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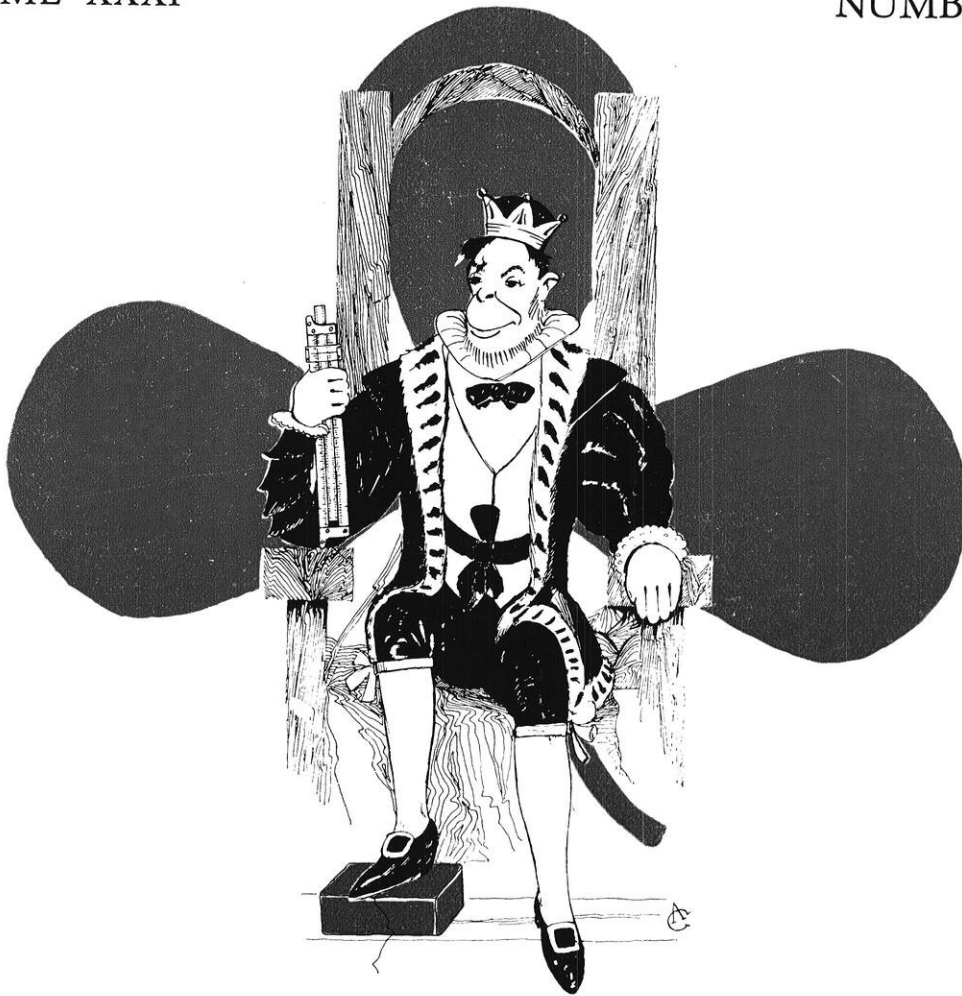
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The Wisconsin Engineer

MEMBER OF ENGINEERING COLLEGE MAGAZINES ASSOCIATED

VOLUME XXXI

NUMBER VI



PUBLISHED BY THE ENGINEERING STUDENTS
of the UNIVERSITY OF WISCONSIN

March, 1927

Uplift Applied To Monuments By Otis Elevators

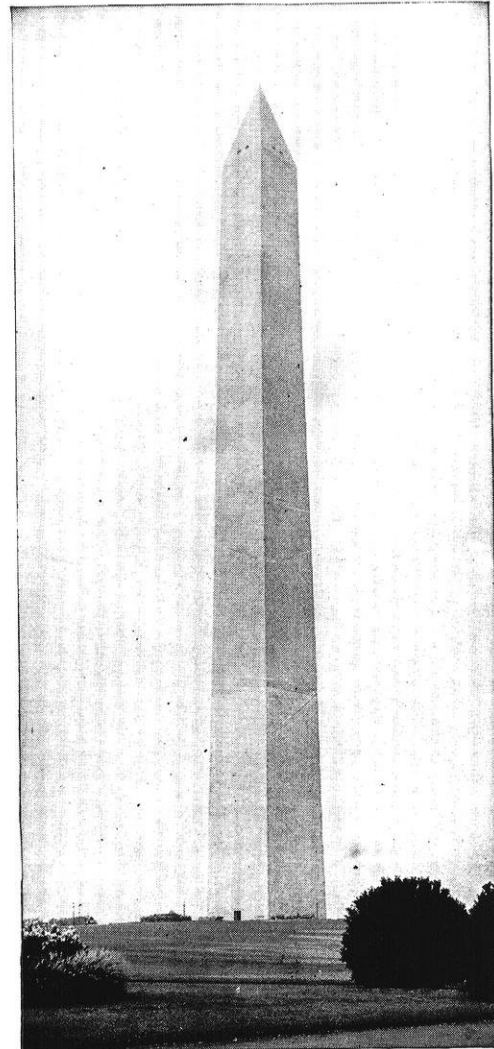
THE Englishman confessed to his American friend whom he was conducting through the London Tower that never before had he visited that most historic building of his native city. It was always there; he could go any time. So he never did, until the insistent American prodded him into action.

Is it for a similar reason that so few college students in and around Boston visit the Bunker Hill Monument? Hardly: because they come from all parts of the country. Is it then another instance of indifference of college men? Not that either. College men in Washington generally ascend the Washington Monument.

No expert is needed to solve this puzzle. The ascent of the Bunker Hill Monument must be made on foot. It's a long, hard climb. But visitors to the Washington Monument are speedily and comfortably borne to the top in an Otis elevator.

AMERICAN HISTORY

- 1799—December—Congress passed Resolution for erection of marble monument in memory of George Washington.
- 1833—Corner Stone laid—
- 1839—Work stopped—
- 1880—Work resumed—
- 1884—100 oz. pure aluminum cap stone set.
- 1884-1926 Over 5,000,000 people ascended to top of Monument.



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ELEVATOR CHRONOLOGY

- 1879—Otis Steam Elevator, installed for use in construction work.
- 1884—This elevator converted to passenger use. Round trip 17 minutes. Passengers carried to the top of the monument during the life of the elevator, 1,279,719.
- 1901—Electric Elevator installed, having a round trip time of 10 minutes. Passengers carried up during its lifetime, 3,750,000.
- 1926—Otis Micro-Drive Gearless Traction Elevator installed, with a round trip time of 2 minutes. Will carry to the top of the monument an estimated number of 12,000,000 passengers in the same time as the life of its predecessor.



O T I S E L E V A T O R C O M P A N Y

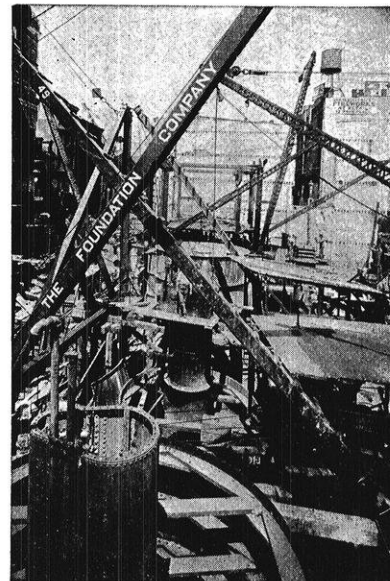
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1902

1927

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DURING the first decade of this quarter century the skyline of New York began to take new form resting on the secure foundations constructed by this organization; then many owners, in other localities, noting the manner of its building, awarded to The Foundation Company contracts for complete construction, so that now the building of superstructures forms a great part of its work.

AS indicative of the service rendered by The Foundation Company over this period of years, these partial lists of repeat contracts have special significance. In one case no less than thirty contracts have been awarded by one owner.

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Foundations 1919
Foundations 1923

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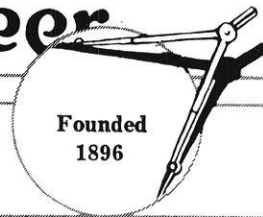
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Published monthly from October to May, inclusive, by
THE WISCONSIN ENGINEERING JOURNAL ASSOCIATION
306a Engineering Bldg., Madison, Wis.—Telephones, Universtiy 177—277

Founded
1896

\$1.50
A Year

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UNIVERSITY OF WISCONSIN

VOL. XXXI, NO. 6

MADISON, WISCONSIN

MARCH, 1927

YOUNG ENGINEERS IN SOUTH AMERICA

By EARL HANSON, m'22

A FACT widely recognized in foreign countries as well as by a great many Americans themselves, is that Americans as a class make the worst, albeit the most prolific travellers in the world. We swarm in hordes over the face of the earth, often carrying the traditional bursting purse, but seldom a heart that is bursting with love for things foreign. We pay more money for travel and get fewer returns out of it than the citizens of any other country in the world. We are too sure of our own superiority over everything and everybody outside of these United States.

The words "tourists" and "American" are rapidly becoming synonymous and as rapidly losing favor with other peoples.

I had a hazy inkling of this when I first went to South America in 1922, an inkling that grew in strength during my three years' residence there and became an absolute conviction about a year ago when I helped Thomas Cook pilot a ship-load of my countrymen to Egypt and back.

But our provincialism is not restricted to tourists. It is equally common among those who live for years in foreign countries.

The average American who leaves his home for his first contract in some mine in a strange land is primarily prompted by a desire for romance and adventure. Being disillusioned on that score very soon after his arrival there, he immediately fills himself with a tremendous yearning for the United States and a corresponding hatred for the place of his temporary "exile" and begins to count the weeks, the days and, in his most desperate moments, the hours, that have to elapse until he can board a homeward bound boat.

The average Englishman, while still more convinced of his own superiority over the rest of the world, has

learned to do better. He puts his provincialism to work. He spares no effort or expense to live the life he is accustomed to, often dresses for dinner even if he eats entirely alone, decorates his house, plants a garden if he can, establishes himself for a year as though he were going to stay a lifetime,—in short, carries with him an atmosphere of "Old England" that never deserts him and protects him from the full pangs of homesickness by never allowing him fully to be aware that he is not at home.

The result is that one finds many more Englishmen than Americans spending their lives and making their careers in foreign countries. We have this handicap as an imperialistic nation, our individual citizens haven't

yet learned to colonize other parts of the world, to regard their stay as anything but temporary. They don't need to. Other people emigrate because of the prospects of better livelihood to be gained outside of their own countries and almost universally regard the United States as *the* land of opportunities, and we ourselves are pretty firmly convinced that they are right.



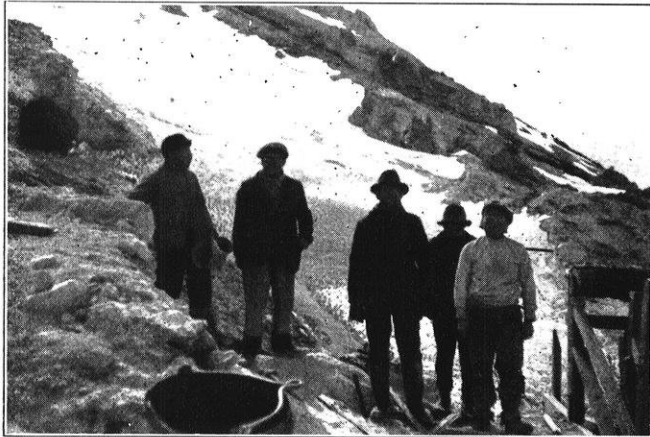
The Three Peaks of Auconquilcha

But slowly, very slowly, we are becoming aware that some of our countrymen have made fortunes in South America, are investing money and establishing interests there in ever increasing quantities, and are receiving ever increasing returns. And those who dare to imagine that there might be a "land of opportunity" outside of the United States, generally dream of South America.

