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The Wisconsin Engineer

VOL. XXIV. NOVEMBER, 1919 NO. 2

to send the players to the game this week.

* * *

ENGINEERING MAGAZINE ON SALE

Following closely on the heels of the Octopus, which appeared on Wednesday, the Engineering Magazine was put on sale Thursday. More than 1,000 copies were published Several articles by prominent men in the field in this country feature the number.

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The Wisconsin Engineer

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A certain manufacturer of near beer prints the following on the bottle lables:

"Important Notice—Do not mix yeast with the contents of this bottle because it will become intoxicating."

Question is, How much yeast should we not use?

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The Wisconsin Engineer

VOL. XXIV. NOVEMBER, 1919 NO. 2.

CONSIDER THE CRANE*

By Chester C. Rausch,

Assistant Director, Safety Institute of America.

Ever since Noah built the Ark and the Egyptians the Pyramids, the problem of handling material has existed. Derricks and cranes are the result of a development extending through centuries and in no field has greater development been made than in that of handling and conveying materials. The fact that electric current furnishes such a flexible source of power has greatly accelerated this development, and the recent enormous increase in the use of steel and iron in structures formerly made of wood has called for a further development of machinery to handle the greater unit weights involved. In spite of the progress that has been made, there are still many hazards that are reproduced in the later models or that result from the manner of their installation or operation. It is to call attention to some of these points and to offer some suggestions by which these recurring hazards may be eliminated that the present paper is prepared.

The locomotive crane is one of the most common types in use. Unlike the overhead travelling crane, it is not confined to definite limits of operation within a building or over a given yard space but, because of its mobility, it operates equally well within a shop or about a yard. This flexibility considerably reduces the number of times that a piece of equipment must be handled when it is taken from one location to another. Moreover, the boom which forms part of its construction enables it

*Abstract of a paper delivered before the Metals Section of the Eighth Annual Safety Congress of the National Safety Council, at Cleveland, Ohio, October 3, 1919.

to reach places an overhead crane could not approach. This one feature, probably more than any other, has brought about its introduction in many plants to perform a great variety of work formerly done with the use of rollers, skids, and various sorts of lifting tackle. The locomotive crane is a rather recent development and there are not as many men available who are skillful in handling this type of crane as there are of other types. The greater skill required in their operation, and their mobility, has resulted in a greater number of accidents from their use.

One of the main sources of hazard consists in the failure to keep the road-bed over which the crane must travel in the best condition. Frequently, in an effort at economy, light weight or partly decayed sleepers and second-hand, defective or light rails have been used, resulting in an inconvenient and unsafe road-bed. The failure to keep the road-bed properly tamped and drained allows it to settle and become uneven so that the crane does not travel steadily and is far more liable to overturn. The use of improper frogs, cross-overs and switches, and the failure to keep them in repair, increase this hazard. Such a road-bed throws numerous strains into the structure of a moving crane by the swinging motion imparted to the load suspended from the boom. This condition sometimes becomes aggravated to a point where collision of the suspended objects may occur with other railroad property or with structures adjacent to the track. When track-ways are too near buildings, especially on curves, the entire attention of the engineer is often required to prevent collision with the buildings. These things distract the operator's attention so that collisions with pedestrians, trucks and teams are more apt to occur.

Overturnings are frequent with locomotive cranes. In the smaller sizes the wheel base is extremely short and in many cases the boom is swung with loads beyond the safe capacity for any increased angle of elevation and the crane is tipped on its side when this angle is increased ever so little as a result of inequalities in the road-bed or slight obstructions on the rails. This type of accident occurs in construction work particularly, because the road-bed is nearly always of a temporary nature and poorly laid. Moreover, on such jobs, supervision of crane opera-

tors is apt to be less careful and the material handled less standardized in size and weight, so that overloading is easier and more frequent.

Another difficulty is the inability of the operator to maintain a clear view both ahead and behind his crane while travelling. Inability to see toward the rear frequently results in people being injured when the crane is turned on its table while moving forward or in running over people or objects when running backward. Reflecting mirrors, similar to those used on automobiles, tend to eliminate this difficulty, provided the mirrors are adjusted carefully and are of sufficient size. In some cranes small windows have been placed low down in the rear through which the engineer can see behind the crane. Even when alarm bells or gongs are used the engineer cannot be certain, without seeing, that the track is clear.

Whenever any crane overturns, unusual and frequently very considerable strains are placed on the structure of the crane, particularly the boiler and steam piping which, because of the internal pressure, are already seriously stressed. Engineers, even if they are fortunate enough to escape scalding or injury when the crane overturns, may be penned in and seriously burned unless the doors and windows are arranged to open outward and are provided with fasteners operating from both the inside and the outside.

Many times the original structure of the crane, particularly the boom, has been changed; lengthened to increase its range, strengthened to increase its capacity for lifting. Such changes frequently introduce strains that cause collapse and often result in death to the operator. It is a tendency that most certainly should be corrected.

If the operator of a crane, and particularly of one that has been structurally changed, is given to the performance of spectacular stunts, the limit of damage is beyond estimate. Speeding the crane along the track, rotating it upon its turn-table at such speeds that the load is swung far beyond a point directly below the end of the boom, and the dropping of the load from considerable heights and stopping it just before it reaches the ground, are performances which the cranes were not constructed to stand.

even considering all factors of safety used in their design. The combination of two or more of these performances at the same time may introduce strains great enough to overturn the crane, to destroy its structure, and to injure not only the crane but many structures adjacent to it. Where the crane is elevated upon a trestle the hazard is greatly increased. Many operators overload cranes and take a chance that the crane can handle the load. This tendency is fostered by the fact that the crane is never under the observation of a single foreman but moves from place to place in charge of its operator. While such acts are, of course, matters of discipline, there are several devices which have been attached to cranes to indicate when the crane is at the point of overturning and to give audible warning beforehand. The best devices of this sort are placed in the cab of the engineer and are frequently supplemented by an indicator placed on the boom which shows, by means of a pointer, the safe load that may be picked up for any given boom elevation. This indicator may also indicate safe overhead clearances for the boom. The use of the tables of safe boom elevations for given loads. frequently placed on plates attached to the frame of the crane or in the cab, cannot be depended upon because they require the exercise of the element of personal estimation of conditions upon the part of the operator.

Whenever cranes approach obscure corners of buildings, door openings, or other points from which traffic or individuals may issue, the engineer should be under obligation either to stop the crane or to have it in such control that a collision cannot occur.

Locomotive cranes are frequently poorly illuminated. The installation of a storage battery provides current for adequate light in the cab for firing and for illuminating the gauges and particularly for a spot light that can be thrown upon the objects handled. Very frequently a light placed on the tip of the boom, and arranged to throw its rays vertically downward, has been found of great advantage. Whenever such cranes work at night consideration should certainly be given to these points.

The work done by locomotive cranes is nearly always conducted out of doors and little attempt is made to house them or to protect them from the elements. As a result rust, with all

its attendant and subtle hazards, attacks the machine in various places—the cables particularly. Proper painting should be given at frequent intervals, adequate lubrication should be provided, and the boiler should have regular inspection. Improper feed water may introduce trouble enough to put the crane out of commission.

In the operation of such cranes dependence is frequently placed upon lowering the load and swinging the boom to throw an object into a location that cannot be reached by the crane when in its ultimate safe position for such a load. The element of time is here depended upon to permit the load to swing into its final place before it can tip the crane far enough to cause it to overturn or leave the rails. Any failure of judgment on the part of the operator is fatal.

Another pernicious tendency is sometimes revealed when the crane is derailed and a leverage action is created by attaching the boom to the track ahead and by the application of power causing it to lift the rear end of the crane so that it may be swung again to the rails. This is done with the boom in an almost horizontal position and has destroyed cranes by introducing the severest strains to which a crane could be subjected. The housing of the hoisting mechanism and the anchorages of the turn-table are very often torn apart in this manner.

Overhead travelling cranes have probably received as much attention at the hands of designing and safety engineers and inspectors as any single piece of equipment. This is due to the fact that it travels over areas in which are located many workmen and much valuable machinery and material so that a failure of any part of the crane may bring about disastrous results. One common fault is the failure to keep the rails upon which the overhead crane travels in proper line both for lateral and vertical adjustments. A slight settling of the rails or a slight misalignment frequently causes trouble. The writer knows of a case where as much as fourteen inches of settlement occurred and where there was a lateral displacement of nearly eight inches. The eccentric strains thrown on the frame of the building by this condition and upon the crane, due to a swinging of the load were considerable and several serious accidents resulted.

In another case a crane repeatedly jumped the runway rails at one end until the wheels were found to be of different diameters which made one end progress farther than the other.

Far too many overhead cranes are used without adequate signs to indicate their safe capacity. The writer recalls a case in which a load so large that the crane could not lift it, was placed under as much lifting strain as the crane could exert and was then dragged down the length of the shop to its location. Such practices, while they are not frequent, indicate a tendency on the part of the operator to take chances—a tendency probably fostered by his lack of adequate information regarding the capacity of the crane or of the dangers which such treatment introduces.

Wherever the space available in a shop will permit, there should be a free aisle-way from one length of the crane-way to another over which loads may be carried without the necessity of passing over more than a few individuals. There are not many old shops where this is possible but there should be some portion of the shop specifically kept as free as possible from men and valuable material and machines to permit the crane operator to carry material over such a space without any more hazard than is necessary. When unusual loads are carried over such spaces every individual should be made to stand from under the load.

