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THE TECHNIC

TERMS.

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MR. Richard Bergmann has been elected from the Freshman class to THE TECHNIC staff to serve until June. Mr. Bergmann has had some experience in this sort of work, and is already known to TECHNIC readers by the cover design which is now being used. It is the desire of the staff to make positions on THE TECHNIC subject to competition by all students. It is especially urged that under classmen who have even the slightest inclination toward such work should hand in any material of a suitable nature that they may be able to prepare. This will not only help the paper, but will also give us a line on a few likely men when it comes time to elect our successors. Because a man has been elected to represent a class does not exclude other members of the class from the privilege and duty of handing in material of any sort. For the Differentials Department especially original, clever stuff is always in demand. To build up a strong department we must have original poems and jokes, and get away from the old idea of recording every chance remark that some one may have smiled at and indulging in various little personalities of interest to very few in school, and absolutely senseless to any outsider.

We should like to give every student activity its share of publicity, but it seems to be impossible to get all the material for publication. We should appreciate it as a favor if the officers of the various organizations will see to it that we get some notice of anything that is being done.

ELSEWHERE we are printing a copy of the revised rules in reference to scholarship and standing. The new rules mark a distinct advance in the already high scholarship standards of the Institute, and will serve to make the courses distinctly more rigid in their requirements. While higher standards will inevitably increase the number of students falling by the wayside, they can not fail to raise the quality of the graduates and to enhance the prestige of the diploma. Engineering is an ex-

acting profession, and requires the highest class of intensively trained men that can be turned out.

For some time members of the faculty have been studying various engineering courses and consulting with alumni and Tech Clubs throughout the country concerning contemplated changes in the courses of study. The report of the committee appointed to investigate the changes has been completed and is at the present time, being considered by the faculty. That the course has kept abreast of the advance of engineering education is evidenced by the slight changes which it has been found desirable to introduce. The general trend of the revision will be to give greater opportunity for more intensive study. A possible development along this line is the placing of two weeks of consecutive shop practice in the present vacation period. In this manner the long blocks of practice hours can be cut down and the schedule re-arranged and balanced so as to enable students to give the proper amount of time to preparation. Minor changes will be made in all the courses. More English will be required, the language requirements will be modified, chemistry will be put forward into the freshman year. One or two new courses may be introduced and a number of shifts and rearrangements of existing courses are contemplated. The complete new schedule will probably be completed by the time this is published.

BY the recent ruling of the Student Council the Rose branch of the A. I. E. E. is not eligible to receive an allotment from the Student Fund, but is to receive some financial aid by becoming a subordinate part of the Scientific Society, so that a portion of the latter organization's appropriation will revert to the electrical society.

The A. I. E. E. is a very important and worthy student organization and is deserving of the heartiest support. Its meetings are well attended and of interest not only to electrical students but to everyone in school. This is particularly true of the lectures given last year on some of the more advanced modern developments in physics and electricity such as wireless telegraphy, Roentgen rays and high voltage phenomena, which find no place in the regular courses. It is to be hoped that similar societies can be formed in other lines, and if possible the four or five possible societies can co-operate in some manner and displace that mummified corpse, the Scientific Society, which comes to life about once a year and relapses immediately into its customary state of inertia.

At an early meeting of the A. I. E. E., Mr. Paul F. Stokes, '10, Assistant Superintendent of the Nela Lamp Division of the National Lamp Works of the General Electric Co., will deliver a lecture on the manufacture of Mazda lamps, illustrated by lantern slides and specimens of lamps in various stages of manufacture. The lecture promises to be exceedingly interesting, as Mr. Stokes is in a position to speak from an intimate knowledge of his subject. Immense amounts of money have been expended during the past few years in research along these lines and enormous strides have been made to bring the electric lamp to its present high stage of development.

BOTH articles this month are by alumni. The first is by Mr. J. J. Kessler, '97, President and Manager of the Dielectric Mfg. Company, manufacturing chemists, who specialize in insulating materials, water-proofing, special paints, etc. Mr. Kessler's article is along the same line as that contributed by him and published in THE TECHNIC for October, 1913. It is an authoritative discussion of the important problem of the effect of hydrated lime in water-proofing concrete.

The second article is the address on the "Safety First" movement delivered before the Student Body by Mr. D. Kranichfeld, '07, safety engineer for the National Association of Manufacturers, which is backing the nation-wide propaganda for safety, especially in industrial plants. This movement is receiving

much attention and publicity at the present time and is of great importance to engineers, as the campaign for the education and protection of the lives of workmen has assumed proportions undreamed of a few years ago.

THE estimate of yearly expense for a student as given in the catalogue has been the subject of considerable criticism during the last few years, and it appears to be somewhat low, considering the present cost of high living. According to the Catalogue the total expense per year should run from $350 to $455, the former figure being designated as low and the latter as medium.

An attempt was made to get expense accounts from members of the Senior class in order to find out what the actual average yearly expense of a student is at the present time. The response was not satisfactory as to number, but a few accounts were turned in, and these are believed to represent a fair average. The total expense per school year would appear to run from $500 to $600, although it is believed that a man can get through on less if he has to.

The following are typical average accounts:

Tuition	$75	Tuition, etc.	$125
Registration	10	Board, room and laundry	270
Incidental Fee	25	Clothes (2 suits, 1 overcoat)	70
Student Fund	15	Other clothes	30
Board	165	Books	17
Room	55	Other expenses	55
All other expenses	235		
Total	$580	Total	$567

The following is an actual expense account as kept by a student during two years:

Institute fees	$125.00	$125.00
Board	131.60	161.70
Room	62.25	72.00
Books and supplies	34.50	36.25
Incidentals	146.25	183.95
Totals	$499.60	$578.90
Average yearly		$539.25

Two different undetailed accounts for three years were received, both taken from actual figures, the averages checking within 17 cents, which is surely within the allowable limit of error in this case. The two sets of actual expenses are as follows:

Freshman year	$496.50	$625.00
Sophomore year	555.00	525.00
Junior year	655.00	557.00
	$1,706.50	$1,707.00
Average per year	568.83	569.00

The variation in the three years is exceedingly irregular, probably for personal reasons known only to those concerned, but singularly enough the net average is almost the same in each case. Number two seems to have led a fast and gay life as a freshman but sobered down considerably during his second and third years. The first man started in by being very economical and gradually worked up until his Junior year. With his actual account, was handed in his estimate of expense for the Senior year, which is $720.

The only essential difference between these accounts and that published in the catalogue would seem to be the estimate in the latter of "other personal expenses," $50 to $100. This might be changed to bring up the total to somewhere near $550, to include all expenses.

In the current catalogue of Worcester Polytechnic exactly the same change has been made. Under yearly expenses including clothing and incidentals, an estimate of $600 for the total yearly expense is made. Formerly a prospective student was led to believe that with a little care his yearly expenses at Worcester could be kept under $450, a recognized improbability, and, without a scholarship, an impossibility.

EARLY in March, John G. D. Mack, '87, Professor of Machine Design at the University of Wisconsin, will deliver an address under the auspices of the Institute on "John

Ericson." It is possible that the address will be given down town in order to enable Terre Haute people to share with Rose students the privilege of hearing Prof. Mack.

The United States Gypsum Co. has requested the privilege of having one of its engineers deliver an address on the gypsum industry at the Institute. The lecture is of an educational nature and is to be illustrated by moving pictures. It was prepared by the Gypsum Industries Association, an association of gypsum companies.

NEAR EDUCATION WITH THE TWO-YEAR COLLEGE COURSE.

A WELL-KNOWN college president is quoted as having publicly declared himself as looking with some favor on a two-year college course, especially for those who are going into business, leaving two subsequent years of putative post-graduate study for rounding out the education of others. This will have a cheerful sound to those who desire an imitation of a liberal education. It suggests only too forcibly the specious argument put up by a certain bogus university, which shall be nameless here, and based on the liberal views of still another college president. The latter, according to the advance agent of the bogus university, feeling that the opportunities for the wider dissemination of college training should be improved, had with great breadth of view taken the stand that a college degree could properly be granted to a suitably prepared student on a single year of actual residence at the university, the rest of the required work having been done elsewhere. But, "our trustees," proclaimed the advance agent, "have followed the distinguished scholar's far-sighted proposition to its logical conclusion, and have arranged for the granting of a college degree without any actual residence at all, merely when the suitable course of instruction by correspondence, conducted through our admirable set of books, price—— dollars, has been completed."

There are two kinds of education, one of which is secured as a result of honest work, thorough, steady and well directed, the other obtained by hook or crook in any way which does not involve too much time and trouble, or too strenuous attention to literary pursuits. The latter bears to the former about the same relation that a counterfeit half dollar does to the genuine coin. It is not here in the least intended to suggest that the first of these college presidents stands for the counterfeit in education, but his program, if carried out, would lend itself altogether too readily to the exploitation of shams. It might be put through conscientiously and without disastrous results under his own wise direction, but at grave risk of setting an exceedingly bad example.

Two years of so-called post-graduate work on the top of the present Freshman and Sophomore years of any institution of learning would land the student exactly at the point he now reaches at the end of the four years' course, and the so-called college course cut off two years earlier would be nothing better nor worse than it now is at the expiration of a similar period. What is needed in this country, and particularly in education leading up to technical pursuits, is not less time, but more than is now available, time spent in thorough work with a definite aim in view. It is perfectly true that the average young man, whether going into business or a profession, is in the present state of things launched rather late into the serious business of life. This, however, is not in main the fault of the colleges. The loss of time is in the shiftless and witscattering methods of the lower schools, particularly those which lead up to the so-called college preparatory stage. When the teachers in the humble institutions realize that one thing well learned is worth a superficial smattering of half a dozen, and when the preparatory schools, backed by those below them, get down to hard business, young men will be able to save a year in getting into college, and consequently a very valuable year in getting out of college. This accomplished there will be small temptation for any university, big or little, to hand out educational apologies. —*Engineering Record.*

The Effect of Hydrated Lime in Concrete Mixtures

By J. J. Kessler, '97

ONE of the live issues in connection with the problem of water-proofing concrete is the effect of hydrated lime. Hydrated lime is becoming very largely used for this purpose. It is being widely advertised by manufacturers, and very remarkable water-proofing qualities are being claimed for it.

The general claim that is made for hydrated lime is that it water-proofs concrete because it actually fills up the voids of the concrete and for this reason makes it impossible for water to seep through concrete which had been treated with hydrated lime.

The writer has already shown in a previous issue of The Technic, published in October, 1913, that this void filling or pore plugging theory has no foundation in fact as far as the action of water-proofing pastes were concerned.