Opportunity is a hazy word that demands individual interpretation. It buzzes in the ears of the college senior who is looking around for a job. It is shouted by every body snatcher who makes the rounds of the colleges in the spring of the year, looking for apprentice

engineers, travelling salesman, or cheap labor. It is sometimes connected with South American jobs when the fact is realized that these pay salaries of from \$175 to \$200 a month to inexperienced men as compared with the almost traditional \$75 to \$125 offered by the man hunters.

This much is perfectly true, the young engineer who is anxious to earn a little more money upon graduation than he probably could at home, will find ample opportunity for it in South America. But the fact also remains that at least half of the men who go there



*Workers in the Auconquilcha Sulphur Mine —
The Highest in the World (20,000 feet)*

intent on saving money utterly fail to achieve their purpose during their first years. The fault does not lie with the high cost of living. The camp in which I worked had the name of being one of the most expensive mining camps in South America, yet it was possible to live fairly well there on \$100.00 a month.

The fault lies with our national trait or inertia in the matter of readjustment to strange environments.

The thing that happened to me in Chuquicamata happens to hundred of other young men throughout South America. They arrive there full of interest and curiosity in a foreign land. In the case of Chuquicamata they glory for a few days in the fact that they find electricity, hot and cold running water, a well equipped club, moving pictures and a jazz band in the heart of an absolute desert.

But as these things become familiar to them they begin to get bored. They find themselves living in a small community of their countrymen that is necessarily self-centered because most of its members dislike the natives of the country and almost consider it a breach of social etiquette to associate with them. Many dislike them not because of any personal contacts and experiences but on general principles. They have heard tales of "the natives." They distrust them because it is the thing to do to consider them dishonest, they shun them because it is rumored that bathtubs are not as common in South America as in the United States.

And the young men on their first contracts almost invariably follow suit. It would be difficult not to. It

would be difficult entirely to disregard the talk of hundreds of people who have lived in the country for years and therefore must certainly know it.

Yet I know men who have spent close to ten years in Chile and still know little more of the country than the hotels and race tracks, the saloons, and the bawdy houses of her principal cities.

The American mining camps in South America have a tendency to be transplanted bits of the United States with figurative fences around them, high, strong fences. They are necessarily inferior bits because all of the atmosphere of the rest of the United States is lacking.

The young engineer becomes bored. He misses the diversions of his home country, he misses the large and ever changing circle of acquaintances and friends to which he has been accustomed. And as his boredom is augmented by the realization that the camp indulges in a tremendous amount of petty gossip and internal politics, he generally begins to hate it, with a hatred that is all the stronger because he feels himself tied by a three-year contract.

Many of them either turn into hermits and misers and lead a miserable life for the purpose of saving enough money so they can return north at the end of eighteen months. Many others try to forget their troubles by leading a wild and riotous life, and save up little but debts. Few like the country.

And yet the fact remains that well over half of those who finish their first contracts go back for their second and even their third.

The employment managers very effectively use this as proof that their camps are fine, pleasant places. But there are other reasons.

When a man has spent three years in thinking about his friends at home and wishing he were with them, and then returns to his home to find that he and his friends have developed different interests and drifted apart and that he has become more or less of a colorful stranger to them, his South American contracts begin to take on a different aspect and become less hateful. When he tries to find work in the United States and finds that he has become so out of touch with conditions here and that his South American experience is valued so little that he cannot find a job that would pay him the same salary he could get by returning to the south, he often ends his vacation by signing a new contract.

And the second one generally turns out better than the first. The inertia to re-adjustment has been overcome, the man begins to realize that boredom can be overcome, he begins to settle down and save his stake. Hundreds of men have returned to the United States after eight or ten years in South American mining camps with enough money in the bank to go into business independently and thumb their noses at mere jobs.

As I mentioned before, one difficulty which the young engineer has to recognize is the general tendency among

employers in the United States to undervalue South American experience. While there is a considerable justification for this attitude, the compensating factors are quite generally overlooked.

Hundreds of young engineers flocked to Panama when the Canal was built, partly because of a romantic urge and partly because they wanted the experience of being connected with so tremendous an undertaking.

For many of them the undertaking was entirely too large and too well organized. Like the worker in a Ford factory they found themselves doing one thing day after day and month after month, taking quantities on one cut, giving grades and levels. As experience for any work but that of instrument man, this counted for little, and the fact that intelligent men who kept their eyes open could learn a lot in Panama from mere observation was not often taken in consideration when they applied for their next job.

While this condition is far from applying to all of South America, it is too often taken for granted by employers in our own country.

It is possible, however, to generalize on the variety of experiences to be gained by young engineers in South America. It depends on their jobs, their locations, and themselves.

But right here I want to take a jilt at the commonly accepted idea that the good men are the ones who are given opportunity to handle the greatest variety of work. The speed with which an inferior man gets shuttled from job to job, is generally far greater than the speed with which his superior brother is allowed to show his versatility.

But "experience," as such, can be gained by the young engineer in South America, experience that ranges all the way from the crudest kind of construction work to the most highly technical experimental and test work. And in an isolated camp, which gets its supply of trained men from a country four or five thousand miles away, there is ample opportunity for any intelligent man to undertake work which he

wouldn't be allowed to undertake in the United States where a great many specialists can easily be obtained.

I know men in South America who in three short years after their graduation from college leave by the sheer force of necessity, become experts in highly specialized lines of their own choosing: the use of liquid oxygen in blasting, the electrolytic deposition of copper, railroad location.

But employers in the United States have a tendency to take their cues from certain misguided travel writers and regard all of South America as "Manana" land, the land of tomorrow. They have an idea that any man who works there for a time becomes shiftless and falls into the habit of putting everything off till some future day.

Very little reflection will show that this attitude is groundless at least as far as the larger mines are concerned. If these are to compete with other mines throughout the world they have to get their work done on schedule time. And if South American labor is inferior to our own, as it admittedly is, it behooves the North American "jefes," the bosses, the engineers, the executives, to jump around all the more. Doing a piece of work well and on time with second rate labor requires a better man than would be needed if the best workers were available.

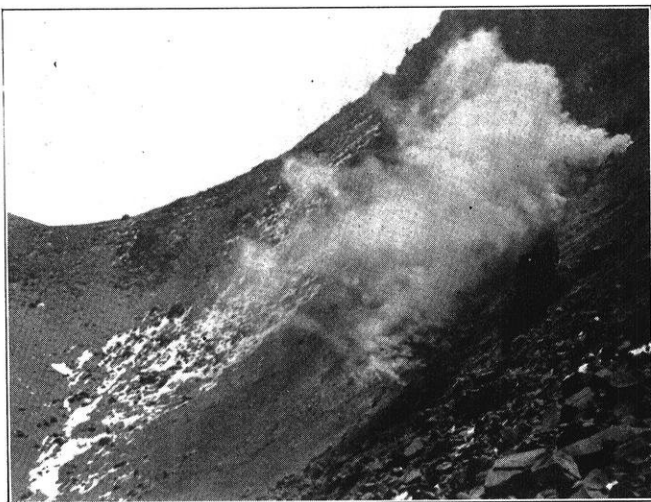
And the mere fact that a young engineer who goes to South America suddenly finds himself in a strange country, cut off from all of his old support, moral and otherwise, and has to begin to produce and work immediately, picking up the language and adjusting himself as well as possible as he goes, is an invaluable bit of "experience" that cannot be measured in terms of dollars.

Volumes can be written on the subject treated in this article. Mining camps in Latin America have already begun to creep into our national literature.

In a brief sketch such as this, it is impossible to do anything but make a few generalizations, a survey of conditions that by no means hold good everywhere and are constantly changing with our increasing consciousness of foreign "opportunities." And while the tone of my article is unfavorable, I could not possibly comment on whether or not a young technical graduate does well by going South.

For, personally, I am extremely well satisfied with the results of my three years in Chile and am devoting a great deal of my time at present toward finding an opportunity to return there and engage in certain definite and highly specialized work of my own choosing.

And the fact also remains that most young men who go there on their first contracts are in search of romance. Almost all of them are disappointed, not because of any quality peculiar to South America but because romance is a trait peculiar to individuals, rather than to spots on the earth. Any man who has to travel thousands of miles in search of it, simply hasn't the psychological equipment necessary for finding it.



Crater of the Volcano San Pedro

ENGINEERING SOCIETY OF WISCONSIN HOLDS CONVENTION

By L. F. VAN HAGAN, *Professor of Civil Engineering*



G. E. HEEBINK, c'08
President

seemed to warm the cockles of the hearts of those present to enjoy them.

President Clarence M. Baker, of Madison, who presided, kept things moving according to program. Baker, by the way, is running Mr. Mussolini, of Italy, a close race for honors as the modern Poo Bah. He was president, not only of this society, but also of the Technical Club of Madison, which entertained the visiting society at a banquet on Friday evening. He made the address of welcome, and then, bowing to himself, he made a graceful response for the visitors. Baker is also the recently-elected president of the board for the Methodist Hospital.

The Friday night banquet was a great success. Louis Kessler in charge of the music, led the crowd which completely filled the hall, in songs of ancient vintage (including Sweet Adeline) and entertained them with a medley of local verses, written by Sam Bryan and sung by the "Roast Bull Band." Before the main address of the evening, which was given by Dean Russell of the College of Agriculture, Prof. D. W. Mead, after reviewing the recipient's many years of effective service as secretary of the society, presented Prof. L. S. Smith with a fine Hamilton watch, suitably engraved, as a gift of the society. During Prof. Smith's regime, the society increased in membership from sixty to three hundred and twenty, its activity and prestige increasing in proportion.

Dean Russell's story of "How Science Wins Out in the East" thrilled his listeners, who learned with

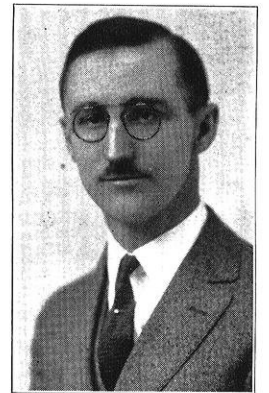
surprise that single industries, such as the sugar or the coffee industry, in Hawaii, Java, and Japan, are maintaining research institutes that have annual budgets of half a million dollars. Compared with the \$20,000 research fund of our College of Engineering, such amounts are startling.

Sixty members gathered in the dining rooms of the University Club on Thursday evening for an informal social meeting. A quartette from the university Glee Club entertained with a group of songs, and Prof. L. S. Smith spoke on his recent experiences in Japan, after which there were light refreshments and gossip.

Japanese courtesy might improve road conditions in the U. S. according to Prof. Smith, who told how he saw a truck run into a boy on a bicycle in Japan. The boy was badly cut, his cargo of milk spilled, and his bicycle was badly broken. The driver of the truck dismounted and approached the boy, who had arisen. Prof. Smith expected to hear a torrent of abuse such as he had heard following a collision at Park St. and University Avenue in Madison; but, instead, the two persons bowed profoundly twice. Then the truck driver bound up the wounds of the boy, put the bicycle in the truck, and drove away with the boy beside him apparently upon the most friendly terms.