There are many excellent installations of the highest quality of cranes operating over inadequately illuminated spaces. The fact that the operator is a considerable distance above the floor where the attachments to the crane hook are being made and that he must see through a haze that sometimes develops in shops only aggravates an already bad condition. It may be far too expensive to increase the general illumination for the benefit of a single crane operator and in such cases excellent results have been obtained by attaching to the crane trolley one or more lights properly covered with a focussing reflector and so arranged that the area immediately about the hook when at its lowest point and near the floor is brightly illuminated. Such illumination tends not only to assist the crane man to observe what is being done on the floor but helps the crane attendant to make proper

attachments to the load. Furthermore, when such a load is travelling down the shop the brilliant illumination throws it into bold relief and it serves as an admirable warning of its approach. In many shops the hook of the crane is painted white and kept white in order that it shall attract attention to itself and furnish some measure of indication to the crane operator of its location with reference to the floor.

In many shops lighting fixtures arranged to furnish general illumination of the floor are, from necessity, placed above the travel-way of the crane. If such buildings have wide spans the crane operator, unless properly shielded by an awning to his cab, is confronted in his view up and down and frequently across the shop with many spots of brilliant and glaring light that serve to confuse his vision. In some shops this general illumination from above the crane-way is augmented by lamps having angle reflectors, and too often no reflectors at all, placed just below the crane runway. When operating the trolley on the far side of the shop these lamps throw a steady stream of light into the face of the operator, seriously confusing his action. Such lamps should be shielded from above with reference to any position the load to be observed by the crane operator must assume.

A person making an examination of any considerable number of overhead travelling cranes is impressed by the fact that so many of them have none of the electrical equipment in the cab properly guarded. There are exposed contact points, circuit breakers, knife switches and terminal lugs carrying from 110 to 500 volts or more. Contact with these exposed points may kill a crane operator or temporarily incapacitate him so that his crane continues its motions uncontrolled. Simple guards composed of asbestos, wood, sheet metal or other material are not only easily applied but inexpensive. The possibility of serious accident in the movement of an uncontrolled crane is sufficiently great to require ample protection for the crane man and new equipment should be specified to have only back-connected control panels and inclosed resistance grids.

Many cranes have practically nothing more than a hand rail to keep the operator in the cab. During his slack moments, when he is comfortably stretched on a box, stool or bench, any lapse of

consciousness would permit him to shoot under this rail and fall to the floor below. There is no reason why the crane should not be enclosed to a reasonable height with grillage to prevent such an accident without interfering with the craneman's vision or movements.

Cranes, like all other apparatus, require occasional repairs and continual maintenance. It strikes one as almost criminal to note the lack of any adequate repair deck over which the crane may be housed and from which oiling, adjustments and repairs may be safely performed. There is scarcely a condition in any shop where such a deck cannot be provided in one end or the other for at least a portion of the width of the crane span. Although there are many heavy parts used in the construction of the trolley of a crane, no provision is made for a small wall crane or a travelling chain hoist to assist in this work. Many times repair men are exposed to serious hazards from falling on account of this lack. It is not infrequently the case that the bottom chords of the roof trusses are used in making repairs and at such times they are subjected to strains which they were never designed to withstand. Workmen are frequently called upon to make crane repairs after dark and to use electric drills or soldering irons in connection with their work. The placing of a few plug receptacles for the attachment of portable extensions to make connections to these tools would greatly assist in this work. Such provisions should be made as parts of a repair deck.

Most cranes are now fitted with an over hoist or over travel stop that automatically arrests the upward travel of the hook if the operator fails to cut off the power as the hook-block approaches the hoisting drum. Crane operators have been observed to turn on the power and calmly wait for the load to come into contact with the over travel release, thus disconnecting the motor. The fallacy and danger of such operations are evident and should be matters of strict discipline.

Every crane requires its cable to be lubricated to prevent wear from friction and destruction from rust. While such lubrication accumulates grit and dirt in some shops the advantages of the lubrication tending to give long life to the cable more than offset the damage which this grit may do. The lubrication of the cables

is sometimes accomplished by a man standing on the trolley who applies the grease as the cable is wound up. Sometimes the cable is all wound up and the top half of the drum properly greased. The bottom half is then greased after the drum has made a half revolution to bring the ungreased cable into an upward position. The writer recently saw a very clever greasing device which could be temporarily attached to the top of the hoisting block in such a way that an arm holding collar made of soft wicking could project out and surround the cable. This arm was connected with a tank supplying grease in such a way that the cable, by passing through the collar, became properly lubricated throughout its entire length.

In view of the present knowledge concerning crane operation it seems rather trite to mention the fact that so many cranes are operated without a safe or convenient means of access to their cabs. The daily exposure of operators to falling, to contact with live wires, or to being overcome by fumes or gases while climbing to their cabs is considerable. It would seem the part of wisdom that not only new structures, but old structures as well, should be equipped with either a properly enclosed ladder or an adequate stairway from which the cab could be reached with a minimum of danger.

Overhead travelling cranes, and locomotive cranes to an increasing extent, are handling material by means of electromagnetic lifting devices. These are so ruggedly constructed that they will withstand almost unlimited abuse. The only weak link in their safe operation is the cable connecting them to the source of power or the power supply itself. Usually the source of power is sufficiently reliable to make failure only a remote possibility. The cable, however, is subjected to all manner of rough handling as a result of following the movements of the magnet. If this cable passes over a suitably grooved pulley at the tip of the boom, or on the trolley drum of the crane, and is so arranged that a counterweight will carry the slack down the boom or that it will wind up on the drum of the trolley most of the wear can be avoided.

One may still find a tendency to overload crane hooks. In handling some objects several chains are used so that the mouth

of the hook is filled and attachments are made to the very tip of the hook in such a way that a severe side bending strain is introduced in addition to the lifting strains introduced by the chains hanging at the bottom of the hook.

The inconvenience attendant upon work performed on overhead cranes and the failure to provide convenient platforms from which to perform such work, has resulted in much neglect of crane repair and up-keep. One of the most noticeable defects is an increase in the amount of play and back-lash that is allowed to develop in all parts of the structure, particularly in the gears. When this is excessive and the gears pound badly, the starting of the motor or its reversal from a raising to a lowering motion introduces strains on pinions, shafts, keys, and other parts sufficient to cause much damage. This wear is very often due to the fact that adequate lubrication has not been furnished because access to the oil and grease cups has been difficult and the person responsible for maintaining the equipment has neglected to do his work because of the difficulty of getting at the places where it must be performed. In some cases this condition has been helped materially, and even overcome, by the use of oil cups or compression grease cups serving all parts of the crane and so located that they can all be reached from the crane walk-way. It then becomes necessary only to go with an adequate amount of grease or oil to the several conveniently located cups to keep bearings adequately lubricated.

Gantry cranes, wall cranes, and other combinations of hoisting apparatus capable of operation in one or more directions, each has its particular problems, but they have been covered by consideration of similar conditions that occur largely in both locomotive and overhead travelling cranes.

SUMMER EXPERIENCES

Summer work is probably the rule rather than the exception among the engineering students of Wisconsin. One reason that the men are keen for summer jobs is that they need the money; another reason is that they are anxious to get some practical experience,—to pass their novitiate before the day comes when they seize their sheep-skins in their strong right hands and sally forth to do or be done. There is a big advantage in being more or less experienced in engineering work when a man is looking for his first steady job.

The senior civils were asked to write up the thing that most interested them in their work during the past summer. It might be a new idea in regard to their work, an ingenious method of surmounting some difficulty, or some interesting little novelty that they encountered. Apparently the men made good use of their opportunities to learn. The following stories contain much of interest and value.

Troubles with a Dry Mix for Concrete Paving

That engineering is not altogether an "exact science" was well illustrated by the experience with dry concrete in road construction in this state during the summer of 1919.

The road season opened with the customary instructions to inspectors to insist on a dry mix,—so dry, in fact, that the concrete required spading with the flat of a shovel against the forms to secure a good looking edge on the slab. This requirement met with considerable opposition from the contractors and their foremen, for the dry concrete was difficult to handle, required tamping when being struck off, and was the bugaboo of the finishers. The requirement was insisted upon, however, as it was thought by the engineers that the curing of the concrete was aided by a minimum amount of water in the concrete as it came from the mixer, and that less rolling was required to get rid of the excess surface water before finishing with the belt or large wooden float.

With the coming of hot weather in July, the dry mix developed faults, cracks or "checks" appearing frequently before the concrete was set sufficiently to permit the slabs to be covered with

clay and sprinkled with the hose. When the clay was removed weeks later, uneven spots in the surface were shown up,—spots that had been unnoticeable when the finishing was done, but which were later altogether too apparent to the eye, especially after a shower. After this experience, inspectors and engineers alike united on the trial of a wetter mix. As soon as a little more water was used in the mix, foremen and finishers were able to secure a splendid surface without excessive labor, and the concrete was easier to handle for all concerned. Even in the hottest sun, this consistency proved its merit, for the "checks" in the road were few and far between. True, surface water was more troublesome, but, by giving the surface three rollings where two had previously been given, it was placed in good condition for the belt finish.

The amount of water added was not great, yet it seemed to be sufficient to effect a cure. The consistency of the concrete that was being laid at the approach of the fall season was slightly stiffer than what engineers call a plastic mix, with, of course, no surplus water appearing as the material was dumped on the subgrade. R. E. .S

Neatness and Accuracy

When I was working in the office of a big consulting engineer in Chicago, the thing which impressed me most was the extreme pains which were taken to have every report and every bit of work which went out of the place in the best condition possible, and also the great attention which was given to all details. Data were never taken or used unless it was absolutely certain that they were reasonably accurate. Suspicious looking results were rerun whenever possible. The greatest care was taken in making tracings. Some very fine draftsmen would spend days working on a single drawing; but when they finished they could show a piece of work which was nearly perfect. Whole drawings would be sometimes rejected simply because the letters in one of the printed words did not have the proper spacing; or because some of the lines were not well joined. C. P. K.

