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Far more strongly than most churches, this great tower of commerce bespeaks the real spirit of Gothic architecture—aspiring, rugged, virile—an inspiration for the thinking, creating architect of today. Contradicting the antiquarian, this great tower declares that the spirit of Gothic architecture is a living, organic thing, adaptable to modern problems of accommodation and engineering, and endowed with a future as magnificent as its past.

Certainly modern invention—modern engineering skill and organization, will prove more than equal to the demands of the architecture of the future.
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Wabash River Station

The new Wabash River Station which Stone & Webster has built jointly with Kelsey, Brewer & Company, for the Indiana Electric Corporation, is a central steam generating station for distributing electricity for domestic and commercial use throughout the central and western part of the State of Indiana, where the demand for power is in excess of the present supply. This development is situated nine miles south of Terre Haute and seventy-five miles west of Indianapolis, and is on the Wabash River in the heart of the Indiana coal fields, where cheap fuel and adequate condensing water are readily available. Power is transmitted from an outdoor substation which Stone & Webster has built at the Wabash Station over a 132,000 volt transmission line which has been built by Kelsey, Brewer & Company to a substation which Stone & Webster has designed and has built five miles due south of the geographic center of the City of Indianapolis. From this substation the power is distributed by the Merchants Heat and Light Company’s system in and about the City of Indianapolis. Power is also delivered at this substation to the Northern Indiana Power Company for distribution in the Northern part of the State. The Wabash Valley Electric Company and the Attica Electric Company both distribute the power along the Wabash River for a distance of approximately 100 miles. There is a total of about 150 communities in Indiana served from this system.
The Education of a Mining Engineer

By S. J. Kidder, '00

This is a specialized course of engineering that plays a tremendous part in industry—
There are now thirty-eight schools that offer specialized
courses in mining engineering

We all know that a mining engineer has to do with
the discovery, production and disposal of mineral
substances and it would seem that his education must
necessarily prepare him in some measure to deal ade-
quately with these subjects. But no sooner does he
undertake any one phase of his work than he comes in
contact with other men, and sooner or later, this
contact will be with men of broad fundamental train-
ing and background. If the engineer is to be capable
of meeting these men on anything like an equal foot-
ing, his own training must be equally broad.

Objects Sought by Education

In casting about to find the main objects to be
sought for in the education of a mining engineer, that
interesting autobiography, "The Education of Henry
Adams" furnishes an excellent clew. It states that,
"the object of study is to fit young men, in universi-
ties or elsewhere, to be men of the world, equipped
for any emergency; and at the utmost, the active-
minded young man should ask of his teacher only
mastery of his tools. He views the young man
himself, the subject of education, as a certain form
of energy; and the object to be gained is economy
of force; the training is partly the clearing away of
obstacles, partly the direct application of effort."
The above would seem to hold good in the education
of a mining engineer as well as in the education of
anyone else.

The report of the committee on Technical Educa-
tion, of the Mining and Metallurgical Society of
America, published in September 1921 points out that
in final analysis: "Character, human sympathy,
vision, clear thinking and force are, after all, the
alphabet that spells success for an engineer and for
a citizen, and afford that personal satisfaction which
is the chief goal of existence."

Henry H. Knox in a brief article on Technical
Education and National Character, quotes the re-
marks of Admiral Sims made after his war experi-
ence, "I have been inclined to suggest that it would
be well, in training naval officers of the future, to
combine a college education with a shorter intensive
technical course at the Naval Academy. For these
college men have what technical academies do not
usually succeed in giving—a general education and a
general training, which develops the power of initia-
tive, independent thought, an ability quickly to grasp
intricate situations, and to master in a short time,
almost any practical problem."

Broad Fundamental Training

The reason then for the insistence on a broad fund-
amental training for the mining engineer, in addition
to instruction in general engineering subjects and
specialization in mining and metallurgy, is that the
engineer may be prepared not only for the highest
positions in his own profession but also that he may
be prepared to take his place in public affairs when
he is called on to do so, with credit both to himself
and his profession.

Harlan Fiske Stone, the new Attorney General, has
made a similar plea with respect to legal education.
In his 1921 report as Dean of the Law School of
Columbia University he said, "The American bar has
been content to leave the problems of legal education
and the improvement of the bar to the ministration
of the 125 or more law schools of the country, good,
bad and indifferent, without the active interest and
cooperation which ought to exist between an organ-
ized profession and the educational institutions which
train its members.

"A not unnatural result has been the growth in
number of those who apply for admission to the
bar with a wholly inadequate education, both general
and professional. The superiority of the English bar
as a whole over our own, despite its inferior legal
education, is due in large measure, I believe, to the
fact that most of its members are educated at uni-
versities, and they came to their profession with an
intellectual equipment and a moral and educational
background wholly lacking to the great number of
youths who in this country, are annually admitted
to the bar after they have completed a meagre high
school education."

There are in this country 129 schools offering pro-
fessional courses in engineering; of these 38 have
regular courses in mining engineering and allied sub-
jects. Pennsylvania leads with 5, while California,
Montana, Nevada, Ohio, Oklahoma and Washington
each have two, while the 19 others are scattered over
as many states.

Recommendations

The Committee on Technical Education of the
Mining and Metallurgical Society already referred
to, prepared a file of the catalogs of these various
mining schools, and made a comparison of their
courses together with numerous recommendations
which are worthy of detail study by those responsible
for the selection of the subjects taught in any mining
school.
Considering the instruction in general groups, the Committee has recommended that as much as 40 per cent of the total time in a four-year course could well be devoted to the fundamental subjects of mathematics, physics, chemistry, and mechanical drawing.

General engineering subjects embracing geology, mineralogy, surveying, civil, mechanical, and electrical engineering were allotted 30 per cent of the total time.

To specialization in purely mining and metallurgical subjects the Committee suggested devoting not over 20 per cent of the time believing doubtless, as suggested by Admiral Sims, that specialized technical courses should be shorter and more intensive.

The Committee has left then only 10 per cent of the time in a four-year course for thesis work, English, history, foreign language, economics and physical training. This amount of time seems inadequate for these important subjects if the engineer is to be fitted for the highest positions in his own profession and to take whatever part he may be called upon to fill in public affairs. Would it not be better to urge the college course in combination with the short intensive training in general engineering subjects and the specialized courses in mining and metallurgy?

To include the college course does not necessarily mean that the graduate will enter on his work later in life. Preparatory education requires as much or more attention than any other. Who will say that the usual eight years of grammar school work cannot be done as effectively in six years? High school and preparatory school courses also need their share of attention. Progressive institutions are adopting higher standards with new and improved methods of teaching. Interest is being awakened by requiring students to prepare projects or themes on subjects related to mining and engineering work. Such instruction is more direct and combines theory and practice in such a manner as to stress the underlying basic principles.

Cooperation in Research and Training

Even in this brief paper mention should be made of the growing cooperation between the Bureau of Mines and various educational institutions in establishing graduate fellowships in mining, metallurgy and chemical research. The same spirit of cooperation is being manifested between the mining schools and the mining industry, especially in the case of some of the larger mining companies that have established regular underground training for engineering students.

There remain a number of subjects which are brought out in most discussions as essential to the education of a mining engineer of these, training in the use of correct English in writing letters and reports is the most generally recognized. Coupled with this is demanded the ability to write a brief but complete summary of any report made.

The history of the development of science and practice in such a manner as to stress the underlying basic principles.

If

"If you can keep your head when all about you Are losing theirs and blaming it on you; If you can trust yourself when all men doubt you, But make allowance for their doubting too; If you can wait and not be tired by waiting, Or being lied about, don't deal in lies, Or being hated don't give way to hating, And yet don't look too good, nor talk too wise;"

"If you can dream—and not make dreams your master If you can think—and not make thoughts your aim, If you can meet with Triumph and Disaster And treat those two imposters just the same: If you can bear to hear the truth you've spoken Twisted by knaves to make a trap for fools, Or watch the things you gave your life to, broken, And stoop and build 'em up with worn-out tools;"

"If you can make one heap of all your winnings And risk it on one turn of pitch-and toss, And lose, and start again at your beginnings And never breathe a word about your loss; If you can force your heart and nerve and sinew To serve your turn long after they are gone, And so hold on when there is nothing in you Except the Will which says to them: 'Hold on!'

