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MARKS-'35.

... ROSE SHOW, APRIL 23-24-25 ...

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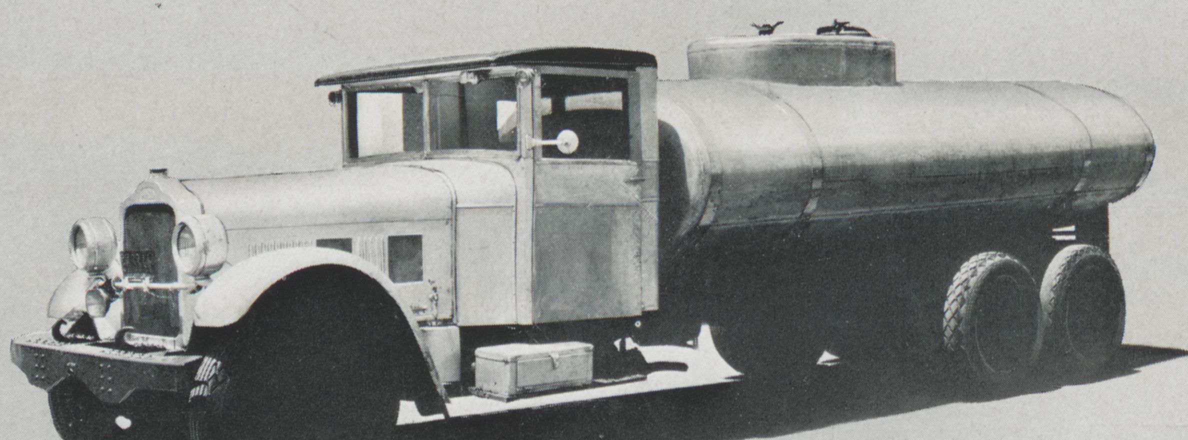

Surveying This Issue

THE color used on this month's issue of the *Technic* is a near likeness to the shade of rose which was selected as the school color by the alumni association last year.

THE lead article this month was written by General R. I. Rees, Assistant Vice President of the American Telephone and Telegraph Company. This article is a discussion of "What the Engineers' Council for Professional Development Means to Young Men."

THE *Technic* contains two student articles this month. Mr. Carroll presents information on "Case Hardening." Mr. Marks has written another article, which is concerned with the use of chicle in the chewing gum industry.

THIS issue of the *Technic* is called the Rose Show Number. This issue is also the last to be published by the present staff. Next month the newly elected staff will take charge of the various positions.

—*C. D. O.*

THE ROSE TECHNIC

Engineering College Magazines Associated
Mr. Leonard Church, Chairman
1510 Hanna Bldg., Cleveland, Ohio

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Member of Executive Com., Amer. Assn. for Adult Education. Member: Society for Promotion of Engineering Education (President 1929-30); American Assn. for Advancement of Science; Acad. of Political Science; Amer. Soc. Mech. Engineers; Corporation of The Polytechnic Institute of Brooklyn; Personnel Research Federation; Amer. Inst. of Mining and Metallurgical Engineers. Member, Engineers' Council for Professional Development, and chairman of Committee on Professional Training.

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What the Engineers' Council for Professional Development Means to Young Men

Robert I. Rees, Assistant Vice President of American Telephone and Telegraph Co.

MATURE engineers who have achieved high distinction will tell you that success in life depends upon a determination to continue to grow and to work—to work hard. Opportunity for work comes to you with your first job. Opportunity for intellectual growth can come to you only through your own initiative.

There are two fallacies which have prevailed in the past and which must be challenged. The first, which is now rapidly disappearing, is that when you graduate you have finished your education. As a matter of fact, formal education is merely an accelerator which projects you into a life of higher achievement and growth through work and experience. During your college years you have stored up valuable knowledge, and if they have also inspired you with exalted purpose, high aims, and sound ideals, your future success is on the way to accomplishment.

The other fallacy, which I still hear expressed frequently by older men, is that you are "fed up" with education and need a good long rest from intellectual effort. During the senior year students reach the apex of intellectual stimulation and achievement. Why should not this pace be maintained and carried on throughout life? This fallacy was conclusively exploded by Dr. Thorndyke, one of our greatest living psychologists, when he discovered through intensive research that learning ability reaches its maximum between the ages of twenty-two and thirty. Why should we call a halt during the most productive years of our lives?

This modest preachment, for which I apologise, is for the purpose of introducing to you the aims and purposes of the Engineers' Council for Professional Development. I can not do better than to quote from the Charter of the Council:

"Its purpose is the enhancement of the professional status of the engineer. To this end, it aims to co-ordinate and promote efforts and inspirations directed toward the higher professional standards of education and practice, greater solidarity of the profession, and greater effectiveness in dealing with technical, social, and economic problems. Its immediate objective is the development of a system whereby the progress of the young engineer toward professional standing can be recognized by the public, by the profession, and by the man himself through the development of technical and other qualifications which will enable him to meet minimum professional standards."

The Council is a conference of engineering bodies. It has representation from the five great national engineering societies which represent the professional aspects of the engineer's life—civil, mining, mechanical, electrical, and chemical engineering. The educational phase, which is now your fundamental interest, is represented by the Society for the Promotion of Engineering Education, while the legal phase is represented by the National Council of State Boards of Engineering Examiners. E. C. P. D. functions through an Executive Committee and four standing committees:

1. Committee on Student Selections and Guidance
2. Committee on Engineering Schools
3. Committee on Professional Training
4. Committee on Professional Recognition

You will note from the names of these committees that in their effort to serve they cover a period of about ten of the most constructive years in a young man's life. In planning the program as a whole, the Council and its members realize that it must do constructive thinking and take action in connection with a very rapid and continuing change in many things having to do with the engineer and engineering. Dr. Hirshfeld, first chairman of the Council, indicated a few of the things we have in mind as follows:

1. There is a growing demand that the engineer give more thought to the economic and social results of his work.

2. There is a rapidly developing mass of law requiring measurement of engineers and their licensing by states.

3. There is an expanding feeling that a real engineer falls in the professional class and should be recognized as such.

4. There is an enlarging appreciation of the advantage of engineering studies in preparation for a career in business and commerce.

In short, we are living in the midst of a civilization and culture

based largely on the engineer and his works, and this fact is making it necessary for the engineer to become a more multi-sided, better educated, and more roundly interested individual.

Those engineers concerned with the organization of E. C. P. D. thought the purposes of the Council could be served only by the wholehearted cooperation of the engineering bodies principally concerned. Now all those concerned in the making of engineers, the accrediting of engineers, and the welfare of engineers and engineering are working together toward a common end.

Reverting now to the functions as indicated by the four standing committees, it is obvious that in order to have engineers of high standing, only those young men who have the interest, ability, and capacity for engineering should enter engineering schols. The Committee on Student Selection and Guidance offers the cooperation of the whole engineering profession in assisting young high school graduates to discover whether or not they have these qualities, and on the results of such findings to decide whether or not they should enter an engineering school.

The second committee, that on engineering schools, offers the cooperation of the profession toward developing ever higher standards in engineering and through close contact keeps the engineering schools continually informed of the changing aspects of the profession.

The committee which perhaps is of most interest to you is the Committee on Professional Training. The work of this committee has for its objective the stimulation of and helpful counsel to the young engineer. I have always felt that we of the committee should be on our guard not to set up anything like a rigid program for the engineer starting out on his life's work, but should leave such a program to his own initiative and simply have engineers of experience stand by to help him in his program of professional, economic, and social development.

It is safe to assume that the young engineer who has just graduated is not yet a professional engineer, but that he requires first a thorough background of experience, accompanied by his own definite program for professional as well as cultural development. The purpose of the latter in his program is to give it breadth and depth in order that he may always be prepared to assume his responsibilities as a citizen, as well as his responsibilities for social welfare.

In spite of the great contributions which the engineer has made to the progress and prosperity of our country, we are continually being charged with incompetence in taking up the responsibilities of leadership in government and social affairs. If we search our hearts I suppose we must realize that with our interest concentrated on critical analyses of facts, principally in the field of material things, we have not given the attention we should to our economic and social responsibilities. In saying all these things about broadening the field of endeavor for engineers, the Council is convinced that in developing capacity for leadership we not only contribute more to society, but our growth is bound to reflect advantage to us in the improvement of our individual economic status. In other words, if we serve society more we serve ourselves better.

