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## Volume 24 - Issue 7 - April, 1915

Rose Technic Staff

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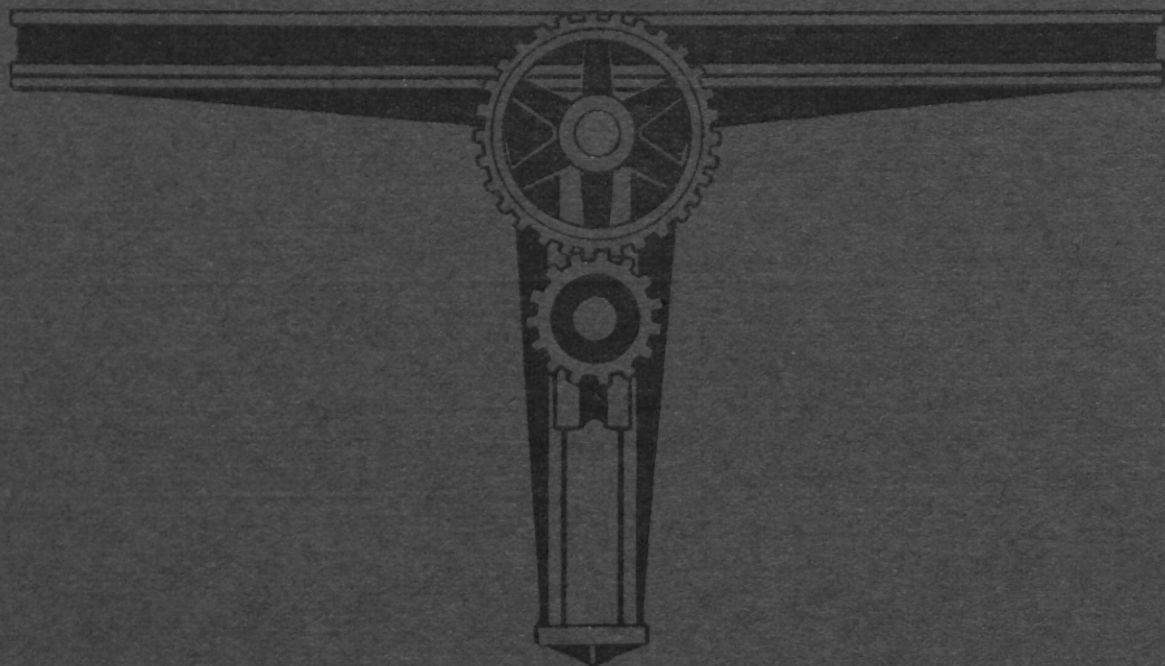
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# THE TECHNIC



ROSE POLYTECHNIC  
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APRIL, 1915

VOL. XXIV, No. 7

TERRE HAUTE, IND.

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# THE TECHNIC

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**B**OTH articles this month are by alumni. The first is on the marking and locating of corners and boundaries and is especially valuable because its author, Mr. Arthur D. Kidder, '99, Supervisor of Surveys, General Land Office, Department of the Interior, is a nationally recognized authority on the subject of surveying. The paper was furnished to the Illinois Society of Surveyors to be presented at their meeting, January 27, 1915.

The second article is by Albert F. Brennan, '13, of the Prest-O-Lite Co., a former Editor of **THE TECHNIC**, who needs no introduction to upper classmen. The article is descriptive of some repairs made by the oxy-acetylene welding process, a process now becoming very prominent and of great interest to all engineers and students of engineering. We are indebted to The Prest-O-Lite Co., Inc., for the use of the illustrations accompanying the article.

**T**HE most arduous and nerve-racking task that any man in college has to face is the athletic manager's job of framing up a schedule. It requires voluminous correspondence, Machiavellian diplomacy, hours of labor, and the patience of Job. About 75% of this bother could very easily be eliminated and much better schedules made if the members of the I. C. A. L. would take it upon themselves to get together every year and make up the state schedules in a meeting, as is done by the Western Conference. Other than in running a track meet, the I. C. A. L. seems to be characterized chiefly by a masterly inactivity.

**T**HE Inter-Fraternity Board is fulfilling in a modest way, a long-felt want in the Institute, and its work in this direction has never received the notice it deserves. We have long been aware that all of us need training in speaking and thinking on our feet, and in the meetings of the Board a few have had the privilege of gaining this very training. The lucidity and force of the arguments developed in the

pleasant little series of debates held during the past few months, were little short of marvelous. It is much to be regretted that a far larger percentage of the students can not take part in the deliberations of this unusual aggregation of talented long-distance debaters.

One of the most attractive features of the said deliberations is that the Board's work is made even more pleasant by the fact that its originators wisely provided that it should have no power or authority, and consequently no matter what its decisions may be, they are entirely harmless to everyone concerned and can be changed or reversed at will. Revising the agreement is one of the most enjoyable ways of spending an evening that can be imagined, and is a game that can be indulged in by any small social gathering with pleasure and profit to everyone taking part.

**D**URING the fiscal year ended June 30, 1914, there were built in the United States and officially numbered 1,291 vessels of 311,578 gross tons, compared with 1,648 vessels, of 382,304 gross tons for 1913, according to a report by the Bureau of Navigation. The principal vessels are four American-Hawaiian Company steamships, each of 6,600 gross tons, and three Grace Company steamships, each of 6,300 gross tons, all for the Panama canal trade and averaging 4,000 net tons. The steamship *Matsonia*, for Hawaiian trade, 9,728 gross tons, is the largest vessel built in the United States since 1905, and the *John D. Archbold*, 8,374 gross tons, is the largest oil tanker yet built in the United States. On the Great Lakes 10 steamers of over 1,000 tons each were built, the *Alton C. Dustin*, 7,978 gross tons, being the largest. Only three large schooners were built. In all, 38 vessels of over 1,000 tons each were built, aggregating 169,000 tons.—*Railway Age Gazette*.

SHOWING UP THE FRICTION-LOAD LOSSES—  
“The manufacturer who runs his entire equip-

**S**OME unkind critic inquires of us as to what has become of the regular general assemblies announced in *THE TECHNIC* with such assurance some time ago. In self-defense we wish to say that our announcement, while a little early, was official, and that Dr. Mees has given his word that regular general assemblies will be instituted at the earliest possible date this year. He further said that he was enthusiastically in favor of the idea and had only been awaiting some evidence of a desire for something of the sort to be expressed by the students. Since the Council publicly went on record in favor of their establishment, we feel safe in assuring the Student Body that regular general assemblies will be instituted as soon as this can be done conveniently by those in authority.

ment up to its full capacity every minute of the day and every day in the year is a curiosity,” said Mr. R. A. MacGregor, Toledo, Ohio, before the recent convention of new-business men at Cincinnati. However, motor-service salesmen are continually meeting manufacturers who think they are doing this. When pointing out to these men the saving to be made by eliminating friction, the argument is often advanced, “Why, that shaft takes no power; I can turn it by hand.” It is well to meet this argument by saying, “Is that so? Well, let's see you turn it 250 times a minute.” That suggestion generally shows the friction load more nearly in its true light. Even a 1-hp. friction waste, if allowed to continue nine hours a day, twenty-five days in the month and twelve months in the year, costs as much as the interest on \$1,000, if energy is purchased at 3 cents per kw-hr.—*Electrical World*.

The aggregate power of the automobile engines manufactured last year in this country is equivalent to twice the potential energy of Niagara Falls, or 13,500,000 horsepower.—*Power*.

## Marking and Locating Corners and Boundaries

A discussion of the public land surveys, the means employed to identify the lands shown upon the official plats and the methods deemed most effective and equitable for the recovery of lost or obliterated corners.

ARTHUR D. KIDDER

Supervisor of Surveys of the General Land Office.

**I**N order to assume a suitable mental attitude for a consideration of the above subject one should think of the vast public domain which has been added from time to time to that area which was controlled by the Original Thirteen States, and consider the United States Government as the proprietor of this estate. The various treaties and land purchases entered into by the United States Government since its beginning have added to the original area immense territories known as the public domain, all of which, excepting the Republic of Texas, came under the immediate control of the Congress of the United States, which in a true representative spirit enacted suitable legislation for the acquisition of title by the individual citizen, the most important considerations being those of actual occupation by the grantee for a useful purpose. The survey and platting of the public lands has been incidental to the administration of the various laws providing for the disposal of the public lands by the government in favor of the individual, yet this work has been going on since the first settlements began in Ohio and it will not be entirely completed until the last ambitious settler returns from a fruitless search for an unappropriated homestead. Perhaps it is not generally known that the survey of the agricultural lands is not carried far beyond the demands of actual settlement on the public lands.

The system of rectangular subdivision has been admirably suited to the United States public lands, and only slight modifications of the system as originally conceived have been necessary in order to accord the plan of survey with advanced knowledge concerning the prin-

ciples of geodesy. There has been a gradual and pronounced improvement in the public land surveying methods in order to keep pace with the advancement in the science of surveying. The rectangular system provides for the unit of entry under the land laws, broadly, the quarter-section of 160 acres, upon a plan in which the square mile, or section of 640 acres, is the unit of survey. The unit of platting is the township of thirty-six sections, and the unit of control is the quadrangle of sixteen townships, bounded by standard parallels and guide meridians, all referred to an initial point of survey. About thirty-five such initial points have been located in widely separated localities in the United States and Alaska.

All agricultural entries are based upon descriptions in accordance with legal subdivisions shown upon the official plat. The plats are constructed in harmony with the official field notes returned by the surveyor. The land included in an entry is identified on the ground by fixed monuments established by the surveyor. A United States land patent grants to the entrymen a title of ownership to the area defined by certain fixed monuments on the grounds and related by description and outline to the official plat. The function of the United States surveyor has been fulfilled when he has properly executed and monumented his survey and returned a sworn official record thereof in the shape of complete detailed field notes and a plat. The function of the local surveyor begins when he is employed as an expert to identify the lands which have passed into private ownership; this may be a simple or a most complex proposition, depending upon the con-



dition of the original monuments as affected principally by the lapse of time since the execution of the official survey. The work of the local survey usually includes the subdivision of the section, already mentioned as the unit of official survey, into the fractional parts shown upon the official plat. In this capacity the local surveyor is performing a function contemplated by law, and he cannot properly serve his client or the public unless he is familiar with the legal requirements concerning the subdivision of sections. In the event that the original monuments have become lost or obliterated the surveyor cannot hope to effectively recover the obliterated corners without a full understanding of the record concerning its original establishment, nor can the surveyor hope to equitably or legally restore the lost corners until he has mastered not only the principles observed in the execution of the original survey, but the principles upon which the courts having jurisdiction over such matters have based their rulings. This is more of a study than is usually supposed by those unfamiliar with this class of work.