Preparations of Specifications for Small Cities

The city engineer in a small community is confronted with the serious problem of preparing numerous specifications for various

municipal projects and of doing so with the very limited clerical force and finances at his disposal. In Shorewood, a suburb of Milwaukee, the problem was partially solved by printing specifications in loose-leaf form.

A model was first drawn up in which all general information and definitions, which apply equally to all improvements, were grouped together. The part pertaining to the particular kind of project was condensed as much as possible and arranged on one sheet, blank spaces being left for names, dimensions, etc. Cover sheets, proposal blanks and estimate sheets were also drawn up in blank form. All these were arranged for printing on six by eight inch sheets, sub-topics being placed on separate sheets. To illustrate the working of the scheme let us assume that the engineer wishes to prepare a specification for the paving of Edgewood Ave., six copies being the minimum required. A paving cover is selected, the blanks filled in on the typewriter and six carbon copies made simultaneously. Proposal blanks and estimate sheets are treated in the same way. The sheets of general matter are then added and the specification is complete. The sheets are all numbered when printed and the covers folded and arranged for binding. The latter is done on a small punch press, brass clips being used. The finished result is a neat, efficient looking pamphlet which serves the purpose as well as the elaborate, individual booklets prepared by the larger municipalities. E. S.

Leaning Too Hard on Old Records

People not familiar with the manner in which old surveys have been executed find themselves in trouble if they use the measurements shown on recorded plats. An instance of such trouble happened in a nearby town not long ago.

A sewer plan had been prepared, the hearings held, the assessment made, and the construction started. In checking up the work, an error of several feet was discovered,—the records would not check. The people who had performed the work were unable to arrive at any satisfactory conclusions. Another party who had had experience in similar work was asked to find the trouble.

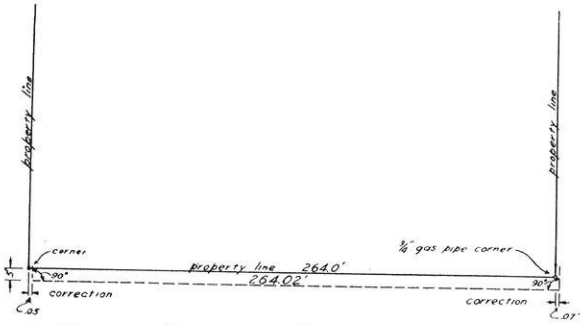
He checked up the old survey and found that differences as

large as thirty-four feet existed between the lots in the plat as laid out and as recorded. Some lots were over and some were under the recorded measurements. Out of twenty parcels assessed, only eight were assessed correctly. It was necessary to reassess.

The lesson learned was that it is not safe to take for granted the reliability of old records. Their accuracy should be verified before they are used as a basis for further work. R. A. H.

Finding the Distance Between Block Corners

Many times in city surveying it is necessary to measure the distance between block corners. In the business district of a city this is usually difficult because the store fronts are built right up to the property line, and there are numerous projections which make it impossible to measure the distance between corners directly. The following method is offered as a means for getting around this difficulty.



FINDING DISTANCES BETWEEN CORNERS.

At each block corner, measure out about five feet at right angles—by eye and tape—to the line that is to be measured. This will give two points on a line parallel to the original line. Then measure the distance between this second set of points. After that, set the transit over one of the points and sight at the other, turn a right angle and find how far the line of sight is to the right or left of the actual corner, and apply the correction to the distance between the offset points. Then go to the other point and repeat the process. The accompanying figure will illustrate the method. The left hand correction must be added

to the measured distance and the right hand correction subtracted to obtain the true distance between the original points. P. W.

The Engineer's Level in the Shipyard

Steel plates, bent and punched, when assembled into a ship according to design, form a structure which closely approaches the original design. Given perfect punching, bending, and assembling, the ship would be exactly as designed; but these conditions do not obtain, and the process of assembling must be carefully checked throughout.

In the construction of the shallow barges and towboats for the Ohio River traffic, the top timbers of the erection berth are brought into the same plane, by leveling, before the keel is laid. The instrumentman is acquainted with the differences in elevation over the bottom area of the boat, the elevations generally being referred to a point midway along the keel line. As the steel shell takes form the instrumentman frequently checks the camber and any portions not at computed grade are jacked up or lowered, as the case may be, before more plates are riveted in place. The same procedure is followed in assembling the decking.

In one case of side launching, the "heel" of the towboat, on entering the water, was observed with engineer's levels. A graduated rod was fastened vertically to the top deck of the boat, and a reading was taken on the rod when the boat struck the water and again when the boat had attained its maximum heel. These readings gave the angle of the "heel" and information as to the stability of the craft.

Finally, the level was used to check the deck elevations as the boat lay moored in still water, so that the designers might determine the accuracy of their estimates of weight distribution, etc.

W. G. H.

THE FRESHMAN AND HIS READING

The freshman likes to read about spectacular things like building the Panama Canal, harnessing Niagara, draining the Zuider Zee, or Tesla and his wireless transmission of power, a very natural taste for one whose professional reading has been largely confined to the Electrical Experimenter, The Illustrated World, Popular Mechanics and the Scientific American. Besides we must acknowledge that even the gray-beards of Engineering have a leaning toward the bigger things. Such reading has its place, but the experienced engineer has learned that it is the "Kinks" —the new ways of doing things—which he uses in his every day work. And, this being a practical and mercenary age, the demand is for details, and the technical papers cater to the demand.

Consequently the freshman, who, on coming to the library and finding his old friends almost lost among the numerous technical periodicals, attempts to read some of the latter, is apt to be disappointed. His appetite has been whetted for something technical but these magazines prove very dry reading. His technical knowledge is limited—that is why he is here—and he fails to appreciate the value of "A discussion of the spacing of the bars in the trash-rack of the dam at Boulder Bend", or an equally enlightening article on "The distribution of the indeterminate stresses in an eccentrically loaded I-beam having one fixed end." About this time the average man becomes discouraged—do you blame him?—and henceforth confines his reading to his textbooks and the Saturday Evening Post.

While much of the material in the engineering library is too technical to be interesting to a beginner, there are many things which the first year student can read with both pleasure and profit. If he has a hobby like wireless or automobiles he will find many books on his favorite subject. For the courses like shopwork, surveying, and drawing and lettering, he will also find many books that he can use; and the periodicals, though so highly technical, still have many articles of general interest which will greatly assist him to see his future in the proper perspective.

But the thing we started out to tell about is the "One Week Shelf." This is a collection of books which is designed to furnish at the same time both recreation and useful information for the engineer. These books were selected on the recommendations of various members of the Engineering Faculty and every engineering student, be he verdant freshman or dignified senior, will find it worth his while to glance over this collection. We call it the "One Week Shelf" because books from this collection may be borrowed for that length of time. Just to whet your appetite we will mention a few of these books. We have all heard of "Bessemer Steel" but how many of us know that the modern check protector is based on one of Sir Henry Bessemer's early inventions; that his process for making gold paint furnished the sinews of war for carrying on his experiments in steel; that this process was worked secretly for forty years; or that the success of his first attempt at steel making was due to a fortunate accident. Sir Henry tells us all about it in his autobiography.

George F. Swain of Harvard says, "A student may work hard and earnestly in school or college and yet accomplish little or nothing. He should therefore, be made to see, not only the necessity for hard work, and how to work, but how to work effectively." If you belong to the large majority and don't know how to study, read Prof. Swain's little book. It is brimful of good suggestions.

Of course you just love English—everybody does. John L. Harrington, a consulting engineer of Kansas City has written an excellent essay on The Value of English to the Technical Man. This and many equally good things can be found in the book by Waddell & Harrington, "Addresses to Engineering Students." The engineer who has never read this book has missed something. Then we have Chordal's, "Letters"; Porter's, "Engineering Reminiscences"; Hoover's translation of "De Re Metallica"; Bond, "On the Battle Front of Engineering"; Tomlin, "The Work of the Engineers Behind the Battle Lines in Frances," and —; but what is the use, you must read these books to appreciate them, so just go to the library and borrow one.

THE COMMERCIAL ENGINEER*

By GEORGE P. BALDWIN,

Manager, Philadelphia District, General Electric Company.

In America's industries there is a large and increasing demand for more electrical equipment, more expert service, more elaborate improvements to obtain increased output and efficiency, and still more delicate definements in the various processes. The demand is growing because it has been proven that electricity permits easier, more rapid and cheaper production in old processes, and that it has also endowed the world with new products which would otherwise never have been discovered or would have been impossible to produce.

A detailed list of the thousand-and-one fields of commercial activity on the part of electrical engineers could not be furnished here. There is hardly a commodity known to civilized man—be it derived from the animal, vegetable, or mineral kingdom—but what is worked upon by electricity in some form between the raw material and the finished product.

Consequently, there is an unfilled demand for skillful commercial engineers to introduce the products of the central station and the electrical manufacturer into these thousands of industries. The question of opportunity in the electrical engineering profession is quite beside the point; what the young man of today has to consider, particularly the undergraduate in college, is how best to fit himself that these opportunities will be within his grasp.

The engineers and executives of America's greatest corporations of tomorrow are in college today. They will change and control the habits of a nation. The intelligent young man in college today can map his career more successfully if he appreciates what the future holds. The writer will dwell specifically upon the human requisites for grasping what the future holds in the field of commercial engineering.