During the last two years this Committee on Professional Training has tried to develop a few fundamental tools which may be helpful to the young engineer. The first has for its purpose the stimulation of the individual to make an honest analysis of himself. This is a self appraisal blank or questionnaire which asks a series of questions about your occupation, which of course will be your first job, and your professional status leading to the achievement of full professional membership in the engineering society of your choice, and which prompts a study of the requirements for registration if you live in a state requiring such legal procedure. It also has questions pertaining to personal status including personal relationships, personal shortcomings which need correction, a plan for building up adequate financial status, and prompts you to think of your relationships as a neighbor and citizen. On the basis of this self analysis you are invited to prepare a general program for your development, extending over a period of years as well as one for immediate execution covering, let us say, the first year of your development work. You are cautioned not to be overambitious, but to prepare a conservative program which will easily be accomplished during the time period.

Two of the most important attributes the successful engineer must possess are, first, the ability to deal with men and affairs and, second, the ability to read and absorb the written experience of others. In order to contribute as helpfully as possible to this end, the Committee has prepared a reading list in the general fields of knowledge, based upon recommendations by a number of eminent men, many of them distinguished engineers. Over a period of four or five years it is suggested that a minimum of twenty-five of these books be selected and read, preferably at least one book in each classification. The classification includes works on philosophy, religion, economics, psychology, literature, history, and others. The heavy courses which undergraduates carry in the engineering curriculum make it difficult, because of lack of time, for them to become interested in these broader fields. The interim between graduation and the final test for professional recognition offers an excellent time for browsing in these fields. "Reading maketh a full man."

There is associated with the Committee on Professional Training a junior committee representing the major branches of engi-

neering. During the past year this committee has prepared a survey of educational facilities throughout the country which are available to young men who are at work. They are largely of a university extension character, but courses in the late afternoon and evening are included. The courses listed are in fields of general and professional knowledge and will be helpful to engineers who prefer this more formal type of continuing education. In addition to the reading list, in general fields of knowledge, there is in preparation a brief bibliography of professional and technical literature which will soon be available.

Let us just comment briefly on the operation of such a program. The objective of an operating program for the professional development of junior engineers is to encourage initiative in their own development and to be helpful in providing ways and means of aiding them in pursuing their training program. This involves the active cooperation of the profession as a whole. It would mean the organization in communities where there are sufficient numbers of young engineers of committees with similar functions to those of E. C. P. D. These local committees, upon request by a group of juniors, may counsel with individuals, or may be helpful in arranging actual general training courses and provide facilities for their conduct. It might be well for these committees to make a community survey which would discover ambitious young men in technical or professional employment, both society members and others, and encourage them to join with their associates in undertaking a program of development and to identify themselves with the profession. This, briefly, is the conception of a program which, except in a few experimental communities, is not in operation, but is the goal toward which we are working. I should like to emphasize again that with initiative upon the part of the junior engineer, I am sure helpful response will come from the older and the more experienced professional men.

A brief word about professional recognition. The Committee in charge of this part of the E. C. P. D. program feels that there might be developed gradually three separate and distinct awards. When the junior engineer demonstrates that he has met the minimum requirements for professional status and has maintained his membership in a national engineering society, he will be recognized by those societies by full corporate membership, indicating that he has achieved professional engineering status. Many states now require registration and license, a legal procedure which confers on the individual the status of professional engineer. The requirements for registration vary in the several states, and it would be well for you to discover at the beginning of your career what those requirements are in order that you may qualify therefor.

Another award which is being discussed is the conferring of a professional degree by engineering schools and colleges throughout the country upon the young engineer when he has met the full requirements for professional status. The achievement of these objectives would truly demonstrate growth of the individual to high standing in his profession, in his community, and as an outstanding citizen.

Speaking personally and reverting to what was said in the beginning of this discussion, I make a plea for continuous growth, not so much for the purpose of being rewarded but for the inner satisfaction of knowing that you are becoming more competent and efficient in contributing to the world's work. With this objective always in mind you can meet all the requirements for professional recognition, taking them in your stride as it were, and continue to still higher achievement.

CASE HARDENING

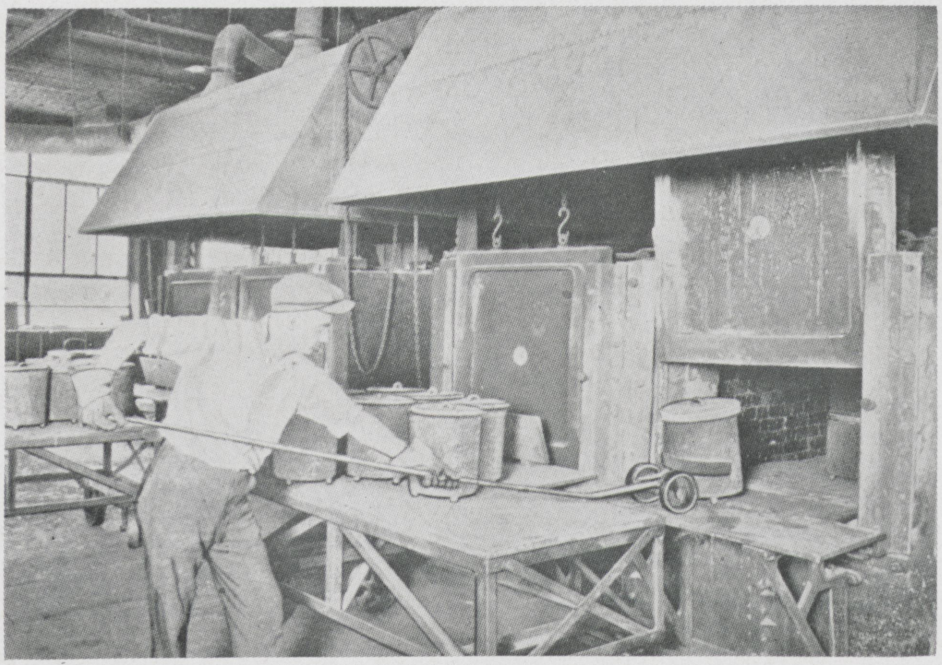
Lawrence Carroll, e., '37

CASE-HARDENING is a form of cementation applied to low or medium carbon steels in order to impregnate them with carbon to a depth of from a few-hundredths to one fourth of an inch, thus securing a high carbon case which may subsequently be hardened by suitable heat treatment. The advantage gained by this operation is that a surface is produced which will withstand wear, abrasion, cutting or indentation, and at the same time the core is left soft and tough so that the shock resistance of the material is not impaired.

History

One of the earliest known methods of steel making consisted in heating a low carbon ferrous metal, such as wrought iron, with carbon or other carbonaceous material. The iron absorbed an appreciable amount of carbon from the surrounding material and became steel.

The process of case-hardening was known to workers in ferrous metals many centuries ago. It is not known how ancient the process is. We do know, however, that the Chinese were familiar with case-hardening as early as the eighth century. In the ninth century a



Carburizing Ball Bearings

Benedictine monk wrote a book on case-hardening in which explicit instructions were given as to the correct method for case-hardening files. It appears that files and ragged tooth saws were the first implements to be so treated. It is interesting to note that the earliest case-hardening of which we have record was done by wrapping the piece to be hardened in a piece of skin which was then burned. This was the forerunner of the charred leather which is in use to some extent today. This book of the ninth century went so far as to give a formula for the carburizing compound in which the hardening was to be done, and which consisted of three parts of charred horn to one of salt.

Since these early experiments, the process of case-hardening has, of course, undergone many radical changes. Progress was slow during the middle ages, but it has been especially rapid in the last forty-five years.

Theory of Operation

Carbon is a very active element and combines readily with iron and other elements to form different compounds. This chemical combination proceeds when the metal is in contact with carbon at a suitable temperature. The speed of reaction increases with increasing temperature and is most rapid when the metal is in the molten state. The reaction proceeds at lower temperatures by diffusion of carbon into the metal, as contrasted to solution when the metal is molten. Thus, when a metal such as iron or steel, with which we are concerned, is heated in contact with a solid, gas, or liquid that contains carbon, the surface of the metal absorbs a certain amount of the carbon. This is diffused into the body of the metal as the surface continues to absorb new carbon. This action continues as long as the temperature is maintained and the carbon supply remains substantially unchanged. The rate of diffusion, however, diminishes at a constant ratio, due to the resistance set up by the already carburized portion of the material. This phase of the process is called carburizing.