A fine display of architectural drawings and photographs was on exhibition in the rooms of the Historical Museum during the convention. The display was under the joint auspices of this society and the Madison Art Association, the pictures having been loaned by the Philadelphia Chapter of the American Institute of Architects and sent out by the American Federation of Arts. The nucleus of the display was a selection from the exhibits at the 1925 convention of the American Institute of Architects.

Portraits of Dean Turneure and Professor Storm Bull, painted by Professor Carl Marr, of Milwaukee and Munich, were presented to the College of Engineering on Friday morning by Fred Dorner of Mil-



J. P. SCHWADA, c'11
Vice President

waukee, who spoke for the alumni and faculty members whose generosity made the portraits possible. The portraits are artistic in color and composition and are excellent likenesses. They will be hung permanently in the reading room of the Engineering Building.

The luncheon on Friday noon at the University Club was a new feature this year. Those attending more than filled the banquet room, overflowing into the regular dining rooms. There was no formal program, but Louis Kessler led the crowd in singing old favorites. Bob Connelly, city engineer of Appleton, inspired by recollections of his days and nights in college, burst forth into a solo rendering of a ditty that the engineers used to sing for the laws across the campus.

Bob Connelly was only one of a considerable number of city engineers that attended the convention. Others were Don H. Ames, Two Rivers; James W. Beaugrand, Racine; Chas. U. Boley, Sheboygan; Garret E. Heebink, Beloit; A. L. Hillis, Marinette; C. V. Kerch, Janesville; August Kringle, Green Bay; Arthur P. Kuranz, Waukesha; A. E. McMahan, Menasha; George H. Randall, Oshkosh; Joseph P. Schwada, Milwaukee; George H. Stanchfield, Fond du Lac; J. A. Stemper, Oconomowoc; H. V. Tennant, Portage; Henry H. Tubbs, Elkhorn; and E. E. Parker, Madison.

A corps of energetic senior student reporters, from his classes in Engineering English, assisted Prof. L. F. Van Hagan in his duties as publicity director for the meeting. Working in relays, they covered every minute of the meeting and gave the press prompt service.

The new officers for the society, elected on Friday, are Garret E. Heebink, City Engineer of Beloit, president; Joseph P. Schwada, City Engineer of Milwaukee, vice-president; Robert M. Smith, City Engineer of Kenosha and Prof. Leslie F. Van Hagan, trustees. Prof. Charles I. Corps was re-elected secretary treasurer at a meeting of the board of trustees on Saturday.

The new president was born in 1883, at Baldwin, St. Croix Co., Wisconsin, and grew up in Sheboygan Co. He was graduated from the course in civil engineering at the University of Wisconsin in 1908. After some years spent with the U. S. Geological Survey and the Illinois Central R. R., he entered municipal work. In 1913, he entered the services of the City of Beloit and in 1914 was made city engineer.

Licensing of Engineers in Wisconsin came before the

meeting on Saturday morning and brought out some earnest discussion, as a result of which it was decided not to attempt to introduce a licensing bill at this session of the legislature, but to appoint a special committee to study the matter and to report with recommendations at the next convention. The committee is not only to study the subject as a fact-finding body, but is to pass those facts on to the members and other engineers in the state in a campaign of education. The board of trustees has appointed Prof. Leslie F. Van Hagan to head the committee.

The excellent report of the Committee on Materials, which was presented by Prof. M. O. Withey, should serve to stimulate other committee chairmen to action.

A proposal to have the conventions in the future split up into small groups during some half-day session for the purpose of having detailed discussions of current problems, is being given some consideration by the trustees. There seems to be decided objection to having too much of such sub-division. "I don't want to miss anything," said one member, "I enjoy hearing about the other fellow's work as much as I do discussing the details of my own work."

"The present basis of paying for the acoustical treatment of buildings is unsatisfactory; we should devise some unit by which we can measure the effectiveness of such treatment," Joe Schwada told the convention in discussing R. F. Norris's paper on Noise and Its Prevention, and he illustrated the need for such a unit by citing his experience in arranging for the acoustical treatment of the auditorium in Milwaukee. Bids for the job were so different in regard to kind of sound-absorbing material, the placing of the material, and the price, that it was evident that there was not fair competition. Therefore, a study was made and specifications

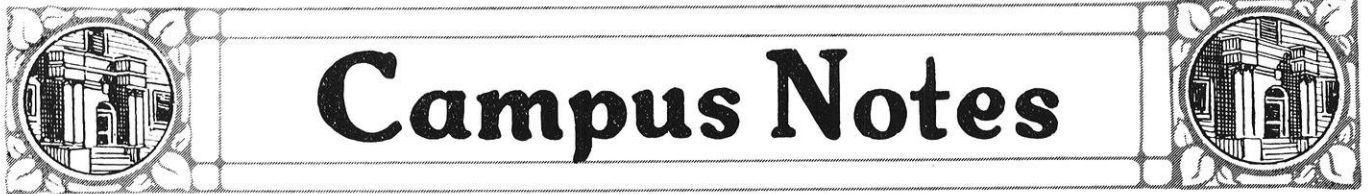
In order to get a report of the recent annual meeting of the Engineering Society of Wisconsin before its members at an early date, the Board of Directors has arranged with us for the publication of this preliminary report. The complete proceedings will be published in the July number of the Bulletin of the Associated State Engineering Societies. Professor Van Hagan attended the gatherings of the society and presents an accurate cross-section of what took place.

—THE EDITOR

were prepared, which eliminated certain ineffective materials, and under which a satisfactory bid was received.

Adolph Kannenberg, member of the Wisconsin Railroad Commission, in his paper on the Control of Stream Pollution, emphasized the importance of having laws that recognize fundamental economic conditions. "It has been a penal offense for the past ten years," he said, "to pollute any surface waters in the state with anything but authorized municipal sewage. This law, if enforced, would put every paper mill in the state out of

(Continued on page 202)



Campus Notes

ENGINEERS APPOINTED TO MILITARY BALL COMMITTEES

The announcement of the committee heads for the Fifteenth Annual Military Ball to be held on April 1, include several engineer cadet officers. Those appointed are:

Operation officer, R. F. White, min'27; supply officer,



N. B. Thayer, e'27; signal officer, S. D. Cotter, e'27; recruiting officer, C. D. Highleyman, e'27; mess officer, R. D. Jordan, e'27; service officer, H. M. Mather, e'27; transportation officer, W. H. Fuldner, e'28; printing officer, R. H. Brigham, c'28.

FIRST SHORT COURSE FOR FOUNDRYMEN DECLARED A SUCCESS

The first short course for foundrymen, held in the mining and metallurgical laboratories of the university on Feb. 1, 2, 3, and 4, under the direction of Prof. R. S. McCaffery and under the auspices of the department of metallurgy and the extension division, was declared a success by all who attended. The course attracted seventy-eight men from sixty-one foundries in Massachusetts, Ohio, Iowa, Illinois, Minnesota, and Wisconsin. According to Prof. E. R. Shorey, who had charge of the enrollment, the response that was received this year warrants the holding of the course again next year, probably making it an annual event.

The course was conducted as a series of round table discussions. Recognized authorities acted as group leaders. The course covered the following phases of foundry work: Cupola practise, moulding and core sands, furnace slag and temperatures, foundry costs, management and accounting, non-ferrous metals, malleable iron and steel castings. The group leaders were R. S. McPherran, Allis-Chalmers Mfg. Co.; H. W. Dietert, United States Radiator Co.; Wm. S. Ford and A. F. Murphy, Wm. S. Ford and Co.; C. A. Busche, Prime Mfg. Co.; W. J. McNeill, Federal Malleable Co.; A. T. Baumer, Milwaukee Steel Foundry Co.; and C. I. Wesley, Wesley Steel Treating Co.

Pres. Glenn Frank and Dean Turneure addressed

the gathering at a luncheon at the University Club on the first day of the course. The other feature talks were given by Prof. R. S. McCaffery on "Recent Developments in Metallurgy Affecting Foundry Practise"; E. A. Doudna, Wisconsin Teachers Assn., on "Our Wisconsin"; Prof. S. W. Gilman on "The Thrill of the Difficult"; and Carl Johnson, Gisholt Machine Co., on "Industry in Wisconsin."

The course was completed with several inspection trips and a demonstration in the materials testing laboratories.

POLYGON SPONSORS RECOGNITION PIN DESIGN CONTEST

Polygon, in response to the agitation regarding a recognition pin for Wisconsin engineering students, is sponsoring a contest for the best design of a pin to be worn on the coat lapel as a means of recognizing the wearer as a Wisconsin engineer. Polygon is offering a prize of \$5.00 for the best design submitted before Saturday, March 19. The contest is under the direction of R. C. McCoy, e'27, and D. W. Thompson, m'28.

Here are the rules of the contest:

1. Design must be such that it signifies engineering and Wisconsin. The kind of engineering or the year of graduation is not necessary on the pin.
2. The design should be such that it can be used for a pin not to exceed a width or height of three-eighths of an inch.
3. Open to all students taking engineering or industrial art courses.
4. Contest begins Tuesday, March 1, and ends Saturday, March 19.
5. The judges of the contest are Prof. A. V. Millar, L. S. Baldwin, and Prof. C. M. Jansky. Their decision shall be final.

Designs can be turned in at the desk in the engineering library, to any member of Polygon, or mailed to Polygon, in care of the Wisconsin Engineer.

The design need not be elaborate nor should it involve any expensive or intricate pattern. It should be simple, inconspicuous, and stand out distinctively as significant of Wisconsin and engineering.

There is still plenty of time before the contest closes. So let's have your idea on a recognition pin. It may be worth five dollars.

ENGINEERING ECONOMICS AS IS

The junior civil who wrote, "The rate of return equals the investment plus the operating expenses divided by the income," must have studied his economics in Russia or Mexico.

EXTRA! EXTRA! LAWYERS AND ENGINEERS IN RECONCILIATION

At last the impossible has happened. An engineer started it. Just like a true and loyal son of St. Pat, having compassion on the lowly, unhappy looking, down in the mouth shysters across the way, he stealthily crept into the very habitat of the arch-enemy on St. Valentine's day and placed a valentine on the shyster bulletin board.

It was close to noon before the lawyers gathered enough courage to come near the strange missive and pry it loose from its imposing position. The envelope was quickly torn open, and three lawyers succumbed in the mad struggle to secure it as a souvenir. When the valentine was read, the eager crowd could contain itself no longer. As one, they all faced towards the Engineering Building and prostrated themselves on the floor in joy with copious tears rolling down their cheeks. Their submission to the mighty engineer was complete.

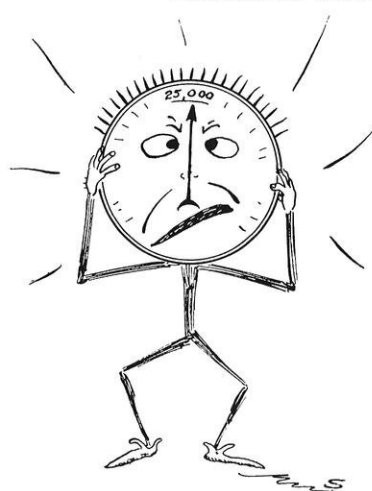
The valentine, as described in glowing terms by a lawyer later, contained a picture of a man in a dress suit, his arm around a pretty lass. Underneath this was the verse:

*"I ain't got nothin'
I never had nothin'
And I don't want nothin' but you."*

It is understood that the lawyers have started a collection to buy a token to send to the engineers. After an extensive fund campaign, in the law school, it was reported that three cents had been collected. It seems that the engineers will have to wait until next year to receive a reply.