"If you can talk with crowds and keep your virtue, Or walk with Kings—nor lose the common touch, If neither foes nor loving friends can hurt you, If all men count with you, but none too much: If you can fill the unforgiving minute With sixty seconds' worth of distance run, Yours is the Earth and everything that's in it, And—which is more—you'll be a Man, my son!"
Dear Albert:

Have you heard of the discovery of vitamine 6BK yet? It has been given the formula $P_8S_{16}O_{10}$. It was isolated last week. We have now the last connecting link between the synthetic foods. This wonderful substance, against which all others hitherto made fall into a shadow, possesses when dissolved in water, all of the properties of all of the natural foods. This discovery is the crowning achievement of science and outranks any other which has been made in the preceding 300 years. Every food can now be synthetically prepared. This vitamine can be so concentrated that when 1 gram is dissolved in 100 cc. of H$_2$O it has a food value of 2500 calories. Just think, enough to keep one man, doing hard work, in perfect condition for 24 hours without evincing the least fatigue. It is put up in vials containing 100 grams and is marketed at the remarkable price of $10.00. In other words it costs only $0.10 to have a quantity sufficient for 100 days, or only $36.00 for year's supply. Imagine living expenses of only $36.00 a year!

I might give you some of the experimental details involved in its preparation. It was first noticed several years ago that, in the distillation of vitamine 201A, a point was reached at which a very violent frothing took place. This continued for perhaps three minutes and then completely subsided. In the meantime no distillate came over, but as soon as the frothing ceased vitamine 202B was obtained having the formula H$_2$S$_{16}$(9) this being the active ingredient of apples. The reaction which takes place in the following:

$$2H_2S_{16} = H_{16}S_{32}$$  

That is, Vitamine 201A is one of the atomic vitamines which changes by distillation, irreversibly into the molecular vitamines. It happened rather accidentally during a distillation that one of the phosphorous bulbs which they were using, broke. The frothing immediately ceased and the distillation proceeded. When the resulting distillate was analyzed, it was found to have a constitution very dissimilar to vitamin 201A. Measurements of its food value were made immediately. From the mean value of several experiments its heat value was determined to be 2500 calories per gram of the substance. The immensity of this figure astounded the experimenters. They realized at once the latent possibilities of this substance. Among the first substances to be given the name of vitamine was noted. The resulting formation is shown by the following equation:

$$2P_8S_{16} + 30_2 = P_92S_{16}O_{10} + O$$  

It seems as if no one recognized this wonderful substance, for the time being, as the greatest scientific achievement yet made in the history of the world.

In the meanwhile physicists had been working on and perfecting very high powered microscopes. After many, many fruitless attempts, a microscope having a magnifying power of 500,000 diameters was perfected. Imagine their consternation upon looking at a substance with this microscope to see particles moving about with a very great velocity, darting here and there, colliding, zig-zagging, just like so many water flies. Man had his first glimpse of the molecules. The questions then arose: Is it possible by microscopical analysis of the molecules to determine the specific nature of the substance? Would the molecules have definite structure or would they all be the same? These questions were answered very soon. The structure of the molecules depends on the specific substance. That is, certain classes of compounds have the same molecular structure just as there are certain systems of crystallography. This in itself was at once a great help in the forward march of all sciences, especially because it proved to be the immediate cause for the discovery of vitamine 6BK.

While looking at some of the above prepared compound it was immediately identified as a vitamine, not a single one, but a whole series comprising vitamines in the fruit family, the vegetable family, and even in the meat family. Its immense value was at once recognized. Measurements of its food value were made immediately. From the mean value of several experiments its heat value was determined to be 2500 calories per gram of the substance. The immense value of this figure astounded the experimenters. They realized at once the latent possibilities of this substance. Experiments were then made on guinea pigs. The daily rations were $\frac{1}{4}$ gr. in 50 cc. of water. In one week an enormous development was noted. The pigs seemed to have an increased vitality and at the same time showed an increase in weight of ten pounds. If it affected guinea pig in this marvelous manner, what would its effect be on man?

Some of the workers in this field experimented on themselves to find what good, if any, it had on the human body. The rations in this case were increased.
to $\frac{3}{4}$gr, and this was then dissolved in water. What was their amazement to find that this dose was more than enough for the whole day. They needed nothing else to eat. In one week they showed the same remarkable progress which the guinea pigs had. At first it was feared that this substance could not be used as a general food because of its too great food value. It was thought that if so great a gain is made in a week, the development in a year would be too enormous to judge. This question was speedily answered by watching the further advancement of the guinea pigs after continuous treatment. It was observed that maximum development was reached in about four weeks, after which everything remained constant. The pigs seemed to thrive wonderfully at this point, and showed no ill-effects whatsoever from having only this substance to eat for a period of four weeks. When tried on man, it led to the same conclusions. It seemed as if the body, when built up to its highest efficiency, refused to assimilate any more of this substance than was absolutely necessary to keep the body in most excellent condition.

It might be worth while to tell you about another substance which is a by-product of the first one. If you will look back at equation (2) you will see that a compound having the formula H₂S·P₂ is formed as a by-product. This is a water white liquid, which was at first thought to have no value at all. It was subsequently found that it was extremely inflammable and that it burned with a very hot flame. The idea at once came to mind, would not this make an ideal substitute for gasoline, which you know has reached sky high prices because of its scarcity. When tried in an ordinary cylinder of a car it was noted that it showed twice the power that high test gasoline has. An ordinary car of 16 cylinders was able to make better than 80 miles on one gallon. With maximum efficiency it would be possible to go from New York to Denver with one filling of a 30-gallon tank. Just think what progress this means. One hundred years ago people thought that it was lucky to get 12-14 miles per gallon out of an 8-cylinder car. Even the exhaust gasses when dissolved in water make a very palatable beverage.

Although there were other inventions and discoveries made in the last year, yet I think that the above two stand out much more prominently than the rest. It is even intimated that these wonderful accomplishments will be but shadows to some which are yet to come. If circumstances follow this same course, it is but a matter of time when man as man will cease to have existed, because he as a man will no longer fit into the category of circumstances. Let us hope that while making these great discoveries, we take heed lest we be destroyed.

Your friend,

G. H. Pfeiffer

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**American Scholarships for British Students**

Group of twenty scholarships for British graduate students patterned after the Rhodes plan, have been established by the Commonwealth Fund of New York.

The fellowship for British graduates will be available at any of the twenty-six universities which on Jan. 1, 1925, were members of the Association of American Universities. A British committee of award, whose honorary chairman is the Prince of Wales, will examine each candidate as to character, ability, qualities of leadership, health and general fitness.

Each fellowship is for two years with the possibility of a third year being granted to a limited number for satisfactory reasons. While each student may elect his own university, in order to secure adequate distribution, not more than three fellowships will be awarded in one institution in any one year. The exact amount of the fellowship has not been announced but will approximately $3,000.

The Rhodes scholarships, says a statement by the Commonwealth Fund, "have enabled American students not only to enrich their education from an academic point of view, but through study and travel in England and on the continent to gain a wider understanding and outlook upon world affairs. It seems fitting that by a reversal of the process similar opportunities should be offered to British students."

The Commonwealth Fund director also believes "that international understanding can be forwarded in no more practicable way than through the provisions of such international education opportunities."

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**Is all Education Received at School?**

*M. E. Feldstein, '25*

At the general assembly on February 19th, the speaker made a statement which said that the test of a man is what he does when he has nothing to do, or words to that effect. This is not a new statement or in the least contradictory to itself. It most certainly applies to engineers in the strictest sense.