In explaining the single operation of carburizing, which is really just a part of the broader operation of case hardening, we have necessarily touched, to some extent, on the mechanics of the operations. It has been shown that steel, when heated in the presence of carbon-containing compounds and gases, receives to a varying degree most of the gases present. The carbon element is absorbed principally in the form of carbon monoxide. What actually happens is that the carbon in this combined gaseous state unites with the iron forming iron carbide, and the increasing of the carbon proportion converts the original mild steel of the case to hard tool steel.

Factors Affecting Case-Hardening

Having discussed the fundamentals of carburizing and case-hardening, we may now proceed with the discussion of the factors upon which the case-hardening depends. These four important factors are:

(1) Chemical analysis of steel to be hardened.

(2) Shape of part.

(3) Heating for carburizing.

(4) Heat treatment of carburized piece.

Steels used for case-hardening are so well standardized today that it is hardly necessary to dwell long on them. As the strength of case-hardened parts depends on core-toughness, too high carbon content is to be avoided, since toughness becomes brittleness on hardening. Consequently, steels under 0.27% carbon are to be recommended, and there is no low limit to carbon content.

Alloying elements act with the carbon to affect the hardening in various ways. The common alloying elements used are manganese, chromium, tungsten, vanadium, molybdenum, silicon, and nickel. It is generally conceded that the first five elements increase the rate of carbon penetration in carburizing, and that silicon and nickel retard it.

The shape of the part often affects the carburizing process and also the hardening process which follows. A rod of small diameter will carburize to a greater depth, the time and temperature remaining constant, than a rod of greater dimension. Objects with both heavy and light cross-sections will carburize deeper on the light cross-section. This is because the light cross-section comes to carburizing

heat more quickly than heavy cross-section parts. Certain parts which perhaps have thin cross-sections, or in which a great depth of penetration is required in the heavy cross-sections, must be protected, wholly or in part, from carbon penetration at these light sections. Protective coatings of copper plate, clay coatings, etc., are used for this purpose.

The next important consideration is the temperature at which the carburizing is done. On the temperature depends, to a large extent, the depth of penetration, the concentration of carbon in the case, and the structure of the core after the operation is completed.

Up to this point case-hardening has been discussed in general, since the factors upon which it depends have been the same for the different methods. It should now be made clear that there are three chief classes, usually classified according to the physical state of the hardening medium as follows.

Solids—Pack Hardeners—Used where deep penetration is desired.

Molten Baths—Cyanide Mixtures—Used where deep penetration is not essential and distortion must be a minmum.

Gases—Gas Carburizers—Used where deep penetration is desired and tumbling of the part will not distort.

Solid Carburizing

If a solid carburizing agent is used, the articles to be case-hardened are packed in metal boxes containing the carburizing compound and are then heated gradually in a furnace to a temperature above the critical range so that the iron may be in the gamma form. The exact temperature depends on the nature of the steel, the carbon content of the case desired, and the composition of the carburizing agent. These governing factors are usually determined by experiment. In general, it may be said that the higher the carburizing temperature and the longer the time of heating, the deeper will be the case. It is further true that with solid carburizers the solid carbon content of the case also increases with the carburizing temperature.

Since it is true that some gas capable of giving up free carbon can be used for carburizing, we naturally come to the discussion of compounds which will liberate gases containing carbon. Most compounds that can be depended on for carburizing are mixtures of the following substances, two or more of which are contained in most commercial grades on the market: wood charcoal, ground bone, anthracite coal, ground coke, charred leather, horn, animal black, lamp black, graphite alone or together with barium and sodium carbonate, common salt, barium chloride, potassium or sodium cyanide.

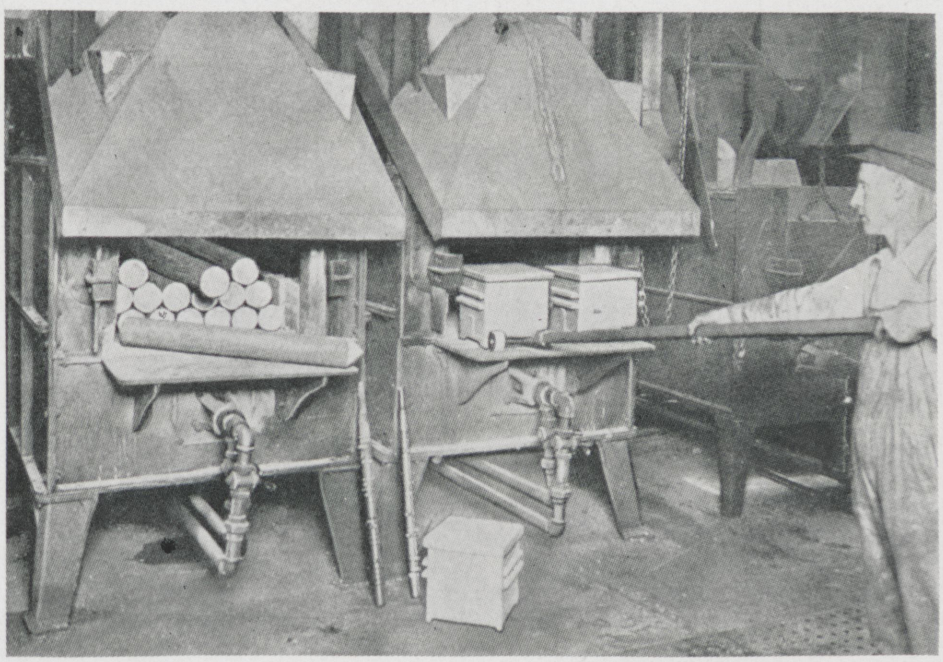
Molten Baths

The second of our three methods of case carburizing is by the use of a cyanide bath. The bath operation consists of dipping the pieces in a vat of molten sodium or potassium cyanide. Both nitrogen and carbon from the bath unite with the steel, forming a different case composition than that produced by a solid or hydrocarbon gas carburizer. The operating temperature for cyanide hardening will vary between the ranges of 1400° F to 1625° F according to the composition of the steel being treated. The time of treatment at the required temperature may vary from 5 minutes to an hour. A longer treatment is not economical as after this time interval the case is not increased in proportion to the immersion period. This method produces the hardest case due to the high nitrogen content, provides an ideal medium for carburizing finished machine work, maintains the finish, and develops attractive surface colors when properly quenched.

Gas Carburizing

The third method of carburizing, namely gas carburizing, is the last to be discussed.

While it is a fact that in the strict sense of the term any of the methods of carburizing could be called "gas carburizing", this term is commonly used to describe the method of carburizing in which a gas is employed directly, and in which the steel to be carburized does not come in contact with a solid or liquid capable of giving up a carburizing gas. Under the subject "Solid Hardening", the statement was made that all carburizing was due to the action of carburizing gases. It can readily be understood, therefore, why a free carburizing gas, such as coal gas, rather than a substance capa-



Carburizing Automobile Parts

ble of liberating a carbon gas, should have some industrial application.

The industrial process for carburizing with gas consists, for the most part, of a horizontal retort, rotating in a combustion chamber fitted with suitable burner equipment for securing the proper temperature. The pieces to be carburized are charged into one end of the retort and the retort sealed and later discharged at the same end after the required time has elapsed. Gas is forced into the retort, and as the temperature is correst for carburizing, the steel absorbs the carbon from the gas very readily. Gas carburizing is extremely economical in point of cost per pound of steel.

Heat Treatment

"The structure of ferrous metals changes when they are heated. This structual change which occurs at a definite temperature is accompanied with an evolution or absorption of heat. The points on the temperature scale at which such changes occur are known as 'Critical Points' for the particular ferrous metal under observation. The critical points depend upon the nature and the amounts of alloying elements present in the iron." This excerpt from a manual of heat treating is offered to help explain the discussion of the heat treatment which follows.

The subsequent heat treatment of the carburized material, which logically follows the carburizing process, necessarily follows those steps necessary for the treatment of two distinct kinds of steel, the low-carbon core (about 0.2% carbon) and the higher carbon case (about 0.85% or more). The carburized part, coarsened in grain by the carburizing temperature, is first reheated to slightly above its Ac_3 (critical) point and quenched, preferably in oil. This leaves the core in as fine-grained a condition as possible. This treatment of the low-carbon steel core is wholly unsuitable for the high-carbon steel case, so the quenching is repeated, this time from the temperature Ac_1 (absorption of heat point). In this case, water quenching is generally preferred for plain carbon steels. After the second quenching, the part is reheated below the critical range to remove quenching stresses and to toughen the case. This last heat treatment is known as tempering or drawing.