STEAM AND GAS LABORATORY RECEIVES HIGH PRESSURE GAUGE TESTER

A new high pressure gauge tester has been purchased for the steam and gas laboratory by the mechanical engineering department. It is capable of calibrating and testing gauges for pressures up to 25,000 pounds per sq. in. The installation of the gauge tester makes the steam and gas laboratory one of the best equipped in the middle west.



WATCH FOR IT!

There will be a flash of shamrock on the hill St. Patrick's Day, and every loyal son of the Ould Saint will show his colors!

Prof. G. L. Larson addressed the Milwaukee Engineering Society, Feb. 4, on "Some Aspects of Steam Engineering."

WHY THE IRISH WEAR THE SHAM-ROCK ON ST. PAT'S DAY

In days of old when knights were bald, and all that sort of thing, and you had to go to the blacksmith shop to get your pants pressed, the people of Ireland were living in peace and contentment, strange as it



may seem. And well might it be, for they had no installment-plan Fords to buy, no Tux collars to make life miserable, no house bills to pay, and all was well and joy was unrefined.

But there was sand in the cinnamon (there always is, confound it) — the land was infested with flies. There were horse flies, house flies, bottle flies, butterflies, and flies of the ordinary or garden variety. Mince pie was impossible, and fly paper was being used for currency. (Some of this is still in circulation in some parts of Scotland.)

The Hod-carriers' Union decided to do something about it, and a meeting was called at eight o'clock in the First Methodist Church. No report of that meeting has ever been received, but it was decided that the government should import toads to eat the flies. This they did with huge success, and the bald-headed men closed their eyes for a week's uninterrupted sleep.

But the toads were worse than the flies — how much worse it is impossible for us to say, having sworn off profanity just last week. At any rate it was soon evident that the toads must be disposed of, and that darn quick. So they imported snakes to do the job.

The snakes went over the land like a vacuum cleaner, or a tent, or something like that — at any rate, the toads were no more and a great deal less. But as fast as the toads disappeared the snakes multiplied, and soon it was necessary to call a meeting of the Bar Association to frame a protest. It was a hardship, they said, on the very few of their members who did not have delirium tremens, and who were trying to stick on the water wagon, to stay sober under such conditions. As an upshot of the whole matter, St. Patrick, who even then was renowned among engineers for his engi-

(Continued on page 201)



Engineering Review

DRILL CREWS STAGE THRILLING RACE THROUGH SOLID ROCK!

The water tunnel headings of the Moffat Tunnel were "holed through" with 33-foot steel at 6:35 A. M. on Lincoln's birthday, preparatory to blowing out the final 8-foot granite barrier on Friday, February 18, the date set for President Coolidge to shoot the last round from Washington by telegraph.

As the heading crews blasted nearer to each other the distance between the headings reached 33 feet on Friday afternoon. At that time East Portal struck soft, seamy rock and was obliged to timber. The largest steel on hand was 21 feet long, so West Portal crews determined to make a 30-foot length and attempt to hole through first. The first steel was started on the center line but stuck when 25 feet in, so another had to be started 0.8 feet north of it. By 4 A. M. this was drilled down, the last 5 feet being through such soft rock that it was decided to try to punch a hole through the remaining distance with a piece of 40 x 5/8 reinforcing steel. As the ground gave way under repeated thrusts, the spirits of the seven drillers and two engineers rose until the final blow sent the steel through to East heading a foot north of center, or practically on line. The East Portal tried to pull the steel through, but a bend had been made against such a contingency, so the rod was pulled back and the distance measured and found to check within a foot of the estimated length. Grades checked within 1½ inches.

A Wisconsin man, Clifford A. Betts, '13, was in charge of surveys on this entire project. He found it necessary to do a large part of the alignment work over the Continental Divide at night, using lights for sights, as the refraction conditions between the crest of the Rockies at elevation 1,200 and the terminal targets at East and West Portals in the Boulder and Fraser valleys was great enough to throw the line several feet. The distance between portals was obtained by triangulation and checked by chaining.

Engineers' Bulletin.

ELECTRIC POWER PLANTS SAVE COAL

Electricity, which has been used as a substitute for coal in so many ways, has, singularly enough, led to a substantial saving of that fuel. Since 1919, improvements in the generation of electricity have resulted in the saving of 75,000,000 tons of coal. Figures compiled by the United States Geological Survey show, that during the last six years, the consumption of coal and its equivalent in other fuels in central generating stations increased about 15 per cent, while the energy generated in these stations increased by over 80 per cent.

This saving is attributed to a variety of causes—actual progress that has brought the consumption to a pound of coal per kilowatt-hour in the most up-to-date plants, the elimination of inefficient equipment, the growth of interconnections, and similar factors. And it is claimed that the saving is not alone in what the industry has not taken from the national coal pile during the past six years, but in the price of coal, for competitive buying on the old scale would inevitably have marked up the general level of coal prices.

In one year the power plants that are to be classed as public utilities generate and distribute more electricity than do all the light and power companies of all the other countries in the world combined.

—Power Plant Engineering

THE MECHANICAL LOCOMOTIVE STOKER

After many years of experimentation and development work, the firing of locomotives by mechanical means is now a successful accomplishment, and practically all the new locomotives built today that come within what is considered the mechanical stoker requirements, are equipped with a machine for stoking the locomotive known as the Locomotive Stoker. The prime purpose of the locomotive stoker is not what might at first be assumed—to promote fuel economy, but rather to increase the capacity of the locomotive or to make larger locomotives possible. This results in increased earnings for the railroad and permits the building of the immense locomotives constructed today, which are admittedly beyond the capacity of a man to fire by hand—just as in the large steam or electric power plants no one would attempt to fire the boilers by the use of a single fireman, so in the larger locomotives they use the mechanical stoker, which is designed along widely different lines from the power plant mechanical stoker.

While in stationary power plants the coal is burned evenly and rather slowly, with a uniform load on the boiler, very different conditions prevail on locomotives. A locomotive stoker must be so designed that it can handle different types of fuel and be controlled by the fireman to take care of the varying loads and speeds of the train. The locomotive stoker consists of the following parts: Driving engine, conveying system, elevating system, and distributing system. The driving engine consists of a steam cylinder and piston which drives through a rack the vertical elevators and horizontal conveying screws. The conveying system consists of a worm which breaks the lumps to the proper size and brings them from the tender to the engine. The conveyor is controlled by varying the speed of the

(Continued on page 206)

On Timken Bearings

In the epic history of the railroads a new chapter opens. Cars regularly equipped with anti-friction bearings are here. Timken Bearings make it possible. The first standard Timken-equipped cars go into operation on the Chicago, Milwaukee and St. Paul.

Timken Tapered Roller Bearings for this progressive railroad's crack flyers, The Olympian and The Progress Leader, mark the day of new ease, quiet and surety in long distance travel.

On guard against the wear and waste of friction, Timken Tapered Roller Bearings not only conserve power, but put an end to hot boxes and the whole lubrication difficulty.

Steel wheels speeding steel grades and curves cause stresses which have been thought beyond anti-friction bearings. Here again, as in every other type of mechanism, throughout industry, the "impossible" has yielded to Timken design, construction, and resources.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN *Tapered Roller* **BEARINGS**

Reproduction of two-page Timken Advertisement in The Saturday Evening Post

Railroad trains running on Timken Bearings represent the most significant development in the history of friction elimination. When you realize that Timken-equipped trains can be started with only *one-eighth* of the power formerly needed, and that the old hot box dangers are gone, you begin to sense the meaning of this latest Timken achievement.

For a long time Timken has been approaching this climax. Timken Tapered Roller Bearings have become universal in motor vehicles. They have swept industry, being used in machinery of every type, sponsored by the most highly reputed engineering institutions. In Transportation, Manufacture, Mining, and Agriculture Timken Bearings identify the most modern designs of the most progressive equipment manufacturers.

It is certain that engineers of every class will be increasingly concerned with the greater mechanical endurance and operating economies made possible by Timken Tapered Roller Bearings.

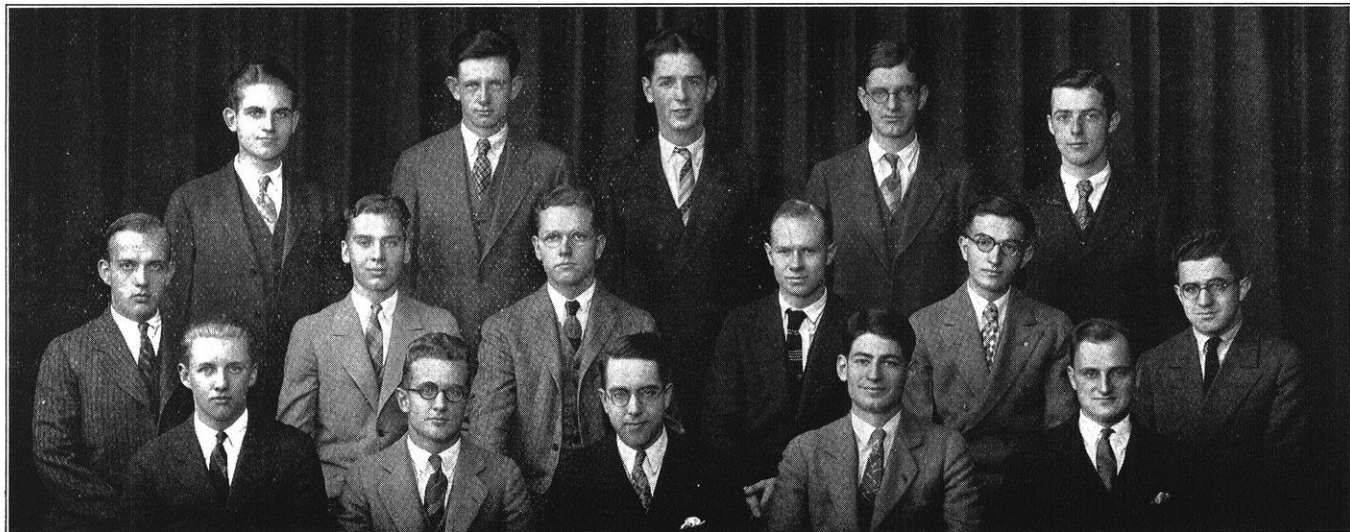
THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

Every Engineering Department should have the highly informative Timken Engineering Journal—110 pages broadly covering modern bearing practice. Faculty members may have a copy upon request.

Please mention The Wisconsin Engineer when you write



Editorials



TOP ROW—B. R. Teare, R. W. Leach, S. B. Tobey, H. D. Crawford, M. J. Williams
 MIDDLE ROW—G. G. Wolfe, P. H. Rosenthal, G. C. Ward, J. W. Myers, M. Hersh, J. Levin
 BOTTOM ROW—D. H. Kuenzli, R. A. Millermaster, R. T. Homewood, E. Birkenwald, R. R. Smith.