It is the purpose of this paper to discuss the effects of hydrated lime in concrete mixtures, and also to inquire into the causes of this effect.

When one considers that hydrated lime is soluble in water (100 parts water absorbs 17 parts $Ca(OH)_2$ at 32 degrees F.), and also that hydrated lime itself has very little tensile strength compared with that of Portland cement, it is very interesting to inquire just to what properties hydrated lime owes its efficiency in concrete mixtures.

Small percentages of hydrated lime in concrete mixtures improve the plasticity of the mass very considerably. The general effect of this increase in plasticity is, of course, to make concrete much more homogeneous by keeping it in this plastic condition while it is being placed.

Concrete with hydrated lime added is therefore much more fluid while being handled than similar concrete without hydrated lime. This of course, in itself is a very great advantage, and it gives the finished concrete properties which could not be secured in any other way, and with so little expense.

Many of our largest concrete buildings are being constructed by mixing the concrete at points on the ground or in the basement of the building. After mixing it is conveyed to various parts of the building.

Portland cement in itself has not much plasticity, some brands being much less plastic than others, and in order to be properly conveyed it must, of course, have more or less fluidity.

We may consider, therefore, that concrete containing hydrated lime is more plastic and homogeneous and of more uniform density than concrete without it.

Another property of hydrated lime which makes it a useful substances in concrete mixtures is the fact that it takes up more water than does Portland cement.

Dry hydrated lime requires from forty-five to sixty per cent water in order to convert it into a plastic mass, whereas, Portland cement only requires twenty-one to twenty-eight per cent of water to enable it to acquire the same consistency. The water required for hydrated lime does not enter into chemical combination with the lime excepting in that it dissolves a small quantity of it, whereas, in the case of Portland cement a considerable amount of the water is actually removed through chemical action in the cement.

The net results, therefore, that hydrated lime mixed with concrete has, is to preserve the plasticity of the mixture a longer time than would otherwise be possible.

Concrete mixed with hydrated lime preserves its plasticity therefore up to the point when it is put in place, to a much greater extent than concrete made with pure cement.

The fact that hydrated lime makes wet concrete more plastic, more dense, and more homogeneous has been well established, and the general tendency, of course, would be to make such concrete more water-proof.

We raise the point, however, that this effect is only apparent up to the addition of small percentages of hydrated lime, and that this effect is not due to any direct water-proofing properties which the concrete has, but simply the improvement it makes in the physical properties of the wet concrete.

In our article of October, 1913, we have already shown that the addition of lime to neat cement briquettes tends to increase the water absorption of these briquettes very considerably. We have shown that a series of briquettes made up with different amounts of hydrated lime show water absorption out of all proportion to the amount of lime added. We have also shown that the presence of hydrated lime in Portland cement briquettes decreases the strength of these briquettes out of all proportion to the amount of lime added.

These results are exactly what one would expect from the addition of a substance which is soluble in water to a considerable extent, and which has of itself not nearly the tensile strength of Portland cement. While the addition of small amounts of hydrated lime have been shown to be beneficial it must not be supposed that further improvements can be affected by the addition of further hydrated lime, but it must be expected that points will be reached where the further addition of hydrated lime will be very detrimental, not only to the water-proofing qualities, but to the physical properties of the concrete.

Hydrated lime can improve concrete, therefore, only up to the point where it improves homogeneity and density of the mass on account of the better plasticity and flowing qualities of the concrete while it is being put in place.

If hydrated lime be used beyond this point its effect can only be in the direction of decreasing the water-proofing qualities of the concrete as well as its strength.

The use of hydrated lime in concrete, therefore, does not render unnecessary the use of other water-proofing substances, but is only a valuable adjunct.

From the foregoing we conclude that small percentages of hydrated lime when added to concrete will do the following things:

First—Makes the concrete more plastic and homogeneous, improving its uniformity and density.

Second—Enables concrete to retain its plasticity while setting.

Third—The water-proofing results obtained from hydrated lime are indirect and not due to any positive water-proofing property of hydrated lime itself.

Fourth—In order to obtain the best results hydrated lime should be used in conection with water-proofing substances of positive value.

CONTINENTAL BAKELITE.

The Continental Film Company of Newark, Delaware, have gotten out a new track insulator, which they designate as Continental Bakelite. This compound is for use in insulating joints or for skims to insulate the rail from metal ties. Bakelite has the faculty of not becoming saturated with water when in service. Tests made with Continental Bakelite Insulation show, where fiber was cutting out every three or four days, the same joint insulated with Bakelite over two years ago, that the material is still there. The results of other tests made by railway officials have shown that the life of Continental Bakelite is much greater than that of ordinary vulcanizing fiber.

The cost of Bakelite is greater than the ordinary fiber compounds used, but this should be offset by the increased life and less cost of maintenance labor.—*Railway Engineering.*

What Accident Prevention Means to the Engineer*

D. KRANICHFELD, '07, Safety Engineer of the National Assn. of Manufacturers

MANY people fail to realize the need of a national safety campaign, or even realize the annual loss resulting because of accidents, a large percentage of which are preventable. At the present time a broad movement is spreading over the United States, in an endeavor to arouse a public interest for the prevention of accidents, and is generally known by its slogan, "Safety First."

For several years we have heard conservation on all sides—the conservation of our natural resources, such as water powers, coal deposits, forests and soils, but the movement tending to preserve the lives and limbs of our working men and the public at large, is certainly a movement that is worthy of the consideration and co-operation of all. The annual tax placed upon society directly due to preventable accidents and diseases, is one to which we all must contribute.

Prof. Irving Fisher gives in Bulletin No. 30, of the Committee of One Hundred on National Health, two hundred and fifty billion dollars as the minimum estimate of the vital assets of the United States in 1907. This is estimated as being from three to five times the value of all other resources. He also asserts that the estimated annual loss of three billion dollars due to accidents, sickness and death, of which one-half, or one and one-half billion dollars, is preventable.

From figures given by the Interstate Commerce Commission, we find that 35,000 of our American workmen, the best assets of our nation, give up their lives every year in industrial accidents. This is appalling and does not include deaths due to agricultural hazards, traffic accidents or accidents in the home, but is strictly confined to industrial occupations. Thirty-five thousand a year, or one for every sixteen minutes, of every hour, of every day in the year. As to the injured, we find that the number totals 2,000,000, or one for every sixteen seconds. Of these 2,000,000, 500,000 are classed as serious injuries. If you are in this room one hour this morning, death through accident will have entered four homes, with its usual accompaniment of sorrow and suffering. These staggering, but undoubtedly conservative figures of a single year of peaceful industry, far exceed the number killed and injured in some of our military campaigns. The total number of killed and wounded in the Spanish-American and Philippine wars did not exceed 6,000, while during the same period, the killed and wounded in our industrial army, numbered at least 5,000,000, or for one killed and wounded in battle, 850 suffered injury in industrial occupations. When we stop to consider the additional number of injuries that results in agricultural accidents, traffic accidents or accidents in the home, it is time that drastic measures are taken for stopping or at least diminishing this annual loss.

Each year, industrial accidents make thousands of wives, widows and their children, orphans, many of whom are cast out upon society to be cared for by charitable institutions, supported by the general public.

Legislation and education must cure this. (*Marcus A. Dow, N. Y. Central Lines.*

* Paper read before students of Rose Polytechnic Institute.

Many people have the erroneous idea in regard to hazardous occupations, and think the majority of accidents have their source in machine operations. The roar and rumble of a rapidly moving train fills us with awe because of the energy stored up in the moving mass of iron and steel, and its ability to do damage and destruction unless properly controlled. Some think the passenger, riding on a railway train, is subjected to extra risk of life and limb, but upon investigation it will be found that he is more safe on a train than when trying to walk across some of our busy streets.

Deaths caused by automobile accidents in Chicago increased 2,140 per cent from 1905 to 1913, or from one death for 1,290 automobiles to one for 188. *(Prepared by Nat. Assoc. of Mfrs. Courtesy, George H. Whittle.*

During the month of September, transportation accidents in the streets of New York caused the death of seventy-two persons, forty-five of whom were children. Of this latter number, thirty-five were killed by automobiles, eight by engines and two by street cars. Not a single child was killed by a horse-drawn vehicle. It would appear that drivers of motor cars in New York are, either foolishly careless, or criminally reckless. This slaughter during one short month is appalling, and is a common occurrence in every locality of the country. Every day we read of traffic accidents, many of which resulted through carelessness and chancetaking, that could have been prevented by the practice of the principles and rules of Safety First. I recently read the following head lines in a Chicago paper, "Record of Automobile Accidents for One Day:

Four Dead.

One Fatally Injured.

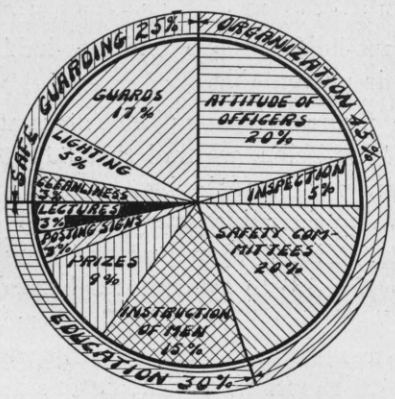
Eight Seriously Injured."

Even for Chicago with its rush and hurry and congested traffic conditions, thirteen accidents in one day, due to the automobile, is ample reason for a concerted safety campaign. Even if not engaged in industrial occupations we are liable to injury at every hand, and it is necessary that we think of our own personal safety at all times. We are no longer safe upon the streets, and are subject to injury through the thoughtlessness and carelessness of others.

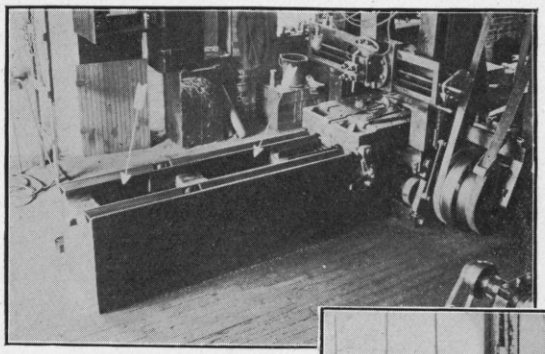
Because of the increase of accidents that come to the attention of the general public, interest is being aroused in this national movement toward safety. I am sure you all agree that it is ample time we are begining to think of the unnecessary and preventable waste resulting through accidents.