A well known engineer described how his conception of engi-

*Reprinted from the General Electric Review, May, 1917.

neering developed as time went on. In the early stages of his college career his idea of engineering was limited to operation and maintenance, so he spent a vacation period in a central station. This experience developed in his mind the belief that construction was more interesting than operation. He next took a position with a construction gang. This developed in his mind an interest in manufacturing. He finally entered the employ of a large manufacturer, in the Engineering Division. From designing details he was promoted to a position where he was assisting in the complete layout of large installations.

One afternoon on glancing up from his drafting board he noticed a party of visitors inspecting the works. It was a committee of business men being conducted through the plant by one of the commercial engineers, in order that they could observe the manufacturing facilities of the company. Then it dawned upon this young man that great installations must be sold before they are designed, just as they are designed before they are manufactured, erected, and operated. Then, also, for the first time it occurred to him that the activities of the commercial engineer were essential and important.

Now, of course, this is only the conception of one man. He was quite well grounded in practical experience—in the plant, on the road, in the shop, and in the drafting room—before his mind turned to the commercial phase of the engineering profession. That man now holds a highly responsible position in one of our great corporations. He has found that what is commonly known as "salesmanship" requires just as intense and involved a study as does engineering, and also that successful salesmanship requires a mental layout and a scheme of operation that are as profound as engineering in its broadest sense.

Not long ago, many believed that salesmanship was an individual talent that would enable a man to sell anything—candy or electrical machinery. Salesmen used to make the statement that they could sell *anything,* but today there are not many of these candy salesmen trying to sell electrical machinery. The universities of this country, with the assistance of the manufacturers, are devoting considerable thought towards training men for the commercial side of the professions.

The first requisite for a successful sales transaction is a scientifically designed and well manufactured product. The next element is the salesman's intimate knowledge of this product and its application; and the third and most important feature, as far as the commercial engineer is concerned, is his ability to establish and maintain favorable relations with the people with whom he is brought into contact. It is this ability to establish favorable relations and maintain them that produces results and for which the engineer who desires to enter the commercial field must train himself. He must have not only sound engineering knowledge, but must also supplement this with a well rounded-out knowledge of men, and affairs in general; this latter feature is important and, strange to say, is often lost sight of by the young man.

A man who is now a prominent executive in one of our engineering organizations nearly marred his career because of his neglect to realize this. The great turning point came when he was offered the position of treasurer of his company. He hesitated. He considered it fortunate. He feared he would no longer remain an engineer. Yet he finally yielded to exterior pressure and accepted the position. Later developments proved, without question, that this was the best step he could have made for it broadened his vision. Since he has crossed the threshold into the commercial world he has been able to make use of his engineering knowledge in a vast number of diverse fields. Today, he is amazed at the ignorance which caused him to hesitate.

His successful career is an example of what can be done today in commercial engineering. The old school salesman has passed. The salesman of today must thoroughly know his subject. If he does not have a deep knowledge of engineering principles and their application as well, he may try to get business by means of guessed-at statements; or should he not yield to this temptation, he will find himself often in the position where he must confess his ignorance in the presence of the prospective customer and offer to send to the home office for an engineer. The doctrine of the survival of the fittest is rapidly eliminating this type. Today, the great manufacturers realize that the man to get the business should really be an engineer, and be able to discuss

intelligently the topics under consideration in all their phases. It has been proven that the old method was an economic waste; the new method is modern business.

But, the securing of this high type of commercial engineer involves a process of elimination. Experience has shown that out of one hundred engineers of high order by no means all of them develop sound commercial judgment and are capable of quick, accurate business decisions. And of those who have this accomplishment, not all of them possess the requisite knowledge of human nature, the tact, the ability to form acquaintances, and those qualities which are summed up in the word "personality." If exact figures were produced, it would be surprising how few good engineers possess these first two requisites for a commercial career—judgment and personality.

And still one more requisite must be fulfilled in order that a first-class engineer may make a successful commercial engineer, and that is language. He must make a clear, logical arrangement of his engineering facts; and both in personal interviews and in writing he must submit these facts in concise, impelling language. A great author made the statement:

"I had more time I would write you a shorter letter."

Thus did he emphasize the fact that concise expression is a difficult and rare accomplishment. So difficult is logical, simple, attention-riveting language that of the engineers who possess judgment and personality surprisingly few will be found who possess this last qualification essential for a successful commercial career. And the fact should be further emphasized that the best place and practically the only opportunity for language training is during college days. After graduation, one's mind will be intent on what he says—not on how he says it.

The greater one's solid, practical, engineering knowledge, the greater will be his future in the commercial field, provided he possesses a clear, definite knowledge of human nature and the world in general, and is able to express his thoughts in concise convincing language.

To add a commercial training does not make one any less of an engineer. A bar of fine steel can be finished, tempered, ground to a fine edge, and yet it is still steel. Just so, a commer-

cial engineer is still an engineer. But he must be more than an engineer. To illustrate. You call on the President of a great railroad with the object of interesting him in electrification. You explain in detail, from the point of view of railroading, the savings that can be effected. The President is interested. Then you start to talk about kilovolt-amperes, power-factors, diversity-factors, and the like. The President has been brought up in the profession of steam railroading and he is not familiar with electrical terms. His distress is shown when his eye wanders to the pile of unanswered correspondence on his desk. Unknown to you, you have lost his attention. Then he sagely remarks:

"Very interesting—I want you to explain these points to Mr. Thompson on the third floor,"

and he politely bows you out, shunting you off to a subordinate. It then occurs to you that you have not been given an invitation to call again. Your mind and that of the President's have not met because of your foreign tongue. An interpreter was needed. You had engineering knowledge and engineering skill, but you did not possess the judgment to know when you were in danger of losing the President's attention. Moreover, you lacked the tact to regain his attention or to obtain another interview.

Knowledge and language are the two master tools of business —the language that you used was not adapted to the work. It was as though you were trying to cut diamonds with a saw. To be sure, you were articulate—sounds emanated from your mouth—but they were not sensed by the commercial ear. Truthful and accurate as your statements may have been, they were not comprehended.

It cannot be impressed too forcibly upon the young men of today that they fully avail themselves of the manifold advantages offered by the universities; that they beware of the habits which have been the undoing of the old school commercial men now almost entirely displaced; that they remember, as Francis Bacon wrote,

"Reading maketh a full man, writing an exact man, and conference a ready man."

WHAT IS FRESH AIR?

"There is no such thing as 'fresh air,'—at least, there is no difference between the air inside a crowded room and the outside air, so far as the effect upon the lungs is concerned," declared Mr. John Robins Allen, of Pittsburgh, in a talk before the students of the College of Engineering, on November 7. Mr. Robins, who is a graduate of Michigan and a former Dean of the College of Engineering of Minnesota, is Director of the Research Bureau of the American Society of Heating and Ventilating Engineers.

According to Mr. Allen, air varies but slightly in its chemical composition under ordinary circumstances, and the old idea that "stale air" is poisonous is erroneous. No fresh air is needed provided there is proper temperature, humidity, and circulation. Open windows in a sleeping room improve circulation and lower the temperature, so that the room is more comfortable; but the air is no more healthful than it would be if the windows were closed.

The problem of the ventilation engineer is to control temperature, humidity, and circulation. He must also study and control dust conditions, for dust is now believed to be the germ-carrying vehicle. A further item to demand attention is odors. Odors have no physiological effect, but they do have an important psychological effect, and the engineer must cater to psychology.

Professor Allen touched upon the necessity for what he termed "utilitarian research." He classed research in three groups: Pure research, which has no practical application; commercial research—conducted by the industries—the results of which, while practical, might not become public; and utilitarian research—conducted by universities and technical societies—the results of which are of practical importance and are made public. He pointed out that all engineering practice must rest upon research,—that theory must be proved if progress is to be made.

MEDITATION.

One hundred years ago, on August 25, James Watt, inventor of the steam engine, died. The Engineer, London, in discussing Watt and his characteristics in its issue of August 29, says, "He had the art of putting a problem into his mind and of leaving it there to develop. He tells us himself that his great idea, the

idea of a separate condenser, came to him on a Sunday walk on the green at Glasgow. The subject had been on his mind for months and came to fruition by sub-conscious action. We should like to insist on this curious fact. We are all well aware that thoughts come to us suddenly, that the solutions of problems spring into existence unexpectedly, not when they are most earnestly sought, but when the mind is brooding. We can think of no word that expresses the condition more nearly than the word meditation. All great thoughts, whether they be inventive or philosophical, spring, we suggest, from meditation, from putting problems into the mind and keeping them there. * * * But meditation without preparation is useless. The mind must first be saturated with basic principles or the sub-conscious activity has nothing to work on."

COLLEGE SPIRIT.

College spirit—what is it? All college men are supposed to have it. In their freshman days they are introduced to it; throughout four years they are acquiring it and as alumni they return periodically to celebrate this highly desirable, but undefined ultima thule of college life.

To some college men college spirit means glorification of the college's traditions; to others, loyal support of its athletic prowess and to others still a feeling of pride in the institution, its environment, and its achievements. The sentiment inhering in college spirit is best typified, perhaps, in the words alma mater. The college man brings to his college that devotion which a dutiful son owes to his mother.

The farther away the graduate gets from college days, however, the more he feels the need of some redefinition of college spirit which will contain somewhat less of local sentiment and somewhat more of broad idealism. To all such the definition given by Justice Wendell P. Stafford of the supreme court of the District of Columbia in an address to Dartmouth college students is commended as a specimen of the noble idealism for which a college should stand. Justice Stafford defined college spirit as "a bold and hardy determination to cultivate and discipline our powers with the aid of all that men have learned before us and then to pour the whole stream of our power into the noble tasks of our own time."—*Milwaukee Journal.*

ESSENTIAL PROBLEMS IN THE APPLICATION OF POWDERED COAL

That the introduction of powdered coal as a fuel has resulted in great economies and has revolutionized certain industries, was the statement made by Mr. W. G. Wilcox, of the Powdered Coal Engineering and Equipment Company, in a talk before the Wisconsin Section of the American Chemical Society, on October 14.