CHANGE OF STAFF In accordance with recent practice, the Board of Directors of the Wisconsin Engineering Journal Association elected the editor and the business manager of the *Engineer* at mid-year rather than in June. This practice, it has been found, gives the new staff a chance to become acquainted with the work while under the eye of the more experienced staff members, who have retired from active staff work. The new business manager is Richard W. Leach, e'28, and the new editor is Gerry Ward, c'29. The other members of the staff are appointed by these men and our faculty advisor, Professor F. E. Volk.

This year marks the creation of a new staff position, that of Advisory Editor, which will be filled by our retiring editor, Robert T. Homewood.

The Board of Directors also made awards to four men of our retiring staff who have performed unusually meritorious work over a period of a year or more — R. A. Millermaster, L. J. Cleveland, H. D. Crawford, and R. R. Smith.

STATE LICENSES FOR ENGINEERS There has been some talk in and about the state capitol and the University of the advisability of licensing engineers to practise in the State of Wisconsin, and of creating an examining board for the purpose. There seems to have been no decisive action taken in the matter, and the Engineering Society of Wisconsin has appointed a committee to investigate present conditions and make recommendations.

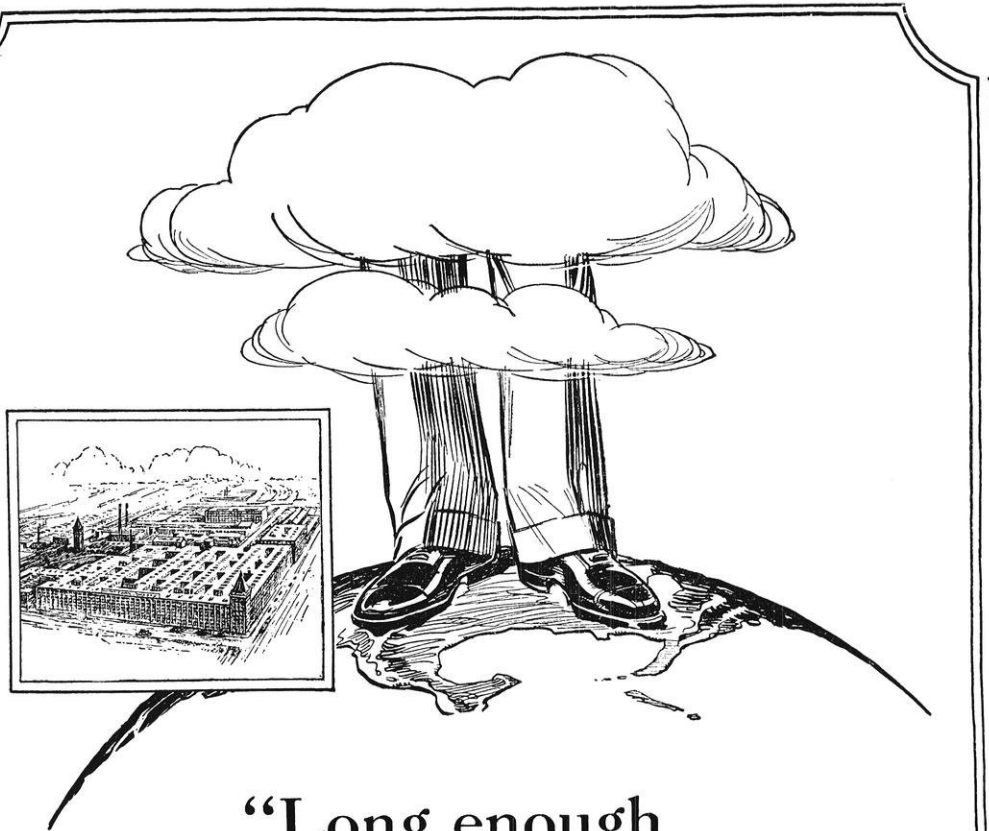
It seems to the *Engineer* that this matter must be

approached with caution, or we are going to find ourselves confronted with a situation similar to that facing members of the legal profession. Certain schools will train and "point" their men to pass the state examination, with that sole object in view, while others will go on attempting to develop their students into broad-minded clear thinking men with a real knowledge of the fundamentals of their profession. Graduates from the former will have little difficulty with the examinations and their alma maters will point with pride to the fine record they have made, while graduates from the latter will write mediocre papers because their college course has led them to broader view of their profession and has not made them into experts on one particular set of examination questions. As a result, graduates of the state university will either have to be exempt from the examination or our courses will have to be altered to fit it.

Again, — suppose a graduate goes from school into some other state or country and achieves success. He wishes to return to his native state and there practise his profession. Will he be able to pass an examination which is built up on the basis of his college course, the details of which he has long since forgotten? If the examination questions are altered to suit his needs, what earthly chance has the new graduate to make a passing grade when his paper is compared with that of the experienced man?

The other side of the case is not without convincing argument, but it seems to us that more damage than

(Continued on page 214)



“Long enough to reach the ground”

LINCOLN'S famous answer to the question “How long should a man's legs be?” suggests a similar answer to the question “How large should an industrial organization be?”

Large enough to do its job, of course, which simply means that there's need in this country of ours for both small and big businesses and both can prosper.

The job of providing electrical communication for the country calls for a vast organization backed by vast resources. And that's what the Bell System is.

Here great size has advantages in greater operating efficiency through which its customers benefit, and advantages to those engaged in the industry who find here a wide range of interesting work offering opportunity to men of varied talent.

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Number 66 of a Series

Please mention The Wisconsin Engineer when you write

Alumni Notes

At the annual convention of the Engineering Society of Wisconsin, held in the Auditorium of the Engineering Building on February 17, 18, and 19, the following alumni were among the active members registered at the meetings.



Boley, C. U., c'83, City Engineer, Sheboygan.

Caldwell, W. G., c'10, County Engineer, Waukesha.

Collins, W. A. c'24, City Engineer, Beloit.

Cennolly, R. M., c'16, City Engineer, Appleton.

Daggett, G. F., c'09, Mineral Aggregate Co., Milwaukee.

Disthelhorst, C. A., c'12, Street Dept., City Hall, Milwaukee.

Donohue, Jerry, c'07, Consulting Engineer, Sheboygan.
Dunnewald, P. W., c'12, Practicing Engineer, Madison.
Fowler, D. S., c'17, Highway Commission, Madison.
Gamble, R. W., c'16, Supt. of Streets, Milwaukee.
Glaetti, John, Jr., c'07, Civil Engineer, Madison.
Halbert, C. A., c'08, State Engineer, Capitol, Madison.
Heebink, G. E., c'08, City Engineer, Beloit.
Isabella, N. M., c'14, Highway Commission, Madison.
Klement, E. F., c'22, Civil Engineer, Fort Atkinson.
Kringel, A. E., c'10, City Engineer, Green Bay.
Parker, E. E., c'07, City Engineer, Madison.
Quimby, F. K., c'20, City Engineer, Antigo.
Rabuck, A. J., c'23 Land Commission, City Hall, Milwaukee.

Schwada, J. P., c'11, City Engineer, Milwaukee.
Smith, L. H., c'12, Supt. Water Works, Madison.
Smith, R. M., c'13, Asst. City Engineer, Kenosha.
Stanchfield, G. H., c'92, City Engineer, Fond du Lac.
Steinmetz, G. P., c'23, Railroad Commission, Capitol, Madison.

Traxler, Henry, c'13, City Engineer, Janesville.
Waite, J. H., c'10, Mgr. Waukesha Cement Tile Co., Waukesha.

Walter, R. C., c'05, CE'10, Gen. Supt., Wisconsin River Power Co., Madison.

Webber, M. L., c'97, Engineer, Lake Forest Co., Madison.

MECHANICALS

Fabera, Wenzel, m'25 is still pushing the slip stick in the air heater department of the Combustion Engineering Corporation of New York. He writes of the new 14th St. central station, "The entire plant looks like a glorified bathroom and is well worth seeing. The first turbine was started about a month ago and the deed was done by none other than Queen Marie. Not everything had been tuned up and it was not yet possible to get more than half speed on the turbine, but by means

of a rheostat and a phony circuit, the dials read full load when the royal hand threw the switch. When the queen left the country the New York Edison Co. gave her a lot of electrical appliances including a washing machine. What

possible use a queen could have for a wash machine is beyond me." He stays at 306 Carlton Ave., Brooklyn, New York.

Hodges, John S., m'04, who is a farmer on Route 2, Oakfield, Wisconsin, was in Madison on February 9 on a rate case and took the occasion to visit classmates at the college. Hodges says that his training in mechanical engineering was an excellent preparation for farming. The Wisconsin farmer, he says, should have a training in engineering and medicine.

Nelson, C. O., m'23, gives his address as 713 Portland Ave., St. Paul, Minn.

Perry, Russel, m'26, former cross-country captain and Frosh coach, has jaunted across the country to the Oregon Agricultural College, where he is instructing in Ag Engineering, Hydraulics, Electricity, and Mechanics. His address is 140 North 25th St., Corvallis, Oregon.

Smith, Harold A., m'26 is at 336 Central Ave., Whiting, Indiana, where he is helping design a new boiler plant for the central station. He promises the Engineer a descriptive article before long.

Shimanski, Victor, m'25 has been made sales engineer for the Trane Co. with central Wisconsin and Illinois for a territory. His permanent address is 844 Rush Street, Chicago.

Weideman, B. A., m'25 is chief engineer for the Leach Company, Oshkosh, Wisconsin, and is looking for a mechanical grad to fill a position in the Engineering Department.

Caldwell, Earl, m'24, former editor of this column, has just completed the manuscript for a pamphlet on public parking garages, urging the use of Portland Cement in their construction. He has covered this subject quite thoroughly, going into the economics, the safety features, and the growing necessity of this type of development. Caldwell is with the Portland Cement Association of Chicago.

Drissen, Wallace W., m'24, has left the Allis-Chalmers Company, and is now employed by the Modern Pouring Device Company, manufacturers of conveyor systems and foundry supplies, at Port Washington, Wisconsin.

Edwards, A. W., m'25, with **Andrew W. Cowan**, c'26, and **R. L. Wadsworth**, m'17, accepted the challenge thrown at Cincinnati to make the Wisconsin Club there a success. And they did just that, of course, being engineers. In appreciation, they were elected respectively president, secretary, and chairman of the entertainment committee. Edwards is manager in the Cincinnati office of the Trane Company, at 20 Greenwood Bldg., Cincinnati, Ohio.