Three weeks ago, I had the pleasure of attending the Third Annual Safety Congress, held under the direction of the National Council for Industrial Safety. Here were gathered men from all parts of the country, manufacturers, state officials, insurance representatives, and safety experts, to discuss ways and means of conserving human lives. It was an inspiration to see the interest manifested at these meetings, and it clearly demonstrated that Safety First is not an idle whim, nor a mere hobby.

In order to bring about a successful campaign for the prevention of industrial accidents, it is the opinion of safety experts that the problem must be attacked from three different angles, namely: Safeguarding, organization and education.



Relative value of the various branches of safety work from results of ten years' accident prevention campaign. *(Mr. R. J. Young, Illinois Steel Co. Prepared by Nat. Assoc. of Mfrs.)*

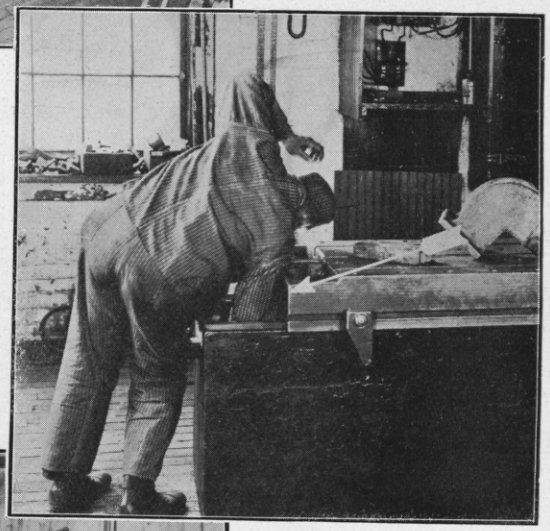


Cause.

The openings between the ribs of a planer bed are often used as a storage place for tools, clamps, blocks, etc.

Prevention.

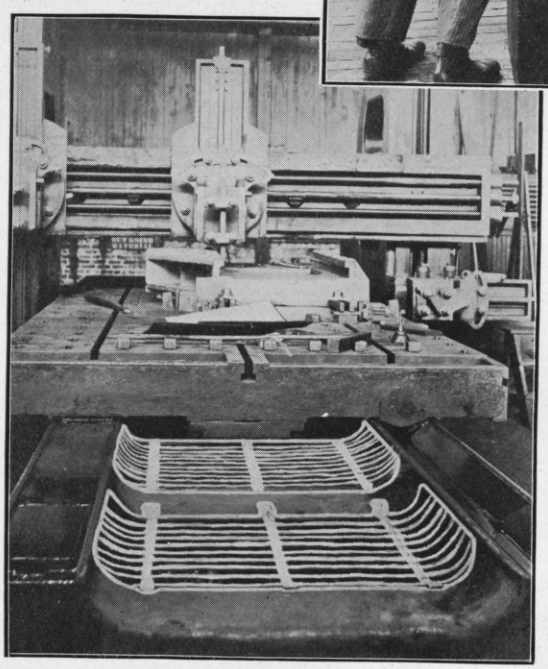
The bar ground or gratings shown over openings are to prevent the operator reaching into same and getting injured by the moving table. This eliminates the possibility of the openings being used as a storage place.



Effect.

The operator has his arm caught between table and rib of bed while reaching for a clamp, which may result in an injured hand or arm. Even though the table moves slowly these accidents have frequently happened.

(*Courtesy of Bucyrus Co.*)



HOW ACCIDENTS HAPPEN—CAUSE, EFFECT, PREVENTION

(Taken from "Safety Supplements" of *American Industries.*)

Accident prevention does not stop with the elimination of physical hazards by the installation of mechanical guards. It has been found that guards only prevent one-third of all preventable accidents, but it is the first step in the right direction.

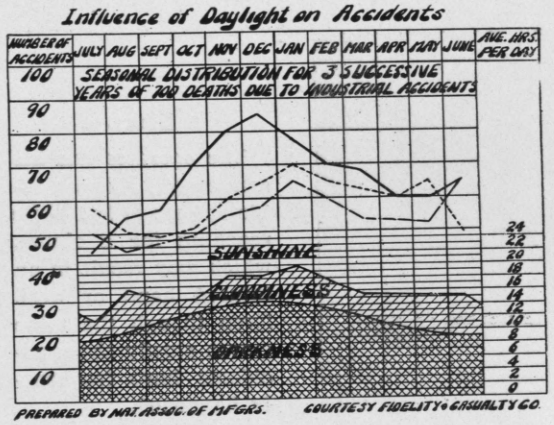
Time does not permit me to enter into the subject of guarding very thoroughly. Many accidents may be eliminated by the enclosing of dangerous gears, belts, pulleys and shafting; removal or guarding of dangerous set screws and revolving projections; the providing of safe ladders, stairs, railings, platforms and runways; the guarding of grinding wheels, sharp revolving cutters and saws; all of which are capable of inflicting serious injuries unless protected.

Guarding should be done according to definite safety standards, and in line with the best safety practice. Guards should be neat, substantial, non-inflammable and entirely enclose the danger point. Guards that only partially remove the hazard are a danger in themselves and should not be tolerated.

One of the greatest hazards in the metal working industry, especially in foundry operations, is that of flying chips, resulting in severe eye injuries and oftimes blindness.

To eliminate this hazard, safety goggles are provided, reducing eye accidents to a minimum

and saving thousands of eyes annually. How often have we seen blind men soliciting charity on our street corners and bearing a small placard, "Blinded by Accident." Had safety goggles been worn, these men would still be capable of earning a living for themselves and family, and would not have to be supported by the charitable offerings of the public.



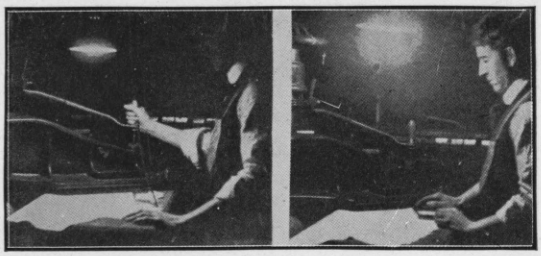
After leaving the institute, doubtless many of you will find your way into manufacturing establishments. Should your duties require you to purchase machinery and machine tools, a point to be remembered, is that guards should be provided by the machine manufacturers. In many plants the engineering and purchasing departments lay special stress on this point, and require the purchasing specifications to include guards, which must conform to certain adopted standards. Other features being equal, guarded machinery should always be given preference. Should you enter the field of machine and tool design, it is well that you have a fair knowledge of safety requirements. The purchaser of new machinery will look with more favor to a machine that is well guarded than to one upon which make-shift guards must be applied when placed in service. One State has already made it an offense, punishable with fines or imprisonment, to place machinery on the market with the gears not provided with guards. In some drafting rooms all drawings must be checked for safety, as well as design and correctness, before being approved.

It is an established fact that improperly lighted work places, dark corners and stairs, and insufficient illumination at machines, are breeding places for accidents.

The above chart made from the records of a large insurance company clearly shows the connections between darkness and accidents. During November, December and January, or the months having the greatest percentage of darkness and cloudy days, we find the greatest percentage of accidents occurring. During June and July, or the months of the least amount of darkness, we find the least number of accidents.

In your chosen profession some of you may be called upon to lay out industrial plants, and if so, one point to be remembered in the design and arrangement of factory buildings is to provide plenty of natural light and the design of a lighting system, that will afford adequate illumination at night or during dark days. With the advent of the more efficient types of lamps, illumination is not the same problem as formerly, but nevertheless it is one that must be given much thought and often requires the services of an expert in this class of work.

There are right and wrong ways of doing all kinds of work, the same applies to illumination. While an ample number of illuminating



RIGHT WRONG

RIGHT AND WRONG WAY OF LIGHTING.

Improper illuminaion doubles the accident risk, increases the per cent of spoilage and produces eye strain and unnatural fatigue due to the effect of glare. (*National Electric Light Association.*)

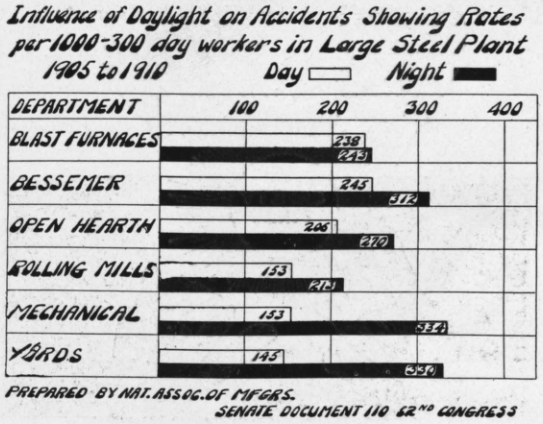
units may be provided, bad arrangement may produce a harmful effect.

Not only does poor illumination increase ac-

cidents, but also increases the percent of spoilage, decreases the quality of the product, increases after dark laziness and the amount of loafing.

The chart taken from the report of an investigation made by the Department of Labor on the conditions of plants engaged in the steel industry, gives a good comparison of day and night accidents. The percentage of injured in all departments is greater among night workers than is to those on the day shifts. The introduction of light means a decrease of accidents.

The next important step is a proper organization to handle all matters pertaining to safety work. Organization is just as essential in accident prevention, as any other department of a manufacturing establishment and the reduction in accidents anticipated can all be measured by the strength of the organization. The work is not a one-man proposition, but requires co-operation from the president down to the common laborer. Unless the executives, superintendents and foremen think, talk, and act safety, it cannot be expected that the employees



will take an active interest in the work, because the attitude of the superiors, is always reflected to the men farther down in rank. If any employee fails to fulfill the part allotted to him the safety cause is weakened in a like proportion.

It is necessary that the men be given a responsibility and a definite place in the work. One of the greatest means of obtaining the desired co-operation is that of having men serve on safety committees. The following extract taken from the 1912 report of the Interstate Commerce Commission clearly shows how the committee idea applies itself to railroad safety. "Great possibilities in the direction of a solu-

tion of the problem of accident prevention, lie in the so-called safety committees, which have been organized by many roads. These committees are composed of officers and employes who co-operate in striving to eliminate accidents due to the failure of men to perform their duties properly. By making safety first, the dominant feature in the minds of the employees and continually pointing out methods for its attainment, an important step in the right direction is taken." By having men serve on committees gives an exchange of ideas that will materially aid in keeping alive the safety interest. Ideas and information gained from the rank and file employees is of much value because they come in contact with dangers that even the best inspectors overlook, and they are often capable of giving practical suggestions for remedying of dangerous conditions.