The science and art of education is the biggest and most important of them all. In the professional school, and especially in the engineering school, men are trained along certain, definite lines. Granted that in the already crowded engineering curriculum there is no room for the classics or liberal arts, there is no reason that the technical man be narrow as to things outside of his professional sphere. The mental equipment of the world’s engineers is a vital thing in its existence. It is absolutely necessary that everyone know a little of what is going on around him outside of his own realm of activity in order to preserve a mental equipoise. One easy way is to read and digest mentally some of the books and articles written by the thinking men of the world along the line of art, literature, and world problems. It is not advocated that every one provide himself with "Dr. Elliot's Five-Foot Shelf" or any other such compilation. Nor is it necessary for one to spend all of one’s spare time poring over musty volumes of ancient origin. A few hours each week of well chosen reading is an asset that no one can take away. It is something that costs hardly anything and brings untold good. It is absolutely worth while, and brings to one a feeling of superiority that fully repays for the time invested.
The Development of the Vacuum Tube

Ralph D. Werner, '26

The primary function of the vacuum tube in the radio receiving set is to reduce the high frequency of the radio wave to one which is audible to the human ear. Radio waves in use at the present time vary in frequency from 12,000 to 60,000,000 cycles per second and since only those frequencies lying between zero and 20,000 cycles per second are audible to the human ear, some other means must be used to make audible all others. The vacuum tube accomplishes this by that method called "beat reception." When the beats produced by the receiver differ from those of the incoming wave by an audible frequency, a sound is heard in the telephones.

Before the invention of the vacuum tube, wireless transmission was accomplished by spark transmitters. By changing a condenser at a high voltage and allowing it to discharge across an air gap, a wave was transmitted, this wave being formed by the oscillations produced by the spark surging back and forth across the gap. With this type of transmitter it was only necessary to have some sort of instrument which would change the oscillations received (alternating current) to a pulsating direct current which could be heard in the telephone receivers.

The earliest instrument or rectifier for this purpose was the coherer. It consisted of carbon granules placed between two conducting surfaces and surrounded by a glass tube. The oscillations upon passing thru this instrument caused the carbon granules to cohere, thus decreasing its resistance. This variation of resistance caused a varying current to flow thru a battery and telephone receiver placed in series with the coherer, thereby producing a sound in the receiver.

It was later discovered that certain crystalline substances, such as galena and silicon, possessed rectifying qualities that far surpassed the coherer, and the crystal detector replaced the former instrument due to the greater sensitivity of the latter. This detector, due to its simplicity and low cost, is in great demand and is today in great popularity. The crystals change the oscillations received into pulsating direct current which causes signals to be heard in the telephone receivers.

J. A. Fleming introduced the use of the rectifying properties of a tube containing a filament and an anode or plate. If an alternating current is applied to the plate, the filament being incandescent, a current will pass from the plate to the filament as long as the plate be at a positive potential; but should it be negative, no current will flow. The oscillations picked up by the aerial wire and applied to the plate of the tube thru inductances, cause a pulsating current to flow in the plate circuit, thus producing the signal in the telephones.

Dr. Lee De Forest put a wire network or "grid" between the plate and filament. The received energy is applied to the grid, and while it is at a positive potential, it will help the electron flow from plate to filament; but should it be charged negatively, it will reduce the plate to filament flow. The greater the potential applied to the grid the greater the variation in the plate current and the louder the signals. Tests made by the Bureau of Standards show the current requirements for the different forms of detectors to be as follows:

- Crystal detector: \(10^{-5}\) amperes
- Fleming valve: \(10^{-6}\) amperes
- Regenerative tube: \(10^{-8}\) amperes
- The regenerative or De Forest tube is the most sensitive because less current is required to produce audible signals.

Since 1914, the vacuum tube has reached a remarkable state of development. Tubes for the production of continuous waves are being made larger all the time, the limiting factors being those of keeping the tube cool, and the insulation from breaking down. In the amateur field, at the height of the crystal detector use, the amount of power required for reliable spark transmission over a radius of 50 miles was about 5,000 watts. With the advent of the vacuum tube, the power consumption was 1,000 watts for a 1,000-mile transmission, and in some cases 2,500 to 3,000 miles. Vacuum tubes are now used exclusively for transmission; and with the exception of a few rare cases, for reception and great distances have been covered with the expenditure of a very small amount of power. In recent efficiency tests made by the American Radio Relay League, a distance of 2,600 miles was covered with the input to the plate circuit of the transmitting tube being only .08 watt— quite a difference from 5,000 watts for 50 miles.

The vacuum tube has another great advantage over its predecessor, the spark transmitter. The latter sends out its energy on a broad band of wave lengths, while the tube transmits it on a single wave length. For this reason alone, the vacuum tube is far superior to any other form of transmitter. It enables a number of stations to transmit in a narrow band of wave lengths without interference—a distinct necessity in this day and age of radio broadcasting. This does not apply to radiophone, or modulated continuous waves, but only to unmodulated waves emitted from tube transmitters using direct current on the plate. This is truly the age of the vacuum tube, and with its continuous increased efficiency, great things can be expected in the future.

Prom Plans Well on Way

The Junior Prom of this year will be the outstanding social event of the season, and it is the earnest desire of the Junior Class that all Rose men, alumni, and friends attend this function. The Prom is scheduled tentatively for the first weekend of May. The exact date will be announced as soon as definite arrangements are made. The dance will be held in the gymnasium of the school with the rooms in the main building serving as reception rooms. The decorations will be somewhat similar to those of previous years with the addition of several novel lighting effects.

The committee is working hard on the numerous details, and they promise a dance that Rose will regard as an achievement and a befitting honor for our worthy seniors. Every member of the student body is asked to cooperate with the junior class so as to put this premier event over with marked success and to make this Prom an event long remembered by all.
The Effect of Aeronautics upon Future World Development

By "Louie" Sisson, '26

Much comment has been aroused on the subject of aeronautics, both military and commercial—Here is some light on the subject.

The word "future" in the title of this article, will thru necessity make it a product of the imagination based upon the logical sequence of events in the future of Aeronautics.

No man can say, with full certainty, that such-and-such will be thus-and-so in the years to come; but with the wealth of information that we have gleaned from aeronautical history of the past two decades, we may inductively—even synthetically, if you please—build up a picture of future conditions that will not be beyond the realms of ordinary probability.

Although the optimist paints a too-vividly utopian picture for his "Future," and the pessimist goes to the other extreme and says that the world is scheduled for unpitigated ruin and chaos, we shall make an endeavor to prognosticate from a conservative point of view.

In the first place, we must consider existing types of air craft and the future development of the main divisions of the two great classes, namely "lighter than air" and "heavier than air."

In the heavier-than-air class we mean all craft that fly by means of air action upon plane surfaces and propelled by means of air-propellers or "screws,"—(glides may be included altho they are not self-propelling, except by taking advantage of various wind currents)—commonly and technically referred to as "airplanes," "aeroplanes" or simply "planes." This class will include everything from the tiny air-flivers powered with only motorcycle-engines to the giant "Barling Bomber" that carries a gross weight that figures in tons.

In the lighter-than-air class we have the craft lifted by a huge envelope filled with hydrogen or helium and propelled by one or more gas engines fitted with the conventional propellers.

This class involves the non-rigid or unbraced gas envelope, the semi-rigid or partially framed envelope, and the rigid type which is framed from stern to stern so that the gas envelope or "balloon" cannot alter its shape. Incidentally, the rigid-type dirigibles are fast supplanting all existing types of lighter-than-air craft owing to the superior strength and reliability of rigid construction.

In the future, as it is now, the airplane is supreme in the field of passenger and express work where the stops are fairly frequent, and the speed required is high. "Interurban" and all short hauls would be too expensive and undesirable for dirigibles. Mail work and army dispatch work are also by their nature best suited to the scope of airplane work.

For tran-continental and trans-oceanic travel, it is the dirigible that will be the outstanding and most desirable craft. Its ability to remain indefinitely aloft, its greater carrying capacity and comparatively luxurious quarters are factors all in favor of the dirigible.

Even now England is building the R-101 which will be larger and faster than the "Los Angles" or the "Shenadoah" which are two of the finest dirigibles in existence.

So in the future we may expect London and New York to have only thirty-six hours traveling time between them. "London for your week-end excursion" may be the slogan of a future New York air company.

Here we are forced to admit that the United States is five years behind most of the European powers as regards an air program and all aerial passenger or freight development.

During the war the United States produced everything from the Curtiss "Military Tractor" to the 400 horsepower Liberty motor, but the pork barrel, log-rolling regimes have blindly reduced our air service into a very poorly equipped, under-manned department of defense.

European governments are not only increasing their army air programs but are, in every way, encouraging civilian companies to enter the field of systematic freight and passenger transportation. In America the more venturesome pay five or six dollars for a short ride in a 1918-model "2 seater" that is probably a survivor of some of Uncle Sam's war-time air squadrons. In Europe, the same fare would carry one half-way across France, Belgium or Germany, only because air transportation is conducted on the large but economical scale of any public carrier.