Applications

Case-hardening is especially applicable to the construction of armor plate, safes and vaults, the moving parts of machinery which are subjected to both shock and wear, such as crank shafts, pivots and axles, gears, etc., also for the bearings and knife-edges of weighing machinery, and for many other purposes in machine and implement construction. Due to the extremely hard outer case, the operation is usually applied to the finished casting, forging, or otherwise fabricated object, so that no machine work need be done on the hardened surface.

Since the scope of this article has necessarily made it a summary rather than a treatise, many of the intricate details of the processes have been omitted as well as are some of the minor and less general methods of carburizing. It has been shown, however, that with case-hardening a product has been brought forth which possesses the properties of internal strength and surface hardness.

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THE PRODUCTION OF CHICLE

James R. Marks, m., '36

THE story of chicle, the basic ingredient of chewing gum, from the time of its gathering in the shadows of the damp southern forests to the hour of its emergence from sanitary factories as a popular delicacy, makes a truly fascinating tale.

Fine chicle is the partly evaporated juice of the sapodilla, an evergreen tree found in exploitable abundance only in the southern provinces of Mexico, the northern part of British Honduras, and the Department of Peten in Guatemala. It is derived from various species of the sapodilla tree, but that from the chicozapota, or Mexican variety, far outranks any other in quality because it contains the highest percentage of gutta and the least amount of resin. A high gutta content increases the elasticity of the gum and makes it more "chewable." The tree cannot be tapped until it is thirty years old, but it lives to a very great age if properly cared for. Many of those now producing are believed to date back to the time of the Spanish

conquest. The mature Mexican tree attains a height of forty or fifty feet with a diameter of about forty inches and yields from thirty to thirty-five pounds of chicle per annum. The sapodilla also furnishes an edible fruit of the persimmon variety, known as the sapodilla plum, as well as a hard red timber which, because of its susceptibility to high polish, is valuable for the manufacture of furniture and other articles where hardness and durability are essential. Over-tapping of the trees for latex often causes the fruit to become inedible.

Incisions, either a group of V-shaped cuts spaced one above the other and connected by a vertical channel, or one long gash encircling the tree in a spiral form, are made in the early morning. These incisions reach from the base of the trunk to the branches of the tree, a distance of about thirty feet. The "milk" oozes out and slowly runs down the grooves into a canvas sack propped against the base of the tree. Two hours are required to drain the average tree, and, once tapped, from four to twelve years are required before a tree recuperates sufficiently from its injuries to be retapped. In many cases the tree dies after the first tapping because of excess cutting. Chicle is generally run during the rainy season because the high humidity causes the trees to bleed freely.

The fresh sap resembles cow's milk, but by the time it has reached the collecting receptacle it has become a yellowish white sticky product of the consistency of cream. After coagulation by boiling, it assumes a grayish hue.

After collection, the contents of the canvas bags are strained into huge kettles, mixed with an equal amount of water, and heated over slow fires. This boiling process usually takes place on Sundays, though why this particular day is chosen nobody seems to know. During the cooking, which takes from one to two hours, the liquid is stirred with long wooden paddles in such a manner that the content

remains as a unit in the center of the kettle, while the water is thrown aside and evaporated. After it has been tested and found to meet requirements, the hot dough-like mass is poured out upon greased canvas, cooled, kneaded, and molded into blocks, weighing from twenty-five to fifty pounds each. These blocks are then packed in burlap bags, transported by means of shallow dugouts to seaports along the tropical rivers, and shipped to the United States.

Crude chicle in this form is hard and brittle. It varies in color from light grey to a dark brown, and melts readily with heat. When warm it is very ductile and adhesive, without perceptible odor or taste. It is entirely free from any injurious qualities. The block gum shipped from Mexico has a water content of about 33 per cent, but loses 3 per cent of this during transportation to New York.

Natives, known as chicleros, gather the chicle. They are usually clean and honest skilled workmen who labor hard for their living but dress well and spend generously in hours of leisure. Each chiclero deals entirely with contractors, agreeing to deliver crude gum at a price of about twelve cents a pound. In these bargainings, the chiclero underrates his producing capacity in order to be sure of delivering the exact quantity of chicle agreed upon and because it will enable him to do a little side trading of his own. This bootleg trading is cleverly done without the knowledge of the contractors and in spite of the most careful vigilance on their part. The chiclero must establish his own camp, find his trees, extract the latex, and prepare the gum. His equipment consists of a machete for slashing the trees, rope and a pair of iron spurs for climbing, canvas bag receptacles, and iron kettles. He may be compelled to walk many miles through the forest in order to tap from five to seven trees, considered a day's work. If there is one tree to each acre, the growth is considered of average thickness.

Although none is produced in the United States, crude and refined chicle are dutiable commodities. The tariff was imposed solely for revenue purposes. Up until 1919 domestic manufacturers obtained the greater part of their chicle from Canada, a heavy importer of the product. Since that time the bulk of the stock has been imported directly from the producing countries. Small supplies of refined chicle occasionally come into the United States from Belgium and Czechslovakia, but, they too, draw upon Mexico and the Honduras regions for their raw materials.

The author wishes to acknowledge assistance given by the Beech-Nut Packing Co. in compiling the information contained in the above article.

THE ROSE TECHNIC

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The Engineer A Salesman

The engineering student is generally afflicted with one chronic ailment—unsociability. He does not know how to meet people. His conversations are apt to include only such topics as strength of materials, the operation of some machine, or some phase of analytical chemistry. The engineering student must avoid such tendencies because this defect in his social make-up may be a serious impediment to his success.

When an engineer finishes his curriculum, he has something to sell, but as a general rule he has little selling ability. His studies will do him no good if he cannot convince employers that he will be an asset to their interests. The ability to speak intelligently on a number of subjects and the ability to meet people congenially and with ease are as essential to the successful engineer as is his ability to solve strictly engineering problems.

In other words, if the engineering student is to be most successful, he must not pursue his engineering course to the exclusion of all other considerations. He must get into activities which widen his interests and broaden his understanding.

Our Grading System

It can hardly be said that any grading system is perfect. It is practically impossible for a professor to record enough grades for each student during a semester to enable him to arrive at the true mark of the student's knowledge of the subject being taught.

Students may "cram" for quizzes and examinations and may happen to cover the correct examination material. On the other hand, a man who has studied industriously throughout the term may have almost the entire course in hand and yet do no better or worse than the lucky "crammer" of short memory. A man may give an oral recitation on the one or two topics which he has prepared from the entire assignment. Another man may be given a failing mark for his recitation because it concerned the one point in the lesson which he did not understand.

In view of these possibilities, the principle involved in any grading system is that during a period of several weeks the error in marking will be reduced to a minimum by taking an average of all such grades.

Obviously, no professor can with any real justification give one student an 88, while he gives a second an 89, and a third a 90. The marks from which this final grade was determined were not accurate themselves. Any math student knows that he cannot compute answers to seven or eight places when he is using logarithm tables which themselves are accurate to only five places. The principle involved here is analogous to that involved in the computation of a final grade for a student.

The grading system at Rose is an attempt to classify students in such groups as excellent, good, fair, poor, and failing. The greatest problem so far has been in getting the professors and instructors to adopt this system in which they grade students by letters rather than by numbers.

Some students, probably with a resentful feeling, ask if it is possible to have 4.00 men. The answer is *yes* because such students are not considered perfect. A rating of 4.00 means a straight A average. On the percentage basis, a 4.00 does not mean 100%, but 90-100%. The value of this grading system will not be realized unless we are fully acquainted with it.

Criticism

We are all aware of the fact that two kinds of criticism exist; one is destructive, the other constructive. The former can be quite detrimental, while the latter can be quite beneficial.

As individuals we are all different, and because of such differences we are apt to criticize our fellowmen for not doing things in the way we would like to have them done. Since our viewpoint is not necessarily that of others, we are not justified in being too critical.

There are many people who are not content with existing conditions. They criticize that which others have attempted to create. In other words, they offer destructive criticism for present conditions, but are unwilling or unable to offer anything to improve those conditions.