The number of committees and the membership of each should be determined by conditions and size of the plant. Each safety organization should have a central committee, which acts as a clearing house for all safety

matters. Under this committee may be found a plant committee, a workman's committee, or a foreman's committee, but whatever the arrangement, it should have a head in order to obtain satisfactory and lasting results. Some one has aptly said, "Get the men with you and the accidents will take care of themselves."

The First Safety Committee was a matter of necessity, so each safety committee is to any safety organization. (*Courtesy of "Colliers" and Philadelphia "North American."*)

The most important step in the safety movement is that of educating the workmen. It means the changing of men's minds, and the elimination of dangerous and unsafe practices. We hear on every hand the percentage of accidents resulting through carelessness, but personally I wish to look beyond for the correct reason and lay it to the fault of lack of education and training. I believe that men do not thoroughly understand what accidents mean and the serious consequences which follow.

Besides the pain the injured one must endure, the accident often proves a hardship for the home. Should the only support and breadwinner be taken away, it may be necessary for the wife and mother to earn the living or the children to be taken from school to seek employment. This helps swell the ranks of child labor and results in children being denied the rudiments of an education that should be the privilege of every child. Education for the prevention of accidents should start in the schoolroom by sowing the seeds of safety in the minds of children, who later in life will take their places in our industrial plants. It is hard to teach an old dog new tricks. Safety should be one of the essentials of an apprenticeship course and be thoroughly impressed upon the minds of every new employee. The whole safety movement really evolves itself into an educational problem and any means that will further the cause should not be overlooked.

The bulletin board is frequently used upon which are shown picture lessons of accidents and serious consequences that have resulted through the failure to follow the principles of safety. Printed matter may be distributed in the form of shop bulletins or even short sermonettes may be inserted in pay envelopes.

There are a number of good motion pictures available, dealing with accident and fire prevention. These aid materially in driving home

All accidents should point toward Safety First and be a further incentive toward aiding in this most important movement. An example how the Public Press can aid in stimulating a public interest and in keeping the idea in the minds of all. (*Courtesy of "The Evening Press," Grand Rapids, Michigan.*)

the safety idea in a way that it is not easily forgotten. Safety talks and informal meetings, such as "smokers," have a very desirable effect

in reaching some of the older employees. When men realize the full price they, their families and the community must pay because of accidents it is safe to predict that an appreciable decrease in accidents will be noticeable.

In conclusion let me point out the reasons why the safety movement is especially vital to the engineering student.

First. The safety movement tends to conserve the best asset of our nation, the American workman. It is a humanitarian movement that will lesson sorrow and suffering, and will work for the good of society and the nation.

Second. We hear the cry for greater efficiency on every hand. We cannot have efficiency if we have waste and all accidents represent waste.

Third. Many of our young engineers will be called to positions of trust in manufacturing establishments, and it is well that you realize the importance of accident prevention and what it means to the manufacturer or employer of labor. Nothing will demoralize a shop more than an accident. The loss of time and output is quite an item for the large manufacturer, not to mention the dollars spent through litigation and compensation. Perhaps at the present time you do not realize the tax placed upon the manufacturer because of accidents, but it is a figure that is astonishing, if not appalling.

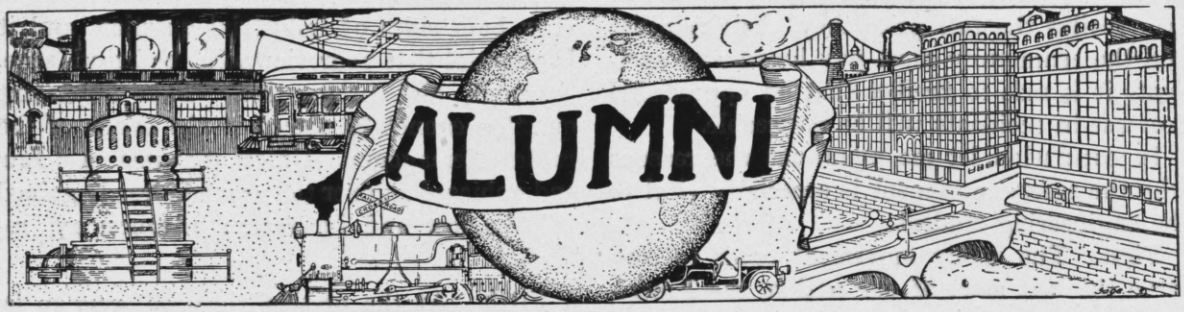
Fourth. After leaving the institute you will take your place in public life and help mold the future of the nation. Because of your broad engineering training no one is better fitted to view both sides of industrial question, and it is essential that your viewpoint be broad, sane, thorough and progressive. This important question cannot be placed in the hands of the radical demagogue. Unless it is met in a fair and unbiased manner the ground already gained will be lost and its future advancement retarded.

Fifth. At the present time we seem to be passing through a wave of social and industrial unrest. This is more pronounced in the past few months than at any previous period, and it is only a question what the future will bring forth. No movement offers a better chance to bring the employer and employe into closer relation, and it is one worthy of the aid and support of every good citizen. Safety meetings will indirectly tend to reduce strikes, lockouts, industrial disorder and social unrest. Because of your broad and liberal views afforded, you can largely aid in eliminating industrial chaos and bringing about industrial peace.

Sixth. No nation can boast of a more progressive class of men than is found in our American manufacturers. They are attacking the accident prevention problem in a thorough and aggressive manner. To you, they look for assistance and help. If guided by the records that engineers have made in the past, I am sure that you will not disappoint our manufacturers in the future.

ELECTRICITY VERSUS STEAM IN RAILROAD PRACTICE.

A New Haven railroad official is quoted as saying: "Upkeep of electric engines is on the order of five cents to seven cents per locomotive mile per one hundred tons of weight. Steam locomotive maintenance runs anywhere from eight to twenty-five cents, depending upon nature of the coal and water used—an average figure of eleven cents would not be bad. With regard to pounds of coal burned for electric engine versus steam engine haul, a pound of coal burned under the boilers of a central electric station for such traffic will develop twice the drawbar pull that would be developed if the same pound of coal was burned in the firebox of the steam locomotive."—*Electrical World.*



Some Alumni Statistics

Location by States Where Alumni are Professionally Engaged.

Alabama	3
Arizona	6
Arkansas	6
California	30
Colorado	11
Connecticut	1
Dist. of Columbia	9
Florida	2
Georgia	6
Illinois	88
Indiana	123
Iowa	9
Kansas	9
Kentucky	26
Louisiana	4
Maine	1
Massachusetts	9
Maryland	2
Michigan	17
Minnesota	10
Mississippi	1
Missouri	36
Montana	4
Nebraska	10
Nevada	2
New Mexico	2
New York	69
North Carolina	4
North Dakota	1
New Jersey	6
Ohio	73
Oregon	3
Pennsylvania	34
South Dakota	3
Tennessee	4
Texas	8
Utah	5
Virginia	4
Washingon	5
West Virginia	3
Wisconsin	13
Wyoming	1
Honduras	3
Hawaii	2
Mexico	2
New Zealand	1
Japan	1
England	1
Canada	1
Panama	6
Cuba	1
South America	1
Total	682

10 Foreign Countries.
42 States.

States from which Students have Entered the Institute.

Alabama	8
Arizona	1
Arkansas	8
California	13
Colorado	4
Connecticut	2
Dist. of Columbia	11
Florida	3
Georgia	9
Idaho	1
Indiana	905
Illinois	168
Iowa	29
Kansas	24
Kentucky	150
Louisiana	5
Massachusetts	7
Michigan	19
Minnesota	10
Missisippi	2
Missouri	39
Montana	2
Nevada	2
New Mexico	5
New York	23
North Carolina	2
North Dakota	3
Ohio	173
Oregon	3
Oklahoma	1
Pennsylania	18
Tennessee	7
Texas	22
Utah	5
Vermont	4
Virginia	2
Washington	3
West Virginia	5
Wisconsin	9
Honduras	5
Hawaii	1
Mexico	1
New Zealand	1
Porto Rico	2
Isle of Pines	1
Syria	1
Russia	1
Persia	1
Japan	1
England	1
Canada	2
Cuba	1
South America	9
Total	1,734

39 States.
14 Foreign Countries.

ROSE MEN SUPERINTEND ERECTION OF NEW EDISON PLANT.

The Condron Co., of Chicago, structural engineers, of which Theodore L. Condron, '90, is president, has been engaged by Thomas A. Edison to superintend the rehabilitation of the mammoth Edison plant at West Orange, N. J., which was recently almost destroyed by fire. The loss sustained in the fire was enormous, and the partially destroyed buildings present some exceedingly difficult problems along original lines, which will have to be solved by the engineers. The *Engineering News* and the *Engineering Record* will contain articles dealing with the engineering problems which the Condron Co. is encountering in its work. Mr. David J. Johnson, '11, is engaged in the work on the Edison plant.

Mr. Harry Rutherford Kadel died of typhoid fever at Indianapolis, Dec. 22, 1914. Mr. Kadel was born in Terre Haute, May 3, 1880. He graduated in the Mechanical course in 1905. After graduation his work was in conection with water works and filtration plants at different cities.

Mr. David Powers Sanderson, '86, died of tuberculosis at Los Angeles, Oct. 7, 1914. Mr. Sanderson was born at Cedar Point, Ind., Oct. 4, 1863, and graduated from the Institute in the Civil Engineering course in 1886. He was actively engaged in engineering work for a number of years after graduation, and represented the institute at the National Conservation Congress at Seattle in 1909. He was compelled to

retire from active business on account of poor health, and moved to Los Angeles, but the climate failed to arrest the course of his disease, and he grew steadily worse until his death last October.

Among alumni who have been recent visitors at the institute are Denny, '13; Hughes, '13; Christopher, '11; Hoffner, '11; Butler, '10; Wickersham, '09; Crow, '11; Ostrander, '13; Bringman, '14.

Prof. McCormick attended the meeting of the Louisville Rose Tech Club, Dec. 28.

George F. Standau, '10, is construction foreman for the Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

C. F. Werst, engineer with Stone & Webster, is at present working on the Boston Elevated Railway.

W. L. Edwards, '10, is with the Farquhar Furnace Co., at Wilmington, Ohio.

Rufus C. Slocomb, '12, was married on Dec. 11, 1914, to Miss Elizabeth Branden, of Pittsburg, Pa. Mr. Slocomb is now located at Wheeling, W. Va., with the B. & O. R. R. Co.

W. O. Hensgen, '06, who has been in the United States Radio Service of the Department of Commerce, is now with the Navy Department as expert radio aid, and located at Mare Island, California.