Sooner or later America will be obliged to take her place with the more progressive nations of the world and will develop the airplane and dirigible for the world of to-morrow. Radio has linked the world as far as communication is concerned, and with future aircraft, man will be able to put his feet upon any country on the globe within the span of a week.

Of course it will come, but now, hundreds of orators throuout the country harangue the "knowledge-thirsty" Kiwanis, Rotary, and Women's Departmental clubs about world peace, world unity, world arbitration—world everything, and with the same breath they condemn the airplane as nothing but a dangerous toy and an engine of warfare. "Cut the air-program"—"Scrap the battle-planes"—and so on until old morpheus brings relief to the long suffering listeners.

What a pity we business-like American citizens do not realize that world peace can come only when the world has become closely enough linked so that each race and nation may appreciate the help and good of other peoples instead of regarding them as only grasping rivals. What a boon it would be if the hard and fast barriers of race and religion might be adjusted to bring about a closer unity of all mankind.
Transportation facilities are and always will be a potent factor in breaking down provincialism and nationalism, and here the super-speeds of airplane travel will play a part of inestimable greatness. Canada—Tahiti—Bombay—Copenhagen or Tierra Del Fuego—all will be in closer touch with each other due to the faster and more efficient means of aerial navigation.

As we build more and more planes, we shall learn to build them more and more reliable, and this will in turn increase the public faith in flying.

“Public faith” is something that cannot be bought or created; it must grow; and the business of flying must have the confidence of the public if it is to grow. As long as the element of fear remains this said growth is and will be slow.

Too many people condemn the “Stunt-flyer” as fool-hardy and a seeker of scatter brained notoriety, but in reality, he is to flying what guinea-pigs are to the biologist. Experiments, stunts, and danger do them no good, but the scientific and technical information gained will and does benefit the whole world.

When the army flyers fought, ducked, dodged, and nose-dived their way thru the world war, man after man lost his life.

Many of them were killed in plane battles, but also a great number of fatalities were due to failure of the planes from many causes—unskilled flyers, weak guys or support, jammed controls, or defective ignition; all of these contributed to some one or other’s death as his plane crashed to earth. But let us say here, that the science of flying advanced more between 1915 and 1920 than it had in all of the years since the Montgolfiers first flew with a huge balloon of paper, filled with straw-gas, back in the early part of the eighteenth century.

During the war the Germans built Zeppelin after Zeppelin only to have them explode or be shot down by the enemy. Zeppelin crews were short-lived—frightfully so, but the German dirigible designers along with contemporary engines of England and France have mastered the art of designing rigid aircraft until our own Shenandoah, “Daughter of the Stars,” freely translated, stands as a monument to the dream of an engineer and as a mile stone in the development era of aircraft.

Just as any advancement in the man-made thing we call civilization, the future of aeronautics will hold its glory, its tragedy, its failures—but last and most eagerly sought for—its ultimate and well deserved success! So may we look forward to “better flying” as one of the greatest factors in future world development.

The Opportunities for College Graduates in the Technical Writing Field

By A. B. Zerby,
Executive Assistant to Manager, Publishing Department, Westinghouse Electric & Manufacturing Co.

Perhaps the most important question in the mind of any engineering student as he is contemplating his training course, is this: “What kind of a position should I attempt to secure immediately after my graduation?” The universal spread of college and university education today is releasing thousands of young men every spring from their educational work to their constructive life work. The increasing of such men, all looking to their future, has introduced keen competition for the worthwhile jobs. It is, therefore, well worth a man’s time to consider carefully what he shall do with his talents when he leaves his alma mater.

After four years spent in pursuing a course in Electrical Engineering, it is quite natural for the student to dream of electrifying great railroads, harnessing great water falls, electrifying industry and doing the larger and more spectacular things in Electrical Engineering. I wonder how many such men ever think of the possibilities of combining their engineering knowledge with whatever talent they may have for writing, and so devote their future to the literary end of Engineering rather than to the design and construction fields. Since this is, perhaps, a new thought to many students, the question naturally arises—“What are the opportunities in the technical writing field?” This brief article will attempt to point out some of these opportunities.

The electrical manufacturing business is based fundamentally on inventions. Some inventions are arrived at by patient, systematic experiment and research directed by high-grade engineering talent. Around the invention is built a machine which forms the basis of the manufacturing company’s product. Multiply the inventions and you will multiply the classes of apparatus which the company manufactures. All these, added together, cumulatively form the company’s products.

It is now necessary to sell this apparatus into those fields—in the home, in industry, or in transportation—where they will be beneficial to mankind. The men who invent the machines, the men who develop the machines and the men who make the machines, do not sell them. How then is the salesman to have sufficient information and knowledge of the machine so that he can sell it? Here enters the technical writer.

His talents are two-fold. His background of engineering knowledge permits him to fully comprehend the device and his ability to intelligently write this knowledge gives him the power of informing the salesman about its construction, application and operation.

In this connection, it is interesting to record briefly the evolution of selling in the technical field, of which the electrical industry is representative. In the early days of the industry, neither the salesman who sold the goods, nor the customer who bought the goods, were thoroughly acquainted with them. The con-
struction and operation of the device was a mystery to both parties and in nearly every case the final purchase was made on the word and faith in the salesman. A salesman, therefore, could make almost any claim for his product and his customer had no easy way of checking whether he was right or not. Very little descriptive literature was written on the product and frequently the purchaser was compelled to do his own experimenting to determine whether the device would suffice for his needs. Service and safety engineering were in the nebulous stage, and after a customer once bought a piece of apparatus he was confronted with the necessity of making it operate. In so doing, he gradually accumulated a very definite and intimate knowledge of the apparatus and so, in the evolution of things, it came about that in many cases the customer knew more about the product than the man selling it.

This condition forced the electrical manufacturing companies to reconstruct their selling forces and men with engineering knowledge who could talk intelligently about the products which they were selling, were in great demand. That their selling force might better be equipped with a knowledge of the specific products which they were manufacturing, many of the electrical companies instituted training schools in which young technical graduates with the desire for salesmanship were put through an intensive course of training in the works, studying the installation and the operation of the various apparatus manufactured. The consumers of electrical equipment also gradually changed over their organizations until they were well supplied with fully trained engineering talent, and today both the buyer and seller meet on a common plane of engineering knowledge.

Since this is so, the manufacturing companies must of necessity maintain a staff of technically trained men capable of translating engineering knowledge into the language of every day communication. The district offices and the salesmen in the field must be constantly acquainted with the changes and improvements in apparatus and the new devices perfected, so that they can intelligently sell the company's products. The technical writer must serve as a pioneer, for the science. We differ from the older countries in that, although we quickly recognize what the engineer does, we are not inclined to exalt him into realms of distinction beyond his actual achievements. The technical writer will be performing a great public service by making men aware of the engineer and bringing him out of his isolation into his fullest obligations of citizenship.

Service work is an important branch in every organization today and in this connection the technical writer has a definite duty to perform. He must supply installation and operation information to those customers who have already purchased apparatus and give the necessary information for ordering repair and replacement parts. The writer plays an important part in building up the good-will of the company by keeping the customers satisfied and assists the salesman in obtaining future orders from these same customers when the need again arises. Competition in business is becoming keener every year and customer service work, the outgrowth of this competition, is receiving more attention and study and it is the technical writer who must serve as the connecting link between the company and the customer.

To a large extent the newspapers have been neglected as regards technical stories and this neglect may be attributed to the purely scientific language in which these articles have been presented in the past. The newspapers are one of the chief instruments by which the people may be reached and they afford a splendid channel for educating the public in the latest engineering developments. The time is now at hand to supplement the sensational stories appearing daily in our current newspapers by interesting educational stories engineering articles must be written into the language concerning the latest engineering developments but the of everyday communication that they may be intelligible to the readers. It is essential, however, that the writer have a technical training that he may cooperate with the engineer in obtaining the necessary information for his articles. The necessity of explaining the engineering details are eliminated to a large extent and the engineer is not obliged to supply information which to him seems obvious.