It is only within the past ten years that the Congress has made provision for the use of other than native corner material. An endless number of disputes over the restoration of lost or obliterated corners would have been avoided had provision been made long ago for the use of a permanent corner material. The model now in use is the so-called iron post, which consists of a section of iron pipe cut about 42 inches in length, of which 6 inches at one end is split and spread out to form flanges or foot plates; a bronze cap is bolted upon the opposite end of the post, and the pipe is filled with concrete. Three different sizes are used, 1 inch, 2 inch and 3 inch in diameter, to be used for different classes of corners. These are purchased in large quantities, complete as described, at costs ranging from about 80c each for the small size, to about \$1.40 each for the large size. These posts are usually shipped by freight in car load lots to distributing points central to the surveys to be executed. The

transportation of the posts by wagon and pack mule from the railroad to the points where the posts are finally planted in the ground adds considerably to the original cost. Suitable marks are stamped upon the bronze caps by the surveyor when he establishes a corner whereby the monument may be readily identified. Steel dies are used for this purpose. It has often occurred to me that surveyors everywhere could better serve their clients and the public by using a somewhat similar or uniform monument as here described, at a relatively slight cost, but of untold value in perpetuating carefully determined true corner points, indicative of true professional attention. For this purpose I would recommend the uniform size of 2 inch iron post above described, each to be stamped when employed with the year, number and name of the surveyor. All permanent corners should be witnessed by connection to fixed objects, and the surveyor should always preserve a complete record of the evidence recognized in the recovery of an obliterated corner, also a record of the retracements upon which the re-establishment of lost corners are based. Such records are of inestimable value and should be as carefully preserved as deeds and abstracts of title upon which ownership is asserted. I am perhaps idealizing the proposition, but the thought is worthy of serious attention.

To return to the subject of monumenting the public land surveys I will repeat that only native corner material was employed until a few years ago, with certain exceptions to be noted. This material consisted of native stone, if at hand, or in lieu thereof green wood posts cut near by. There is a great difference in the character of native stone which need not be here discussed, but a good durable stone, suitably marked, makes about the only first class native monument. A green wood post can last only a comparatively few years at best. In many prairie regions neither stone nor timber was available for the use of the early surveyors. In such localities foreign corner material was imported. This material consisted generally of

charcoal for deposit, or seasoned and sawed wood posts. A unique material was used in Western Oklahoma many years ago consisting of a galvanized iron frustrum of a cone, resembling a large old fashioned coffee pot. These were easily and permanently marked, and made a very durable monument.

It has always been the practice in the public land surveys to note the position of natural objects intersected by the surveyed lines; such records are of the greatest value in the future identification of the position of a line, and it has always been the practice to establish certain accessories at every corner, as witnesses to aid in fixing the position of a monument for all time. The line tree and bearing tree are the most common accessories to corner monuments in timber localities, and when green wood posts were planted the bearing trees were of vastly greater importance than the posts. The surveyor should be somewhat of a woodsman, and pay close attention to the timber species, the characteristic habits of the various forest trees, the different rates of growth, etc., etc., thus aiding himself in the identification of bearing trees and better understanding the choosing and marking of trees for future identification.

In the past most bearing trees have been marked at about breast height, upon a blazed surface some 4 to 6 inches in width, and 6 to 8 inches in height. A better way, as pointed out by an eminent forester, is to scribe the marks upon a narrow vertical blaze, perhaps 2 inches in width, and 12 or 15 inches in height, low down upon the tree trunk immediately above the root crown. The advantage in the latter method is two-fold; there is less injury to the tree, as the narrow vertical blaze will heal over in much less time than the wide blaze, and should the tree be cut down the marks remain upon the stump. In most species it is better to barely remove the bark and scribe the marks on the cambium or live tissue immediately underneath the bark. The cambium should not be injured any more than absolutely necessary in order to obtain a smooth surface for the scribe mark. It is better that the blaze

should heal over as quickly as possible; there-after a scar will be plainly discernible for many years on most forest species, and on all trees a new outer ring will grow each year. The annual rings serve a useful purpose in furnishing an accurate count of the years intervening from the date of healing over of a blazed surface to the year in which the old blaze is uncovered, unless the tree has died, and if the cambium was not originally injured this count runs to the actual year of marking.

Civilization has paid too little respect to the bearing trees marked by the early United States surveyors, and the demands of timber exploitation have served to remove much of the best physical evidence of the early surveys. No better accessory exists generally today than the bearing tree, where timber grows, and these will serve as useful a purpose for the local surveyor as for the United States surveyor. A few suitable marks are sufficient to identify a tree, and the fewer the better. The marks should never be uncovered unless absolutely necessary to prove the identification of a tree, and then the tree should be injured as little as possible. Two or more trees are usually marked, and the species, breast height diameter at time of marking, and the relative position from the corner are recorded. This data generally serves to identify the bearing trees without uncovering the marks. Nothing can be proven by only one unknown tree unless the original marks are in evidence, but two or more trees, or stumps, if of the proper species, size and relative position, may generally be depended upon as absolute identification. It usually gives the surveyor a thrill of delight to identify an old bearing tree, and, if the tree is sound, the old blaze may be uncovered and there will be found the original marks in perfect condition. The outer growth should be carefully removed as the chip will carry a perfect reflex of the scribe marks, a splendid exhibit in any court proceeding. It is not unusual to identify bearing trees or stumps of trees marked sixty or seventy-five years ago. The principle consideration is as to whether or

not the original bearing trees have escaped destruction.

Marks upon ledge rock or large boulders make first class witnesses for corner monuments, but such accessories occur in a comparatively infrequent ratio considering the total number of established corners. Mounds of stone have been used in large numbers as an accessory to corner monuments; these serve to attract attention, but are of little value in themselves as a means of identification. In the prairie regions it has long been a common practice to dig pits of specified dimension and position to witness a corner; these are valuable only in a firm sod, and the earth removed is a detriment unless thrown far away. Pits will gradually fill with material of slight different character and color from the native soil, and the native grass is superseded by a different species. It is not unusual to identify pits at corner points established as long as fifty years ago. In order to identify old pits the principal conditions are that the soil be not too loose, and that the original surface shall not have been otherwise disturbed.

The first step necessary to proceed with the identification of a survey is to carefully consider the conditions delineated upon the official plat and in connection with that to make a close study of the method and order of procedure of the original survey as recorded in the field notes. A monument is neither lost nor obliterated if it can be identified by comparing the evidence on the ground with the record of the survey. A monument is considered as obliterated when it cannot be identified by comparing the evidence on the ground with the record of the original survey, yet can be satisfactorily recovered by means of the testimony of witnesses having knowledge of the precise location of the original monument. The expert testimony of surveyors who have identified the original monument, prior to its destruction, and thereupon recorded new connections or accessories, etc., is by far the most reliable, though land owners are sometimes able to furnish val-

uable testimony. Thus it is seen that an additional record must be admitted in order to establish the authenticity of an obliterated monument. A lost corner is one which cannot be identified by the original field notes nor otherwise recovered by means of admissible testimony.

Untold numbers of corner monuments have been treated as lost when in reality the evidences of their identity were still in existence. I have encountered numerous examples of unprofessional work in this respect, where, by the exercise of skill and thorough search the original monuments could be positively identified, yet were treated as lost. The greatest difficulty to overcome in the recovery of an obliterated corner is that of establishing the authenticity of the record intervening after the destruction of the original monument.

It is of utmost importance to consider the relation of one monument to another, and the relation of all to the recorded natural objects and items of topography. This is the final step, and, with the exercise of skill and judgment, will lead to the actual identification of many original monuments which a careless or impatient surveyor would otherwise pass over as lost.

The courts may fix the position of a lost monument, and land owners may agree upon the position of common corners and boundary lines, but such locations have a different significance than the original, and may be better discussed by those familiar with legal procedure.

The surveyor is not prepared to consider the restoration of a lost corner until after he has exhausted every means of identifying the original, and at this stage of his work he should have determined upon a most probable position for the original monument based upon his findings in connection with retracements leading from known corners towards the lost corner and from that point on to other known corners in accordance with the scheme of the original survey. The principle of proportionate measurement enters into the problem at this stage and should always be recognized unless abso-

lutely outweighed by physical evidence to the contrary.

The principle of proportionate measurement most nearly harmonizes surveying practice with the legal consideration of the equities involved in controversies concerning lost corners.

In this process the surveyor follows the fundamental rules for balancing a survey on a plan by which his re-established lines are initiated from known original corners and termina-

ted upon other known original corners, with every line and corner of the re-establishments bearing similar geometric relations one part to another as is shown upon the original official plat. Many unique problems occur, but the underlying principles looking to solution are the same, and in this work as in most other professional work rules can be of little help in unusual cases without a mastery of the fundamental principles involved.

### COLLEGE NOTES

Statistics show that twelve football players were killed last fall. Only two of the victims were college men. Neither of the two college men were injured in an intercollegiate game. None of the twelve were more than twenty years of age, and the accidents occurred while the victims were making a tackle in a majority of the cases. In 1910, twenty-two men were killed; in 1911, eleven men; in 1912, thirteen men; in 1913, fourteen men.—*Ex.*

The Rhode Island State College has decided to reward the Editor-in-Chief and Business Managers of its college weekly with a gold seal in the form of a watch fob with the name and position of the recipient engraved on the back.

The authorities of the University of Pennsylvania are contemplating erecting a stadium with a seating capacity of 100,000.

Dean Holgate at Northwestern claims that the women of that institution are in a great part responsible for the defeat of last year's football team. He maintains that the women kept the football men up too late and gave them too many *rarebits* and *spreads*, which kept them out of condition.

Plans have been finally made for the erection in the very near future of a \$75,000 Y. M. C. A. building at the University of Michigan. There will be no dormitory and very little recreation facilities in the proposed building. It will be devoted entirely to religious work. With a

membership of nearly 1,300 the Michigan Y. M. C. A. lays claim to being the largest student Christian association in the world, with the possible exception of that at the University of Illinois.—*Ex.*

Princeton voted down the issue of compulsory chapel attendance by 960 to 169.—*Ex.*

Harvard has accepted University of Michigan's challenge and will play five games of chess by mail.—*Ex.*

Nine hundred students at Columbia University, according to recent statistics, earn the biggest part of their expenses while attending the university. The total amount earned is \$150,000. The journalists made the best showing, with an average of \$108.63.