Among alumni who visited in Terre Haute during the holidays are Scott, '14; Henry, '14; Eshelman, '14; Beauchamp, '13; Scheffel, '13; Buck, '13.

The marriage of Miss Bella Hudmon to Mr. Leon J. Willien of the class of 1906 will take place Jan. 20 at Opelika, Ala. Mr. Willien is with the Charles Tenney Co., of Boston, Mass.

Lucien N. Sullivan, '86, who has been U. S. Consul at Lopaz, Mexico, has been transferred to Newcastle, New South Wales.

ELECTROLYTIC OXYGEN MANUFACTURED IN ST. LOUIS.

Several factories in St. Louis, Mo., are now engaged in the electrolytic production of the commercial oxygen gas which has recently come to be an important agent in welding and cutting metals. The electrolyte used is a ten per cent or fifteen per cent solution of either caustic soda or caustic potash. As direct current traverses the electrolyte the oxygen given off at one electrode is collected and compressed, while the hydrogen given off at the other electrode is allowed to escape.

One well-equipped oxygen factory in St. Louis receives energy through three 75-kva transformers from twenty-five-cycle, 13,000-volt primary lines. At a reduced potential this alternating current is used to drive a 100-kw motor-generator set, a 20-hp motor connected to air compressor and a 10-hp motor for miscellaneous work. Direct current for the electrolytic process is taken from the motor-generator set. With this equipment it is claimed that the oxygen company can produce about three cubic feet of oxygen gas for each kilowatt hour used. This plant operates continuously twenty-four hours a day. Another process, employing liquid air, has been tried, and although less electricity is used, the first cost of the aparatus is declared to be higher than that which is required for the electrolytic process.—*Electrical World.*

WATER SOFTENING BY ELECTRO-CHEMICAL METHODS.

Among the papers prepared for the meeting of the American Society of Refrigerating Engineers held recently in New York City was one by Mr. C. P. Landreth, of Philadelphia, calling attention to the fact that electricity will hasten chemical reaction and thereby improve the results obtained with boiler-feed-water softening compounds. To soften water is analyzed in the usual way and the chemical compound determined which will precipitate the scale-forming compounds present in the water.—*Electrical World.*

REVISED RULES IN REFERENCE TO SCHOLARSHIP AND STANDING.

Effective January 1, 1915.

1a. The passing mark under the credit system shall be sixty per cent; all grades below this shall be considered failures.

1b. There shall be four pass grades—A, B, C, D.; failures shall be indicated by E.

2a. All failures may be made up by examination in the September following, on such dates as the Faculty may set.

2b. In lieu of such examination, students who have failed in Freshman and Sophomore work, may elect to take the work over in the next succeeding class, or may take the final examination with said class.

2c. A second failure in a required subject taken in course shall exclude from the institute.

3a. Seniors. Failure in more than three credits of required Senior work shall disqualify a student from obtaining a degree in the current year.

3b. No student may rank as a Senior candidate for a degree in the current year who has not cleared his record of all failures in required subjects of the Freshman, Sophomore and Junior years.

4. If a student makes a weighted general average of seventy-five per cent, with no grade below fifty per cent, all subjects shall be considered as passed.

5. Entrance requirements of preparatory subjects pursued in the institute shall be treated as required institute work.

6. No numerical grades given on final examinations shall be given out to students until authorized by the Registrar.

7. All sections of the rules are hereby amended to conform with the above.

C. L. Mees, *President.*

THE Rose Tech Camera Club has just concluded a contest, the exhibits of which may be seen in the case in the main hall. The club regularly holds contest of various kinds, awarding three prizes. First prize was awarded to Brauns, '15, principally on the merits of a portrait, a child's head. J. M. Sanford, '15, was second, his set of pictures being especially commended as excellent examples of photography. One exhibit in particular, a still life subject, would be hard to beat for simple, straight photography. Brooks, in his first entry in a camera club contest, carried off third prize with a very good set of pictures. Gray, '17, received fourth award; Wallner, '15, fifth, and Carlisle, '16, sixth, each exhibiting some very interesting work. Prof. Peddle judged the pictures and prepared a very careful criticism on each set submitted. Exhibitors find these comments by Prof. Peddle very helpful in correcting their faults. The club expects to hold several more contests this year, one to be a lantern slide contest for which Prof. Peddle himself has offered a first prize of $5.00. The club will grant second and third prizes. This opportunity to gain an acquaintance with the important subject of slide making should attract quite a number of contesants. Anyone wishing

to compete and not being familiar with slide-making will find the subject very simply, yet thoroughly treated in *Photo Miniature*, which may be had from the Librarian.

Members are much interested now in the completion of an apparatus for making enlargements. The parts have all been obtained except the light, which will be one of the new tungsten lamps, nitrogen filled, the filament being concentrated in order to secure, as nearly as possible, a point source. When completed the machine will print from any negative up to 4x5 an enlargement up to 8x10, or even larger.

Members have been making use of the club dark room, getting profit and enjoyment from the periodicals in the library, and have been showing interest in the contests. The meetings have taken on a more interesting aspect by reason of talks from the members themselves. At the last meeting the members enjoyed the cheer of a big grate fire at the Heminway house, and were entertained with a talk by Sanford on the toning and coloring of prints, supplementary to which Mr. Sanford had prepared a very beautiful set of pictures to illustrate his remarks. As the meeting was such an enjoyable one, attempt will be made to hold others of similar nature, announcement of which will be posted.

All advantages of the club may be enjoyed by those who pay the regular student fund.

FRESHMAN COURSE IN SHOP PRACTICE.

IT is in the Freshman year in Engineering colleges that the student is initiated into the shops and shop practice. For the average, student this is the first time that he has ever worked in a shop, amid the buzz and hum of moving machine. Often the student is inclined to waste his time in this strange surrounding because he is unacquainted with it, or else puts forth his greatest efforts to accomplish the work and overcome the new difficulties. With these facts in mind, to encourage a keener interest in this direction, Mr. Ranels has completely revised the Freshman course in shop practice which has been instituted this year, which will be enlarged upon and added to as time goes on. The course now stands:

First Term—5 credits.

A. Bench Work.
B. Wood Turning.
C. Cabinet Making.

Second Term—5 credits.

A. Elementary Pattern Making.
B. Practical Pattern Making.

The bench work consists mainly in the construction of joints. There are sixteen exercises, each requiring a separate blue print. They range from the single half-lap joint to the more difficult blind dove tail. Since this is often the first time the student has ever used a blue print, it is not an easy task to read one. Further, there can not always be an instructor at his heels, telling him the significance of this or that line. To facilitate the reading, and to encourage the student to seek information for himself, new blue points have been prepared, carrying with them a photo of the finished product in different stages of construction. This is the first time we know that this combination has been tried. It has worked most successfully and all towards the accomplishment of more work.

The primary result derived from this bench work is to acquaint the student with the different hand tools and the various machines. It is preparatory to the cabinet making where applications of the joints and other exercises are found.

Following the more elementary shop practice, comes the course in wood turning. This embraces twelve exercises in spindle turning, from the single cylinder to the combination of beads, cusps, etc. These are followed by work on the face plate, church and arbor and chuck. Aside from the simple turning, practice is given in the different styles of finishing.

Finally, the student is given a chance to construct something for himself, usually a piece

of furniture or other bit of cabinet work. This must be of such a nature and calibre as to meet with the requirements of the office. If, however, the student doesn't care to choose a piece of work for himself he may construct any of the cabinet exercises provided by the office. A personal interest is always manifested in this cabinet making, due, perhaps, to the fact that the finished product is his to carry away with him, but nevertheless an interest which makes for better work and increased efficiency in practical experience.

SECOND TERM—15 hours.

The second term's work in the wood shop is devoted to pattern making. During the early portion of the term, elementary work is done, such as the construction of single pattern which brings into use the different pattern maker's tools.

During the remainder of the term the more advanced work is given. This is essentially practical. The student is given the blue print of the part of some definite machine, from which to construct the pattern. This is of such a character that it can be completed in the course. Here are brought into play the earlier knowledge of draft, shrinkage, finish, pattern lay-out, etc.

Throughout the country has been noticed the general weakness of college graduates in practical training. This is as true of engineering as of law.

Especially so is the engineering student lacking in the rudimentals of pattern making. This is manifested when he enters the drafting room in practical designing.

The practical applications of theoretical, or even logical and common-sense principles, do not seem to have been fully disclosed. This has been this reason for the revised shop courses; to encourage the student to look into the future; to give him a more practical training in a more practical way.

SPECIAL MEETING OF THE STUDENT COUNCIL.

December 9, 1914.

Meeting called to order by President Brauns.
Roll Call. Anderson absent.
Report of financial secretary:

	Credit.	Debit.
Scientific Society	$9.40	.....
Symphony Club	32.65	.....
Camera Club	12.45	.....
General fund	234.82	.....
Technic	107.40	.....
Y. M. C. A.	115.40	.....
Athletic Association	.....	105.49

This was the report as complete as possible. No estimate could be made as to how the accounts would balance up at the end of the year however, since the treasurers and managers of the different organizations had not turned in reports, and the total amount of outstanding bills was therefore unknown.

Moved by Stevens, and seconded by Wallner, that physician's bill against Athletic Association be paid. Carried.

Moved by Compton, and seconded by Grafe, that all treasurers of the different organizations and managers of teams from whom reports are due be brought before the Council to give a complete report and explain fully the financial situation in the organizations which they represent. Carried.

Moved by Stevens, and seconded by Arnold, that owing to lack of funds no coaches be employed during the year for basketball, track or baseball. Carried.

Moved by Arnold, and seconded by Compton, that Weinhardt be appointed to consult the orchestra about playing at the Glee Club concert, it being understood that unless this organization proves itself worthy of support it will be considered as being no longer in existence. Carried.

Moved by Weinhardt, and seconded by Compton that meeting be adjourned. Carried.

Meeting adjourned.

Special meeting called for Wednesday, Dec. 16.

F. W. Hild, *Recording Secretary.*

STUDENT COUNCIL MEETING.

January 6, 1914.

Meeting called to order by President Brauns.

Roll Call. All present.

Reading of minutes of previous meeting omitted.

Report of financial secretary:

		Overdrawn.
Technic	$51.12	$.....
Y. M. C. A.	3.40	.....
Symphony Club	32.65	.....
Scientific Society	9.40	.....
Camera Club	32.26	.....
General fund	131.68	.....
Athletic Associatoin	.....	103.14

Moved by Stevens, and seconded by Anderson, that meeting be adjourned. Carried.

Meeting adjourned.

F. W. Hild, *Recording Secretary.*

ORCHESTRA DISBANDS.