SPECTACULAR

ROSE

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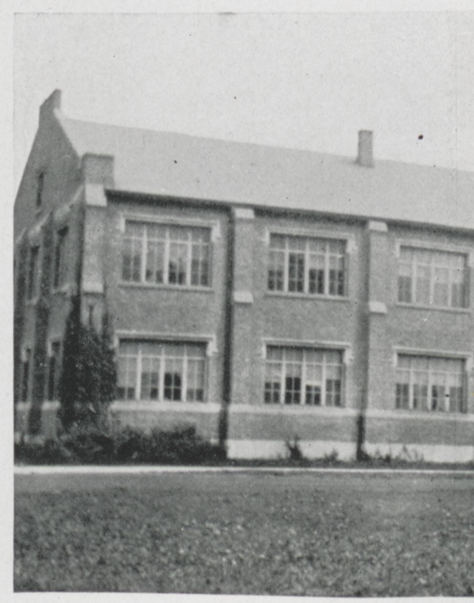

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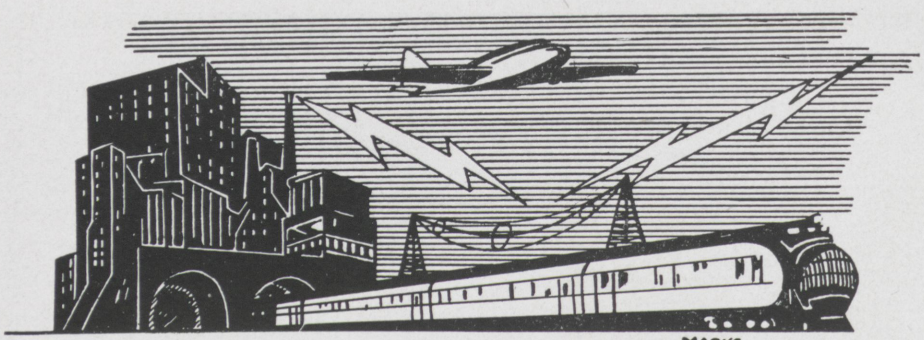


Research and Progress

by
Charles Macdonald
m.e., '36

New Polarizing Glass

UNTIL recently many practical uses for polarized light had been restricted because of the limitations in the size of polarizers. About the only convenient polarizer was a Nicol prism, and the largest ones in general use gave a beam only about 3/4 in. in diameter. Made of specially prepared crystals of Iceland spar, such polarizers are expensive and hence limited in use. The recently announced new material called Polaroid, developed by the Land-Wheelright Laboratories, makes available polarizing "glass" that is relatively inexpensive and obtainable in sheets as large as 14 in. wide and several feet long. For polarized beams of the same area, Polaroid costs about one-fiftieth as much as a Nicol prism.

Polaroid is nothing more than two sheets of glass between which a thin sheet of cellulose acetate material is cemented. The only fundamental difference between this glass and other laminated glass is that the cellulose sheet, only a few thousandths of an inch thick, has suspended in it minute artificial crystals each with its polarizing axis in the same plane. The result is that only the components of the transverse light vibrations in the other planes are blocked.

For three-dimensional moving pictures the films are taken with the ordinary stereoptican machine. The two films are then projected on the screen as superimposed images. But a plate of Polaroid in each projector polarizes the one image in one plane and the other image in a plane perpendicular to the first. When the images are seen through special spectacles of polarized glass, each eye sees but one of the images, and the separate images formed in each eye thus give the three-dimensional illusion.

Previously the same effect was obtained by using two films of different color and viewing the superimposed pictures through spectacles having color filters. Natural color moving pictures were not possible with this system.

Another use for Polaroid is in glareless automobile headlights. with all car headlights and windshields equipped with the glass polarized 45 degrees to the horizontal, all in the same plane with respect to the car, approaching cars would have their headlights and windshields polarized at an angle of 90 degrees to each other. To each driver the approaching headlights would appear dim, but the illumination created by his own headlights would not be affected.

For photo-elastic analysis an ordinary lamp bulb and two sheets of polarizing glass are all that is needed. The stressed model is placed between the two polarizing sheets with their axes set at an angle of 90 degrees, and the stress fringes are observed or photographed in the ordinary manner. Thus full size models a foot high and several feet in length can be tested readily. For models with a maximum dimension of 10 in. a complete analyzer can be built for $35 or less.

By placing a sheet of clear colorless cellophane between two sheets of Polaroid, brilliant colors appear, each color changing to its complement as one of the sheets is rotated. Unusual stage effects and other commercial applications of this phenomenon undoubtedly will be found.

Airplane Research

With the present design of wings, airplanes will be limited to a speed of about 575 miles an hour, according to Dr. George W. Lewis, director of research of the National Advisory Committee for Aeronautics. At this speed motion pictures show that the sustaining flow of air over the top of the wing suddenly breaks away in a "shock wave" and the airplane loses all its lift.

Study of this phenomenon has been made possible by the committee's new "superspeed" tunnel at its laboratories at Langley Field, Va. In this tunnel, in which the test chamber is only two feet in diameter, air flows up to 750 miles an hour are made possible by the jet induction method in which compressed air at 300 pounds per square inch pressure is injected into the tunnel and allowed to expand in the nozzle shaped chamber.

Dr. Lewis says that the development of aviation has gone hand in hand with the development of the wind tunnel, which is the most important instrument for its study. The United States had the first large wind tunnel, a twenty foot tunnel at Langley Field in 1926. This tunnel gave it leadership in aeronautics. Then came the full scale wind tunnel, which was the

first of its kind and again assured that leadership. The variable density tunnel and this new "super-speed" tunnel are worthy additions to the committee's laboratories.

Studies at Langley Field, borne out by modern transport planes now flying in the United States, have proved that while vibration and instability tend to increase with speed, lift improves and drag decreases as the size of the plane increases. There is every indication, Dr. Lewis says, from the performance of such large planes as the Boeing 299 bomber and the Sikorsky and Martin Clipper ships that still larger sizes will prove entirely practical.

Quick-Setting Concrete

The honors go to Karl P. Billner, a young Swedish engineer of New York, who has perfected a method of hardening concrete which, he says, will result in better, cheaper, more durable, and nonskid highways which will dry out in twenty minutes as compared with the present twenty-four or more hours.

Billner calls his process the "vacuum compression method", and explained it as simply the removal of the excess water from the mixture by utilizing atmospheric pressure by the use of rubber or metal mats.

He conducted a demonstration before a gathering of scientists, road builders, and professors at Yale University. Within twenty minutes after he had poured an eight-inch slab, the group walked and jumped on the concrete without making an impression on its surface. Another mixture, to which the method was not applied, took twenty-four hours to set and nearly a week to dry out. Both mixtures were composed of one part of cement, two and one-half parts of sand, and five parts of crushed rock.

This new concrete, applied to road construction, will permit the making of a nonskid surface with grooves in the pavement resembling those in an automobile tire. Roads can be built in less than half the time now necessary.

Boulder Dam Generators

The Boulder Dam generators rated at 82,500 Kva., 60 cycles, 16500 volts, 180 RPM are the largest water-wheel generators built to date. The two Westinghouse machines are 40 feet in diameter, 32 feet high above the floor level, and weigh over two million pounds each. The entire weight of the generator rotor, water-wheel runner, and water thrust, amounting to approximately one and three-quarter million pounds, is carried on a Kingsbury thrust bearing mounted on the upper bearing bracket. This large thrust bearing, which is 7 feet in diameter, operates in a bath of oil which is cooled by copper cooling coils through which cold water is circulated.

The main generator shaft is 32 feet long, 38 inches in diameter at the spider, and has a 65 inch diameter flange where it bolts to the water-wheel shaft. It weighs over one hundred thousand pounds and has a 6 inch diameter hole through its entire length to permit periscopic examination of the material in the forging.

These machines are especially designed and proportioned to obtain high flywheel effect (over one hundred million foot pounds squared), low reactance, and high short circuit ratio so as to increase the stability and reliability of power transmission over the 287000 volt transmission line to Los Angeles, a distance of approximately 275 miles from Boulder Dam.

Automobile Wheel Suspension

In the design of the new Scarab car developed by William B. Stout of the Stout Motor Car Corporation, all four wheels are independently supported in order to give greater flexibility. Each wheel can rise and fall as required by the contour of the road surface. In order to obtain this flexibility each wheel is suspended from its support by a coil spring in conjunction with an "oleo" or airplane type, air-cushioned shock absorber.