The slow development of the application of powdered coal, Mr. Wilcox explained, was due partly to lack of money and partly to several tragic mistakes caused by lack of knowledge. The essential of complete combustion is a proper ratio of air to fuel. Powdered coal is a flexible fuel and permits of the proper ratio being readily obtained. Data, taken under service conditions, indicate that it is the ideal form of coal consumption. Bituminous coal is used with the greatest success. It is pulverized until 85 per cent will pass a 200-mesh screen, in which condition it flows through pipes like a liquid. Its flow is calculated by the familiar hydraulic formulas. The fuel is carburized at the nozzle, the amount of air being easily regulated. It burns with a flame that resembles a huge gas jet.

The advantages of powdered coal are that the flame is readily lighted or extinguished, and that the flame can be controlled in intensity and directed in point of application. The first advantage results in a decided fuel economy. The results of the second advantage may be illustrated by the experience of the copper industry which was revolutionized by the adoption of powdered fuel. Copper reverberatories, formerly 40 to 50 feet long, are now 150 feet long, and the output has been proportionately increased with a decrease in fuel consumption of from 30 to 40 per cent.

The new form of fuel has been introduced into the Wrought Iron Industries, in which the cost of crucible expense per 1000 tons has been reduced from $350 to $85, into the cement industry, where it is used in the clinkering and drying furnaces, and in the steam locomotive. It seems destined to displace its parent, "hard rock," and to be a close competitor of oil.

EDITORIALS

ENGINEERING PUBLICITY

In the experience of the writer it has frequently occurred that some commendable Engineer's activity failed to secure enough publicity to make it entirely successful. Meetings and lectures or performances were often rather poorly attended merely because The Daily Cardinal made no mention of the affair, and other forms of advertising reached only a fraction of the students concerned. Last year the meetings of the engineering societies were seldom if ever mentioned in the campus newspaper. Students often inquired: "Why doesn't the Cardinal mention our meetings? The "hill" societies seem to get plenty of publicity."

An investigation of the conditions indicates that the fault lies almost entirely with the engineers. Relatively few engineering students are members of the Cardinal staff; naturally the doings of the engineering societies have not received much publicity. The students from other colleges who work on the Cardinal staff readily gather news items from the societies of their college. Cardinal reporters from other colleges are not able to find news items from the Engineering School very easily. The person who knows the inside data of any activity is hard to locate, and when interviewed he is often rather reluctant about giving out the news.

To secure all of the items from the Enginering School the Daily Cardinal has appointed an Engineer's Editor. Through this agent all groups in the college will be able to get the desired publicity for their activities, and the entire student body will be able to satisfy its interest in the activities of the engineers. However, the information must be offered by the persons who have the data. Society secretaries, committee members, and others are urged to deposit any and all announcements, advance notices, programs, news items, or other data in the Daily Cardinal box in the lobby. The Engineers' Editor will collect the papers every noon, and he will write up feature articles, announcements, or combined articles for the next day's Cardinal. The names of officers, speakers, committee members, as well as

the activities, are excellent news items. Help your society, the school, and the student body by submitting all of the news items that might possibly be of interest. C. A. W.

WELCOME: "THE OCTOPUS"

Another student publication makes its appearance on the campus this month,—the humorous magazine, "*The Octopus.*" It will be the first issue in two years of a periodical devoted sepecially to jokes, odd poems, songs and stories. With the large enrollment of this semester and on account of the wealth of material in the University, the "Octopus" should be a decided success. The *Wisconsin Engineer* welcomes the newcomer to the field, wishing it a prosperous future. However, it is only fair to warn *The Octopus* that the famous "CAMPUS NOTES" are entirely protected by copyright. C. A. W.

POLITICS

An engineer for President of the United States! Why not? At a recent reception in his honor, Herbert Hoover was introduced as particularly choice material for the office, and the idea was greeted with tremendous enthusiasm. Certain it is that there is no other man in public life at this moment who seems so well fitted for the high office of Chief Magistrate. His training has been of the best and his experience has been broad. He is idealist enough to rise above sordid selfishness and yet he keeps his feet on the ground and accomplishes results that might almost be classed as miracles. Hoover is the rare prophet who is honored in his own country. His international fame rests upon other than engineering accomplishments and yet he is honored by engineers even more than by those outside of the profession. Placed at the head of this nation, he would, without doubt, apply to its affairs the same level-headed and energetic methods that he has employed with such conspicuous success in his previous undertakings. We've tried most everything else as president; let's try an engineer.

United States Senator Miles Poindexter has opened the Presidential campaign by making public announcement of his candidacy. His platform is strongly American in sentiment and he

takes a decided stand against the "reds". He seems to hold the belief—strange in these days—that "every citizen, of whatever station he may be, both at home or in foreign land, or on the sea should be protected from unlawful injury to his person or his property by any individual or special class, or by any foreign power." He also takes a decided stand against the "reds", and declares, "There can be no compromise with anarchy." Engineers will be particularly interested in his national road plank. He favors "an extensive system of national roads—built on approved engineering principles, located with a view to military defense as well as civil and commercial uses."

Talking of politics, where were the engineers in the recent class elections? In the long list of successful candidates, we find only two familiar names: Ross Rogers was elected treasurer and Willard Kates, Sergeant-at-Arms of the junior class. S'matter?

EVERYBODY SATISFIED?

Apparently all Wisconsin engineering graduates are holding down jobs that are entirely to their liking. The faculty members report that "pretty respectable" openings are going begging for want of men to fill them. Employers are asking for men right along, but the college is unable to put them in touch with our graduates because we are not in touch with them ourselves. We do not want to create the impression that frequent change is a good thing; but, if you happen to feel that the job you are holding down is not just what you want, why not write in to your friends on the faculty and let them know that you would consider other positions, And, even if you don't want a job or anything else, why not keep in touch with the college?

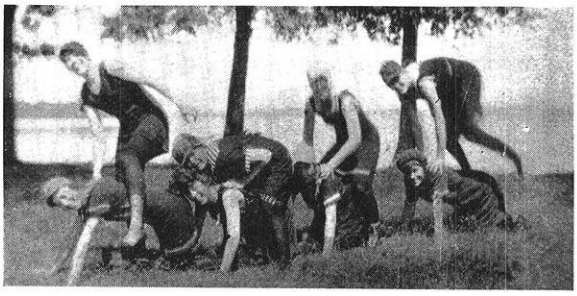
THE STUDENT-FACULTY COMMITTEE

The faculty of the College of Engineering committed itself to a decided innovation when, on October 27, it voted to provide for the formation of a committee of students, the function of which shall be "to consider educational matters pertaining to the welfare of the College of Engineering." The originators of the idea hope, by this means, to provide a method by which student

criticisms and suggestions may be made known freely and quickly to those who are responsible for the educational policies and methods of the college. The committee is not to be a soviet, and the management of the college is not to be placed in student control; the committee merely serves to bring the students into active co-operation with the faculty and the alumni in dealing with educational problems. The committee is to consist of seventeen members, fifteen of whom will be students. There will be two members from the freshman class, three from the sophomore class, and a junior and a senior from each of the five courses. The faculty representatives will be the Dean and one faculty member appointed by him.

THE MIXER

The memorable event, the Engineer's Mixer, has come and gone. Every one of us is the better for the new acquaintances made and the new viewpoints gained. However much the mixer may mean to the old men it surely means more to those who are just entering upon their engineering studies. Upper classmen, think back to your first months in college. How much the friendship of one who had been "thru the mill" meant to you! What an inspiration to greater effort was the advice of a "big brother engineer"! The guiding of our Freshmen is worth much earnest effort on the part of every upper classman. D. W. N.



LIKE THIS STYLE BETTER?

ALUMNI NOTES

By WILLARD A. KATES

HOMECOMING VISITORS

The Homecoming game with Minnesota brought quite a number of old friends back to the familiar scenes in the Engineering Building. The register in the lower hall yields the following names and information:

FRED. L. ALTER, c '14, City Engineer, Manitowoc, Wis.

B. E. ANDERSON, c '15, is a sales engineer, with business address 1205 First National Bank Bldg., Milwaukee, Wis.

F. T. COUP, e '12, is with the Cutler-Hammer Mfg. Co., 324 First National Bank Bldg., Milwaukee, Wis.

G. W. ESAU, ch '11, with the Modern Steel Treating Co., home address, 698 Frederick Ave., Milwaukee, Wis.

"SI" EDWARDS, ex-c '17, and wife were in Madison for a few hours to attend the game. Edwards is working with the contractors on the General Motors plant at Janesville.

E. W. FISHER, c '16, partner in the Fisher Auto Co., Mondovi, Wis.

C. A. FOURNESS, ch '14, is a chemist, Neenah, Wis.

D. S. FOWLER, c '17, assistant engineer, W. F. Reichert, Consulting Engineer, home address, 166 E. 2nd St., Fond du Lac, Wis.

HERBERT GLAETTLI, c' 19, draftsman, Worden Allen Co. Home address, 158 Reservoir Ave., Milwaukee, Wis.

CHARLES J. GOLDAMMER, e '17, is working in Milwaukee, Wis.

RALPH A. GRANT, m '17, engineer with Allis-Chalmers Co., 485 28th Ave., Milwaukee, Wis.

S. C. GRIBBLE, ch '17, American Tar Products Co., Carrolville, Wis.

H. GUMPRECHT, c 18, is a farmer, address, Baraboo, Wis.

HAROLD HOSLER, c '18, and wife came up from Chicago, to see the game.