The orchestra has disbanded owing to the difficulty of getting a sufficiently large number of men to make a good showing. The action is very much to be regretted, as we need a good orchestra, but it was the only thing to be done under the circumstances.

The Mandolin Club also seems to have added itself unofficially to the dead list. There seems to be no reason given for its lack of activity, but the officers have not attempted to call a meeting this year as far as is known.

The second factulty dinner will be held at the Hotel Deming, Feb. 11. All students, who were not present at the previous dinner, will be invited.

INTERCOLLEGIATE NEWS.

The eight largest law school libraries and the number of volumes in each are: Harvard University, 150,00; Columbia University, 55,000; University of Pennsylvania, 50,125; Cornell University, 44,000; Northwestern University, 40,000; University of Chicago, 36,000; Yale University, 35,000; University of Michigan, 32,000.

The Mask and Wig Club of the University of Pennsylvania is to present the university with a $25,000 house to be used as official residence of the provost. About fifteen years ago the club gave to the trustees a few thousand dollars and each year since they have added to the amount.

The A. B. C. powers whose mediators are playing so large a part in our foreign affairs send 168 students to our universities and colleges: Argentina, 43; Brazil, 113, and Chile, 12. Mexico herself has 223 representatives studying in this country.

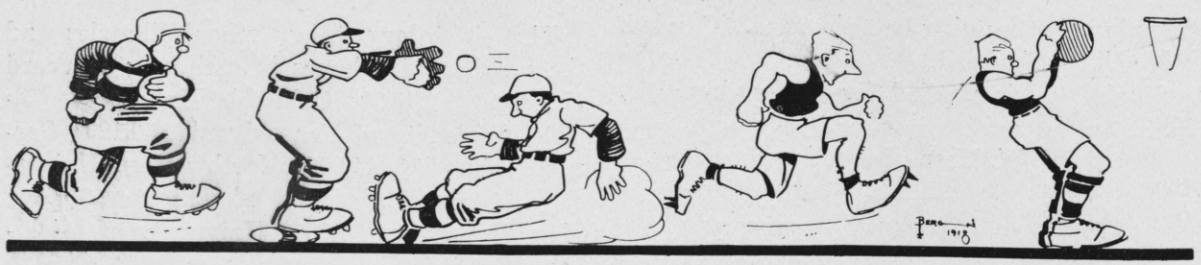
Out of 300 members of the academic senior class at Yale, who voted on the question of daily compulsory chapel only eighty voted to abolish it, all the others voting that it be maintained.

The Yale Athletic Association has decided to erect a new boat house at Gales Ferry and work on the structure will commence next week. In addition to room for housing the shells, there will be sleeping accommodations for twenty-five men and complete shower and dressing room facilities.

Three hundred thousand dollars was the total amount received by the Harvard authorities from their football season this year. This is considerably in advance of the receipts of previous years.

Some forty-eight men of the University of Manitoba have enlisted in the Canadian troops which have gone to fight for England. The majority entered the Engineer's Corps.

The student body of Hamilton College recently voted to abolish hazing.



ATHLETICS

Basketball

BASKETBALL SCHEDULE.

Jan. 12—Indiana Dental College here.
Jan. 16—University of Louisville here.
Jan.20—Central Normal at Danville.
Jan. 22—State Normal at K. of C.
Jan. 30—Butler at Indianapolis.
Feb. 5—Evansville Y. M. C. A. at Evansville.
Feb. 6—University of Louisville at Louisville.
Feb. 9—Central Normal here.
Feb. 13.—Indiana at Bloomington.
Feb. 17—Franklin here.
Feb. 20—Notre Dame here.
Feb. 26—Butler here.
Mar. 3—Normal at K. of C.
Mar. 5—Earlham at Richmond.

Above is the basketball schedule as it stands at present. The chief interest of course centers in the two Normal games, both of which are to be played at the K. of C. Hall. The first is considered as the home game for Normal, and Rose students will pay the regular admission fee, but will be admitted free to the second game.

The team is going through hard workouts each night under Prof. Wischmeyer, who is acting as volunteer coach, and deserves much credit for donating his services, as otherwise the team would have been forced to go without a coach. He has had considerable experience and should turn out a good team, as the material is promising, if everyone turns out.

The Freshmen made a clean sweep of the inter-class series, winning all six of their scheduled games. The Sophomores failed to win a game, and finished with a grand average of zero. The only competition was between the Seniors and Juniors for second place. Following are the scores of games actually played:

Seniors.....27	Juniors....24	Freshmen..15
Sophs.....20	Sophs.....11	Juniors....11
Freshmen..19	Freshmen..44	Seniors.....16
Juniors.... 8	Sophs..... 5	Sophs..... 8
Freshmen..22	Juniors....13	Freshmen..24
Seniors....16	Seniors.....10	Seniors..... 9

Shower baths will be installed at the K. of C. Hall this year, and the inconvenience of dressing and bathing at the Y. M. C. A. done away with.

ATHLETIC ASSOCIATION MEETING.

FIRST REGULAR MEETING.

Oct. 19, 1914.

Meeting called to order by President Stevens.

Roll Call—Carter and Wente absent.

Bill from R. P. I. shops presented.

Moved by Prof. Hathaway, seconded by Dr. White, that the bill from the shops be turned over to the financial secretary to be paid. Carried.

Moved by Prof. Hathaway, seconded by Stuart, that Stevens be elected manager of the baseball team for the season of 1915. Carried.

Discussion of stationery for manager of athletic teams.

Moved by O'Laughlin, seconded by Allen, that a committee be appointed, consisting of the president, to see about purchasing stationery. Carried.

Moved by Prof. Hathaway, seconded by Stuart, that Binhack be appointed as janitor of the gymnasium at one dollar per week. Carried.

Moved by Prof. Hathaway, seconded by Stuart, that Athletic Association meetings be held the second and fourth Mondays of each month. Carried.

Adjournment.

Oct. 26, 1914.

Roll Call—Carter, O'Laughlin, Wente, Allen absent.

Reading of minutes of previous meeting.

Moved by Howard, seconded by Dr. White, that Leitch be elected manager of track team for the season of 1915. Carried.

President reports the purchase of Athletic Association paper.

Moved by Dr. White, seconded by Stuart, that the secretary of the Athletic Association purchase a ledger in which to keep accounts. Carried.

Adjournment.

Nov. 11, 1914.

Roll Call—O'Laughlin, Howard, Prof. Hathaway absent.

Reading of minutes of previous meeting.

Report of football manager to date shows a loss of $351.39.

Moved by Stuart, seconded by Dr. White, that bills from Dr. Porter, Weldele & Co., and R. F. Marley & Co., be paid. Carried.

Adjournment.

Nov. 30, 1914.

Roll Call—W. Carter, Prof. Hathaway absent.

Moved by Stuart, seconded by Risser, that baseball R's be awarded to the following men: Stoms, Planque, Brown, Hegarty, Larr, Kline, J. Carter, Sheldon, Stoltz.

Moved by Stuart, seconded by O'Laughlin, that football R's be awarded to the following men: Davis, W. Carter, J. Carter, Cotten, Pirtle, Goldsmith, Sheldon, Yatsko, Henry, Buck, Riggs, Trimble, Springer, Bright. Reserve R's to Kingery, Woodward.

Moved by Stuart, seconded by Howard, that Myers and Wente be awarded tennis R's. Carried.

Election of assistant basketball, baseball and football managers.

Basketball, 1915—Nominated: Coats, Evans, Finley, Leibing. Finley elected.

Baseball, 1915—Nominated: Manson, Motz, Overpeck, Stuart, Weinhardt. Weinhardt elected.

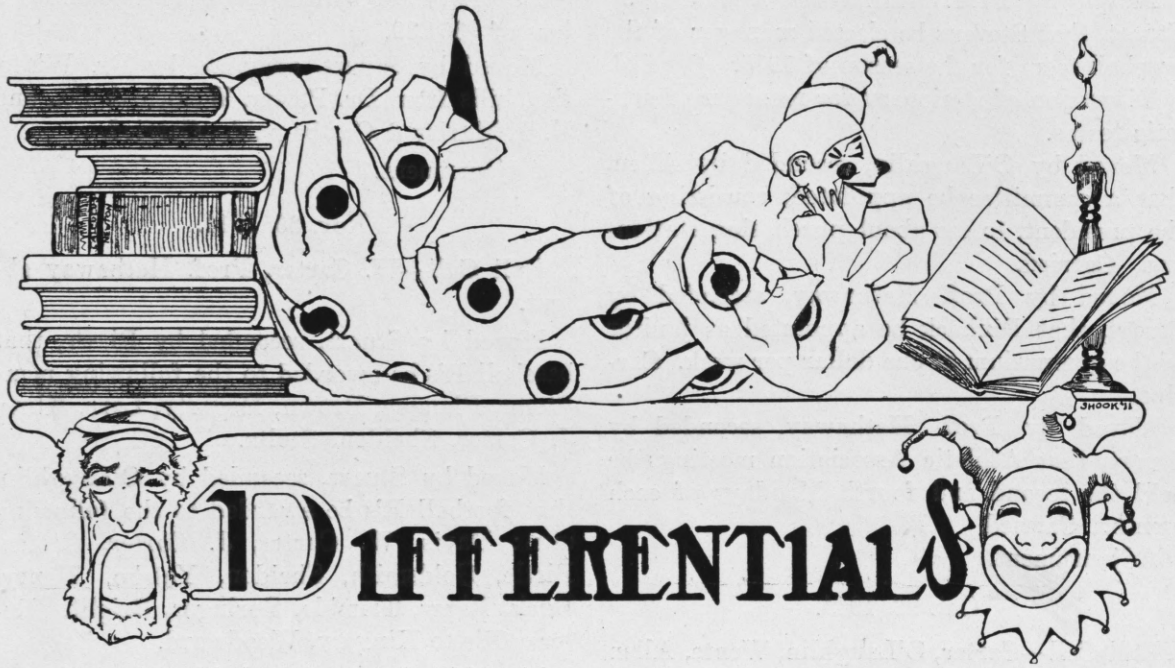
Football, 1915—Nominated: Risser, Aitkin, Austermiller. Aitkin elected.

Moved by Stuart, seconded by O'Laughlin, that the matter of a basketball coach be dropped until the faculty takes action. Carried.

Adjournment.

DAYLIGHT-SAVING MOVEMENT AT CHICAGO.