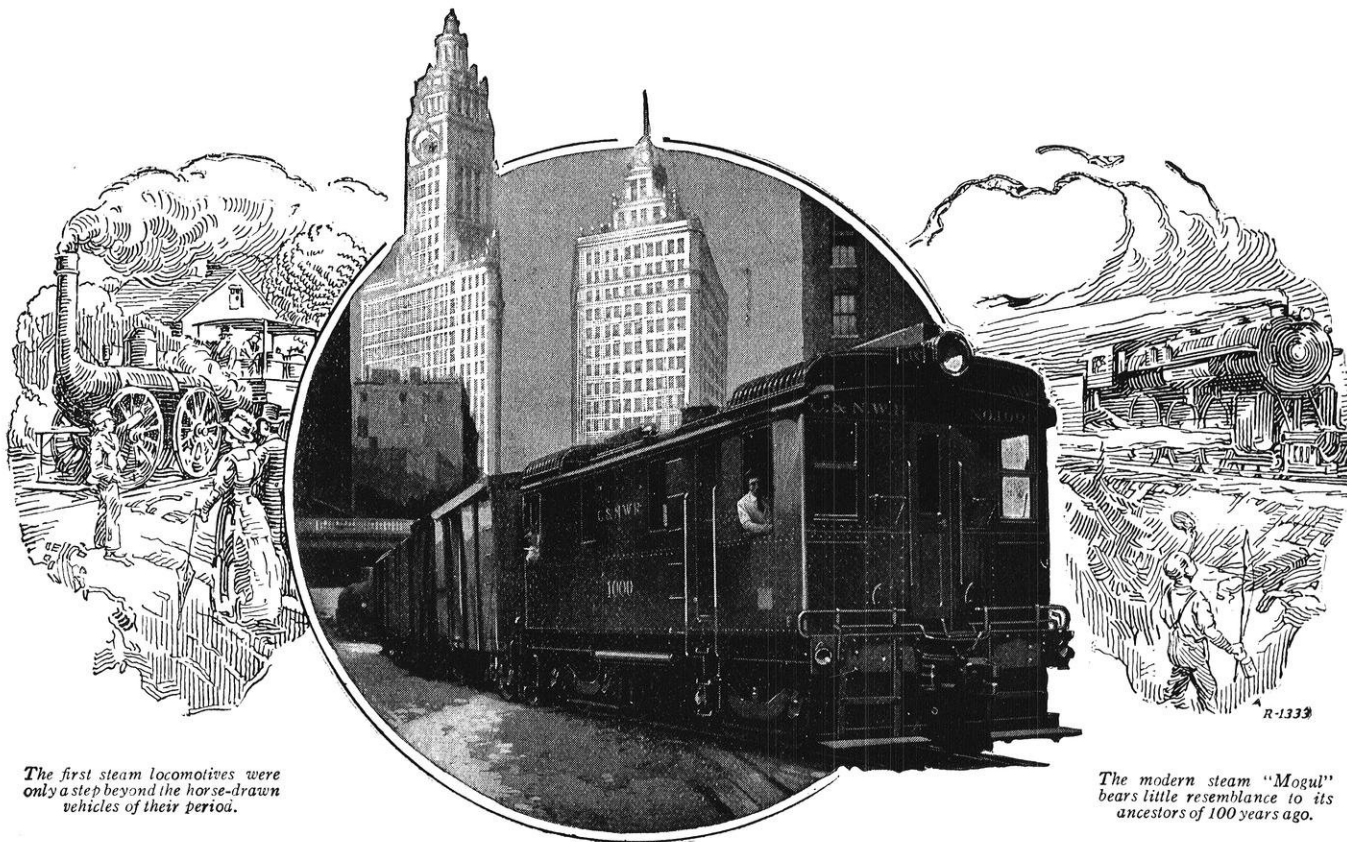
CIVILS

Mackay, Scott, has been appointed associate professor of Metallurgy. Prof. Mackay holds a B. S., 1913, from Rensselaer Polytechnic Institute and an M. S., 1926, from Wisconsin.

Berg, John, c'05, CE'19, state engineer of South Dakota, was re-elected president of the South Dakota Society of Engineers and Architects at the recent convention.

(Continued on page 210)





The first steam locomotives were only a step beyond the horse-drawn vehicles of their period.

The modern steam "Mogul" bears little resemblance to its ancestors of 100 years ago.

An Industrial Pace-Maker

THE last century has witnessed American transportation grow from a modest strippling into a full-fledged giant with more than his share of responsibilities. Regarded with skepticism a hundred years ago, this unpromising infant has gradually welded the country into an industrial unit that has no peer the world over. And he is only just beginning!

As a matter of history, the interval between the earliest and the most recent developments in railroading is not so great. To be sure, there is a vast mechanical difference between the "Tom Thumb" of 1830 and the massive locomotives of our own inventive age. But the "Puffing Billies," the "Tom Thumbs," the "Stourbridge Lions" were,

in their day, advance agents of steam locomotion—ancestors of the modern engines that now haul some two-score cars with perfect ease. They were ancestors, too, of the powerful oil-electric, with its low-cost fuel, quiet operation, and unrivalled flexibility under varying loads.

Briefly, the oil-electric locomotive is one in which an Ingersoll-Rand engine operates a high-capacity generator, the latter furnishing power to several electric motors. By the adaptation of its oil engines to railroad uses, Ingersoll-Rand Co. has again contributed to industry, and has

sponsored an idea which is as sound in principle and application as the I-R developments of other years.

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ENGINEERING SOCIETY MEETS

(Continued from page 193)

business; but, as a matter of fact, only one case has ever been brought to court. The way to solve this problem is not to kill the paper industry, but to find a method of treating paper-mill wastes economically so as to render them harmless before they go into the streams."

The practice of proportioning materials for concrete by weight, as is done by Iowa roadmakers, instead of by volume, as is more common practice, was described and upheld by R. W. Crum, engineer of materials and tests for the Iowa Highway Commission. "The weighing of aggregates has been standard practice in Iowa for three years," said Mr. Crum, "and is past the experimental stage. There are no practical difficulties in handling aggregates by weight, the equipment cost is negligible, and the rate of production is not affected. Contractors are unanimously in favor of the method, which gives a concrete of more uniform composition and reduces over-run of cement."

"It is possible to obtain 2000-lb. concrete in three days with standard portland cement by properly proportioning, mixing, placing, and curing the concrete," said J. H. Chubb, manager of the service bureau of the Universal Portland Cement Co. "The most important factors in obtaining such early-strength concrete are decreasing the amount of water and increasing the amount of cement in a unit volume of concrete. Other factors are mixing time, temperature of concrete when placed, and the temperature and conditions under which it is cured. The ratio of volume of water to volume of cement in any given mixture is of utmost importance upon the final strength. For given materials and conditions of manipulation, the strength is determined solely by the water-cement ratio, so long as the mix is workable. A cubic foot of cement, two cubic feet of sand, and 6½ gallons of water will give a mortar having a compressive strength per square inch of 3700 pounds in 28 days. Keep the same amount of sand, cement, and water, and add a cubic foot of gravel, and the strength will be the same. Add

two, three, or even four feet of gravel and the strength will still be the same."

Measurement of concrete aggregates by the ton instead of by the cubic yard to eliminate the errors that are caused by the effect of moisture upon volume, was one of the recommendations of the Committee on Materials.

Existing speed limits on the highways came in for a strong attack by speakers. The Committee on Highways recommended raising the limits to 40 miles in the country and 25 miles in cities and villages. John T. Donaghey, former state highway engineer, would even go further and remove the limits altogether, making arrests only in cases where drivers have been guilty of real recklessness.

Mr. Donaghey expressed doubt as to the practicability of the proposed licensing law for drivers of motor vehicles, pointing out the impossibility of giving a real examination to the 700,000 drivers who would have to be granted licenses in Wisconsin. The main argument for the proposed law is that the reckless driver would have his license taken from him. The present law, said Mr. Donaghey, gives the court the right to annul a motor vehicle license for reckless driving, but no use is made of the right. In the discussion, it was pointed out that a man may be half blind or crippled and yet be a safer driver than another man who has all his faculties but lacks good judgment. Good judgment, which is the basis of safe driving, cannot be determined by the tests that would be practicable to give in the few minutes examiners have at their disposal.

Contrary to the popular idea, metal parts do not "crystallize" in service, Prof. Jesse B. Koppers, who has been active in research work in fatigue of metals, told the members. The crystalline structure of a piece of steel at the point of fracture will be found if a new piece is nicked and broken by a sharp blow. It is crystalline in the first place and does not become that way in service. Failure is caused by some flaw in the metal, or by a scratch on the surface, or by some internal stress.



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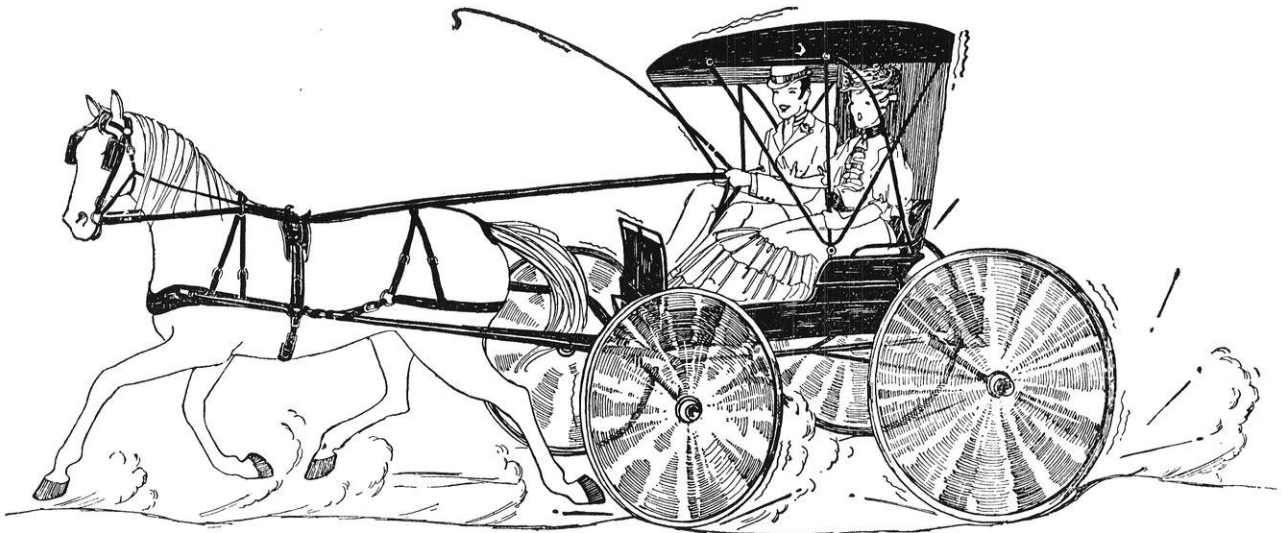
THE LUFKIN RULE CO. Saginaw, Michigan





NEW YORK

WINDSOR, CAN.



Thank you, M'arm!

IN the days of buggies and puffed sleeves, a "thank you, M'arm" was an occasion of rejoicing on the part of the young Don Juan who flourished the whip. The Gibson girl by his side probably protested vociferously against such pitfalls but, nevertheless, she undoubtedly regretted the stretches of newly laid brick, where all was smooth and there were no bumps to encourage a laggard beau.

A quarter of a century has changed all this. "Thank you, M'arms" are an occasion for something other than rejoicing—broken springs rather than wedding rings are the result. Instead of being avoided, brick-paved roads (many of them the same) are sought out, for the present generation knows that while "thank you, M'arms" brought a temporary joy, lasting pleasure is given only by a well-paved and permanent surface.

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The Chocolate Shop

CAMPUS NOTES*(Continued from page 195)*

neering skill, was called in to propose a method for ridding the land of this nuisance (we mean the snakes, not the lawyers, God . . . bless 'em.)

Acting under St. Patrick's orders, the government imported a tribe of monkeys, who immediately set about their work in a business-like manner, and soon had the country purged of snakes. Everything went along beautifully for a long time, and the Irish found the monkeys quite decent folks to have around. But trouble was in the offing. The monks entered into a conspiracy with the lawyers to take over the government, and the plot was discovered just in time.

All the public-spirited citizens of the realm were called together on the seventeenth of March and a gigantic monkey-hunt was staged. The people of the country went out into the woods and shot all day long and piled their prey along the roads, laying them end to end to see how far they would reach. At the end of the day, everyone came back to headquarters to check up, but they found, much to their dismay, that they had killed more Irishmen than monkeys, so the government enacted legislation and to this day the Irish wear the shamrock on the seventeenth of March to identify themselves.