Two hundred seventy-nine members of the Freshman class at Dartmouth, or approximately 62 per cent, were reported deficient in scholarship.—*The Dartmouth.*

The cafeteria at the University of Missouri serves about 500 people each day at an average cost to each of twelve and one-half cents for week days and fifteen cents for Sundays.—*Michigan Daily.*

In one of the Halls at Tufts, a room has been opened up recently, to provide a place for day students to eat their lunches.

Massachusetts Institute of Technology gives away \$23,000 annually in the form of scholarships.

## Engine Repairs by the Oxy-Acetylene Process

BY ALBERT F. BRENNAN, '13

THE first oxy-acetylene blow-pipes were made in 1901 by Fouche and Picard. By 1903 the process was being applied industrially and since that date it has developed rapidly both in this country and abroad. Today no firm which uses metal in any way is fully equipped if it does not make use of the oxy-acetylene blow-pipe. Industrial Journals that formerly paid no attention to the process now herald it as one that is revolutionizing current practice in metal working.

In this article the writer will not attempt to cover the entire field, but will confine himself to a description of three engine repairs with which he has come in direct personal contact.

One of these was carried out at the plant of the Hoosier Manufacturing Company, makers of the well known Hoosier Kitchen Cabinets, located in Newcastle, Ind. This repair was made last September. Previous to that time the company had been using, as a portion of their power equipment, a 300 H. P. single expansion Corliss engine. About five years ago, when the plant was somewhat smaller than at present, this engine and the boilers supplying it were being pushed to the limit of their capacity. On several occasions water was drawn into the cylinder and finally a crack appeared in the main frame casting which connects the cylinder and the pillow block.

The section broken was square and hollow, about thirteen inches on a side, and the metal was approximately two inches thick. The break was patched with boiler plate held by stud bolts on top, bottom and both sides. The load on the engine was then reduced to about 170 H. P. and in this condition the unit continued to run for about five years. At every stroke of the engine, however, the crack pulled

apart about  $1/32$ " or  $1/16$ " on the "crank" side of the casting.

Since a re-arrangement of machinery in the plant had to be made recently and it became necessary to increase the load to about 250 H. P., there was some doubt as to whether the engine would operate properly under this condition.

It was finally decided that the break in the frame could be repaired by welding. It was, however, absolutely necessary that the repair be carried out as quickly as possible since the engine was in constant service and the plant could not be shut down for any length of time.

Arrangements were made to begin the preparation for welding at about 6:00 p. m. Friday evening and endeavor to finish the weld by Monday morning, thus reducing the shut-down period to one-half a day, Saturday. The equipment, gas and supplies, together with an air chipping hammer, were provided several days ahead of time, while the men reported at the time mentioned above. The writer followed them a few hours later, arriving at about 11:00 p. m., the delay being due to a meeting of the Rose Tech. Club at Indianapolis.

Fig. 1 gives a very good view of the engine, the break and the method of preparing the work. The boiler plate patches were removed from the two sides and the top. The bolt holes are visible in the reproduction. The patch on the bottom was rather difficult to remove and since it was not in the way it was allowed to remain. A piece about ten inches square was then cut out of the top of the casting in order to make the break in the bottom accessible for welding. The crack on each side was chipped out as shown and we also chipped out on the inside along the bottom crack. This work was

all done with a compressed air chipping hammer and the fact that we were able to use this in place of doing the work by hand assisted us materially. This chipping hammer was going for five hours, and had the work been done by hand it would have been a long, tedious job. Those unfamiliar with the oxy-acetylene proc-

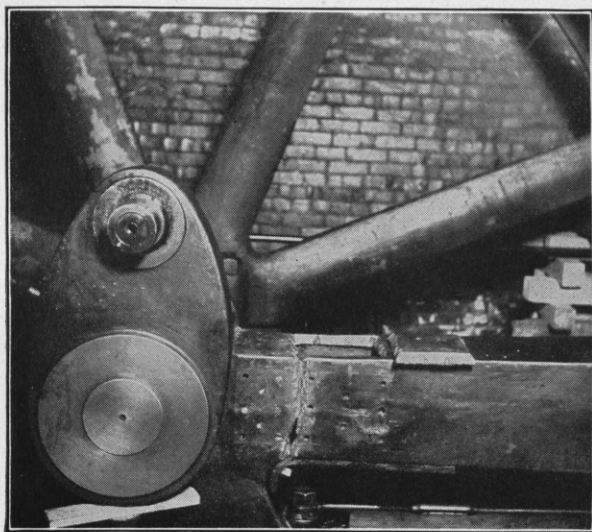


FIG. 1

ess will understand that it is necessary to chisel out this channel to insure the complete penetration of the weld. The two sides of the break are then fused together and metal is added from the filling rod held by the operator.

While this chipping was being done, several employees of the factory raised the ten-ton fly-wheel and crank shaft by means of jacks and crib-work. This was done so that the bottom segment of the bearing could be removed, and also to get the shaft itself out of the heat. It was later necessary to protect this shaft with sheet asbestos.

This portion of the work was finished about 3:00 o'clock in the morning and a fire brick furnace was built around the broken section in order that the casting might be preheated properly.

The flame of a preheating torch using natural gas and compressed air was directed against the casting, since it was necessary that this por-

tion be brought to a dull red heat before the weld was started.

During this slow process the workmen laid down on some work benches while the writer selected a drawing table to get some much needed rest.

By 6:00 o'clock in the morning we found that the casting was not heating as fast as it should so we obtained some charcoal and dumped it into the furnace, directing the flame of the preheating torch upon it. By 9:30 a. m. the casting in the vicinity of the break was a good cherry red and the weld was started. We welded the bottom first, working with the blow-pipe projecting through the hole which had been cut in the top. This part of the work was hard on both the men and the equipment, due to the radiated heat, but we got through without trouble.

As soon as this bottom weld was finished we dumped charcoal inside of the casting, filling it level full through the opening in the top. By again directing the preheating torch on this charcoal we soon had it burning well and started on the side welds. This part of the work was not so hard on the men, but it required more skill, since the break was in a vertical position. It is quite possible to make a vertical or even an overhead weld in steel, although it takes a good operator to do a satisfactory job. With cast iron, however, the proposition is different. Vertical welds are made with difficulty and overhead work is practically impossible, due apparently to lack of cohesion of the molten metal.

In this particular case we found that by welding up a sort of bridge across the break and fusing the filling rod into the pocket thus formed we could do the work well although progress was necessarily slow. In making the weld on the fly wheel side of the frame the operator had to hug one arm of the fly wheel and at the same time manage a long blow-pipe and the filling rod. Working in this disagreeable position, in heat that was intense, required perseverance.

As soon as we had finished both of these side welds we replenished the charcoal fire inside the casting itself and then proceeding to weld the square pieces in the top of the casting which we had cut out at the beginning of the work. This part of the work was quite easy since the men were welding on a flat surface

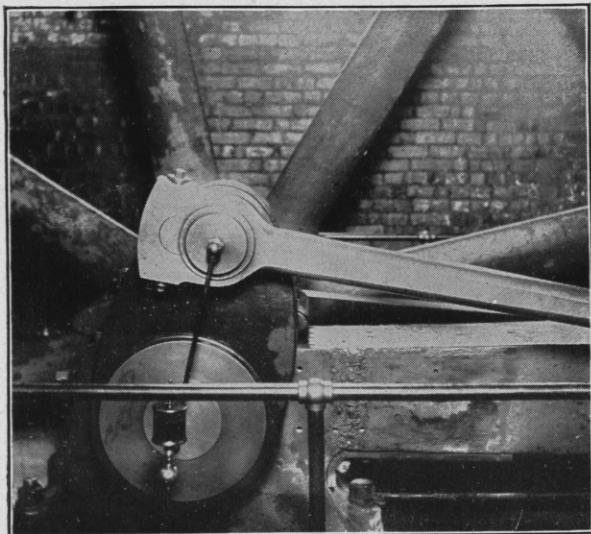


FIG. 2

and the metal seemed to be in good condition. The weld was finished at 4:15 in the afternoon.

We then rebuilt our furnace and put the pre-heating torch back on the casting until about 5:00 o'clock when we left the plant, having been on the job for about 23 consecutive hours.

The reader will understand that we left the casting with a good charcoal fire inside of it, fed by air from openings in the two ends of the casting and the whole was well protected from the air by the fire brick furnace. All of this was done to insure uniform and slow cooling.

We stayed in Newcastle Saturday night in order to look at the job Sunday morning. We found the casting in apparently good condition and could even see a small portion of the charcoal on the inside of the casting still burning. The casting, however, was cold enough that the hand could be laid on it at almost any

place, so that men from the factory were able to start work again and put the engine in running condition. The engine was on the job again Monday morning and has been running ever since without any trouble whatever. Fig. 2 shows the completed job. The casting was not repainted or ground off, at that time, so the weld is plainly visible.

The writer does not know what a new casting would have cost in this case, but it is safe to say that it would have cost considerably more than the making of the weld, due to the fact that the engine was an old one and it might have been necessary to have the part made special at an almost prohibitive price. Then too, as mentioned before, time was an important item. The plant actually lost only about five hours running time.

Another repair was carried out some time previous to this in the same town at the plant of the Indiana Rolling Mills Co. The broken part was the cross head guide of a 600 H. P. Corliss engine. Fig. 3 shows this part after the weld was completed.

The break occurred due to the settling of the cylinder foundation. Approximately 51 inches of 2 $\frac{1}{4}$ -inch metal had to be welded. Arrange-

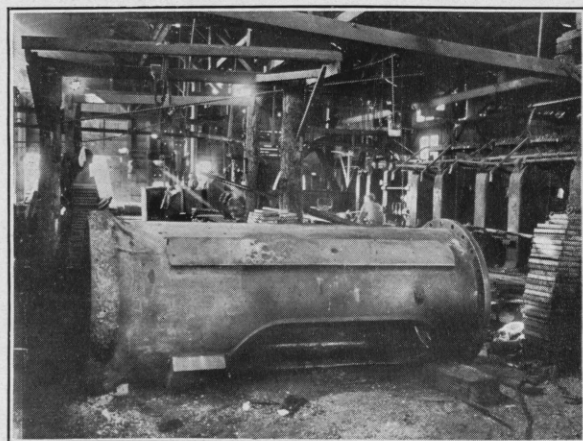


FIG. 3

ments were made whereby the employees of the factory did all the work of removing the casting from its position and chipping out the

break. Several of our men went over to personally arrange for preheating the part. The weld was made the next day. This casting has been in service for several years and in that time has given absolutely no trouble.