The Chicago Association of Commerce has instituted a campaign to give Chicago Eastern time in an effort to start the local business day an hour earlier, thus adding an hour of natural daylight at the close of the working period and reducing the use of artificial illumination. At a meeting of bankers, business men, manufacturers, railroad executives, merchants and others, held at the LaSalle Hotel Dec. 7, the advantages and disadvantages of the plan were discussed by a number of speakers.—*Electric World.*



SPLASHING IN THE STYX.

"Cold day, isn't it?"

"I'd say."

"Do you know, I've often thought that everybody has the wrong idea about Hell."

"How so?"

"I believe that it will be cold, not hot."

"It would be a lot worse, wouldn't it?"

"Maybe they'll have two departments, one hot, the other cold."

"Why, how could such a thing be possible?"

"Take the heat out of the cold department to heat the hot department."

"In that case, Waggie will have to be there, won't he?"

"I hope he is. Otherwise, we'll have to work Thermodynamics even down there. Wouldn't that be—"

"O, there'll be plenty of engineers down there."

"Well, if the gang's all there, I'd just as lief go there. I suppose that we'll have friends in both places."

"Do you think Doc Mees will be the big boss down there?"

"If he's there, he won't be boss.'

"Why not? He's the broadest man I know."

"That's because he stopped growing in the other direction. I think that Doc White will be boss.'

"Doc White won't be there. He wouldn't smoke!"

"How about Lord Howe?'

"He and a bunch of civils will have the contract for the golden streets. He's not needed down below."

"How about Mac?"

"Mac'll be there with bells on. He's a gambler.'

"Jo-Jo?"

"I don't expect him."

"Sage?"

"No chance."

"Wischy?"

"White wings."

"Froggie?"

"Now, I wouldn't be surprised to see him, Bachelor, you know."

"Wickie?"

"Count on him."

"Knippy?"

"He'll be down there, crabbing about something."

"Stock?"

"I dont know about him; but his predecessor will be on hand."

"It's a sure thing that Tommy and Jackie will not show up, I guess."

"We'll miss Hath, won't we. I'd like to hear him make a speech when they give out the H's, wouldn't you?"

"What about Coles?"

"Say, I hope he reforms right away, believe me!"

"Do you think that Billy Ranel's line will get him in the good place?"

"Should say not! St. Peter is wise to that kind of stuff."

"I betcha Tom Tygett will be there."

"Not if Doc has anything to say about it."

"What about Daddy Logan?"

"I'm suspicious. I heard him cuss the other day."

"Do you think they'll have a Rose Tech Club down there?"

"Hush. The show has started. There's Charlie Chaplin. Ha! Ha!"

"At 'em boy, Ambrose!"

OUR OWN THREE-REEL KEYSTONE

IT CHIMETH NOT FOR HIM.

Ah, Faurot! Thou art subtle.
The nuptial bell chimeth not for thee.
When the blundering reporter did fictitiously
assign to thee
A helpmeet,
Thou trodst thy accustomed path, unruffled,
As if thou caredst not!
And when the artful jokers at thy lodging-
place
Made gorgeous decoration,
And scoffingly presented thee with a set of
Community silver,
Thou gravely seated thyself at the board
Whilst strains from Lohengrin issued from
The Pianola, and partook
Of thy usual grape-fruit and Kellog's.
Thou seem'st insusceptible
And art yet uncaught,
But beware!

DICTAGRAPHIC RESULTS.

"It is apparent that something ought to be done. Too many of the chaps in the Freshman class are failing."

"Wal, I don't see what it could be that causes so many failures. I don't think that football is to blame."

"I appreciate the fact that the chemeests are the ones who drag the average down. I think you'll agree that it is reasonable."

"It is perfectly obvious that there is prejudice, so to speak, in the faculty itself. It behooves us to find the cause, and keep the sea-lawyers from passing, as it were. I'm quite frank to say that the fault is due, in no inconsiderable measure, to the lack of spirit."

"It's because the students are not practical enough and don't study good. Do you get me?"

"How's that?"

"Any student that doesn't fall down once in a while is some student."

"Well, shoot now, I reckon he is. Gee whiz!"

"I didn't study when I went to school, and I got through all right."

"I'd like to know the way in which you did it."

"The students get their beters and gammers mixed. He! He!"

"....." (Stock.)

"....." (Froggie.)

"....." (Sam.)

"The meeting—Don't get in a hurry, Peddle. The meeting is adjourned."

"Where have you been?"

"In the hospital, getting censored."

"Censored?"

"Yes. I had several important parts cut out."

First Freshman—"Some of the Seniors ain't wearin' their corduroys."

Second Freshman—"Well have to paddle them on the head, won't we?"

A ZOOLOGICAL REASON.

Two students sat down in a short-order joint,
And yelled to the waiter for pie.
The pieces so flat which the waiter thrust out
Would cause those less hardened to die.
The Freshman, polite; for he's green in the world,
Looked askance at the Sophomore, rough,
And said that, because he was one year ahead,
He'd give him the choice of the stuff.
The Sophomore picked on the smallest piece there,
Gave his friend the surprise of his life,
Cut the pie into three equal portions so true,
And shovelled them in with his knife.
When they quit the cafe, the Freshman remarked
That such self-denial was kind,
And that, in the cold world, his experience had been
That manners are all left behind.
The Sophomore laughed, "Foolish prattle," said he.
"My etiquette's up to the minute.
It wasn't because I am not for myself.
The blamed old pie had maggots in it."

Mrs. Henpeck—"What is the difference between a fort and a fortress?"

Hen—"Well, a fort can be silenced."

Hath—"The principal thing in working out a problem is the knowledge of how to solve it. These formulas I have written here you must remember, whether you memorize them or not."—TECHNIC, Nov., '01.

Hath—"By this method you can sum series."

Hazard—"All series?'

Hath—"Some series, I said."—TECHNIC, May, '02.

Daddy Logan—"The class will be divided into halves. One-half for the machine shop, one for the blacksmith shop, and the other for the foundry."—TECHNIC, Oct., '02.

Doc—"The mechanical engineer at the power plant at Austin, Tex., should have checked up the Civil's dam calculations."—TECHNIC, Nov., '02.

FRESHMAN CHEMISTS SHOOT GOALS.

Dec. 18, a bunch of chemists pulled off a laughable farce out in the gymnasium. The junior chemists were lined up against two Seniors, a Sophomore, two Freshmen, and Doc. White. There was nothing spectacular about the game except the remarkable accuracy of the Freshmen, Bake and Curtis. Much amusement was afforded by Shanks, who tried to hide the ball under his shirt while he raced down the floor. The rooters went wild with enthusiasm when Pigg struck Sanford in the mouth and in the solar-plexus simultaneously. Mr. McKeever made the only score for the Juniors, shooting a basket from a difficult angle with Bake and the Smith Bros. hanging on his neck. Mr. Leitch played a good game, and, although he made no score, he came mighty near the basket several times. O'Brien and Newhart, by sheer nerve, stuck in throughout the first half, although O'Brien's cork popped during

the first five minutes of play. Manson played a consistent game, and had not lost his wind when the final whistle was blown. Doc. White found whistling rather difficult and failed to call several fouls because he could not pucker up his mouth soon enough. The score, while not very important in such a game, was 20 to 2.

Mr. McKeever showed a comprehensive knowledge of things electrical at a recent session of the class in pharmacy, which is held each Tuesday from 10 to 11, at the resort, known as "Joe's." During a dispute with Pigg as to who had got the most out of the photometry experiment, Morris created a mild furore by declaring that his section had even made a new photometer. When interviewed later Mr. McKeever admitted, however, that he had meant potentiometer.

Wicky—"I see Mr. Shanks is asleep."

"Bud"—"No, I'm not professor; its too cold to sleep in here."

Leitch—"Dont believe him professor. He could go to sleep in a refrigerator."

Knippy—"Now which one of these vectors is ahead?"

Leitch—"The front one."

O'Brien—"Gil, when you die I'll bet they pour you back in the bottle."

In analytical mechanics:

Stone—"Are the two flies still at P and Q, professor?"

Hath—"Yaas."

Stone—"Then the flies haven't got independent motion."

Hath—"Oh, yes, they have; I've watched them."

"You may start out with the most innocent looking thing and get into all sorts of trouble before you get through," says Sage.

P. S.—He was referring to integration.

THE FUZZY ONE.

"Who can describe a caterpillar?" asked the teacher.

"I can, teacher," shouted Tommy.

"Well, Tommy, what is it?"

"An upholstered worm.'—*Ex.*

EUREKA!

Freshman, looking through toy catalog, finds following:

AMERICAN MODEL BUILDER

MAKES MECHANICS EASY

"Those football players seem to enjoy being torn to pieces."

"Sure. They're never so happy as when they're in scraps."

Hotel Clerk—I found that "Not to be used except in case of fire" placard that those college boys stole.

Manager—Where did you find it?

Clerk—They nailed it up over the coal bin.

—*Penn. State Froth.*

Professor—Translate "Le pont Washington serait suspender a quatre cables d' acier." "Shaw" Offut. "The Washington bridge is suspended by a quarter inch cable of steel."

LE DANSANT.

In grandma's day when dancing art
Was not amiss
The partners held each other off
L——T
I——H
K——I
E——S
But now with trot and grizzly bear,
The dip and kiss;
Each gets a double strangle hold,
L——T
I—H
K—I
E—S

—*Penn Punch Bowl.*

Cast your bread upon the water,
Said the boarder with a frown;
Add a little salt and pepper,
Call it soup and gulp it down.

—*Ex.*

Mr. Thomas Walsh, Senior electrical, has cast his toque into the literary ring. He comes out with a poem in Scribner's for December. We are in dire need of such talent on the TECHNIC staff. Come on, Tom. Don't hide your light under a bushel.

Tommy—"For the exam, I will hold the class responsible for all formulas, diagrams, definitions, and shall expect each man to be able to draw and explain the testing machine."

Abe Hegarty—"My (——)! (deleted by the censor.) That's impossible!"

JUST LIKE JOURNAL REVIEW.

Anxious Mother—But, John, dear, when do you find time to sleep?

John—Oh, I'm taking four lecture courses.

—*Cornell Widow.*

IN MINERALOGY.

Prof.—Name the largest known diamond.

Mr. A.—The Ace.

ENGLISH AS SHE IS SPOKEN.

We call a little lamb a lambkin
Now is not that a fact?
But call a little nap a napkin,
And they will say you're crackt.

—*Stanford Chaparral.*

IN THE DARK AGES.

When Rastus Johnsing's son arrived
He looked just like his poppy.
In fact the doctah done declared,
He was a carbon copy. —*Cornell Widow.*

HER PREFERENCE.

"Why don't you get married, my dear?" asked the matronly chaperon of the debutante.