The technical writer has also an important duty to perform for the world in connection with the engineer. Perhaps above all others, the engineer has contributed most to the material welfare of humanity. Within the last century he has practically revolutionized the living conditions of civilized people, but as yet the engineer does not occupy his proper place in the scheme of things. Why is he not a more conspicuous citizen? Why do we not have more of the benefit of his trained mind in our public affairs? The membership of the Sixty-fifth Congress did not contain a single engineer in either the Upper or Lower House. It is indeed astonishing that in our country, with its wonderful scientific and mechanical achievements, there stand out very few engineers or scientists whose voices are heard in our National councils, although it is highly probable that the engineer might indeed be a very valuable public servant.

Nothing but praise can be given the engineer for the value of his work, but he has the training that will enable him to serve the public in a greater degree still, if he will but come out of his hermitage and mingle with the open world. In this country there is very little spontaneity of recognition of the men of science. We differ from the older countries in that, although we quickly recognize what the engineer does, we are not inclined to exalt him into realms of distinction beyond his actual achievements. The technical writer will be performing a great public service by making men aware of the engineer and bringing him out of his isolation into his fullest obligations of citizenship.

The duties that logically fall within the field of the college-graduate writer are varied. We might classify them roughly as follows:

(a) Description of apparatus for the sales staff.
(b) Description of apparatus for the prospective customer so he shall recognize his need for such apparatus.
(c) Furnish installation and operating information to the customer who has already purchased the apparatus.
(d) Furnish information to customers for ordering repair and replacement parts for apparatus.
(e) Descriptions of apparatus installations and operating data for the technical and trade publications.
(f) Write appropriate description of apparatus for newspapers.

(Continued on Page 18)
MY FATHER once said to me, "Whenever your job is such that you are not learning something new each day, quit that job." Any ceramic industry that is not so organized that it is continually learning something new about the process which it uses, or the product which it is making, will sooner or later be forced to quit. The ceramic scientist should be the factor in such an organization, responsible for this continual accumulation of specific knowledge, the intelligence department, as it were, the catalyst of progress.

Now just what do we mean by a ceramic scientist? And just how does he differ from the ceramic engineer? The term is rather new, and I expect that each of us here has a different conception of its meaning. In my mind, the distinction between the two is similar and almost parallel to that between the chemist, or better, the industrial chemist and chemical engineer.

It is difficult to distinguish sharply just where the attributes that make one man a ceramic scientist end, and those that make a ceramic engineer begin. In fact, I am somewhat of the opinion that the training of the ceramic engineer should be such that, first of all, he would be an embryonic ceramic scientist. The work of the two, the point-of-view, and generally speaking, the personal equations of the two, after they have been matured by experience in an undergraduate school, and by those rich years immediately following during which they have struggled to round off the corners and seek for their proper niche—are quite different.

The ceramic scientist will probably never be satisfied. One truth found, and he's on the trail of another. Do not think for a moment that this seeking will not have in the background a desire to find a useful truth, but, unlike the engineer, the thought of usefulness, or certainly the thought of immediate usefulness, will be in the background. The engineer in his proper niche will, in time, acquire the ability to take these truths that are found by the ceramic scientist, and apply them to the cheapening of process and the improvement of product.

I was tempted when given this subject of "What Do the Industries Want from the Ceramic Scientist" to play upon words and say that, as yet, the average executive in our industry does not consciously want anything from him. This same executive, long ago, reached the point where he realized his need of the lawyer, his need of the investigator of markets, and the expert accountant, and will not today consider the cost of these, for he knows by experience that they are utterly necessary to his financial success and peace of mind.

Some time ago, it was to the point to say, "There's many a pottery without pyrometers, but none without adding machines." But, today, the absence of one is about as unusual as the other. The ceramic engineer has seen to this, and, today, he is thoroughly "sold" to our industries, and our schools are having a difficult time turning out ceramic engineers fast enough. In fact, the demand has been so strong that many men who should be doing the work that is waiting for the ceramic scientist, are working with production problems, or, perhaps, if more fortunately guided, are using their deductive ability in development work, regarding application of fuels, heat transfer, methods of mixing, milling, mechanical separation, filtration, hydraulic pressing, leaching, drying, etc.

The ceramic scientist has a creative mind, and if you do find him buried in routine work, you will find him impatient and dissatisfied, and probably satisfying neither himself nor those who employ him.

Even the work of the ceramic scientist can be divided into two classes: (1) The abstract search for fundamental truths, which is so slow and costly that the work will probably be carried on by endowed or government laboratories, and (2) the sound technical scientific work which must be carried out by or in cooperation with the industries themselves.

In further discussion of the subject, I will continue to refer to the ceramic scientist as the technical scientific worker, rather than the absolute scientific worker. Workers of the type of Mellor in England and Rieke and Simonis in Germany, are the sort that I like to consider as ideal ceramic scientists. And, of course, there are several in this country, but for fear of missing some, I will not mention any.

This type of work, you can readily conceive, cannot be done by men whose whole time of preparation has been four college years. I do not mean to say that men with only four years actually in college, can not be developed through their work after college, into scientists of this sort. We must remember, that the thinker will see to it that his regular work is, as it were, postgraduate.

Most ceramic scientists, you will readily agree, are today found in the universities, the government bureaus, and in endowed laboratories. But the migration has started. In the chemical industries, this migration started much sooner than it has in our industry. And it has robbed the universities of their best instructors, and the bureaus of their key men. And the rewards of this have been such that today the schools are forced to examine with microscopic care, the attributes of the undergraduate, so that not a single boy with true scientific spirit and with creative ability will be missed.

These students are today carefully groomed for

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1Delivered at the meeting of the Ohio Ceramic Industries Association, Jan. 16, 1925.
sound scientific work, and upon graduation, they are fairly fought for by the industries.

Get ready, Professors Watts, Parmelee, Brown, and you other heads of various ceramic departments of our schools. Our industries are next—for there certainly is a place for these ceramic scientists within the industries themselves. By this, I do not mean that each small plant must have its separate laboratory. But each must have a ceramic scientist that it can call its own.

Many of these men probably will work as fellows in the universities and technical institutes, some of them by special permission, in the government laboratories, many of them, we hope, in the laboratories of the separate industries themselves; the work of all perhaps linked and co-ordinated through some system of organization that will prevent duplication of problems of general interest; an organization that will guide each toward a definite end even on special problems.

Now I come to the real subject of my paper. And I am afraid you are going to be disappointed, not that my paper is going to be much longer, but because I am unable to show you very much more need for the ceramic scientist in the industries newly called ceramic, than there is need for him in the strictly speaking clay working industries.

The very truths that we want the ceramic scientist to seek in the newly called ceramic industries are, for the most part, those that must be sought for in the clay working industries. Of course, the specific problems are different, but the general problems are one and the same.

While in the enameling industry we want the ceramic scientist’s education to be such that he will know something of the fundamentals of metallurgy, nevertheless, his preparation must be such that he will have made a general survey of our ceramic information, that he can, and will have, as his chief goal, the determining of the physical constants which we need, and the creation of new conceptions of our materials and products.

The ceramic scientist must develop a system of the chemistry of the silicates, as complete and illuminating as the wonderful system of organic chemistry. Shall we call this system “ceramics,” in the larger sense, and in keeping with our new definition of “ceramics?”

On first thought, it may seem peculiar that in industries as fundamental as ours, industries whose products are older than historical men, sound technical science has had so small a part, especially when we realize the remarkable perfection in craftsmanship which many products showed generations and generations ago. When we consider the matter carefully, however, it is not strange, for although our products seem simple, since they are made from familiar things (rocks, clays and minerals) and by seemingly simple processes, they are not. These same familiar raw materials are so complex that they almost defy analysis as to their chemical constitution.

This task which we are assigning to the ceramic scientist is an extremely difficult one. Yet, until we do develop this system of ceramics, which is neither chemistry nor physics nor mineralogy but includes all three as applied to silicates—we can only progress slowly and in a piece-meal fashion.

Seale, in the preface of his huge volume on the "Chemistry and Physics of Clays" just published, says, "Physicists have chiefly concerned themselves with matters in mass; chemists have dealt chiefly with the atoms and molecules of simpler and, therefore, more easily understood substances." He goes on to say that most manufacturers and users (of ceramic products) do not yet realize the enormous importance to them of chemists and physicists with highly specialized knowledge regarding this industry of ours.