Another break of the same nature and due to the same causes occurred recently in the Lebanon power plant of the Terre Haute, Indianapolis & Eastern Traction Company. The engine was a 1200 H. P., cross compound Corliss. The break occurred in the cross head guide on the high pressure side. The casting was strapped and braced and the engine continued in service, but did not work satisfactorily. In this case, as in the one just mentioned, it was necessary to remove the casting. Fig. 4 gives a close view of the break after it had been chipped out preparatory to welding.

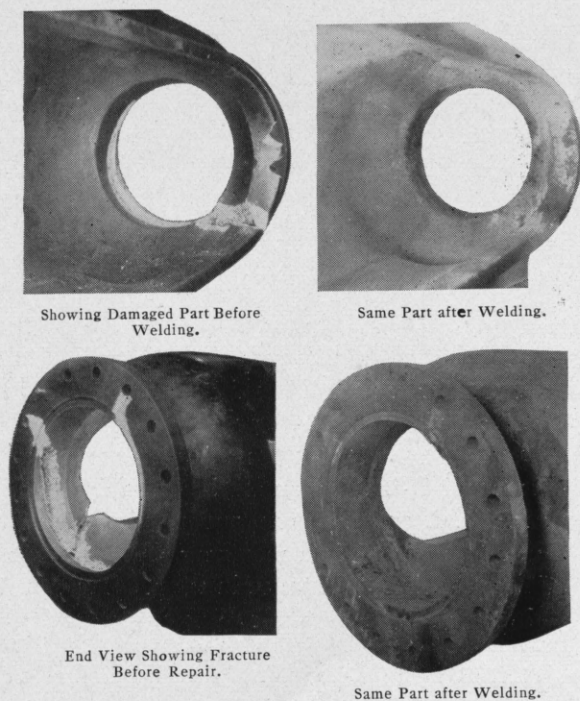


FIG. 4

There was a crack running around the neck of the casting near the flange and besides this a crack running from this neck to the opening in the side of the casting. In all, approximately 80 inches of  $2\frac{1}{4}$ -inch metal were to be welded.

Two men were sent up one morning to do the chipping and make preparations. The casting had previously been removed and placed in a suitable position. These men found it necessary to work until late at night to finish the chipping. Preheating was done by means of charcoal and an oil torch. This was started about 2:00 o'clock in the morning. Two more men arrived the next morning to help with the welding.

It will be seen that all of this weld was made from the inside, since it was easier to carry out the work in this way than if done from the outside. The actual welding was started about noon and was finished about 10:00 o'clock at night, although the blow-pipe was really burning only about six hours. We found it necessary, however, to build up the fire brick furnace and allow the casting to heat up again when the weld was about half finished. Fig. 5 shows the casting completed and in place.

In this case we were also assisted greatly by the fact that we could get compressed air to operate a chipping hammer. Handling was made easy since this company had a large crane and could turn the casting in any way desired.

In this case, time was not so much a factor since each engine in the power plant was idle one week in three. However, it would have taken several weeks to obtain a new part; also the work of tearing down the engine would have been the same had a new part been installed.

All of this work was carried out by the welding department of The Prest-O-Lite Co., Inc. The equipment used was one of the portable type, consisting of the necessary welding apparatus used with dissolved acetylene compressed in steel cylinders and oxygen in high pressure cylinders.

In work such as this, several factors contribute to success. First class equipment must be used as the radiated heat is so intense that only a properly designed and well constructed blow-pipe will operate properly. Proper heat treatment is absolutely essential. The aim must be to get the part hot, keep it hot and cool it slow.



The most important factor, however, is undoubtedly "the man behind the gun."

The oxy-acetylene blow-pipe is being used today successfully in many manufacturing processes as well as in a great variety of repair

work. Skilled operators are fast becoming more plentiful and in a very short time dependable oxy-acetylene operators will be procured as easily as good blacksmiths or machinists.

The writer wishes to express his thanks to

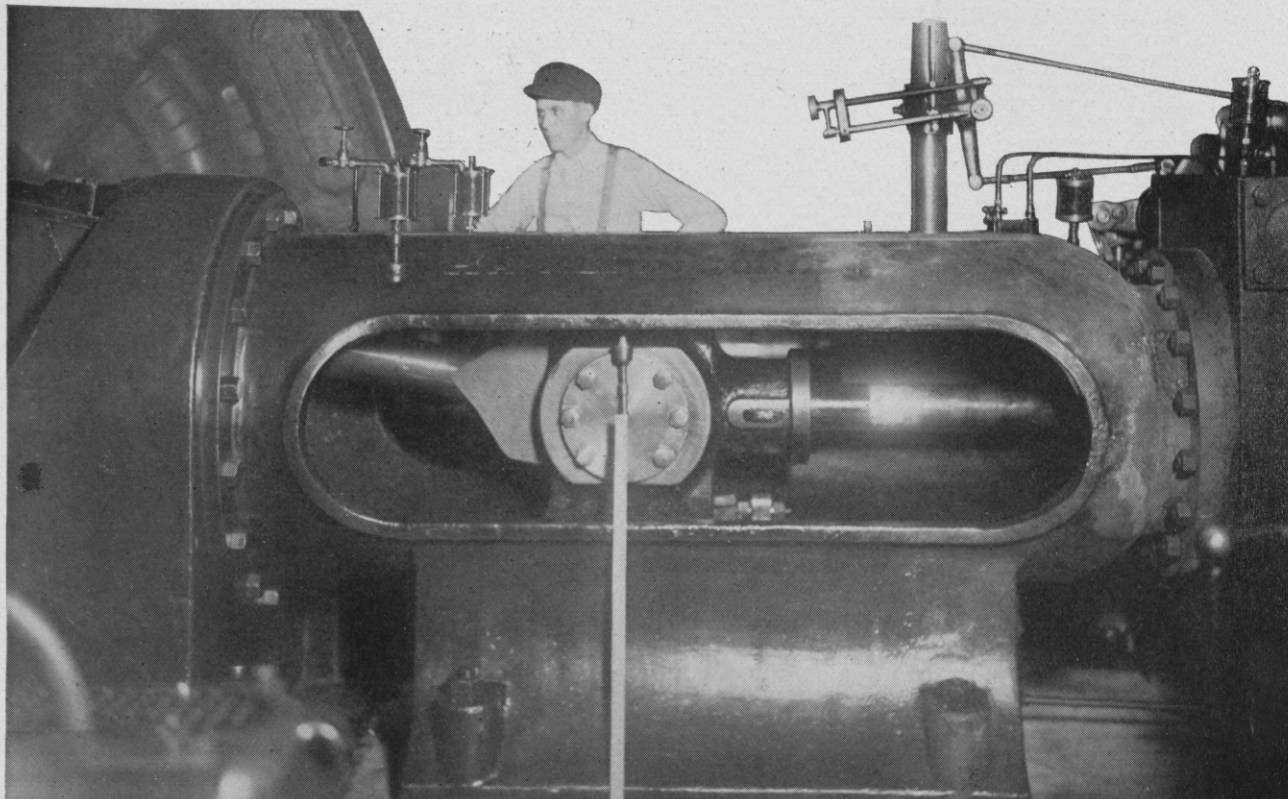


FIG. 5

work. The only limitation seems to be the lack of skilled operators. At present many users are training their own help as the process is not difficult for the average workman to master.

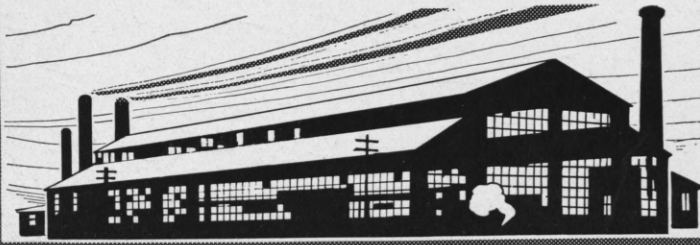
The Prest-O-Lite Company, Inc., for the use of material, cuts and photographs in this article and to the several members of that organization for their assistance in its preparation.

At Reserve this year the Sophomores chiselled out a groove in the side of the flag pole, in which to put their banner. A Freshman climbed the pole but could not find the flag.

At Vanderbilt last year the fraternity men had a general scholarship average of 70.1 per cent, and the non-fraternity men 70 per cent.

Missouri—Two young ladies who are twin sisters entered an egg eating contest last Monday. The final score announced was: Marie, 9; Mildred, 8.

The Junior prom at Wisconsin was a financial failure, largely due to the fact that house parties among the fraternities were prohibited.



## ALUMNI - NOTES

Mr. Arthur J. Paige, '02, whose first published article descriptive of the new Paige Gas Turbine appeared in the December *TECHNIC*, has obtained ample financial backing for his invention and is now preparing to put engines on the market embodying his entirely new principle. A group of Canadian capitalists with almost unlimited capital has agreed to back him practically on his own terms and Mr. Paige has located in Detroit preparatory to starting his plant in that city. He is now engaged in designing several different types of his motor, which will be tried out in practice before placing them on the market. He intends to build both automobile and aeroplane engines and expects the latter field to develop very rapidly. The demand for an automobile motor giving a large number of impulses is strikingly shown by the sudden rise in popularity of the eight and twelve cylinder engines, and Mr. Paige's motor should also satisfy this demand as it gives an even greater number of impulses without the mechanical defects of the eight and also without valves.

John G. D. Mack, '87, Professor of Machine Design at the University of Wisconsin, addressed the student body on the life and work of John Ericson. Professor Mack has made an extensive study of John Ericson's career and his lecture proved very interesting and profitable to everyone present, especially since the work of this great engineer was very slightly known to any students of the institute. His

versatility and genius were truly remarkable and were told of in an exceedingly entertaining and interesting manner by the speaker. Professor Mack also delivered a similar talk before the engineering students of Purdue.

Mr. Theodore L. Condron, '90, engineer in charge of the rebuilding of Thomas A. Edison's plant at Orange, N. J., will deliver an address at the Institute, April 20, on the subject of his work on the Edison job. The results of the great fire at Mr. Edison's plant have been the subject of numerous articles and disputes between adherents and opponents of reinforced concrete construction, and statements have been made that the fire was the greatest vindication of this construction and also that it proved its utter worthlessness. Mr. Condron is in a better position than anyone in the country to speak authoritatively on the subject and his lecture is expected to prove very valuable and interesting. *THE TECHNIC* will print it in full, if possible.

The Pittsburgh Rose Tech Club will hold a dinner at the Ft. Pitt Hotel on Saturday, April 17th.

C. Owen Fairchild, '12, who has been with the Portland Cement Co. at Independence, Kans., has obtained a position with the Bureau of Standards at Washington, D. C.

Born—To Mr. and Mrs. E. D. Kahlert of New York City, a son, Ernest D. Jr., on Easter Sunday.