J. F. KUNESH, c '14, assistant engineer, U. S. Geological Survey, Tucson, Ariz.

L. D. KURZ, e '17, lives at 761 Division St., Appleton, Wis.

G. H. LAUTZ, c '08, district engineer, U. S. Forest Service, business address, Forest Service, Missoula, Mont.

A. R. MCARTHUR, m '00, resident engineer, American Sheet and Tin Plate Co., Gary, Ind.

"BILL" MANTONYA, m '19, our erstwhile poet laureate, was also back for the Homecoming. Bill kicked through with a subscription, telling us that he is with the Schaeffer Bearing Co., and is living at 3163 Pine Grove Ave., Chicago, Ill. We had hopes for the production of some of his famous verse, but were disappointed.

W. R. McCann, e '15, is with the Stenotype Co., Indianapolis, Ind.

Adolph W. Meiselwitz, c '18, is with the City Engineer, Mitchell, S. D.

Edmund Miller, ch '17, is with the Federal Rubber Co., Cudahy, Wis.

Louis F. Nelson, c '16, is a concrete and designing engineer for Paul J. Kalmar Co., Milwaukee, Wis.

Carl R. Oestreich, c '17, works for the Berger Mfg. Co., of Canton, Ohio.

Ray Phelps, c '17, works for the Davis Hanson Co., of Oshkosh.

C. A. Pottinger, e '18, is electrical engineer for the Bureau of Illumination Service, City of Milwaukee.

Russell E. Puerner, m '19, traction engineer, T. M. E. R. and L. Co., Milwaukee, Wis.

C. A. Rau, e '17, assistant foreman, Corn Products Co. Residence, 342 Buena Vista Ave., Pekin, Ill.

C. J. Rice, ex c '08, secretary, Sterling Engine Co., 419 3rd St., Milwaukee, Wis.

Gustav A., e '08, and Louis F. Reinhardt, e '07, were also Homecoming visitors.

Walter A. Rogers, c '88, was also a homecoming grad. Mr. Rogers has been appointed to the Board of Visitors for the year 1919-1920.

E. E. Rosenow, m '14, is a tool maker for Giddings and Lewis Mfg. Co., Fond du Lac, Wis.

E. H. Schwartz, min '18, was back for homecoming. He is now an open hearth operator with the Illinois Steel Co., at Gary, Ind.

R. A. Schmid, ch '15, is a chemist, business address, Appleton, Wis.

R. L. Seelbach, m '18, gives his home address as 1910 Noble Road, Cleveland, O.

Lawrence F. Seybold, e '18, is Assistant Division Research Engineer, T. M. E. R. and L. Co., Milwaukee, Wis.

L. L. Stoddard, e '13, manager of the Stoddard Tire and Supply Co., Mason City, Ia.

J. W. Tanghe, c '16, is a contractor. His home address is 2621 Lisbon Ave., Milwaukee, Wis.

Howard Thwaites, c '16, registers from Milwaukee, Wis.

George Andrae, c 16, has moved from East Pittsburgh to 10 High Street, Boston, Mass. He is still with the Westinghouse E. and M. Co.

Michael Agazim, ch '15, is in France with the A. E. F. as operating engineer in the mammoth refrigeration plant which is part of the great supply depot at Gievres. The following is a newspaper description of this plant, the largest of its kind in France:

Here is stored the major part of the reserve meat rations of the A. E. F. The five big storage rooms making up the plant—which, incidentally, rivals in size and convenience the best in the Chicago

district—are capable of freezing 8,000 tons of beef. Every 24 hours, 120 cars are handled, 60 coming in with their loads of beef from the States and 60 leaving for various parts of France and Germany.

F. L. BAYLE, m '19, is with Stone and Webster Construction Co. His address is, 11 Batavia St., Boston, Mass.

WILLARD B. BELLACK, m '19, was married on October 22 to Retha Faye Williams of Fort Atkinson, Wisconsin.

I. A. BICKELHAUPT, m '14, resides at Elmhurst Inn, Sewickley, Pa.

JOSEPH I. BINGHAM, s '04, is superintendent of public works for the city of Elmira, N. Y.

GEORGE E. BOOTH, e '16, is sales engineer for the Cutler-Hammer Mfg. Co., Chicago, Ill.

LEONARD F. BOON, c '10, C. E. '12, has resigned his position with the Emergency Fleet Corporation, and is now a structural designer for the American Chain Co., 139 E. Market St., York, Pa.

HAROLD BORCHSENIUS, min '13, may be addressed at Bisbee, Ariz.

JOHN E. BOYNTON, m '05, is an engineer for the Corning Glass Works, Corning, N. Y.

HUGH BROWN, c ex '18, enlisted in the French Army for ambulance work and after spending several months in active service was discharged. He then was commissioned in the Motor Transport Corps of the U. S. Army, being reecntly discharged as a First Lieutenant. At present Hugh is business manager of an industrial magazine published in St. Louis by his father, called "America at Work".

W. G. BUTLER, c '13, is superintendent for Frank W. Chase, Inc., 645 N. Michigan Ave., Chicago, Ill.

WILLIAM V. DARGAN, min '15, Assistant Chief Chemist at the Anaconda Copper Mining Company, at Anaconda, Montana, was in Madison on October 20. Rumor has reached us that Bill is due to take the high dive into the Sea of Matrimony before another year rolls around.

ROWLAND G. DAVIS, e '12, is residing at 1142 E. 65th St., Chicago, Illinois.

LAWRENCE H. DOOLITTLE, c '15, is with Marr Green Co., 17 N. La Salle St., Chicago, Ill.

ORLANDO R. ERWIN, e '04, is vice president of the Foamite Firefoam Co., 200 Fifth Ave., New York.

DONALD P. FALCONER, c '05, has recently moved from Cleveland to Chicago. He is to continue as Sales Engineer for the Shawinigan Electro-Metals Company, and will also be attached to the sales department of the Aluminum Company of America. His office address will be, 1500 Westminster Bldg., Chicago, and his home address will be 1018 Maple Ave., Evanston, Ill.

CHARLES R. FISHER, c '11, is with the U. S. Geological Survey, Washington, D. C.

ERNEST J. FISHER, c '04, is engineer for the Truson Steel Co., with offices at 603 Metropolitan Bank Bldg., Minneapolis, Minn.

C. S. FULLER, m '10, has moved to 13605 Garden Road, Cleveland, O.

BENJAMIN GREENFIELD, e '07, is research engineer for the Empire Gasoline Co., Bartlesville, Okla.

MAJOR CHARLES W. GREEN, e '07, who has been stationed at Fortress Monroe for the duration of the war, has been discharged from the army and is now with the Western Electric Co.

WILLIAM D. HARVEY, m '16, is with the Allied Machinery Co., of New York.

HARRY HERSCH, e '15, has accepted the position of electrical engineer for the Signal Electric Mfg. Co., Menominee, Mich.

HARRY HEINTZEN, e '18, is doing research work for the T. M. E. R. and L. Co.

H. B. HEYN, ch '15, after resigning his commission as Ensign in the Navy last year, is now connected with the Armstrong Oil and Gas Products Co. at Los Angeles, Cal.

GLEN H. KLEMME, c ex '18, after attending the Coast Artillery Training Camp at Fort Monroe saw active service in France, and was finally discharged as a First Lieutenant. Announcement has just been received of the marriage of Miss Bonnie Belle Boardman of Mason City, Iowa, to Klemme on the 25th of October. Klemme now has a position in a lumber mill at Belmont, Iowa.

EDWIN KURTZ e '17, has been appointed assistant professor on the staff of the electrical engineering department of Iowa State College, Ames.

OLAF LAURGAARD, c '06, C. E. '14, is City Engineer of Portland, Ore.

NORMAN LEE, e '14, resides at 47 rue de Ranelagh, Paris, France.

MR. FERNANDO MARGARIDA, ch '15, is now located in Porto Rico. He is superintendent of a large sugar plant having a capacity of 12,000 tons and is also instructor in the Sugar Chemistry course at the U. P. R. at Mayaguez, P. R.

K. S. MCHUGH, ch '17, is employed by the American Telephone and Telegraph Co. at New York.

FRANK MOULTON, ex '18, has married and settled down in Madison, being in charge of the drafting office of the State Architect. Frank was in the Field Artillery and spent considerable time in the Southern States. He is now a First Lieutenant in the Officers' Reserve Corps.

A. W. NANCE, c '10, received his discharge from the service and returned to his position as secretary and treasurer of the Farris Engineering Co., of Pittsburg, Pa.

G. H. NICKELL, c '11, received his discharge from the service in July, and is again with the Highway commission at Eau Claire.

FRANK ROBERTS, m '18, is in the turbine department of the Allis-Chalmers Co.

B. H. PECK, e '06, may be addressed in care of the Southern Illinois Light and Power Co., Central National Bank Bldg., St. Louis, Mo.

R. S. PEOTTER, c '05, C. E. '09, has become director and vice-president of the Second Ward Savings Bank, of Milwaukee.

NICHOLAS A. SAIGH, c '15, is Assistant Advisory Engineer on Sanitation, Mexican Border Project for the U. S. Government, in charge of design of sewer systems for about 40 camps being built along the Mexican Border. His headquarters are at Camp Travis, Texas.

ALLISON F. H. SCOTT, e '17, one time senior colonel of the cadet corps at Wisconsin was commissioned in the Aviation Corps and made Adjutant at Langley Field, Virginia. He was then commissioned a Captain and stationed in Washington in charge of the armament of army aeroplanes. Scott has recently been discharged and is working as consulting engineer for an aeroplane concern in Washington.