I will go one step further and say that probably the physicist as such, and the chemist as such, will never work closely enough together to get the results we describe as quickly or as completely as the scientist I have tried to describe, who will be both, not physical chemist, but the ceramic scientist, who will overcome the difficulties, enumerated by Searle, due to the fact that it is difficult to obtain our materials in a pure form, that most of them are insoluble at the start, apparently inert at ordinary temperatures, and difficult to obtain in an easily recognizable form (such as crystals of convenient size).

This ceramic scientist, too, will be equipped to investigate the fundamental principles that Searle lists, which list many here can lengthen: effect of texture, causes and control of strength, distribution of water in partially dried articles, stains produced in drying and firing, causes and prevention of distortion, study of chemical equilibrium (almost impossible) sizes of particles and influence of this on chemical reactions and physical changes, the study of these at high temperatures, colloidal phenomena, plasticity.

I have already mentioned the physical constants (these I need not enumerate) and the determination of the true chemical constitution of our materials and products. Both the ceramic engineer and the ceramic scientist should be so well grounded in fundamental subjects that four years is all too short for the job. Both should, in my opinion, be given courses so that their undergraduate degree would simply be bachelor of science, with special proficiency in ceramics. Electives could well be offered after the freshman year, according to the bent of the student towards engineering of pure ceramics.

Let them become ceramic engineers or ceramic scientists after their postgraduate work either in the universities or in the laboratories, public or semi-public, or in the industries themselves, of course, upon the submission of these and professional records.

Then, too, for those who can afford three years of resident graduate work, a doctor of ceramics degree. It might be well to provide, also, for a complimentary degree, doctor of ceramic science, for those who have done unusual non-resident work.

As Professor Johnson said some four years ago, "The fundamental research which industry needs costs a lot of money, experience never being a cheap article, but the lack of it will be much more expensive to all of us. It is an insurance, an insurance against ignorance, and for the benefits obtained, the annual premium is very small, provided the work is put into the hands of properly qualified men."

This is what the ceramic industries want from the ceramic scientist: insurance against ignorance, a factor in their organization responsible for the continual accumulation of specific knowledge.
The apple that rocked the earth

"I wonder why?"

In Isaac Newton's mind that question clamored for an answer. Many men had seen apples fall, but this man with the question mark mind found out why they fall—and his answer has helped us to understand the workings of a universe.

Would that we all could get a bite of that apple if it would inspire us too with the "I wonder why" attitude!

Intellectual curiosity is a great and moving force. It mobilizes reluctant facts. It is the stern drill-master which whips into shape that most invincible of armies—sure knowledge.

Curiosity, with the will to sweat out the answer, is the greatest asset you can acquire in your college course. This attribute is needed by industry today more than ever before.

Western Electric Company
Since 1869 makers and distributors of electrical equipment.

Published in the interest of Electrical Development by an Institution that will be helped by whatever helps the Industry.
H. A. Schwartz, who is manager of research of the National Malleable and Steel Castings Co., has been giving some special lectures on the “Metallurgy of Cast Iron” at the Case School of Applied Science, Cleveland.

R. Thurman is now manager of the Indiana General Service Co., Muncie, Indiana.

S. P. Hall is taking graduate work at Cornell.

P. A. Philippi has taken up construction work of his own, and is now vice-president and general manager of Wilkins and Philippi, Contractors, St. Louis.

L. E. Grammer is U. S. deputy surveyor at Kodiak, Alaska.

W. E. Baker has left the Dayton Engineering Laboratories Co., and is general manager of the Dayton Fan and Motor Co.

F. E. Meyer is in Beloit, Wisconsin, as mechanical engineer with the Fairbanks-Morse Co. His address is 1403 Keeler Ave.

R. Buck is a chemist with the Indiana and Michigan Electric Co., at South Bend.

J. T. Scott is a chemist with the Metals Refining Co., at Hammond, Indiana.

W. H. Henry has been transferred to Boston where he is a sales engineer for the General Electric Co.

H. G. Coordes is now in Detroit with the Studebaker Corp. His address is 3030 Virginia Park.

R. F. Burns is in St. Mary's, Ohio as resident manager of the Auglaize Box Board Co.

F. L. Baxter is with Harvey Fisk and Sons, brokers, 120 Broadway, New York.

E. D. Brauns is a salesman for J. D. Adams and Co., Indianapolis.

E. B. Plott is now electrical engineer with the United Alloy Steel Corp., Canton, Ohio.

G. G. Anderson is assistant sales manager of the American Blower Co., Detroit.

M. J. McKeever is chemist and metallurgist with the Lucy Mfg. Corp., of Chattanooga, Tenn.

J. F. O'Brien is with the O'Brien Paint and Varnish Co., South Bend, Indiana.

H. W. Knox is now superintendent of the Safe-Cabinet Co., Marietta, Ohio.

R. Aitken has gone to Louisville, where he has a position as designer with the Dow Co.

C. S. McKee, who is now with the Indiana State Highway Commission, is project engineer at Shoals.


J. A. Vrydaghi, who was formerly with the American Bridge Co. is now located at Los Angeles where he is a draftsman in the industrial building department of the Union Iron Works.

Lix da Cunha is chief engineer for Companhia Territorial Constructoria, and technical manager for Companhia Stella Limitada, Sao Paulo, Brazil.

M. P. Bright, ex-'18, is in the insurance business at Warsaw Indiana.

R. E. Woodruff is with the Oxweld Railroad Service Co., Chicago.

F. M. Crapo is chief engineer for the Indiana Steel and Wire Co., Muncie, Indiana.

H. A. Hearn is manager of the Wagner Electric Corp., and manager of the F. B. Company, Indianapolis.

F. F. Peker is with the Commercial Solvents Co. as mechanical engineer. He is located with the company at Peoria, Ill.

H. Briggs is technical assistant to the sup't, of power stations with the Duquesne Light Co., Pittsburgh.


C. H. Penno is assistant chemist for Kingan and Co., Indianapolis.

D. R. Spencer is with the Los Angeles Gas and Electric Co.

C. Raeber has joined H. McComb in Hammond, Indiana, where both are employed in the building department of the Wachewicz Real Estate Co.

F. L. Hays is with the Commercial Solvents Corp., Peoria, Ill. ...

F. Stockmaster, ex-'23, is project engineer with the Indiana Highway Commission at Leavenworth.

R. Hager visited the school in the middle of February. He left the latter part of the month for Havana, Cuba, where he is to do sales work for the General Electric of Cuba.
Which Leg Gets the Weight?

In time, Nature would answer this question. Make a habit of standing in this posture, and your right hip would become larger, due to the added muscular development.

There are conditions in industry when wheels and pulleys must operate under conditions similar to those of the body in this position. One example is found in the pulleys of a troughing conveyer—particularly those pulleys which run at an angle. In addition to the straight up and down load resting on the bearings, there is a definite thrust load that also must be carried.

Timken Bearings differ from human legs in this situation by being already developed to carry continuously such loads. They are designed for intermittent thrust loads and for permanent thrust loads. The Timken tapered principle is the explanation.

From whatever angle the load comes—whether straight up and down, or from a side—it is evenly distributed over the entire length of the rollers. Hence the long wear. Hence, too, the wide use of Timken Bearings in every field of industry.

The Timken Roller Bearing Company
CANTON, OHIO

TIMKEN
Tapered
ROLLER BEARINGS
Far be it from us to hurl a moth into a man's fur coat, but we maintain that Sherwood and McKinney et. al. win the celluloid blow-torch for inane but intrepid pastime.

A while back in February the sun shone one day altho ye thermometer only batted about 41.27° Fahrenheit. So accordingly the boys felt the aesthetic urge of spring in their manly bosoms and Sherwood says, “Let’s go swimming.”

So, as a result, the “First-Time-In-Club” began its season in chilly February.

Those who went in, came out proudly and gargle as how, “Thats what puts hair on yer chest,” but our junior cynic sez, “H—, I wouldn’t jump in that lake if I had as much fur as a walrus!”

Here’s the world’s worst wise crack:—

Ques.—“What makes the grass grow longer, Uncle Tom?”

Ans.—“I eat your gol—dinged soup,” snarled gentle goldilocks.

(Now popular in Chem. Lab. and Machine Design.)

“Whad’ya Mean---St. Pats!”