## The First Great Celebration of Poly Night March 17th, 1915

ON the night of March 17, "Poly Night" was formally instituted with great noise, clamor, music and illuminations, not to speak of elephants, donkeys, goats, freshmen and other inferior animals. To say that it was successful is to put it mildly and the celebration seems to be established as an annual custom, to be improved upon and elaborated each year. It proves without a doubt that the old Rose Poly spirit is still alive and only needs a special occasion to once more exhibit its pristine pep.

The scheme for an altogether unparalleled and stupendous celebration originated in the Student Council, which has shown more ambition and activity this year than has characterized the august governing body for many years. The germ of the idea lurked in the minds of several ever since the setting of St. Patrick's day as the date for resumption of the green cap rule, when the rule was suspended for the winter, following the official and epic wholesale paddling of last December, which, by the way, was a snappy little occa-

sion in itself. For ages untold it has been the custom of all right minded students to absent themselves from the regular exercises of the Institute on St. Patrick's day, in spite of the emphatic disapproval of the President, the Faculty and other Germans. This is the nearest thing we have ever had to a celebration, and at the regular March meeting of the Council the subject of some further observance of the day was brought up, together with the suggestion that the whole school might attend the Hippodrome in a body and thus celebrate the fact that St. Pat was an engineer and also that the freshmen were once more appearing in their green caps. Accordingly a committee consisting of Compton, Sanford and Hild was appointed to frame up the arrangements. The original idea was for a comparatively mild gathering at the show, but the idea took so unexpectedly well that the committee became more ambitious and decided to pull off something more elaborate. Less than two weeks remained, however, to get things organized, and



GRAFE HAD A FIERY MOUNT.

there was much to be done and much that had to be rushed through or omitted altogether. A real, regular band was organized for the occasion, where no band was before; the sophomores undertook to create an elephant; the sale of tickets for the theater party was larger than the most sanguine had ever dreamed would be the case. The whole school backed the project to a man and plans were rushed through in short order.

The irrepressible freshmen broke forth with a parade of their own in the afternoon, but the big official parade was scheduled for 7 P. M., to start at the Heminway house. At that time the gang gathered 150 strong and marched off with the band in the lead, playing its extensive repertoire in tones that brought the wondering crowd from all directions. Following the band came the Seniors, chastely attired in green hats. Then came the Juniors led by a real goat, and each one wearing a Dutch comedian derby and spinach whiskers. Next followed the official elephant, ten feet in height and a wonderful sight to behold, at the head of its sponsors, the Sophomores. Finally came the Freshmen, led by a donkey, which could be quite easily distinguished from the other 1918's by reason of his intelligent expression and the absence of the official green cap from his head.

The down town district having been pretty thoroughly covered and aroused and each corner cop having been made the center of an informal concert, the line of march led to the Hippodrome, in front of which the band established itself and settled down to give some real music, interspersed with yells and other evidences of enthusiasm. Meanwhile the Sophs ditched the elephant in a near-by garage, little suspecting that they were never again to gaze with fond eyes upon their noble handiwork. Where his massive carcass now rests is known to no man but his memory will remain green for many years to come.

The entire center front section of the Hippodrome had been reserved and about 160 seats were occupied a few minutes before the curtain went up, during which time the audience

was not allowed to overlook the fact that something unusual was in their midst. The whole gang was feeling right and soon had the audience with them, the informal fife concert by Sammy Stone and Freddy Kingery making a special hit. The show having begun, it was allowed to proceed undisturbed to its finish, except when one comedian made a suggestive



THE JUNIORS ALL DRESSED LIKE MOSES.

remark in which he connected Rose Poly students with a certain well known establishment for the sale of malt and vinous liquors, at which there was evidence of great indignation.

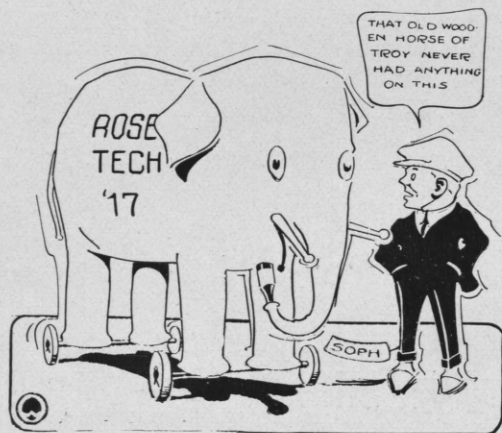
After the show it had been intended to pull off a big stunt at the Heminway House as a climax to the evening. The ceremony centered around the elephant, but great was the consternation when it was found that the pachyderm had escaped while his keepers were in the show and thorough search resulted in no trace of him being found. The ceremony of the founding of The Order of the Elephant was thus somewhat delayed and disarranged, but it was nevertheless carried through and all present initiated with the accompaniment of green fire and oratory.

#### THE ORDER OF THE ELEPHANT; IT'S ORIGIN AND IT'S PURPOSES.

The Order of the Elephant was founded for the purpose of perpetuating and keeping alive in the school the spirit shown at the first Poly

Night celebration and to carry forth some of the same spirit into the ranks of the alumni. Its insignia is intended to be a recognition badge that can be worn only by graduates and seniors (after March 17) and will take the form of a small plain lapel button carrying a white elephant on an old-rose back-ground.

Only full members are entitled to wear this official insignia. A full member is known as a Royal Black, the requirement being that he is a senior on March 17, takes part in the celebration and ceremony and has previously taken part in every celebration while in school, as



THE SOPHS REVIVED THE OLD ELEPHANT IN GOOD FORM shown by the appearance of his name on the official roll of the order. The Juniors are given the title Embryo Blacks and to them is entrusted the next year's celebration through a committee of five chosen from their number by the Student Council at its April meeting, the committee being given charge of all records, paraphernalia, etc. The Sophomores are the White Elephants and are given the custodianship of the official Elephant. Freshmen are called followers of the Elephant. The degrees are conferred on each individual on March 17 and he must be present in person at the time of conferring the degree, as a part of the Poly Night celebration. To gain the final degree a man must have received the earlier degrees, unless by special action of the Student Council. Distinguished alumni may be elected to honorary membership.

In as much as the official insignia is granted only to those about to graduate it will serve as a permanent recognition badge for all future alumni, as the design is to be unique.

#### INTER-FRATERNITY BOARD.

THE third meeting of the fraternity board sometimes designated the world's most unique deliberative body, was held at the home of President Mees, Friday evening, March 26. At this meeting the committee, consisting of Finley (P. I. E. S.), Kingery (Theta XI) and Compton (A. T. O.), reported its recommendations for changes in the agreement to introduce the Sophomore pledging system, as passed at the previous meeting. It soon became apparent, however, that the committee's recommendations would not have clear sailing, as both Theta Xi and P. I. E. S. jumped clear off of the band wagon, to which they had been so laboriously boosted with the help of Dr. Mees at the previous meeting. The two fraternities named, together with Sigma Nu, proceeded to form a reactionary element and with the aid of the two-third majority rule, proceeded to block each recommendation of the committee as it was brought up. This situation caused much frothing at the mouth on the part of the other four, who constituted the radical element and backed the committee, but they were powerless as each measure introduced was voted down by three votes. When the important clause, that referring to the time of pledging, was introduced and rejected, by a vote of three to four, the meeting was absolutely dead-locked and the representatives floundered around in a sea of arguments, near-arguments and imitations of arguments for three hours. The four in the majority showed not the slightest tendency to yield, and the other three put forward propositions for pledging before Christmas, which did not meet with favor as compromises. The situation was critical and the talk became quite interesting to those not half asleep. It seemed likely that the whole agreement would have to be abandoned so rather than to have this hap-

pen or to talk all night, the Sophomore principle was finally dropped and after much voting and wrangling it was unanimously decided to institute a close season extending to the beginning of the second term to be followed by a rushing season of two weeks at the end of which freshmen can be pledged. A committee with Sanford (Alpha Chi Sigma) as chairman and consisting of one representative from each fraternity is to arrange the details and draw up a new form of agreement in accordance with this principle.

While neither side in the controversy will concede that the arrangement is ideal, at the same time it certainly will be better than early pledging and the closed season will be especially good. The plan will also be somewhat easier on the fraternities than the sophomore rule would be and is open to none of the objections brought forward against the latter system. The rules for bidding will have to be handled very carefully and if all the details are carefully considered there is no reason why the new arrangement should not work out in practice.

#### THESES.

Test of producer gas system of a glass factory—E. D. Brauns, J. N. Compton.

Study of Steam and Return Flue Gases as partial draft for furnaces under gas retorts—J. M. Sanford, R. M. Smith.

Design of a suspension bridge across Otter Creek at Forest Park—F. J. Baxter, E. J. Sheldon.

The use of hydrated lime to displace cement in concrete—C. E. Downing, H. E. Wallace.

Study of Terre Haute bank gravel and Greencastle limestone for use in concrete—J. C. Harger, G. J. Stoner.

Design of a steel arch bridge for Forest Park—L. H. Reeder.

Test of steam and electrical equipment of Speedwell mine at West Terre Haute—T. E. Dunn, W. F. Turner.

Design, construction and operation of motor-generator set—F. E. Bundy, J. L. Pirtle.

Determination of cost of production and distribution of power at St. Mary-of-the-Woods—S. M. Finkelstein.

Efficiency Test of Power Plant at Root Glass Factory. (Electrical)—J. E. Ham, E. B. Plott.

Investigation of the uses of Electrical Power at St. Mary-of-the-Woods—E. J. Hegarty, M. V. Hegarty.

Efficiency of lamp shades with various sizes and types of lamps—E. E. Hesse, H. R. Woodward.

Design, construction and test of squirrel-cage rotor for three-phase induction motor—P. L. Millette.

Design, construction and test of potential transformer—Thomas Walsh.

Investigation of the heating and ventilating of American Theater—A. T. Arnold, C. N. Stevens.

Efficiency and cost test on power plant of American Theater—R. F. Burns, T. E. Drake.

Experimental test on bronze and cast iron bearings—H. E. Mayrose.

Efficiency test on Quincy double expansion engine and Byron & Jackson centrifugal pump at Terre Haute Water Works Co.—L. D. Gwinn, O. W. Stilz.