EMIL F. STERN, m '19, is working on the design of tractors for the Elwood Tractor Co., of Madison.

CLAIRE SCHNEIDER, e '18, is working for the A. O. Schmidt Co., of Milwaukee.

C. W. SCHMIDT, e '18, is with the Mechanical Appliance Co.

E. R. STIVERS, c '15, Chattanooga, Tenn., has moved to 46 Municipal Bldg.

D. W. TYRELL, c '17, is with the regular army at Fort Worden, Washington.

GLENN B. WARREN, m '19, is an apprentice at the General Electric Co., at Schenectady, N. Y. Warren will be remembered as the man who successfully handled the editorial end of the ENGINEER last year.

J. WESLEY WILLIAMS, ch '18, is now with the Du Pont Chemical Works at Carrolville, Wis.

EDWARD WRAY, ch '05, E. E. '06, may be addressed at 204 Cameron St., Eau Claire.

H. F. ZABEL, ch '14, has moved from Milwaukee to Hamilton, Ontario, Canada. He is employed by the Canadian Westinghouse Company, Ltd.

MAJ. O. B. ZIMMERMAN, m '96, M. E. '00, attended the commencement exercises of the Pennsylvania Military College at Chester, Pa., last June, and received the honorary degree of Doctor of Science in recognition of his war work in Washington.

CAMPUS NOTES

By WILSON D. TRUEBLOOD

SOLD OUT.

Even 900 copies of the October ENGINEER were not enough to go 'round.

As you balance your thanksgiving dinner on a tray and try to fill your glass with water, think a thought of the spread that the folks at home are just sitting down before. Somebody is always taking the joy out of life.

The events of the month may be briefly summed up in these trenchant slogans:

A dollar for the ENGINEER
Subscribe to the Lit
Give to the Y
Have you a Sing Song book?
Build a Hospital
Send the Band
Buy a Homecoming program
Reserve a Badger
Join the Red Cross.

Did you notice the handsome looking and efficient ushers at the Mischa Elman concert? All engineers, Clarice, all engineers.

Confound that Co-ed who sells the Lit in our lobby! When we approached her the other day with a fifty-fifty proposition, saying, "Trade a Lit for an Engineer?" she retorted, "Engineer, the deuce! I can't read Greek." That's where we have it on you, Hortense; our language may be hard for you to understand, but we can see through your Lit perfectly.

A dynamometer to test the power delivered by the rear wheels of automobiles is being installed in the steam and gas laboratories. This apparatus was constructed by the mechanician of the college of Engineering and will be used in the auto-mechanics course.

Mr. Koehler has been appointed assistant instructor in Chemical Engineering.

You say the Chemical Enginer swells with pride when you mention metallography? You would too, if you worked in the spacious, first class, metallography laboratory that has been fitted out for him. Read about it in a future issue.

The state of South Dakota recently appropriated $50,000 to be spent on the investigation of the possibilities of water power development on the Missouri River in that state. Mead and Seastone, consulting engineers of this city, have been engaged to conduct the investigation.

Charles F. Sloane, C. E. 1916, University of Kansas, has been elected to a scholarship in Hydraulic Engineering and is conducting some research work on the loss of head in pipe bends. Data on this subject are very much needed and a series of experiments along this line is being conducted under the direction of Prof. Corp.

Henry W. Tabor, C. E. 1916, University of Wisconsin, also holds a scholarship in Hydraulic Engineering and is working with Sloane. Tabor was recently discharged from the army as a First Lieutenant of Infantry.

B. Mariategui, a freshman civil, has journied all the way from Lima, Peru, for the privilege of pressing the little red button at Wisconsin.

WISDOM FOR THE GREEN

Oh, ye Frosh who come here to take up the Arduous duties of "Compution", heed my words, lest thy name be Dennis:

1. Honor thy Dean, respect his Name, and presume not on Familiarity, for thou art as the Worm beneath the feet of thy Fellow-men; respect the Profs and all Those who strive to Lessen the Fulness of thy Ignorance.

2. Pound not thy Ear until five Minutes to eight, or thou shalt be Found Wanting; dub thy Instructors "Old fellow" and Slap them on the Back—Lo, thou shalt find They can struggle along Without thee.

3. Hoard not the Oil that burneth in thy Lamps at Eventide; wist thou well that one Hour sown with the Pamphlets of Learning will reward thee even as Dallying with the Shimmy at the Candy Shop will gain thee a Journey to thy Father's House, with thy Pencils, thy Papers, thy Pamphlets which thou Scannethed not, and All thy belongings.

4. Pursue not the Pig with Defective Eye-Sight; nor dally overmuch with the Decimal known among Men as 2.75; a Tight Belt doth be-fog the Mind of the Yearling, it maketh his Knees like unto Water, his Words like unto Chaff borne before the Wind.

5. Fudge not thy Answers, with Elbow-Grease and Para-Gum, for Lo! thy Instructor hath a Good Eye, and thy Deceit availeth thee Naught; a Flunk hath more Honor among men than an Ex which thou deserveth not; I say, fudge on thy work, my Son, and the Meat Axe will fall upon thy Neck even as did the Father upon the neck of the Prodigal Son, and there shall be Weeping and Gnashing of Teeth among thy Friends, for they shall Know thee no more.

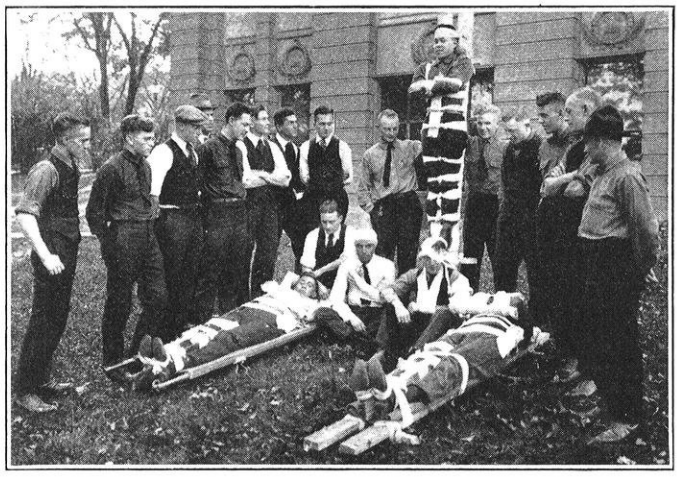
6. Infatuate thyself not with the Virgins of thy Acquaintance for such Pastime is To Make Foolish, and Thou shalt be well shorn, even as at Runkel's thy Gold will be under New Management, and thou shalt kick up thine Heels even like an Ass; for Such are the Ways of Skirts with a Man.

And, I say to you, Oh my Son, take heed of my Words and Misplace them not; conduct thyself with seemly worship of Juniors and Seniors, for they are in the Clouds above you; trifle not with the Sophomore, lest thou be like unto a Fish, thy body

Immersed in water, thy gills gasping for air; perform thy Daily tasks with Rectitude—do all These Things, my son, and Thy days will be long in the Land of the Slip Stick—fail, and thy name will be Mud.

R. E. S.

The Mine Rescue car from Houghton has come and gone, leaving the Miners more capable and wiser men. The First Aid class under direction of Mr. F. K. Sterling was composed of nineteen sophomore and junior Miners. The work consisted of methods of relief for burns, scalds, fractures, dislocations, injured eyes, wounds, arterial cuts, and of methods for resuscitation of patients overcome by gases or drowning. A stranger entered the room and gasped as he saw the patients "suffering" with fractured spines walk about unconcernedly until they were tied down to the improvised stretchers. Even those supposed to be drowned, hesitated not a bit to let the "First-aiders" know when their ribs were too forcibly "stepped" on. Due to the skillful handling of their wounds by the class, the bandaged Miners seen in the foreground are well on the road to recovery. Do not be misled into believing that we tied Tsao's foot to Pfeffer's head to keep him down—'tis just a trick of the camera.



CLASS IN FIRST AID.
Top Row, left to right—Hiestand, Humel, Jourdan, Becker, Link, Kenniston (state Sanitary Engineer) Bramlette, Hahn, Lundberg, Tsao, Solberg, Roman, Gruppe, Zwicker, Sterling (Instr.)
Lower—Grubb, Fourness, Kemler, Pfeffer, Peterson.

You have no idea, Florence, how excited the Staff was when it learned that an L. & S. co-ed senior was a regular subscriber to our little magazine. Of course, it was the Woman's Department we ran last year that attracted you. The department will be revived for your own special benefit just as soon as we find an editor who can qualify.

We were honored last month by a visit from Frederick C. Reed, millionaire ranchman and consulting engineer for The Great Divide Mining Co. at Tonopah, Nevada. Mr. Reed presented quite a striking appearance in his high heeled riding boots, brilliantly colored Navajo jumper, and high sombrero.

In days of old, when knights were bold,
The engineers were gay.
For in every hall and classes all
Manhood had its way.
Now co-eds fair and maidens rare
Crowd our hallowed shrine.
With indigestion we ask the question
What is next in line?

Specifications for the first unit of the new engineering shops have been completed and according to information received the work will start in the near future. Look for an illustrated article on the subject in a later ENGINEER.

The Mining Club, the Pep Club of the Campus, held its first meeting in the Mining Lab. October 22nd. Seventeen Miners were initiated into the awe-inspiring secrets of the Club. They traversed the dark, musty, and fearsome tunnels of the underground world, and met Vulcan, the fiery king of the realm of molten magma. Then came an orgy of eats—juicy steaks, baked spuds, dills, buns, coffee, followed by the ever-present smokes. Short welcoming talks to the new members were given by Prof. R. S. McCaffery, Mr. Shorey, and Mr. Barker, of the Mining Department.