The other day I wuz broadcasting to one of our worthy tax payers about the annual St. Pat’s day celebration and he looks kinda like I do in Nomenclature and say “Whad’ye mean—St Patrick’s celebration?”

So accordingly I elucidate in the following inadequate manner about this ancient engineering holiday.

“Of course everybody knows that old St. Pat is the hibernian (’zat right?) benefactor that shooed all the diamond-backs and moccasins out and off the Emerald Island but as to his connection with us Engineers is a bit obscure.

However, it seems that some years ago a bunch of the boys decides that they had been grinding a little too heavy and promiscuous so they decided to declare a true Engineering holiday whereby they might re-create themselves and also inform the gentle citizenry that the noble Poly school was rarin’ to go.

After a few hours of wrestling with the wassail—the legend tells us—the boys decided that the town was all cluttered up with reptiles so they starts to emulate St. Pat.

Right there the noble exponent and representative of the law interrupts and says that such activities were only appropriate on March 17, or St. Pat’s anniversary so hence the celebration was annually held on this day from that time on up to now.

But as the years rolled by, the gang decided that the existing celebrations were neither uplifting or enjoyable to the public at large so hence the idea of a parade of weird and wicked varmints, clowns and nifty floats appeared the next year to dazzle the eye of an appreciative populace.

New entertainment, keen social events and more pep followed year by year until the engineers became famous thru their St. Pat’s day—“fun, frolic and mardi gras exposition” as our contemporaries have called it.

Engineering schools all over the country get their names and work into the screen news-weeklies via their annual celebrations.

Rose has always been a top-notch as far a St. Pat’s is concerned. Everyone flocks to the show in the afternoon, the crowds line the curbs after supper for the parade, and every jazz-appreciating flapper in town hopes she will get a bid to the big dance.

Just like Ringling Brothers, “We are coming back, bigger and better,” so watch our dust!

Dan McGrew, Valentino, and the Prince O’ Wales must look to their laurels when Rose “lets go”—“We’re a wild wolf and it’s our night to howl.”

“Yea Rose Let’s Go”

P. S. This ain’t a historically perfect description of “St. Pat’s” origin, but “truth is more useless than fiction.”

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Every engineer should have our booklets describing Keystone Copper Steel
KEEPING FAITH WITH THE OIL INDUSTRY'S FAITH IN CRANE

Experienced engineers in oil fields and refineries place their confidence in the dependable service Crane products give. They use Crane piping to carry millions of barrels of oil from the wells through storage farms to refineries. And they employ countless Crane valves and fittings—many of special design—to direct and control this flood at each step along the way.

Crane engineers regard this confidence as a definite responsibility. Accepting it, they consistently maintain Crane standards, altering them only to better them.

Through constant research, these specialists seek improvement in designs and materials—to promote the progress of the oil industry and to earn its continued faith in products that bear the Crane name.

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Wash Sink of Enamelled Iron, No. Y-391
Where dependability is vital

In connection with a new pumping station at Milwaukee, Wisconsin, additional feeder mains were required. It was necessary that one of these should carry an unusually large proportion of the water supply, and 54-inch pipe was decided upon. Although pipe of material other than cast iron had a lower first cost, Cast Iron Pipe was chosen because the possibility of interruption to service had to be reduced to a minimum.

The photograph above shows a section of pipe being lowered into the ditch in the process of laying it.

The Cast Iron Pipe Publicity Bureau
Peoples Gas Bldg., Chicago

Opportunities for College Grads in the Technical Writing Field

(Continued from Page 10)

(g) Write articles for the various house organs maintained by your company. These will consist usually of a magazine for the manufacturing of works department, one for dealers one for your export department, etc.

(h) Furnish advertising copy for popular advertising media such as Saturday Evening Post, Literary Digest, Nation's Business, etc., also for newspapers.

(i) Supply advertising copy for Technical and Trade Papers.

(j) Write promotion letters for direct mail selling of such apparatus as can be merchandised direct.

In short the duties of a technical writer are without end. The rapidly changing tasks which face him are always interesting and extremely fascinating. No one ever saw a technical writer suffering from ennui—he doesn't get a chance to get stale on one job—other problems are constantly confronting him and the thrill of action is always his. There is real satisfaction in solving a difficult problem by virtue of the written word. The pen is a mighty weapon in these days of intensified training and there are no limitations to the field of the technical writer. The social relations between the buyer and seller will influence a sale—but before the contract is definitely placed the thought that will count most will be the product, itself—its efficiency, reliability, adaptability, strength, etc., and investigation will disclose that in most cases some technical writer has recorded these things in so interesting, definite, and conclusive a way that he is entitled to a good share of credit for the final purchase.

The technical writer is constantly increasing and building up a vast store of knowledge for himself, and he is not limiting himself to any one branch of the engineering profession. Specialization is essential and necessary in all lines of endeavor, but one should not limit the scope of his activities to the neglect of everything else that is going on around him. And the technical writer obtains more than a smattering knowledge of the apparatus—convincing articles cannot be written by one not familiar with his subject, and the writer fails in his appointed task if his presentation does not convince his readers. It is therefore necessary that he keep in constant communication with the engineers. He must study new inventions, perfections, and achievements in design and operation and develop an engineering appreciation that he may be properly qualified to present accurate engineering details. In this way the technical writer obtains a view of the work similar to that held by the officials of the organization—not an insight which permits of his engaging in research work, but a broad comprehensive view of the industry—an essential requisite for management.

The salaries in the technical writing field are comparable to those in the engineering, while the results are much more quickly recognized, with the possibilities of advancement thereby enhanced. While serving the Company to the best of his ability, the writer has a splendid opportunity at the same time for building up prestige for himself in his chosen profession. Through his articles he gradually becomes well-known and in time finds himself in that enviable position of a recognized authority.
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FRATERNITY NOTES

ALPHA TAU OMEGA

On the evening of February 28, the active chapter of Gamma of Alpha Tau Omega entertained their pledges and guests at a dance at the chapter house at 525 South Fifth Street. The house was beautifully decorated in the fraternity colors, and music was furnished by Stewarts “Wee Hour Syncopators” Orchestra. The usual A. T. O. pep and the inspiration produced by the enchanting syncopation of the music, combined to make the dance one of the best of a long series of successful events. The guests included Arthur Wallis, James R. Ogden, Ralph H. Signell, Mr. and Mrs. Rex Self of Chicago, and Brothers Jakle, Tyler, Pflaging, Hendricks, Ranahan, Fox, Smith, and Froeb and oodles of beautiful ladies. Chaperons were Brother and Mrs. B. H. Pine and Professor and Mrs. Carl Wischmeyer.

Brother Joe White returned to school Saturday, February 28, after three weeks illness.

The Alpha Tau Omega State dance and banquet are being planned for the week end of April 24 and 25 at Indianapolis.

ALPHA CHI SIGMA

Iota Chapter held its annual pledge banquet at the Terre Haute House on the evening of Feb. 20. The pledges present were Julius R. Adams, Melburne Heinig, Harold Hayworth, Kenneth Metcalfe, James S. Ross, and Louis R. Yansky. Alumni and actives attending were Dr. White, Dr. Mees, Raymond Cooke, Russel Corban, Errol L. Fox, John Sanford, Gustave Pfeiffer, Gainet Phillips, Everett C. Gosnell, Clarence Corban, Ernest Pifer, J. Preston Lentz, Lowell E. Muehler, Marshall T. Landrum, Gordon Kittle, and Harry P. Shewmaker. Bro. John Sanford most ably preformed his duties as toastmaster. The table was decorated with red carnations, the fraternity flower. Dr. White and Dr. Mees made very interesting speeches after the more formal speeches the fellows sat around and talked to Dr. Mees on any subject that came to mind. It is always a privilege to hear Dr. Mees, and the evening was most thoroughly enjoyed.

THETA XI

Kappa is making preparations to hold the annual pledge dance the last week in March. This is expected to be one of our most successful social events of the season.

Brothers Makinney, Mitchell, Green, and Pledge Dorsey are working hard on their act for St. Pats’ show. The men that are working on this act are doing their very best to put over an act that is new and entirely different from any so far.

Among recent visitors were Brothers C. Hall of Ohio State, G. R. Armstrong and Hutchinson of Alpha.
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There was a time when men—even engineers—were satisfied with plain friction bearings for wheels and for other revolving parts of mechanical equipment.