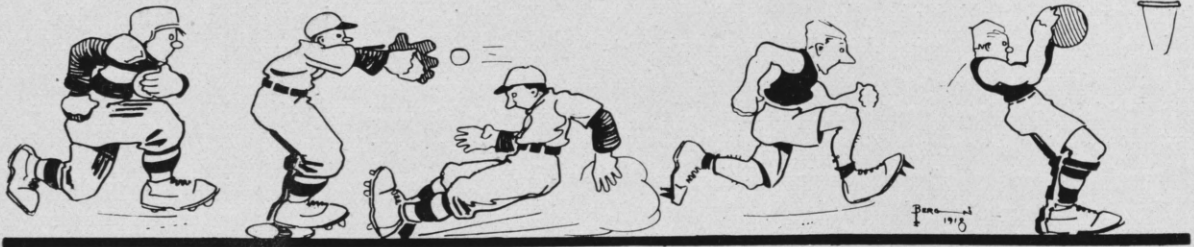
Investigation of the effects of agitation on foaming in boilers—W. E. Carter, E. P. Wallner.

Experimental investigation of the distribution of stresses in curved beams—H. G. Coordes, J. R. Sage.

Efficiency test of power plant at Root Glass Factory. (Mechanical)—C. S. Duddleston, John Reid.

Experimental determination of data necessary for the design of band brakes—T. T. Hardman.

Investigation of distribution of steam consumption at St. Mary-of-the-Woods—F. E. Sullivan, J. R. Wisely.



# ATHLETICS

Rose Poly's athletic activities since the last issue have been confined to preparation for the coming baseball season and to track. The Association finances are, as usual in a very bad condition. One thing about it, however, we know where we stand. Our total outstanding debts at the end of last year amounted to nearly five hundred dollars and the outlook for the 1914-15 programs is a deficit of only about two hundred. Thus with another year of conservative financing for the various teams the R. P. I. A. A. will be a really solvent body. Our credit is still intact thanks to Dr. White's vigorous attention and as yet we have had no trouble on that score. No meeting was held during the last month, due to lack of business, although Manager Compton has completed his report of basketball. Our managers deserve more credit than is ordinarily given them by the average student who has not served a term. Countless little duties are incessantly wanting his attention and then if he doesn't appear around the gym every other night the players want an introduction to "the stranger."

The summary of the basketball season, financially is given below:

Total expense for home games.....	\$509.80
Total expense for trips.....	273.00
Petty cash .....	10.15
All other expenses .....	121.01
	<hr/>
	\$914.56

Receipts.	
Trip guarantees .....	\$290.00
Receipts for home games.....	187.50
First Normal game.....	52.25
Second Normal game.....	71.55
	<hr/>
	\$601.30

Net loss for season—\$313.26.

Thanks to Mr. Wischmeyer this last item was not more. One thing some of the players overlook is that when they charge a bill to the Athletic Association they fail to make the party understand that they themselves are a part of the same Association and will be called on to pay their share of that account. In the case of several doctor bills this is known to have a considerable effect.

As for baseball the prospects are encouraging to Captain Bobbie and a goodly squad has put in regular attendance. Twenty-two men are doing their best for Old Rose and although we have not unearthed that new pitcher as yet, between Brownie and the Captain we are hoping to get away with a clean record. Their support is certain to be of the best with the large number to choose from and of course we expect to beat Normal both games in a decisive fashion.

The men who reported are as follows: Michaels, Finley, Williams, Wagner, Trimble, Buck, Klein, Finklestein, Cooper, Stoltz, Drake, Brown, Smith, Hegarty, Bake Carter, Millotte, O'Brien, McKeever, Barrett, Yatske and Larr. It will be noticed that our own

Sammy has turned his entire energies to the national pastime. This is a severe blow to our rooters, but perhaps by the time the Normal games comes off and the Rose Poly elephant is resurrected his (Sam's) spirit for mental activity will outclass that for physical and he will be with us on the side lines.

Another thing to notice about the candidates is the large percentage of Freshmen who are out. This is certainly a commendable spirit on the part of the men of '18 and they should all remember that if success doesn't come to them the first year a good man will get there in the end.

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#### TRACK.

With the advent of Spring the thin clads of the cinder path have been called out for duty. Manager Leitch has energetically determined to stage a meet or so but his finances are limited to a very small figure. The inter-course meet will be held for the possession of the faculty cup and every track man should be on hand to do his best for his course. The Chemists have a better chance than ever to show their hitherto questioned superiority as Sanford, Smith and Heedwohl ought to be able to annex a few of the deciding points.

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#### STUDENT IN COLLEGE TWENTY-SEVEN YEARS.

Columbia University has a student who has been in its classrooms and corridors for the record time of twenty-seven years. He has taken the degrees of LL. B., LL. M., A. B. and A. M. and is earnestly engaged in the pursuit of others. Such devotion to the halls of learning is probably without parallel, unless it be in the universities of China, where, we have been told men live and die in the study of Confucian philosophy.

Admiration for the singleness of purpose evinced by this American student is somewhat chilled, however, by a mercenary explanation

There is a bare chance of a meet with Normal and if anyone shows sufficient ability he will be sent to the meet at Purdue.

Tennis is also sprouting and we are all pulling for a championship in both the singles and doubles this year at Hanover. Get after it you tennis men!

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#### GROWLS AS WE HAVE NOTICED THEM—A LA RALPH WHITE.

1. Millette is back with us again on the diamond for his last appearance.
2. Fink says he is as good as any one out there, but we won't argue with him as we know his ability as a lawyer.
3. "Willie" "Ricky" Trimble has so far ably held down the championship for official crabber. Without him the life of a manager would be but a question mark.
4. The track team bids fair to answer to the roll call of Manager Leitch and his miler. Ralph Stuart.
5. "Buddy" Compton says he's not in shape for a tennis champion this year. The life of a Senior is a fast and merry one, isn't it? Especially if you are an editor. Leave it to Wentz.

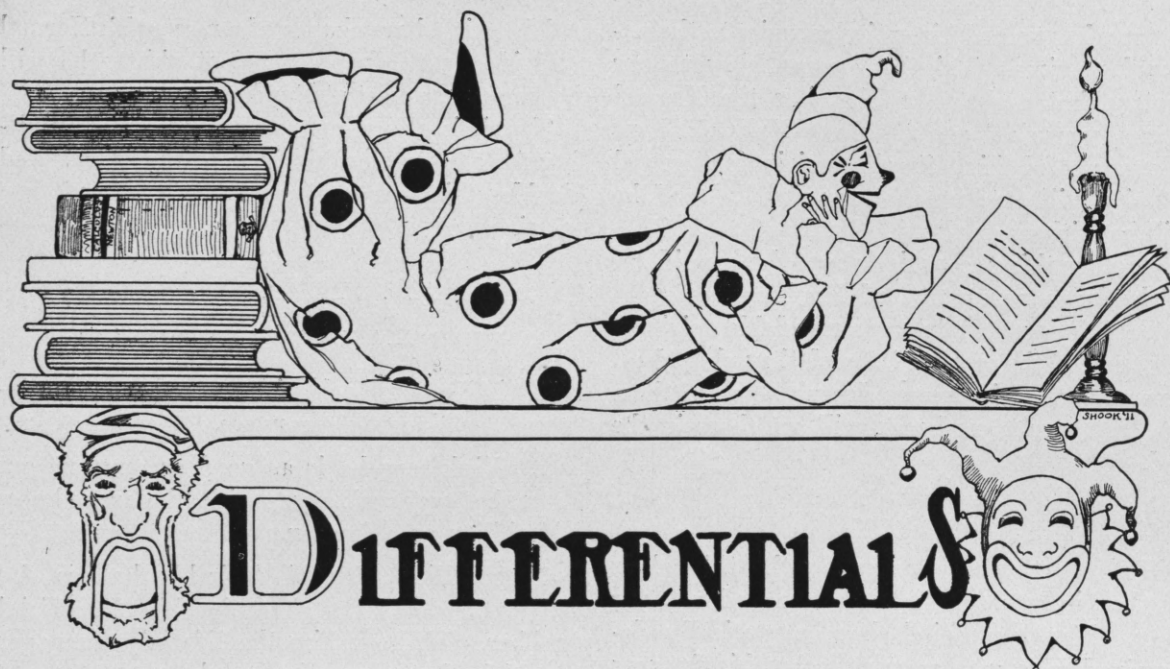
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of his ardor. It appears that he enjoys an income of \$5,000 as long as he remains in the university.—*Chicago Post*.

The following presidents were members of Phi Beta Kappa: John Quincy Adams, Harvard, 1787; Franklin Pierce, Bowdoin, '24; James A. Garfield, Williams, '56; Chester A. Arthur, Union, '48; Theodore Roosevelt, Harvard, '80; William H. Taft, Yale, '78.—*Phi Beta Kappa Key*.

At the University of California the football team has the use of one of the fraternity houses during the month of training preceding the Stanford game. The men who vacate the house are cared for by the other fraternities.—*Ew*.





AS the light appears from under the bushel, so has the poetic ability of Mr. Thomas R. Tygett crawled into the rushing wind and found itself able to remain alight (like Tom's ever-present cigarette). In publishing these few verses by Mr. Tygett, it is hardly necessary to call attention to the marvelous powers of observation and creative poetic genius of one of the most noted Aloomni of Shortridge High School.

#### THE CIVIL.

The Civil has an easy time.  
 He sits upon the sands  
 In gingham shirt and corduroys,  
 With dirty face and hands.  
 He toasts himself some wieners  
 And he boils some coffee too.  
 I think the Civil surely has  
 An easy time. Don't you?

He levels up his transit, and  
 He squints with all his might,  
 He points it at most anything  
 And screws the thing up tight.

If anything's the matter,  
 He cusses red and blue.  
 I think the Civil surely has  
 An easy time. Don't you?

#### THE ELECTRICALS.

As far as plumbing is concerned,  
 Benighted is my plight;  
 I cannot tell a motor from  
 An incandescent light.  
 At Rose, the bunch is pretty good,  
 In fact, the best bunch yet.  
 But the thing that they're most famous for  
 Is Patrick L. Millette.

#### THE CHEMIST.

How doth the little chemist work?  
 He pours and heats and weighs.  
 He works on one analysis  
 For days and days and days.  
 The chem. lab. has an awful smell.  
 He doesn't seem to care;  
 But from his tripod sends another  
 Scent into the air.  
 If they all grow up to lasting fame  
 By posing as great men,

Because of work in chemistry,  
 What credit is there then?  
 I'm sure they wouldn't waste their time  
 If mothers all would say:  
 I didn't raise my boy to be  
 A chemist.

## THE MECHANICALS.

The Make-a-nickels all are tough  
 From Carter down to Runt.  
 They all chew plug tobacco  
 As an ordinary stunt.  
 They always work in gangs of two  
 (Whenever the "Prof." looks in).  
 And always cut at every chance  
 (Excepting Lawrence Gwinn).

NOTE—When asked why he had no poem for the architects, Mr. Tygett said, "Oh, just tell them that Carlisle's a good scout, and let it go at that."