TALK ON "MECHANO-ELECTRIC ANALOGIES" FEATURES A. I. E. E. MEETING

"Mechano-electric Analogies," an address by Prof. C. M. Jansky, electric engineering department, extension division, and the election of Michael J. O'Laughlin, '27, electrical candidate for St. Pat, featured the meeting of the student section of the American Institute of Electrical Engineers, Feb. 23.

"The study of mechanics began with statics, and the principles of statics were well understood even before the Christian era. The difference between ancient and modern life is due to the difference between statics and dynamics," said Prof. Jansky in tracing the development of dynamics. Mechano-electric analogies were developed in the following instances: The principles of falling bodies and the laws of the motions of the planets have their counterparts in the attractions of electric charges and magnet poles; the acceleration in simple harmonic motion is related to the change in rate of voltage change the instant the circuit is closed; the formula for a wave in a string is analogous to the formula for the velocity of a unit charge moving along a conductor.

C. L. NEUMEISTER LEAVES MECHANICS DEPARTMENT

C. L. Neumeister, ch'22, instructor in the mechanics department, has left the university to accept a job as research engineer with the Cellotex Co. in Chicago. He will work with A. E. Elmendorff who was an instructor in the mechanics department several years ago. Good luck Carl!

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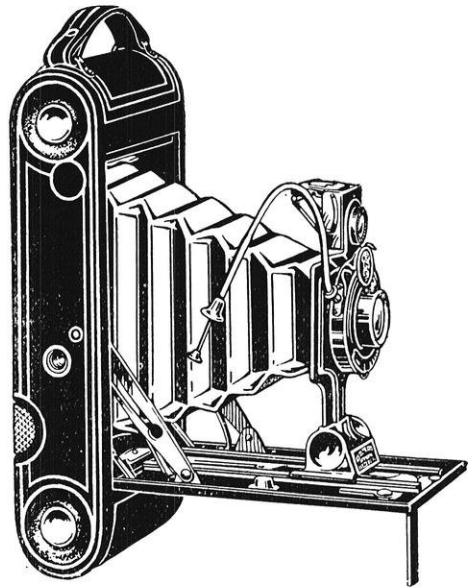
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PLAN BIGGEST AND BEST ST. PAT'S PARADE

Plans for the largest and most elaborate engineers parade held in a long time in honor of St. Pat, patron saint of all loyal engineers, are almost completed, according to L. J. Beck, c'28, general chairman of the parade. The parade will be held April 23.

M. J. Williams, m'27, and R. E. Zinn, ch'27 have been appointed assistant general chairmen. The chairmen of the various committees are as follows:

Publicity, O. E. Brown, ch'28; prizes, D. W. Thompson, m'28; individual stunts, R. J. Soulen, m'27; band, R. H. Lhotak, m'29; judge, H. A. Smith, min'28; posters, R. E. Greiling, c'29; fraternity floats, Merrill Scheil, ch'27; finance, W. H. Fuldner, e'28.

According to the reports from each of the technical societies, extensive preparations are being made to make floats that will rival any of former years. The engineering band is being organized, and all musically inclined engineers who wish to toot for the honor of St. Pat should get in touch with R. H. Lhotak, and make it the best St. Pat's band ever gotten together.

Prizes galore, are being planned for individual stunts and floats. Madison stores are co-operating in furnishing the prizes, and all have donated prizes really worth working for.

ENGINEERS RECEIVE APPOINTMENTS IN R. O. T. C.

Again the engineers come to the fore! The appointment of cadet non-commissioned officers in the R. O. T. C. announced by the department of military tactics and science this semester includes several engineers:

Wm. A. Kutzke, m'29, L. C. Radway, m'29, sergeants, Co. B; E. A. Meisenheimer, e'29, R. H. Pratt, e'29, and M. C. Ford, c'30, sergeants, Co. E; R. R. Gunderson, m'29, and F. S. Hook, e'29, sergeants, Co. F.

TALK ON AUTOMOTIVE INDUSTRY FEATURES

A. S. M. E. MEETING

"Each mechanical engineer, while still in school, should become familiar with automobile engines and become proficient in service station work," said Prof. E. L. Consoliver, mechanical engineering department, extension division in a talk on "The Field of the Automotive Industry" given before a meeting of the student branch of the American Society of Mechanical Engineers, Feb. 17.

There are 83,000 service stations in the country today. The large increase in the number of automobiles necessitates an increased amount of repairs and services rendered on automobiles by all these service stations, Prof. Consoliver pointed out. The mechanical engineer is the logical man to give this service most efficiently.

The program was concluded with a film on the manufacture of spark plugs.

CONDUCT COURSE IN DESIGN AND CONTROL OF CONCRETE MIXTURES

The college of engineering was fortunate in being able to sponsor a short course in design and control of concrete mixtures conducted by Mr. Woodworth of the

research department of the Portland Cement Assn. under auspices of the Portland Cement Assn. and the department of mechanics on March 1, 2, and 3, in the engineering auditorium. Mr. Woodworth is travelling throughout the country to conduct short courses in concrete mixtures based on the researches of Prof. Abrams and present standard practices of the engineering profession. The course attracted more than 250 men at each meeting.

The course covered the following phases the first day: Requirements of good concrete, relation of general quality to strength, fundamental water-cement ratio law, elements of design of concrete mixtures, trial method of designing mixture.

The second day included discussions on water-cement ratio specifications for concrete, selection of materials, standard tests and measures of aggregates, design of mixture by calculation method, bulking of aggregate.

The course was concluded with talks on the control of concrete in the field, curing, and other factors on quality of concrete in structures.

The materials and apparatus were furnished by the mechanics department. The course was arranged by Prof. M. O. Withey of the mechanics department, and L. S. Brodd of the Portland Cement Assn.

A. S. C. E. HEARS TALK ON JAPAN

A talk on his experiences in Japan by Prof. L. S. Smith, and the election of Wm. Taylor, c'28 as the civil engineers' candidate for St. Pat featured the meeting of the American Society of Civil Engineers, Feb. 24.

Prof. Smith told of the reconstruction work going on in Japan, and especially in Yokohama and Tokyo. The rebuilding of these cities, using the most advanced city planning methods, show the remarkable foresight the Japanese people have developed in recent times.

Taylor Nominated St. Pat

The election of Bill Taylor as the civil candidate for St. Pat may set a precedent if he is elected St. Pat. Taylor was the successful candidate last year, and the doughty civils have full faith that they can turn the trick again and elect Taylor as the first man to serve two years as St. Pat's personal Wisconsin representative.

ENGINEERING REVIEW

(Continued from page 196)

driving engine. The coal is delivered from the conveying screws to the vertical elevators which consist of similar screws driven by the same engine. The coal is then distributed to the grates by jets of steam which direct the coal to different parts of the grate, thus insuring even distribution. The distribution is under complete control, as the speed of the driving engine and the steam pressure on the jets are under the fireman's observation and control. The fireman can also reverse the stoker so as to remove any foreign matter which may fall into the conveyor.

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WOVEN WIRE ROAD GUARD PROVES EFFICIENT FOR DANGER POINTS ON PUBLIC HIGHWAYS

A series of tests just completed under the direction of Professor Wm. J. Putnam, of the Engineering Department of the University of Illinois, has definitely and authoritatively verified the safety advantages which have been claimed for woven wire road guard over other types of fencing for danger points on public highways.

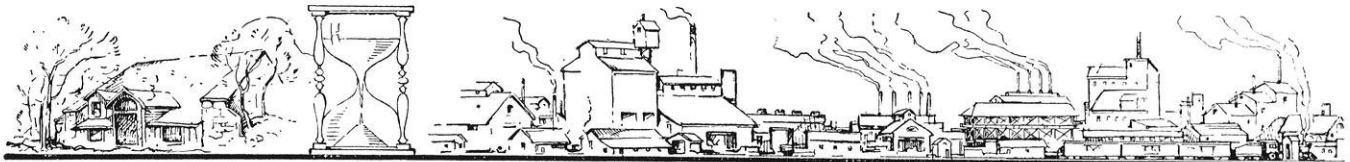
Woven wire fencing was brought on the market some time ago as a substitute for the usual wooden type of guard rail, which has of late years proven very inefficient. Wire cables have also been tried, but a cable strong enough to stop the driving weight of a car out of control could, it was found, slice its way through the car.

Claims made in behalf of the woven wire type of guard are that it acts as a sort of giant yielding net, strong enough to stop the progress of a heavy speeding car, yet elastic enough to break the shock, thus greatly reducing the danger to life and the damage to both car and fence; also that its lasting quality and ease of repair makes it more economical than any other type. The recent tests have verified all of these facts.

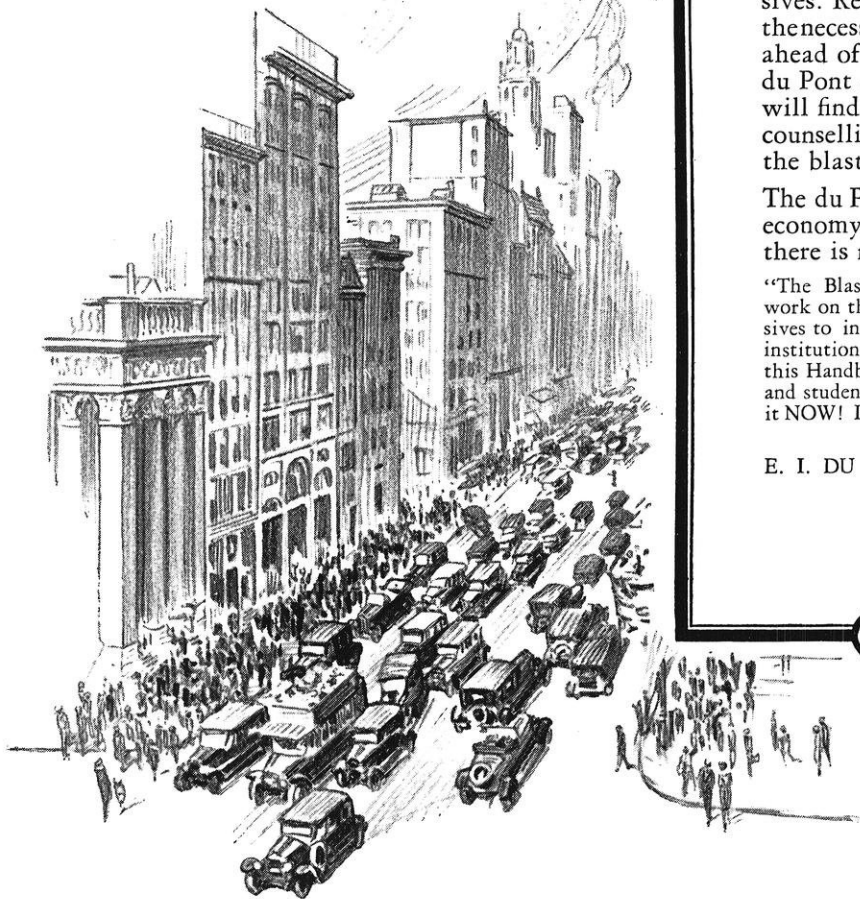
The tests gave an ultimate absorbing power of about 3,200 foot lbs. per foot of fabric or 32,000 ft. lbs. for a ten foot span. In stopping an automobile or truck, the road guard must absorb the kinetic energy of the moving vehicle; for example, the energy of a 4000-lb. car moving with a velocity of 40 miles per hour is seen to be 213,330 ft.-lbs. This energy could be absorbed by seventy feet of the woven fabric fencing without breaking. With heavier cars or higher speeds, or both, it will simply be a case of stretching more fabric. The woven wire road guard fence seems to be a solution to the safety problem on our public highways.