But the day of the plain bearing has passed with that of high collars, pointed shoes and other friction producing devices.

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NEW LOCATION
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P. I. E. S.

P. I. E. S. as a local fraternity, bids farewell to the Rose Campus in a short time. The installation by the national officers of Theta Kappa Nu will probably take place the last of March or first of April.

The annual dance in honor of the year's pledges was given at the Edgewood Cabin on Saturday, February 28. Paul Johnston's Orchestra furnished the music for the affair. The colors of Theta Kappa Nu, onyx, saber, and crimson, were used as decorations. The feature was the beautiful Theta Kappa Nu banner, commemorating the founding of the fraternity, and the property of Missouri Alpha at Drury.

After the dance, the entire party adjourned to the dining room where a delicious luncheon was served. Brother Sherwood acted as toastmaster and called on guests, alumni, and actives, for toasts.

The honor guests were Brother and Mrs. Stock and Dr. and Mrs. Sousley. Four members of Indiana Beta at DePauw were the guests of the fraternity. Brothers Reynolds, Echoff, Griffith, Dedert, Pigg, Balsley, Freers, and Dawson of the alumni were also present.

On Monday, March 2, a joint meeting of the Hanover, DePauw, and Rose chapters of Theta Kappa Nu was held at Greencastle. The Rose Freshman and DePauw-Hanover games were first attended and then the meeting held. Many plans and projects were discussed and the evening was thoroughly enjoyed.

Sigmal Nu

Beta Upsilon's annual dance in honor of the pledges was held on Thursday evening Feb. 19 at the Edgewood Grove Community House. Bud Cromwell's band furnished the music. The house was attractively decorated with the Fraternity colors, Black, White, and Gold. The crowd was peppy, the orchestra was red hot, and the spirit of Sigma Nuism was in the air.

The pledges in whose honor the dance was given are as follows, Fred Carroll, John Crawford, Harry Grafmiller, Bill Houk, Bill Houston, Bill Jones, Al Kepler, Val Mitch, Ed Sager, John Mendenhall, Paul McMullen, Wallace Todd, Bob Thompson, Harry Winkens, and Bob Wade. Dr. and Mrs. Spurgeon were chaperones.

Columbian Laundry Co.

Phones 329

The Soft Water Laundry
Better Lighting Needed in Industrial Plants.

In a paper read before the Illuminating Engineering Society, February, 1920, entitled, "A Survey of Industrial Lighting in Fifteen States," R. O. Eastman submitted some very interesting data regarding the lighting conditions in industrial institutions. The survey comprises some 446 institutions, in which lighting was considered by 55.4% as being vitally important, and by 31.6% as being moderately important, and by 13% as being of little importance. Practically 58% considered that lighting was as important as power in the operation of the plant, and a small proportion would give more attention to lighting than to anything else.

In considering the present condition of lighting as found in the various plants, only 9% ranked as excellent, about ½ ranked as good, 29% fair, 18.8% poor, 3.5% very poor, and 7.8% partly good and partly poor. It was found that the lighting in the offices was far superior to that in the shops; 19% being excellent, 36% good, 31% fair, and only 13% poor and none very poor.

On consulting the executives regarding what factors were most important in considering lighting, the following facts were revealed: Increase of production 79.4%, decrease of spoilage 71.1%, prevention of accidents 59.5%, improvement of good discipline 51.2%, and improvement of hygienic conditions 41.4%. Manufacturers who have good lighting appreciated its value largely from the standpoint of its stimulating effect upon output.

There is no question that any intelligent man who carefully considers the necessity for good lighting in an industrial plant, will agree that it is impossible for a person to do as good work, either in quality or quantity, in poor light as in good light, but yet the result of a careful analysis discloses the fact that only about 40% of industrial plants are furnishing good light to their workers and 60% are operating under poor lighting. It is hard to understand why such a proportion of concerns can be satisfied with a condition which is universally admitted to be a curtailer of efficiency and a prolific causer of accidents. The principal cause of this condition is that those in charge of such establishments have not given the attention to lighting that it demands. They do not know what constitutes good lighting, and in their absorbing interest of other factors of production have overlooked a vital one.

Every safety official should deeply interest himself in the lighting of his plant and insist upon good lighting as much as good goggles, good guards and other necessary accident prevention equipment. Every production manager should insist upon good lighting because the efficiency of the working force is increased by the condition of the lighting furnished. The plant physician should examine the lighting, for eye strain and eye fatigue are directly affected by poor lighting, as is the hygienic condition. Well lighted plants are invariably cleaner than poor lighted places. Plants equipped with Factrolite Glass in all windows are well lighted.

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ROSE POLYTECHNIC INSTITUTE
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TERREHAUTE, - INDIANA
In a hard fought game in which we lost out in the
last half, the Engineers were defeated by a score
of 23 to 13. The game was mighty close in the first
half and in the first part of the second half. The
two teams battled neck and neck for a long time, E. I.
being ahead most of the time, but not very far. The
two scores were within 3 points of one another until
the last part of the second half when the Normal team
seemed to run wild and started a long range bom-
bardment of the basket which was disastrous to our
hopes. Coach Lantz had a mighty good bunch of
sharpshooters, anyway, and when they finally got
started it ruined things for the engineers. We beat
them twice last year and it seems that they were out
for revenge for they sure turned the tables on us in
both games this year.

NORMAL 50—ROSE 12

Our ancient enemy arose and downed us by a
bigger score than ever before, a fact which didn't
agree with us in any way, shape, or form. If there is
anything we hate to do it's to lose to Normal and yet
we can't seem to manage it otherwise. We'll lay for
them some day and just beat the tar out of them and
see how they like it.
The Engineers were simply overwhelmed as they
were in the first game and were helpless before the
nice playing of the Normal crew. There's no getting
around the fact that Normal has a good team while
we haven't as good a team as we might have.
The Rose Freshmen beat the Normal Freshmen,
however, in a curtain raiser to the big game by a
score of 44 to 22 in a very nicely played game. There
will be a third game between the Freshmen teams on
the fourth of March to play off the tie which resulted
from the winning of this game.

MANCHESTER COLLEGE 40—ROSE 19

We just about turned the tables in this game for
a change but not quite. The half ended with the
score 10-7 in favor of the Engineers. However, we
didn't seem to be able to hold it thus and the game
got away. The backguard of the Manchester team
started a long range bombardment of the basket and
couldn't seem to miss. He made five field goals in
the second half alone. His teammates followed his
lead and simply ruined us with a mess of shots
which they didn't seem to be able to miss.
It was a hard fought and a nicely played game and
the only thing wrong was that the Engineers were
on the short end of the score. We look forward to
meeting this clean bunch of dandy fellows again next
year.

MUNCIE NORMAL 38—ROSE 16

In the wonderful new Ball gymnasium at Muncie
we met the Muncie Normal team and again went down
in defeat. The gym was a splendid place to play
basketball but that didn't seem to help us in winning
the game. The superior teamwork and goal shooting
of the Muncie team were too much for us. They had
a bunch of crack shots on the team who hardly did
any more than shoot and the ball rolled in. Our
guarding didn't seem to change things at all and we
couldn't stop the bombardment. However, we staged
a comeback in the second half for at the end of the
first half the score was 26 to 2 in favor of Muncie.
The Engineers came back and gave them a real fight
for their money in the second half.

EVANSVILLE—ROSE

The fast Evansville team invaded Terre Haute and
left with our scalps in their belt. Fast and sure floor-
work and the making of shots when the opportunity
offered counted. The work of Studeville, the six
foot-four center on the Evansville team was fine. He
made lots of close in shots and tip-ins where his
height was a great advantage to him. However, there
were other men on the team who made a great many
goals also and the total was too much for us. Evans-
ville has one of the best teams in this part of the
state so it's no wonder that we lost. We're going
after them next year with all four feet and we'll get
their scalp. Let's go men, up and at 'em.
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In an organization like Westinghouse there is a group of engineers whose chief interest and concern is the efficient, economical, large scale manufacture of electrical products. These men may be electrical engineers or mechanical engineers. They are primarily interested in shop practice and methods—in the same industrial problems as are the manufacturing customers whom Westinghouse serves.

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