## BULLETIN.

Latest song hit—"I Didn't Raise My Dog to Be a Wiener."

Jo Jo—"Now we turn the tube thru the angle Theta. Can any of you tell me what that angle is?"

Lyons—"Theta."

Jo Jo—"That's Right."

Mr. C. Carlisle will entertain with a Salvation Party at the Lyon Tabernacle during the meetings. Mr. Casey Stoltz will be the guest of honor.

When called upon to give an impromptu speech on the war, Louie Bake responded:

"I don't know anything about war, but I'd like to know where the driver sits on these torpedoes."

Jo Jo—All those who were absent had better come up and report or they'll be marked tardy.

Waiter—"Will you have spaghetti?"

Freshman—"No spaghetti, it's too hard to mobilize."

She—"Why do they paint the inside of a chicken coop?"

He—"To keep the hens from picking the grain out of the wood."—*Lehigh Burr.*

First Soph—"I don't see what is going to happen if Constantinople is destroyed."

Second Soph—"Gee, you are ignorant about Mineralogy."

Some daring contributor called attention to a slight misuse of the language by Dr. White and now the Doctor submits the following specimens of English as she wrote, culled from the numerous genus found in the recent mid-term examination papers.

"Sulphur is exceedingly detrimental because it forms a slag which clinquires the grates."

"The gas which comes off is kind of a liquidly gas with some little solid matter."

"Anthracite coal is used because it has a large percent of fixed carbon, not much volatile matter and no hydrocarbons scarcely."

"Coal is disilated and the hydrocarbons will be driven off."

"The modes of formation of peat will start from plant life which fall down."

"The coal is throwed in the fire places, then water is passed around."

Some samples of simplified (?) spelling: feuls, volitale, combinds, anthricite, pleantiful, gass, conscentrated, itomic.

## IN THE ENGINEERING GAME.

"My wife says that she is going to buy cheaper hats and save money."

"Ah, I see; reducing her overhead expenses."

If you want to read any of these jokes (?) to a girl, be sure that she has pretty teeth, and you'll draw a laugh every time.

## SHERLOCK AT FAULT.

(From "Western Wanderings," by Conan Doyle, in the February *Cornhill*.) The catching seemed to be extraordinarily good, especially the judging of the long catches by the bleachers, as the outfielders, who are far from any shade, are called.—*Chicago Tribune*.

## NEW BOOKS.

"Inside Baseball"—by P. Millette.

"How to Pass in the Mid-terms"—by P. Bright.

## APPLIED MECHANICS



ANGLE OF REPOSE

Whenever a man begins to take himself seriously, everybody with a sense of humor moves up nearer, so as to miss nothing.—*Puck*.

The Senior—"You see, dear, absence makes the heart grow fonder."

The Girl—"But presents are more effective."

Movie Operator—"What shall I do with this film? There is a tear in it that cuts right through the hero's nose."

Clever Manager—"Ha! Just the thing! Bill it as a feature in two parts."

## SELF-BETRAYED.

A sentry was giving close attention to his post in the neighborhood of a British army camp in England, challenging returning stragglers late after dark. The following is reported as an incident of his vigil:

"Who goes there?" called the sentry at the sound of approaching footsteps.

"Coldstream Guards!" was the response.

"Pass, Coldstream Guards!" rejoined the sentry.

"Who goes there?" again challenged the sentry.

"Forty-ninth Highlanders!" returned the unseen pedestrian.

"Pass, Forty-ninth Highlanders!"

"Who goes there?" sounded a third challenge.

"None of your d—n business!" was the husky reply.

"Pass, Canadians!" acquiesced the sentry.

—*Omaha World-Herald*.

The following is a list of unusual words found in the Senior examination in gas engines, with their definitions:

airoplane, arrangement for cooling automobile engine.

combustibill, statement of charges for fuel.

shuting, noise made by motorcycle once in a while.

propper, little rack to hold back wheel of motorcycle off the ground when fixing a puncture.

porcelin, porcelean, porcelane, a substance much similar to porcelain in chemical and physical properties.

condens, parts of a gas engine analogous to the condirons of a motor.

bituminious, two-cycle.

explotions, complaints made by pedestrians. scavanging, going faster than thirty miles an hour.

sourse, a kind of sliding valve.

feul, crank.

## AT THE GLEE CLUB CONCERT.

"What do you think of their execution?"  
 "I'm in favor of it."

Jones—Is this a second hand store

Clerk—Yes, sir.

Jones—Well, I want one for my watch.—*Ex.*

It was Commencement Day at a well known women's college, and the father of one of the young women came to attend the graduation exercises. He was presented to the president, who said, "I congratulate you, sir, upon your extremely large and affectionate family."

"Large and affectionate" he stammered and looking very much surprised.

"Yes, indeed," said the president. "No less than twelve of your daughter's brothers have called frequently during the winter to take her driving and sleighing, while your eldest son escorted her to the theatre at least twice a week. Unusually nice brothers they are."

What magazine is best, come tell,

I asked three maids one day.

"The Cosmopolitan," cried Nell.

"The Century," said May.

With a merry twinkle in her eye,

And a saucy smile, sweet Bess

Declared—I know the reason why—

"I love the College Press."

—*Technic*—1894.

"Officer," said a Terre Haute householder, "there's a burglar in my house."

"I ain't got nothing to do with burglars," responded the policeman. "I'm on the traffic squad."—*Ex.*

"Wash ish it wash flies wash hash four legs?"

"Give up."

"Two canary birds."—*Jester.*

She—"The man I marry must have common sense."

Harold Smith—"He won't."

Housewife—"I'm sorry, but I advertised for a Scandinavian cook."

Applicant—"Lawd sake! What diffunce do it make about a lady's religion, dess so's she can cook?"—*Judge.*

## NO CLAIM TO FAME.

Enrico Caruso, the famous tenor, said at a recent dinner given for him in New York:

"No man is as well known as he thinks he is. I was motoring on Long Island recently. My car broke down, and while the chauffeur was repairing it I entered a farmhouse to get warm.

"The farmer and I chatted in the kitchen before the wood stove and when he asked me my name I told him modestly that it was Caruso.

"At that name he threw up his hands.

"'Caruso!' he exclaimed, 'Robinson Caruso, the great traveler! Little did I ever expect to see a man like you in this here humble kitchen, sir!'"—*Ex.*

Wives of other men remind us

We can let our wives dress fine,

And departing leave behind us

Bills to worry another's mind.—*Ex.*

She waited at the church in vain.

Where could the bridegroom be?

"I fear this wedding will go off

Without a hitch," said she.—*The Jester.*

Irate Virginia Colonel (to his daughter): Elizabeth, how could you be so inhospitable to the young man who called last night?

Bess: Inhospitable!—why, dad—

Pater: You should by no means have let him go without asking him to breakfast.—*Columbia Jester.*

Every night over at the power plant, the Brush on the dynamo sparks with the commutator and makes light on the subject.—*Northwestern Magazine.*

## PLACE FOR ALL THINGS.

"Just one kiss," he whispered low—  
The wicked little devil  
Cast her eyes demurely down,  
"I can't, Jack, on the level."  
He stood rooted to the spot,  
Downcast and sad until,

She clasped him sweetly by the hand,  
And led him up the hill.—*Ex.*

Absent-minded man (whose wife is at the seashore): Let me see; I've given the cat some seed and let the bird out. I guess that's all she asked me to do.—*Ex.*

Old Maid: Young man, isn't it against the law to go bathing in there?

Kid: Yes'm, but it's easy to dodge de constable if ye want to come in.—*Ex.*

Senior Lawton (to a hardware dealer): "Have you a steam-engine indicator that I could hire?"

Hardware Dealer: "Well, I live in Decatur, but I don't know any one who has a steam engine to rent."—*Ex.*

HONK! HONK!

'14: "Jim snores terribly."

'15 (Anautoist): "Yes, he sleeps with his cut out open."—*Coyote.*

Kicker: "Our second baseman would make an excellent swimmer."

Snicker: "Why so?"

Kicker: "He strikes out so boldly."—*Ex.*

It used to be that when women had little or nothing to talk about they talked about clothes. But nowadays when they talk about clothes they have little or nothing to talk about.—*Ex.*

Quoth he in the parlor,  
As he looked upon the light,  
"Either you or I, old fellow  
Will be turned down tonight."

"I was only whispering sweet nothings in Pat's ear," said Dutch, as Sherman entered the parlor in search of his glasses.

"Strange you should have mistaken her mouth for her ear," retorted Sherman as he left the room.—*Ex.*

Mrs. Clark came running hurriedly into her husband's office one morning, "Oh, Dick," she cried, as she gasped for breath, "I can't find my diamond ring anywhere."

"It's all right," replied Mr. Clark, "I came across it in my trousers pocket this morning."—*Ex.*

First Knox: "Lend me your new hat today, will you?"

Second Knox: "Sure; but why all the formality of asking permission?"

First Knox: "I can't find it."—*Ex.*

## A GOOD DEFINITION.

Johnny (aged three): "What is a Tech boy? Well, it's like this. Like you teck a peach—well them Tech boys teck things just that way, 'cause I saw one of them tecking a kiss from my big sister. That's why they call them Tech boys."—*Ex.*

Father (visiting at college): "My son, these are better cigars than I can afford."

Son: "That's all right, father; take all you want. These are on me."—*Implement Age.*

Mrs. Newlywed: Give me two pounds of coffee in the bean, please.

The Grocer: Two floors up, madame; this is the ground floor.—*Purple Cow.*

## AFTER THE MIXED DRINKS.

He: I'd like to propose a little toast—

She: Nothin' doin', kid; I want a regular meal.—*Michigan Gargoyle.*

The noblest pursuit of woman—an honest man.—*Ex.*



**THEORY OF MEASUREMENTS.**—By James S. Stevens, Professor of Physics in the University of Maine, 5½x7½ in., 80 pages; New York, D. Van Nostrand Co., \$1.25 net.

The book is designed to be used as a text book or as a laboratory guide for a three years course in the physical laboratory.

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Other topics treated are: Measurements, Errors, The Curve, The Integral, The Arithmetic Mean, A Constant Integral, Weights, The Adjustments of Observations, Short Methods, The Precision of Measurements, Graphic Representations, Precision Measures and Their Derivation, Average Deviation, Probable Error, The Propagation of Errors, The Direct Problem, The Converse Problem, Fractional Method Best Magnitudes and Ratios, Plotting, Construction and Interpretation of Curves, Application to Laboratory Problems, Negligibility, Applications, Criteria, Significant Figures, Empirical Formulae and Constants, Method of Procedure, and Types of Curves.