Some of the sophs are wondering why Math 52 wasn't named Math 57. Surely Heinz hasn't anything on Slichter for variety.

FOOTBALL

Wisconsin hopes for a conference championship, founded on two successive victories, were given a jolt when on November 1 Minnesota smashed through the Badger lines for a 19 to 7 victory.

The first conference game of the year was played with Northwestern at Evanston. The Badger backs pounded through the line for big gains and the Purple crumbled 10 to 6.

The following week the team travelled to Urbana to contest with the Suckers. Illinois created quite a scare by dropping a field goal from the 25 yard line in the first quarter. Fears were banished, however, when after carrying the ball down the field in a whirlwind fashion, Wisconsin sent Jacobi over for the first touchdown. Later on, by a clever forward pass, Weston crossed the Sucker goal again. Illinois made one touchdown. The final score was 14 to 10.

In the game with Minnesota the team was somewhat handicapped by the fact that it was outweighed 13 pounds to the man. Working with their invincible shift and with luck in their favor, the Gophers were in danger at no time. During the last quarter Davey made a spectacular pass to Paulie Meyers who carried the ball over for the lone touchdown. A record crowd, estimated at 20,000 attended the game.

In all the games the work of Weston, Meyers, Davey, Jacobi, Carpenter, and Sundt has been especially notable. At Illinois the long punts of Sundt were one of the features of the game. The Davey-Jacobi system has been a source of continual dread, while the consistent scrapping of Meyers, Carpenter, and Weston deserves highest praise.

ALBERT S. ROMIG, former instructor in the steam and gas department, died at Boulder, Colorado, on October 8. Mr. Romig began teaching at the University in February, 1915, and was connected with the engineering college until May 1918, when he accepted a position as member of the faculty of the University of Colorado. He is survived by his wife and a son, William, age 5.

The Senior Miners, who took the Mine Rescue course under Mr. E. A. Sporley, familiarized themselves with the Fluess-Proto oxygen breathing apparatus, its uses and its limitations. They worked three afternoons in a room densely filled with smoke and gas, while equipped with the outfit, to obtain practice in working under the difficult conditions involved in Mine rescuing. Some of the fellows were skeptical as to the presence of gas and removed their masks. They wept for an hour afterward.

MINE RESCUE CLASS.

Upper—Emmanuel, Hymer, Albers, Prince, Turneaure, McKinley, Wolverton.

Lower—Findisen (State Mine Inspector), Slaker, Ray, E. A. Sporley.

I'LL TELL THE WORLD IT HAS

It is said that Daly, manager of a Dublin theatre, laid a wager that a new word of no meaning should be the common talk and puzzle of the town within twenty-four hours. In the morning, the letters "q-u-i-z-" were found chalked on all the walls of Dublin. Daly won his wager. The word is still town talk, but has it no meaning in your fair young life, Cuthbert?

The math shark breezed in and helped himself to the makin's. "I've got one for you this time, buddy," he said to the hard-working engineer who was humped over the drawing board. "Shoot," replied his host briefly, keeping on with his work for Reddy Millar. "You're pretty good on estimating, I take it?" the math shark inquired. "I admit it," was the reply. "Well, I have a simple little problem that you can't estimate within a million miles," the math shark stated, and waited for a bite from the prospective victim. But the engineer was wary. "Let's have the problem," he demanded. "Why certainly. Here it is. Suppose you had a large sheet of paper one-hundredth of an inch in thickness, and suppose that you tore that sheet in two and laid one part on top of the other. And suppose that you tore it again and laid the parts in a pile so that you had four thicknesses. And you keep on doing that until you have torn the pile fifty times. You can't tell me within a million miles how thick the pile will be." "I'll take you for a five on that," was the answer. When the bet was laid, the math shark demanded the estimate. It came in a hurry, "999,999 miles," said the engineer triumphantly. "Haw, haw, I win," snorted the math shark as he swept up the bills. "Don't be in a hurry, buddy," the engineer said, "you said within a million miles, and I am surely within the limit." "Oh very well, figure it out," the math shark said, "I can wait." The engineer got busy with a pencil and the log tables. "Sufferin' cats," he exclaimed, as he reached the end of his computations. "Who'd believe it?" Who would? It's a great surprise. Try it for yourself.

OF COURSE, SILLY!

A Frosh came puffing up the Hill, his green cap perched on the northeast corner of his cranium, at a precarious angle. Just before the yearling raised his arms to execute the dutiful "Button—both hands", somebody on the steps of the Engineering Building queried: "Wonder how he keeps it on at that slant?" And the answer is: "Vacuum pressure, of course."

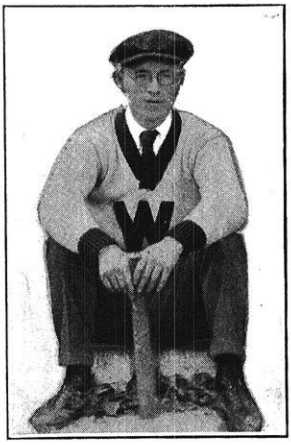
Several of our Norwegian brothers have created an innovation in the way of campus athletics by introducing the game of soccer.

G. A. Morrison, Secretary of the Bucyrus Co., gave an illustrated lecture on Excavating Machinery in the Engineering Auditorium, October 27th. It was the first of the series of talks arranged by the Mining Department.

A toboggan slide is being contemplated for this winter. The location being considered is down Henry Street and out on the Lake. Alvin G. Klann, the originator of this idea, is trying to put the plan through and obtain the necessary consent from the city authorities. This should prove a popular form of sport, as the old slide out on Observatory Hill was well patronized in the days when it was in operation.

Professor H. D. Frary, formerly engineer on airplane work at the Forest Products Laboratory, was recently appointed assistant professor of steam and gas in the place of Prof. Callan who is on leave of absence. In 1910 Professor Frary received his M. Sc. degree at the University of Minnesota, where he afterwards taught engineering math for two years. During the year 1913–14 he undertook advanced work in Germany, returning at the outbreak of war to accept the position of chief calculator on the U. S. Geodetic Survey ship, Carnegie. Later, he pursued advanced studies at the University of Illinois, receiving there the degree of doctor of philosophy.

For the second year in succession, the engineers furnished the Chief of Police for the big class rush. Here he is,—All Spafford.



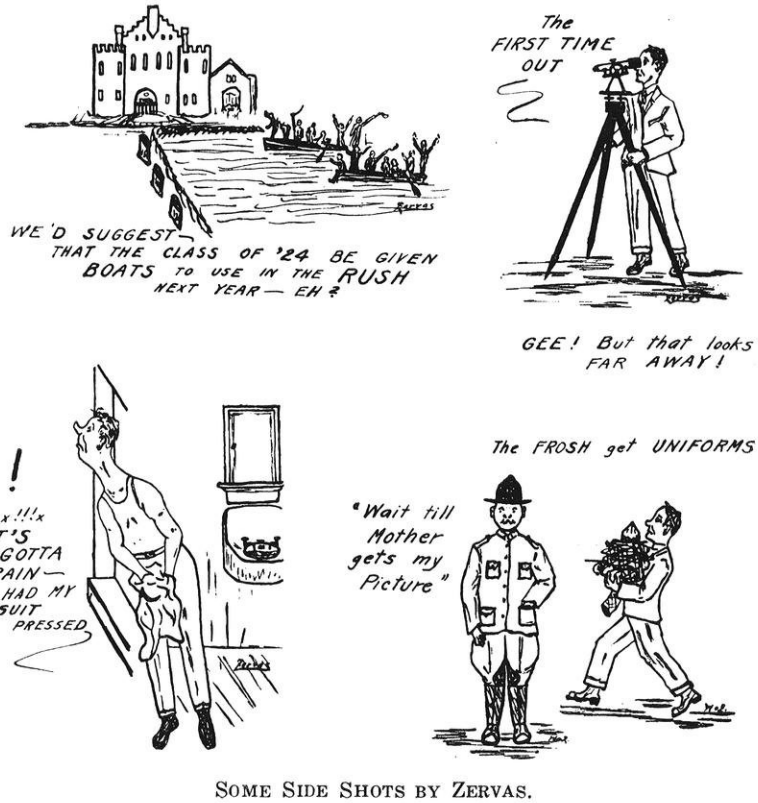
AL SPAFFORD

And by the way, we would inform you that the soph engineers were assigned the job of mussing up the freshman's side of the field. They were thorough going about it. Now we have a fair idea of what France must have looked like after the Germans retreated.

MR. JAMES H. PLATT, who has been appointed instructor in machine design, was graduated from Ohio State University, in 1917, with the degree of Bachelor of Science, Mechanical Engineering course. He was with the Goodyear Tire and Rubber Company, at Akron, as Efficiency Engineer for a short time after graduation. In September, 1917, he went to the University of Illinois as instructor in machine design, but left in January to enter the army. He spent fourteen months in France with the 415 Railway Telegraph Battalion.

G. WADE BOUSHEA, freshman electrical, has been compelled to withdraw from school because of ill-health. He expects to be able to return next semester.

PROF. W. S. KINNE of the Structural Engineering Department has spent a large portion of his time during the past summer writing a chapter on "Roof Trusses", for a "Handbook on Building Construction", which is to be published about the first of the year by Prof. G. A. Hool, of the University Extension Division.



SOME SIDE SHOTS BY ZERVAS.

IT HAS COME TO THIS.

"What kind of coal do you use?"

"Egg."

"Where can I get a dozen?"

BACKWOODS PHILOSOPHY.

"You don't need a dog license unless you got a dog, and a marriage license gets you a wife."

"Well?"

"But a hunting license don't guarantee nuthin."

Kindly mention The Wisconsin Engineer when you write.