The point of support for each of the four wheels is above the center of gravity of the car. This results in the car banking itself when going around curves. Contrary to the effect found in conventional cars, the body leans inward in going around curves, instead of outward. This is accomplished without the use of torsional side-sway equalizers as used on conventional cars.

The framework of the car is built up of welded rectangular steel tubing. This frame carries all the structural loads, the body sheets serving no purpose other than inclosing the car.

SPORTS

Edited by

Kenneth Buis, m.e., '38

Basketball

Soon after returning from a trip to Detroit, the Rose varsity basketball squad completed its schedule for this season with an even break in its last two games. The first game was played on March 3, with Indiana Law School. The final tilt, which was a return engagement with the Lawrence Institute of Technology of Detroit, was played on March 6. Both of these games were played in the Rose Gym.

In the game with Indiana Law School, over-confidence was responsible for Rose's failure to win. This was an overtime game, and as luck would have it, the Engineers came out on the short end of the horn. Rose led with a score of 10 to 0 at the end of the first quarter. At the end of the half, the score was tied with each team having 11 points. The final score was 22 to 21. The Engineers played a rather ragged and slow game.

Mewhinney and Ladson were the leading scorers. Wewhinney accounted for 8 points by making 3 field goals and 2 foul shots. Ladson accounted for 7 points by making 3 field goals and 1 foul shot.

Game Summary
Indiana Law (22)

	F.G.	F.T.	P.F.
Conner, f.	0	3	4
Adamson, f.	3	0	1
Ratts, c.	0	2	2
Reed, g.	3	2	1
Ritzman, g.	1	1	4
Hudson, g.	0	0	0
Totals	7	8	12

Rose Poly (21)

	F.G.	F.T.	P.F.
Eckerman, f.	1	1	2
Kasameyer, f.	0	1	0
Ladson, f.	3	1	1
Wolf, f.	0	0	0
Wodicka, c.	0	0	4
Mewhinney, g.	3	2	4
Smith, g.	1	0	0
Hufford, g.	0	0	0
Totals	8	5	11

Rose vs. Lawrence Tech

The Engineers defeated the boys from Lawrence Tech in their first tilt, which took place in Detroit. Naturally, the Tech cagers were out for the Engineers' hide, but the Engineers seemed to know how to protect their hide. At any rate, the Rose cagers just could not be beaten. The score at the end of the first half was 16 to 9 in favor of the Engineers. The final score was 26 to 16.

The scoring honors for this game went to Kasameyer and Mewhinney. Each accounted for 7 points by making 3 field goals and 1 free throw.

Game Summary
Rose Poly (26)

	F.G.	F.T.	P.F.
Kasameyer, f.	3	1	3
Eckerman, f.	0	0	0
Ladson, f.	2	1	0
Wolf, f.	0	0	0
Wodicka, c.	1	1	0
Coady, c.	0	1	0
Mewhinney, g.	3	1	0
Smith, g	1	1	2
Hufford, g.	0	0	0
Totals	10	6	5

Lawrence Tech (16)

	F.G.	F.T.	P.F.
Butzier, f.	1	0	3
Benachowski, f.	0	0	0
Baby, f.	2	0	3
Kamm, c.	0	0	3
Jelsh, c.	2	0	0
Savage, g.	2	0	2
Stiko, g.	0	1	1
Chapman, g.	0	0	1
Linder, g.	0	1	0
Totals	7	2	13

Perhaps some of you would like to know how many points were scored by the Rose team, and the number of points made by each man on the squad. Well, here goes.

The Basketball Squad

First row (left to right), Mewhinney, Smith, Coady, Kasameyer; *Second row*, Ladson, McKee, Forsythe, Eckerman; *Third row*, Wodicka, White, Wolf, Hardman; *Top row*, Merriman and Coach Brown.

The Engineers scored a total of 202 points during their brief basketball season.

Mewhinney scored 47 points.
Hufford scored 7 points.
Kasameyer scored 39 points.
Wodicka scored 25 points.
Ricketts scored 5 points.
Eckerman scored 14 points.
Wolf scored 18 points.
Smith scored 17 points.
Ladson scored 30 points.

The following men received major letter awards for basketball: Seniors—Hufford, Mewhinney, and Kasameyer; Juniors—Wodicka; Sophomores—Eckerman and Wolf; Freshmen—Smith and Ladson. The student body congratulates these men for their work and for reviving basketball at Rose.

Spring Football

Coach Brown issued a call for spring football practice on March 25. Spring practice lasted until April 8, when school was dismissed for a short spring vacation.

Twenty-five candidates turned out for the gridiron drill, and Coach Brown discovered some very promising prospects for next fall. Don McCullough and Ed Wodicka are co-captains for next season. Wodicka has played end for the past three years, and McCullough is a guard.

According to Coach Brown, more interest and enthusiasm has been shown this year than at any previous spring practice session.

Campus Activities

Edited by

Norman Wittenbrock

ch.e., '38

St. Pat's Day

It has always been the custom to celebrate St. Pat's day at Rose. In the past the students invariably staged a parade down town. The parades were led by "Rosie" and consisted of a procession of monsters and reptiles of every conceivable type. Ever since the students began producing the Rose Shows, the parades have been abandoned. This year classes were dismissed on the afternoon of St. Pat's day and on the morning of the following day.

The annual St. Pat's dance, which is sponsored by the student council, was held at the Trianon ballroom on the night of St. Pat's day. The dance proved to be very successful. Don Kaye and his orchestra furnished the music for the evening. The ballroom was fittingly decorated for the occasion in green while the back of the band stand was adorned with a large shamrock.

Rifle Club

The varsity rifle team recently completed firing in two important matches, the Hearst trophy match, in which all R. O. T. C. units in all branches of the servic compete, and the American Society of Military Engineers match. Regular R. O. T. C. postal matches were scheduled this year with many leading colleges and universities.

Based on the scores of the previous week, a squad of ten men was chosen each week to represent Rose in the fifth corps area intercollegiate matches. Rifle marksmanship is classed as a minor sport and sweaters are awarded to members of the team. Friends of the rifle club have made available the following awards for excellence in marksmanship: Frances Gulick Shrouds award, Prox award, American Legion award, and the Rose military department award.

Assembly Program

The speaker at a recent assembly was Mrs. Demarcus Brown, Coach Brown's mother. Mrs. Brown has talked to the students several times about trips that she has taken to remote parts of the world. At this assembly she related her adventures on a trip to Cambodia, a province of French Indo China. While in Cambodia, Mrs. Brown visited the the ruins of the ancient city of Angkor. This city was built by a race of people that lived for about one thousand years and then disappeared. After spending several weeks at this city, Mrs. Brown continued her journey through Cambodia. This assembly was one of the most interesting assemblies of the year, and the students are looking forward to the time when Mrs. Brown will return to address the student body again.

Inspection Trip

The seniors in chemical engineering recently made an inspection trip to supplement their class work. They were gone for two days, during which time they visited several chemical plants in western Illinois. Professor Child accompanied the students on the trip. The party left on Monday afternoon immediately after classes were over. On Tuesday morning they visited the St. Louis plant of the Monsanto Chemical Company where sulphuric acid is manufactured by the contact process. Other products of this plant are electrolytic chlorine and phosphoric acid products. On Tuesday afternoon they were taken through the Anheuser Busch brewery. Some Rose alumni were present at the dinner at Garavelli's Restaurant in the evening. Wednesday morning the group inspected the oil refinery of the Shell Petroleum Corporation at Wood River, near Alton, Illinois. At this plant they were shown the various methods of producing crude oil products. The group then drove to Decatur, Illinois, where they visited the A. E. Staley Manufacturing Company, manufacturers of corn products. From there they drove directly back to Terre Haute.

Congratulations

It gives us pleasure to announce that a member of the Rose faculty has been honored by the Terre Haute Zorah Shrine Lodge. Doctor Clarence P. Sousley was recently installed as Potentate of Zorah Temple of Nobles of the Mystic Shrine. Since very few men attain the honor which was bestowed upon Doctor Sousley, we are proud of his achievement and wish to offer our hearty congratulations.