"Not for mine, please. Courtship, honk, honk, five dollars. Marriage, ding, ding, five cents." —*Columbia Jester.*

"Did you put in fresh water for the gold fish, May?"

"No, mum; they ain't drunk up what I put in yesterday."—*Princeton Tiger.*

Prof. Chapin: "Milner, give an example of a human dynamo."

Milner: "Ewing, because everything he has on is charged."—*Ex.*

SIGNS OF THE TIMES.

When you see:

A man and woman clutching each other in a frightened manner, slipping about, tipping almost over, reeling backwards and practically having convulsions, it is a sign they are tangoing.

An armed guard accompanying a grocer's clerk on a team, it is a sign the clerk is delivering half a dozen fresh eggs.

A woman wearing a little straw hat, low shoes, thin silk stockings and a thin light suit, it is a sign spring will be here within three or four months.

Technical Notes

CRACKING FROM ELECTROLYSIS.

DUST forming on the anode is the cause of the cracking of reinforced concrete when the steel discharges electric currents into the surrounding concrete. According to a committee report of the International Association of Municipal Electricians, the formation of rust occurs only at temperatures around 100 degrees F. There is no likelihood of damage, therefore, unless the discharge is of very high density, or unless the temperature of the concrete is kept above the critical point by some other cause. It is pointed out in the report that the addition of a fraction of one per cent of salt to concrete increases its conductivity and destroys the passivity of the metal reinforcement.—*Cement World.*

ENGINEERING AT SARGENTS' WHARF, BOSTON.

The series of articles begining in this issue and describing the equipment and operating methods in what is, we believe, the largest refrigeration system in the world, that of the Quincy Market Cold Storage & Warehouse Co., Boston, treats of the unusual practice and design as found in the company's chief station, the Sargent's wharf plant on Eastern avenue. The refrigeration system embodies two large stations, seventeen large warehouses, and a street system having approximately six miles of piping and supplying eight hundred separate services.

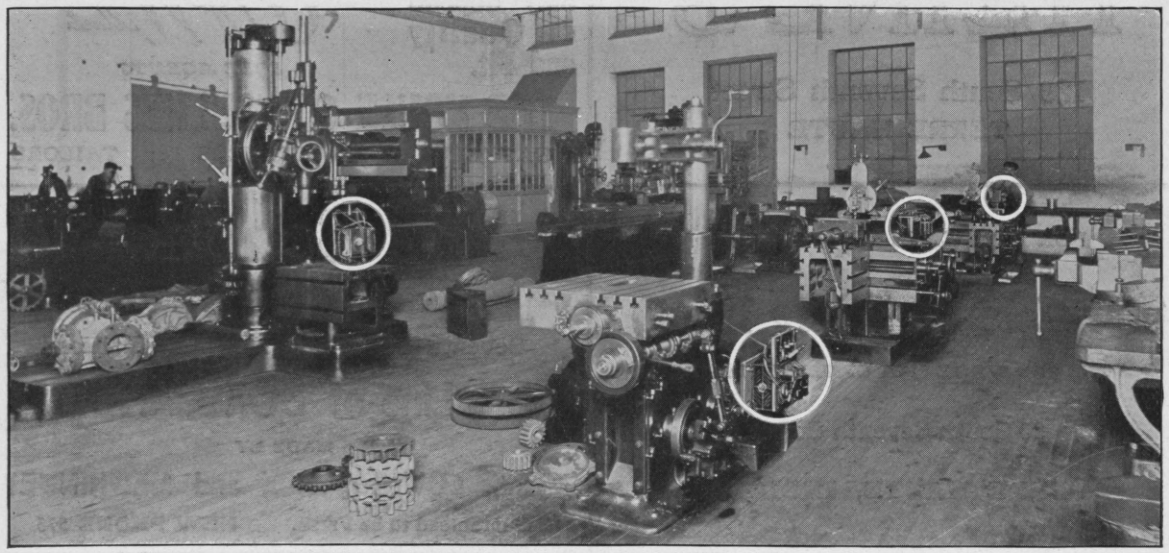
Boston is one of the greatest market places in the world, and millions of dollars' worth of the produce coming into that city is refrigerated by this company, both in its own warehouses and by cold brine served through its street system as water is distributed to a city from a reservoir. Much of the service is sold on a guarantee that the temperature will not vary more than one degree. It is important to the value of all the stored goods that the service be not interrupted. If the load of a light or power station is dropped it can be picked up where it was dropped, but if this refrigeration load is interrupted, the temperature continues to so increase that perhaps by the time the service is resumed, the temperature rise is such as to require hours to get it back to normal.

The nature of the service explains certain peculiarities of design and operating practice, at first thought seemingly extreme. Every feature of design, every move in operating, must be thought out and executed to the end that unintentional interruption will be only remotely possible. An idea of the importance of uninterrupted service may be had from the statement that at present one hundred and fifty million dollars' worth of perishable produce is refrigerated by one compressor.

In this plant, one finds by far the largest ammonia compressor ever built, it being of 1,000 tons capacity at a speed of sixty-five revolutions per minute, but its normal speed is seventy-five, at which it is capable of developing approximately fifteen hundred tons. The articles treat thoroughly of the design of this machine. The amount of refrigerated brine pumped daily in hot weather is greater than the water consumption of many a large city. The brine pumping engines run at exceptionally fast speeds. Turbo-generators furnish light and power for the station and for Boston's great meat clearing house, Clinton Market.

To rebuild by the aid of the plant's own crew worn and antiquated equipmnet, modernize it, thus carrying a high maintenance charge, but practically none for depreciation or obsolescence, is one of the many unusual practices in the plant. The articles are not in the nature of mere plant description, but rather treat of the details of all the important engineering practice as found in this unusually well conducted system.—*Power.*

INCREASE THE CAPACITY OF YOUR MACHINE TOOLS



The worth of a machine is gauged by what it produces; no matter what its real ultimate capacity may be, it is not worth any more to you than what it produces.

A machine tool may have the stiffness and power to turn out twice the amount of work it is actually performing, but the hardships and the uncertainty of controlling its different operations have slowed up the workman; he is cautious, uncertain and may be tired and disgusted.

Let this same tool be equipped with E. C. & M. Automatic Control and the entire situation is reversed. The workman merely moves a small lever to one position to start the machine in the shortest, safe time. Another movement of the same lever stops the machine in the shortest, safe time. Still another movement reverses the machine in the shortest, safe time.

Instead of feeling cautious and uncertain, the workman is precise and definite in his work. He feels invited to a test of capacity and as an entirely natural result, he produces more and better work.

These statements are not pleasant generalities; they are the basic reasons why E. C. & M. Automatic Control is fast becoming the standard with those who know best. E. C. & M. Control is convenience capitalized.

Write for Bulletin 1017

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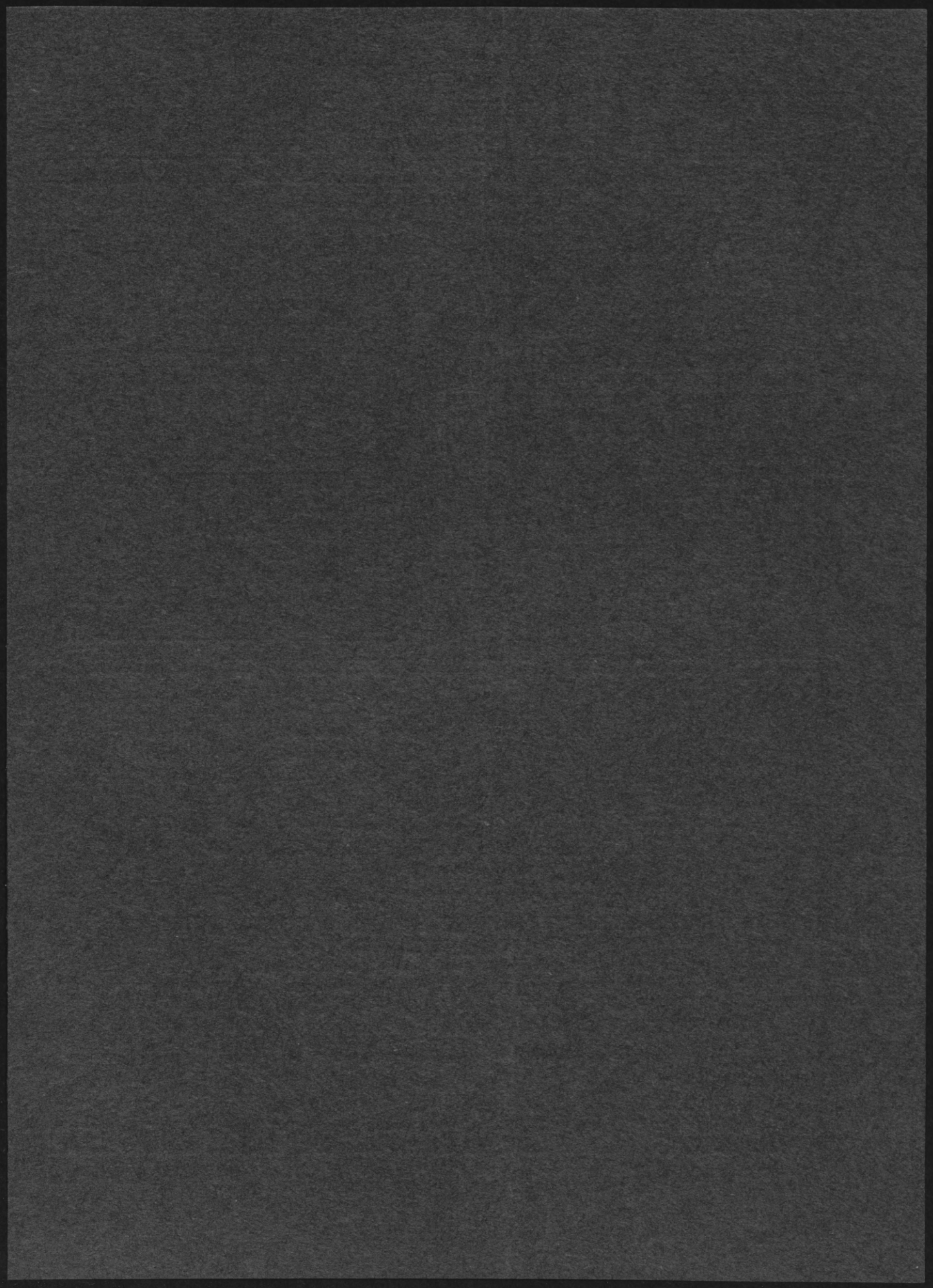

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