**METHODS IN METALLURGICAL ANALYSIS.**—By Charles H. White, Professor of Mining and Metallurgy in Harvard University and the Mass. Inst. of Tech. 356 pages, 106 illustrations. New York, D. Van Nostrand Co. \$2.50 Net.

This book is a very complete compendium of the most commonly used methods of metallurgical analysis. In addition to description of

analytical methods for ores, slags, limestone, petroleum, steel, alloys, coal, water, etc., it also describes methods of sampling and explains the fundamental principles of analysis. There are also included in the book a valuable set of reference tables of use in the laboratory and an extensive bibliography. As a practical laboratory reference work for practical methods of analysis, this little volume can be very strongly recommended.

#### EFFECTS OF ILLUMINATING GAS ON ASPHALT PAVEMENTS.

**C**ONCLUSIONS from laboratory tests show (a) that illuminating gas without agitation rapidly liquefies asphalt cement and refined asphalt and destroys its value as a cementing medium and (b) that illuminating gas not only attacks but combines with the asphalt, increasing its weight. The leaking gas naturally follows the lines of least resistance, which may be either in a nearly vertical line and show the results almost immediately above the leak or, what is extremely hard to find, may follow a long distance through a vein of porous earth or along the space formed by some old settled trench and reach the pavement surface a long distance from the leak. In such cases the pavement is generally affected over a large area, because the earth has become quite generally saturated with the gas, which gradually works up to the pavement surface.

Frequently, if not generally, the first indication of a leak in the gas main, where the street has a bituminous pavement, is the effect on the pavement. The visible effect of leaking gas on

a bituminous pavement is the serious "shifting" or "rolling" of the pavement in its softened condition, accompanied by a breaking up of the surface into a "crackled" appearance like an alligator's back.

Generally when this condition is noticed a perceptible odor of gas will be found in the pavement surface, but sometimes the leak may have been repaired or the gas taken another course and the gas escaped so that its odor cannot be detected, yet the pavement is left in a seriously damaged condition. On the other hand under certain subsoil conditions, the earth below the pavement may retain the escaped gas and continue to have its damaging effect for months, if not years, after the gas main has been repaired and the cause of the trouble probably removed.

In such cases, before making repairs to the pavement, its entire surface over the main and where the surface shows the effect of the gas should be removed and the gas main should be thoroughly repaired (renewed if necessary). After the leaks are repaired, vents or openings at least one foot square, extending from the surface to the level of the gas main, should be left open for two or three weeks or longer, if there is still any odor of gas, and the openings then refilled and thoroughly tamped.—*Engineering News*.

THE production of radium, uranium and vanadium in the United States in 1914 was the largest in the history of the country, according to the U. S. Geological Survey. The output amounted to about 4,300 tons of ore carrying 87 tons of uranium oxide and 224 grains of metallic radium. A little more than 1,200 tons of ore contained 28.1 tons of uranium oxide and 7.2 grains of radium was consigned to Europe; but owing to the war some of it was held in transit. The Standard Chemical Co. and the Radium Company of America produced radium salts during the year, but with the opening of war nearly all operations were stopped, both at mines and mills. The

National Radium Institute, Denver, is now in operation under Bureau of Mines officials, and is producing radium salts.—*Metallurgical and Chemical Engineering*.

#### MOTORS AND POWDERED COAL TO REPLACE GAS.

A glass furnace heated with gas will consume about \$40 worth of fuel a day when operating at full rated output, and in some districts the glass companies have been good customers of the gas companies. At Tiffin, Ohio, the United States Glass Company has installed and is operating electrical machinery which it hopes will enable the company to substitute coal as a fuel in place of gas. In brief, the apparatus consists of a 35-hp motor driving a coal pulverizer, a 10-hp motor driving a blower, and a 5-hp motor driving a hoist. With this equipment it is thought that it will be possible to pulverize coal and blow it under the furnaces, igniting it as it enters, thereby reducing the aggregate cost of fuel and eliminating the annual necessity of shutting down in midwinter when the gas supply is low. The glass company is purchasing its electrical energy from the Ohio Light & Power Company.—*Electrical World*.

#### EFFICIENCY AND SIZE OF STEAM TURBINES.

At a meeting of the West of Scotland Iron and Steel Institute, J. Golder, in a paper on "The Steam Turbine," said that as regards efficiency, the Elberfeld turbine in 1902 gave 62 per cent. A Chicago machine is guaranteed to give 74 per cent. A 35,000-kw. turbo set for New York is guaranteed to give 75 per cent. efficiency. As regards size of unit, so far as the turbine is concerned, there is room for still further increase, and 50,000-kw. sets are projected for the Greater London scheme; 10,000-kw. is getting quite common. A line of advance for which the turbine has long been waiting is the combination of high power with high speed. Ideal conditions for this are found

in the case of the direct-coupled turbo-compressor, and some remarkable machines have been made.

For example, a Rateau turbine capable of 3,000 hp. at 4,000 r.p.m. has been installed in the Midlands. Generator makers, realizing the possibility of this compact and cheap prime mover, have risen to the occasion, and 3,000-kw. at 3,000 r.p.m. Rateau machines have been successfully installed. Fraser & Chalmers have built a mixed-pressure turbine nominally of 2,000-kw. at 3,000 r.p.m., but as this machine does its full load with low-pressure steam, it follows that the design is safe for a pure high-pressure turbine of about double that capacity. Continental builders are said to have made a 6,000-kv.-a. set at 3,000 r.p.m., and a 20,000-kw. set at 1,000 r.p.m. The Chicago set of 25,000-kw. runs at 750 r.p.m. Rateau sets are under contemplation for an output of 15,000 kw. at 1,500 r.p.m.—*Power*.

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NOCTURNAL RADIATION FROM THE EARTH.—While much attention has been paid in recent years to measurements of the amount of solar radiation received by the earth, at different places and seasons, and under various conditions, there have been comparatively few measurements of another important factor in the thermal economy of the earth; viz., the amount of heat radiated outward by the earth's surface at night. Nominal measurements of terrestrial radiation have generally been limited to the comparison of readings of unshielded minimum thermometers laid on the ground with those of similar thermometers exposed in a screen some feet above the ground. Such observations merely show whether nocturnal radiation has or has not been active, but give

no real quantitative values. Since May 14th, 1914, measurements of the loss of heat from a blackened surface freely exposed to the sky at night have been made by the Weather Bureau at Mt. Weather, Va. The maximum rate observed was 0.22 calorie per minute, or 13.2 calories per hour, and occurred on a clear night in early June. The rate has been found to be very uniform during a clear night. If the same rate is maintained during the day, the total radiation from the earth during 24 hours of clear weather in June may amount to 317 calories, or about 40 per cent of the insolation. The average nocturnal radiation in June was, however, less than 60 per cent of this maximum, and continued to fall off as the water-vapor content of the atmosphere increased.—*Scientific American*.

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#### ELECTRICITY IN AN INDIAN SCHOOL.

South of Arkansas City, Kan., just over the Oklahoma line, is the Chilocco Indian Industrial School, where boys and girls between the ages of fourteen and twenty-one years receive instruction in practical engineering, the various trades, agriculture, domestic science, art and music. Natural gas, piped from the Oklahoma fields, is used as a source of power for the school's heating and electric-service plant. Applications of electricity have been made to the machines in the shops where the Indian boys receive instruction and in the sewing-rooms used by the girls. Members of the Kansas Electrical Association visited the school at the time of the recent convention at Arkansas City, and many were surprised to note the dexterity of the Indian children from the reservations in handling electric irons and other electrical devices.—*Electrical World*.

---

Vanderbilt has had the same coach for eleven years, and in the ten years previous to this she has won the southern championship eight times, lost only two games to southern colleges,

tied Yale and Navy, and won from the Carlisle Indians when they were in their prime, besides defeating the great Rose Polytechnic team two years in succession.



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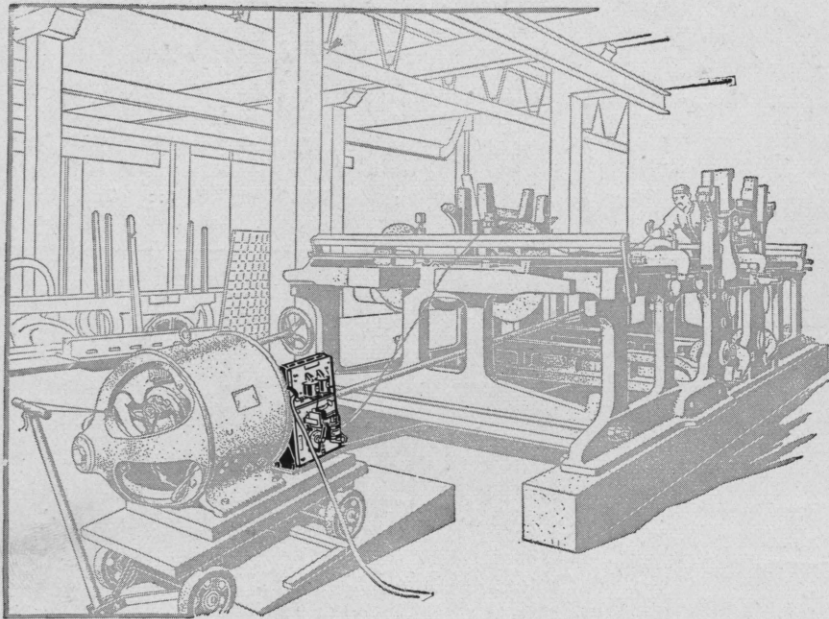
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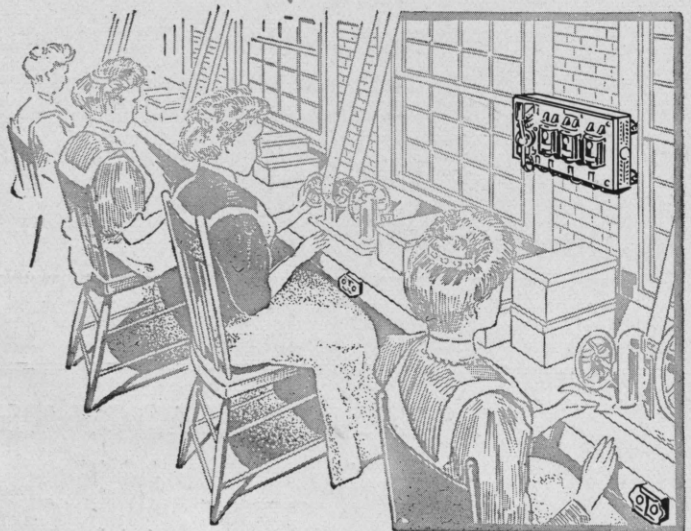
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