Debate Club

The Rose Debate Team has completed its schedule of debates for this year. The team had a fair degree of success, in that it won a reasonable number of its debates. At the debate tournament at Manchester College, from February twenty-first to twenty-second, the negative team won two debates out of five, while the affirmatice team won one debate out of five. The negative team won a debate at Evansville College, but the affirmative team lost to Indiana State and to Indiana Law School. Both teams participated in non-decision debates at Hanover College. On March twenty-fourth the two Rose teams debated against each other before a meeting of the Rose chapter of the American Association of University Professors. The affirmative team won by a close vote. For this debate the teams were Robert S. Kahn and Warren S. Sentman—negative, and Edward A. Coons and Joseph A. Dillahunt—affirmative. Three debaters will be lost by graduation this year; they are Robert Shattuck, Warren S. Sentman, and Louis Duenweg. The members of the varsity debate team were: Affirmative—Robert Shattuck, Edward A. Coons, and Joseph A. Dillahunt; Negative—Warren S. Sentman, Conrad J. Clausen, and Robert S. Kahn. Other members of the debate team were Louis Duenweg, Robert A. Averitt and Alden Foley. Conrad Clausen will receive a debate key in recognition of his two years of service on the varsity debate team.

Assembly Program

At the assembly on April eighth, the speaker was Doctor William L. Batt, President of the American Society of Mechanical Engineers. He is also president of the SKF Industries. Doctor Batt has been visiting the student branches of the A. S. M. E. at technical schools in the southeastern part of the country, and Rose was fortunate in being included on the list of schools which he visited. Dr. Batt discussed the problem of the engineering graduate's obtaining employment. During the course of his talk he pointed out that changes in methods of hiring and firing employees will revolutionize the economic situation in the future.

S.P.E.E. Meeting

Several members of the Rose faculty attended the second annual meeting of the Indiana-Illinois section of the Society for the Promotion of Engineering Education on Saturday, April 18, at the Lawson Y.M.C.A., Chicago, Illinois. This meeting was attended by teachers from Armour Institute of Technology, Northwestern University, Lewis Tech, University of Illinois, Purdue University, and Rose Polytechnic Institute. The Rose representative for the past year has been Mr. Harve N. Chinn; he will be succeeded by Mr. Edwin W. Mann. At this meeting papers were presented by Professor Bloxsome and Mr. Mann. Professor Bloxsome's subject was "Engineering Writing", and Mr. Mann's subject was "Problem Courses for Upper Class Undergraduates."

Rose Show

With the show only a week away, the students are all busy putting the finishing touches on their exhibits. From present indications this year's show will be one of the best given by the school. This year's show, more than any in the past, will be a demonstration of the abilities of Rose men.

ALUMNI

By

Merton Scharenberg, m.e., '38

With this issue of the *Technic* your editor completes his year's work. It is hoped that this section has proved of interest to those for whom it was written—the alumni. However, the success or failure of the column is totally dependent upon the alumni, and because of that each of you can be of great assistance if you will keep the editor informed of your present activities. Just what the policy of the succeeding editor will be is unknown, but the future of this section will continue to lie in your hands. In presenting to you for the last time the Alumni news, the editor wishes to express his appreciation to those who have assisted him by reporting alumni activities, for without that help, this department could not have achieved whatever success may be accredited to it.

Here and There with the Grads

'91 Samuel S. Wales, who has been in California for some time, is back in Pittsburgh at 245 Melwood Street.

'01 Harry A. Schwartz was elected Vice Chairman of the Iron and Steel Division of the A. I. M. E. at that organization's February meeting in New York City.

'12 W. Scott Heer, President of the W. S. Heer Engineering Company, has closed his Terre Haute and Bethel, Ohio, offices and has established himself at 1205 Times-Star Building, Cincinnati, Ohio.

Ex.'13 R. A. Newlin has taken a position with the W. S. Heer Engineering Company at Cincinnati.

'15 Edward J. Hegarty recently accepted the position of Advertising and Sales Promotion Manager for the Standard Air Conditioning Corporation of New York City.

'21 Robert R. Gilkison is with the Velsicol Company with headquarters in Chicago.

'28 Hubert S. Carmack has a sales position with G. E. at Springfield, Mass.

James E. Goddard was recently initiated into Tau Beta Pi as a member of Indiana Beta Chapter at the University of Tennessee.

J. Bartley Smith, who is connected with the Electrical Division of the Panama Canal Operation, is now an Associate Engineer.

Harold A. York has announced the birth of a daughter, Janet Elaine.

'31 Stanley H. Davis, affiliated with G. E., has been transferred to Indianapolis.

Richard W. Johnson announces the birth of a daughter, Marylin Sue, on March 6, 1936.

'32 Harry F. Netzhammer has a position with the Merchants Distillery Corporation at Terre Haute.

'33 James C. Skinner, affiliated with the Pennsylvania Rialroad, has been transferred to Philadelphia.

'34 John Babillus will leave soon for Lithuania, where he is to be placed in charge of the installation of five radio transmitting stations to be built by the Lithuanian government.

Frank Mansur has been advanced to the post of Local Manager of the Placentia Office of the Southern California Edison Company, Ltd.

'35 Robert B. Asbury, with G. E., has been transferred from Schenectady to Ft. Wayne, Indiana.

Burril F. McIntyre is now in the Maintenance Department of Servel, Inc., at Evansville.

Meritt F. Meyers has accepted a position with the Empire Oil and Refining Company at East Chicago, Ind.

Detroit Alumni

Many of the Detroit Alumni were cheering for Rose when they saw the Rose basketball squad beat Lawrence Tech at Detroit on Feb. 25. It was indeed a pleasant surprise when they learned that, once again, many miles from Rose and yet only a short distance from their respective homes, they could see a Rose squad again play basketball after a period of several years of inactivity. Those present were: Richard Brettell, '25, Richard Brown, '27, Wayne Dicks, '29, Robert H. Dowen, '29, Arthur Drompp, '28, John A. Fairhurst, '27, Fred Franzwa, '28, Henry R. Iker, '25, Alfred L. Kasameyer, '28, Clarence Marlar, '24, Herman E. Mayrose, '15, Bertram Menden, '32, Robert S. Roach, '31, Guy Stallard, '28, and Ralph W. Tapy, '26.

These men, together with other alumni, planned to hold a banquet on St. Pat's Eve to revive interest in the Detroit Rose Tech Club.

Cleveland Rose Tech Club Holds Meeting

On March 14, the Cleveland Rose Tech Club held its monthly meeting. The principal business of the meeting was the election of officers. Those elected were: John Richardson, '31, President; Brent Jacob, Jr., '34, Vice President; Harry S. Richardson, '00, Treasurer; and Harry H. Richardson, '35, Secretary. As may be seen, the election was a landslide in the direction of the Richardson family, and as a result they are now in a position to administer the affairs of the club with a minimum of lost motion.

The alumni present were: Peter J. Burt, '26, Walter M. Charman, '18, Wayne E. Dodson, '29, Carl E. Ehrenhardt, '30, Paul F. Froeb, '32, Edward G. Gray, '25, Donald L. Griffith, '22, Jay F. Hall, '35, Harold L. Kessler, '20, Earl F. Kunz, '27, Robert D. Landrum, '04, Claude F. Leisey, '23, H. Blair Pettit, '03, Harry S. Richardson, '00, John F. Richardson, '31, Harry H. Richardson, '35, Harry A. Schwartz, '01, Edward H. Spalding, '05, John T. Stone, '24, Walton L. Woody, '14.

Please Patronize the Advertisers in the Rose Technic

Fraternity Notes

Alpha Tau Omega

The chapter was well represented this last season on the basketball team, and wishes to congratulate Pledge Brothers Eckerman, Ladson, and Smith and Brothers Kasameyer and Mewhinney upon their letters and sweaters.

The chapter extends its congratulations to Brother Kasameyer upon his election to Tau Beta Pi and to Brother Averitt upon his election to Blue Key.

Open house was held on Friday night, April 3, 1936. Chaperons for the evening were Mr. and Mrs. Chinn, Warrant Officer and Mrs. Kearns, and Lieutenant and Mrs. Hawkins.

Sigma Nu

On Saturday evening, March 28, Beta Upsilon held an open house. Entertainment for the evening consisted of dancing, cards, and ping pong. The chaperons were Miss Helen Mahley, Mr. Karl Spangenberg, and Lieutenant and Mrs. Hawkins.

The Indiana, Purdue, Butler, DePauw, and Rose Poly chapters of Sigma Nu and their alumni clubs are planning a dinner dance and state convention to be held in Indianapolis either on the first or second Saturday in May.

Wilton Brown, Beta Upsilon '33, is the father of a baby girl, Barbara Helen, born March 21.

Tau Beta Pi

Indiana Beta Chapter of Tau Beta Pi announces the election of Paul Bennett and William Kasameyer of the senior class and Robert Penisten of the junior class. The chapter congratulates these men, as their election signifies that their scholarship is very good, and that they have demonstrated good character and breadth of interest.

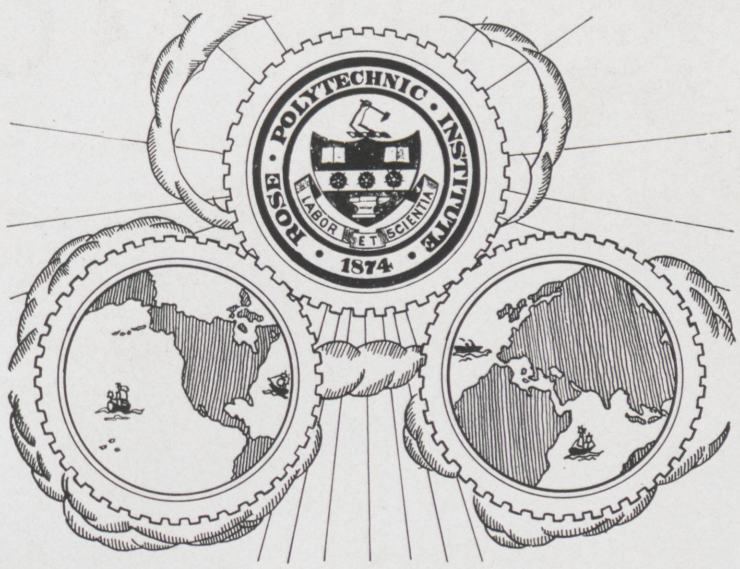
Initiation for these men was held at the Elks Club on Monday evening, April 13, 1936.

The chapter is planning a dance to be held at the Rose gym on May 1. Details have not been arranged at the present time.

Blue Key

The Rose Polytechnic Institute Chapter of Blue Key National Honor Fraternity is pleased to announce the election of James Hufford of the senior class and Robert Averitt of the junior class. Initiation for these new members was held at the Elks Club on Friday evening, April 3, 1936. The ceremony was followed by a banquet.

Blue Key is planning to have a dance some time in May.



THE ROSE SHOW

On April 23, 24, and 25 Rose Polytechnic Institute will welcome all friends of the college at the fifth Rose Show. The students will again demonstrate their ingenuity and resourcefulness with scientific and technical exhibits illustrating principles and applications in engineering. Humorous as well as serious, startling as well as intricate the wide variety of displays will provide a full evening of entertainment.

Doors open each evening at 7

ROSE POLYTECHNIC INSTITUTE

TERRE HAUTE, INDIANA

HUMOR

Edited by

Bob Shattuck
ch.e., '36

Horace: "I'm going to kiss you."

Audrey: "It takes two to make a bargain."

Horace: "O.K. I'll give you two kisses."

Senior: "Do you believe in capital punishment?"

Freshman: "Oh, sure. What was good enough for my father is good enough for me."

He: "If an ugly man tried to kiss you, would you object?"

She: "Why don't you try it and see?"

Prof. Child: "Tell me, Mr. Sears. What is a parasite?"

Sears: "Search me."

Mother: "Now remember while I'm away, dear, that if you drink, neck, or smoke, men will call you fast."

Daughter: "Yes, just as fast as they can get to a telephone."

—*Annapolis Log.*

I suppose you heard about the three little pigs that left home. Their old man was an awful bore.

—*Annapolis Log.*

He: "I suppose you dance."

She: "Oh, yes, I love to."

He: "That's better'n dancing."

—*Utah Humbug.*

LOCOMOTIVES

A young lady recently visited the locomotive works and then later told some friends how a locomotive is made.

"You pour a lot of sand into a lot of boxes," she explained, "and you throw old stove lids and things into a furnace, and then you empty the molten stream into a hole in the sand, and everyone yells and swears. Then you pour it out and let it cool and pound it, and then you put it on a thing that bores holes in it. Then you screw it together, and paint it, and put steam in it, and then they take it to the drafting room and make a blueprint of it. But I forgot one thing. They have to make a boiler. One man gets inside and one man remains outside, and they pound frightfully; and they tie it to the other thing, and you ought to see it go."

"The nicest way to see spots in front of your eyes," says Kasameyer, "is to kiss a girl with freckles."

Gracie: "Were you entertaining a man in your room last evening?"

Cleo: "That's for him to say."

Some men go to prison for life and to their dismay find very little of it there.

COLLECTIVE MATRIMONY

Some folks wonder what the mormon wedding ceremony is like. Roughly this is it:

Preacher (to groom): "Do you take these women to be your lawfully wedded wives?"

Groom: "I do."

Preacher (to brides): "Do you take this man to be your lawfully wedded husband."

Brides: "We do."

Preacher: "Some of you girls in the back will have to speak a little louder if you want to be included in this."

Most girls are like parlor lights —out for a good time.

How about the Scotchman who stood in the bread line so long that he lost his job.

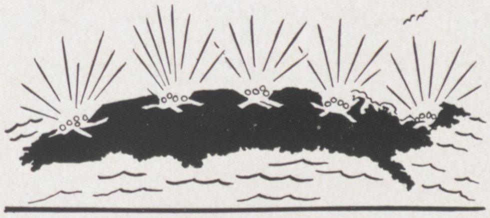
West: "Look, there goes that girl that fainted at Wassel's the other night."

Spain: "Yes, I have a faint recollection of her."

It is alleged that Mr. Harrod learned all about love in ten squeezy lessons.

It is rumored that Margaret now calls Duenweg "Cookie" because he's been a wafer so long.

G-E *Campus* N*ews*



MORE BRIGHT SPOTS ON THE GLOBE

THE mellow, golden-orange glow of sodium lighting is springing up all across the continent. The latest installation, the largest in the United States, is located in the state of Washington. Here sixty-six 10,000-lumen General Electric units line almost three miles of the four-lane Pacific highway between Tacoma and Fort Lewis.

Less than three years ago the sodium lamp made its first American appearance on a highway near Schenectady. Today the largest installation is on the Pacific coast, and the second-largest is at Lynn, Mass., on the Atlantic. In between, highways, bridges, traffic circles, and underpasses are being lighted for safety with these new luminaires, and G-E sodium lighting units have been installed in Canada, Hawaii, India, Spain, South Africa, Dutch East Indies, and Brazil.

X-RAY FOR ART'S SAKE

IS there a portrait of Great Uncle Ezra gathering dust in the attic? It may pay to x-ray Uncle before handing him over to the junkman, for behind Ezra's imposing whiskers may be hiding the sister of the Mona Lisa.

Not long ago, a portable G-E X-Ray Corporation unit disclosed a valuable canvas by the seventeenth-century artist, Goya, concealed under an apparently worthless picture. More recently a New Orleans painter and art expert has used the x-ray to discover a genuine da Vinci signature beneath layers of paint applied by a later and less-capable artist. A sister painting to the newly found da Vinci recently sold for a quarter of a million dollars.

The x-ray does more than discover lost Old Masters; it tells how the great artists of the past worked. A series of radiographs can disclose the full story of their brushwork from the first rough sketch to the last correction and afterthought. The art student of today, by an intelligent use of the x-ray, is in a position to take lessons from the geniuses of the past.

NO CLICK!

THE life of the party, coming home with the milkman, need no longer fear the betraying click of the light switch if his house wiring includes the latest electric switch developed in the G-E Research Laboratory.

Two shallow chrome-steel cups, sealed together with a strip of glass, form the two contacts. A ceramic disk with a hole in it, and a few drops of mercury, partly fill the enclosure between the cups. The device is filled with hydrogen and sealed by welding. In the "off" position, the hole in the disk is above the mercury level. A rotation of twenty degrees to the "on" position permits the mercury to flow through the hole and make the electric connection.

The time-honored click of the switch is abolished. In the laboratory in Schenectady, one of these mercury switches has turned a 200-watt lamp on and off some 65 million times in the last two years, and there are no signs of wearing out or failure.

96-245DH

GENERAL ELECTRIC

—and Chesterfields are usually there

they're mild and yet *They Satisfy*