BUILDING OF 110 STORIES PROPOSED FOR NEW YORK

Plans have been made and filed with the Manhattan Bureau of Buildings for the construction of a 1,208-ft. tower building of 108 stories above ground in New York occupying 50,000 sq. ft. on the south side of West 42nd Street, between 8th and 9th Avenues. The estimated cost is \$18,000,000, to which the cost of the site, placed at \$4,500,000, must be added. The new building has been designed by John A. Larkin and Edward K. Larkin, architects and engineers, and Alexander D. Stark, structural engineer. It will be of steel, limestone, and brick, the foundations being on solid rock. On the 42nd Street side, the building will rise 12 stories followed by four setbacks to the base of the 90 story tower resting on the 18th story. The tower reduces in area by means of six setbacks as it rises to the top three floors. These latter will be given



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over entirely to sight-seeing purposes. Pending the approval of the Bureau of Buildings, no information is available concerning the structural plan to be used. Sixty high speed elevators are proposed, two of which will be express to the 82nd story where passengers will be served by four shuttle cars ascending to the top of the building. The sixty elevators will be arranged in ten banks centered in the building from north to south. There will be no interior courts. Beneath the building will be a basement and a sub-basement.

ALUMNI NOTES

(Continued from page 200)

CHEMICALS

Brown, Stacy, ch ex '18, who left college in 1917 to enter the first officers training camp at Fort Sheridan, died February 6, 1926, at the Hendricks-Laws Sanitorium at El Paso, Texas, after a long fight against the tuberculosis he contracted while in service in France. Subsequent to being mustered out of service, he spent a year and a half at the River Pine Sanitorium at Stevens Point, but being forced to seek a more favorable climate, he went to El Paso. He was a commissioned officer in the Field Artillery.

Tyrell, D. W., ch'17, was elected treasurer of the French Battery Co. at the yearly meeting held recently in Madison.

ELECTRICALS

Lilja, Edgar D., e'24, has left Green Bay, Wisconsin, to take a position at Rockford, Illinois. His address is 121 London Ave.

Martin, William R., e'25, was married to Miss Helen Ruth Miller, of Madison, on February 17, at Milwaukee. They will be at home after May 15 at Milwaukee, where Martin is an electrical engineer for the Wisconsin Telephone Company.

Heller, Harry L., e'26, is in the real estate business in Milwaukee. He has his home at 512 Bradford Avenue.

Rusch, Herbert W., e'15, is the author of an article on the use of an Earth Boring Machine in Line Construction.

Germond, Hallet H., e'23, M. S. in Physics '26, is now teaching in the Physics Department of the University of Wisconsin. His address is 2103 Monroe Street, Madison.

MINERS

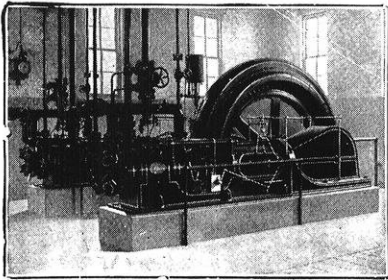
Brandt, Ellis R., m'17, is engineer for the Fairbanks, Morse Company, of Beloit, Wisconsin. He resides at 1113 Bushnell Street.

McNeill, E. D., min'24, sends an announcement of his marriage on January 25 to Miss Marguerite Lenont at Virginia, Minnesota.

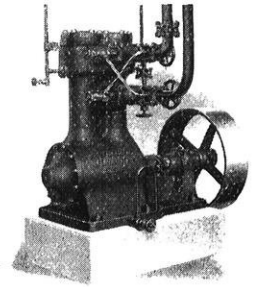
Whittingham, Percy, min'27, who completed his course at the end of the first semester is with the Anaconda Copper Mining Co., in the Research Dept. at Anaconda, Montana.

Parks, Roland D., M. S. min'25, and Miss Ruth Dickey Martin, of Chicago, were married on February 19 at Chicago. Mr. Parks was a graduate student of Mining and Metallurgical Engineering and received his Masters Degree from Wisconsin. He is Asst. Prof. of Surveying in the Michigan School of Mines, Houghton, Michigan.

Pardee, F. G., min'15 has severed his connection with the Michigan Geological Survey. He is engaged in developing large talc deposits in Marathon County for Wausau interests.



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McCullough, Allan Chase, c'18 died suddenly on Saturday, January 8, at Chicago. McCullough was employed in the sales department of the Illinois Steel Company, and was secretary of the University of Wisconsin Club of Chicago. His unexpected demise was brought about by an attack of heart trouble and was a severe shock to his host of friends in the Chicago alumni group by whom he was well known for his cordiality and his effective activity within the club.

CIVILS

Cagill, W. W., c'16 was elected vice-president and general manager at the annual meeting of the French Battery Company.

Hanson, Maurice M., "Moose", c'19 gives his address as 280 13th St., St. Petersburg, Florida.

Lathers, Victor, c'26 is with the Johnson Service Company, 118 East 28th Street, New York City.

Little, George F., who completed his course in civil engineering at mid-year, left Madison on February 14 to work in the office of the City Engineer at Muskegon, Michigan. He will live at 382 Prospect Street.

Loverud, E. K., c'23 has returned from Peru and visited some of the faculty on February 14. Lima is no place for heavy smokers, according to Loverud, for a Swedish monopoly gets 10 cents a box for safety matches and a permit to use an automatic lighter costs about 7 dollars a year. Taxes make the cost of Camels 65 cents a package, cigars 85c and up, and good pipe tobacco is unavailable. He told also of the bootlegging of smokes, the growth of crops from seeds sown 30 years ago due to a recent rainfall, the first in that period, and of a railroad where a concrete tunnel was built and covered because the engineer believed his road incomplete without a tunnel. He expects to return shortly and work on a food supply project. His permanent address is Stoughton, Wisconsin.

Marks, Edward, c'23 is with Toltz and Co., Architects and Builders of Chicago. He has passed the Illinois architects exam and is now a registered architect. At present he is at Portage, Wisconsin, supervising the construction of a theatre building.

Moe, Clarence, c'26 has resigned his position with the Chicago Bridge and Iron Works, to join the technical staff of the Chicago Plan Commission, where he will do structural designing. His address is 8617 South Paulina Avenue, Chicago.

Moehlan, William F., c'22 has recently taken a position with the Armco Culvert & Flume Manufacturers' Assn. and speaks enthusiastically of his work. At present his address is 116 So. Main St., Middletown, Ohio, but he expects to have headquarters in Madison after April 1.

Saltzstein, Irving, c'26, who went to work for a fruit company in Honduras a year ago, visited the College on February 8. He looked fine after his year in the tropics and stated that he expects to return and do some railway locating at the end of his vacation. "People in Honduras, foreign or native, who have anything that can be taken from them during a time of turmoil," says Irv, "are all for having Uncle Sam maintain order. The sight of a U. S. gunboat entering the harbor is mighty comforting when the bullets of contending parties are whistling about one's ears."

Wightman, Nelson W., c'26 recently celebrated his third wedding anniversary at Portage, Wisconsin, where he is resident engineer for the U. S. Engineer's Office, on the new Government lock construction. His address is 1108 Mack Street.

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"Concrete — Its Manufacture and Use" is a 210 page treatise on the uses of concrete, including 26 pages of tables of quantities of materials required in concrete paving work. To engineering students, faculty members and others interested we shall gladly send a copy on request.

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EDITORIALS

(Continued from page 198)

good will be done under such a system. At any rate, as we said before, too careful an approach cannot be made to this very vital question.

ROUND ROBIN SCHEDULE FOR ENGINEERING SOCIETY MEETINGS A very fine suggestion has recently come to us from a prominent member of one of our engineering societies, and it will perhaps be of interest to most of us who enjoy the meetings and functions of student engineering societies at the University of Wisconsin. Certainly, it can do no harm and is well worth trial.

The plan is to have each engineering society devote one meeting each semester to the entertainment of the other societies. A schedule could be easily worked out whereby each society would be enabled to play the host and the other societies would be able to shift their meeting dates to coincide with the date of the entertainment. There is no need for us to offer comment on the type of program to be presented — experience has led us to believe that the social chairmen of the various outfits do not even need the benefit of a hint in order to put on corking good entertainment.

The entertainment to be offered is not the chief reason for the joint meetings, however, although the proceedings will be lubricated thereby. The big idea is to bring about a more harmonious attitude between the different branches of engineering that are represented in our college. The best men we have here are professional society members — why not bring together our best and take stock once in a while? Acquaintance must come first, friendship and sympathy later.

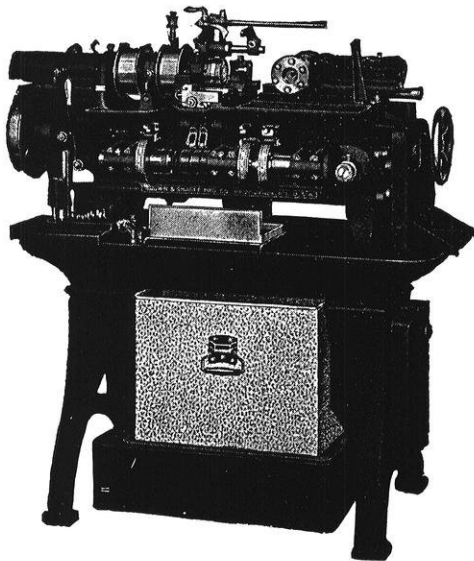
We're no sooth-sayer, but it's as plain as the nose on the editorial face that nothing but good can come out of this suggestion.

MUSCLE SHOALS

Work at Muscle Shoals during the past year consisted chiefly in minor details of construction and carrying on the installation of power equipment. Six of the eight turbines called for in the equipment to be installed at the present time, are complete, ready for operation. These are four 30,000-hp. units and two 35,000-hp. units. The remaining two 35,000-hp. units are in the process of installation. Work on the utility building is well along and construction of the high tension switch yard has been started. The power that is being generated is being sold to the Alabama Power Company under a temporary contract. A total of 428,000,000 kw.-hr. were sold in this way.

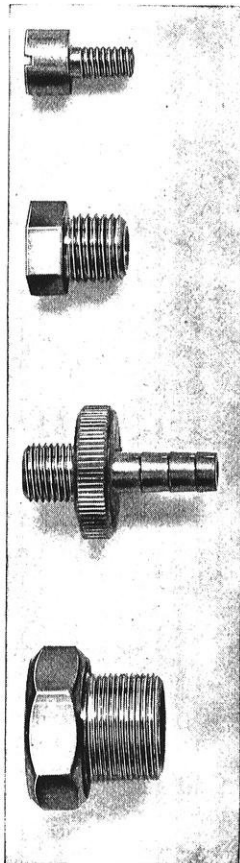
Engineering News-Record

It is possible for American manufacturers to produce a cement that will develop a 24-hour strength equal to that of high-priced, foreign, alumina cements, and it has been done; but, in the present state of knowledge about cement, it does not seem advisable to attempt to put such cement on the market.



*Faster machines
mean still lower costs
to the consumer*

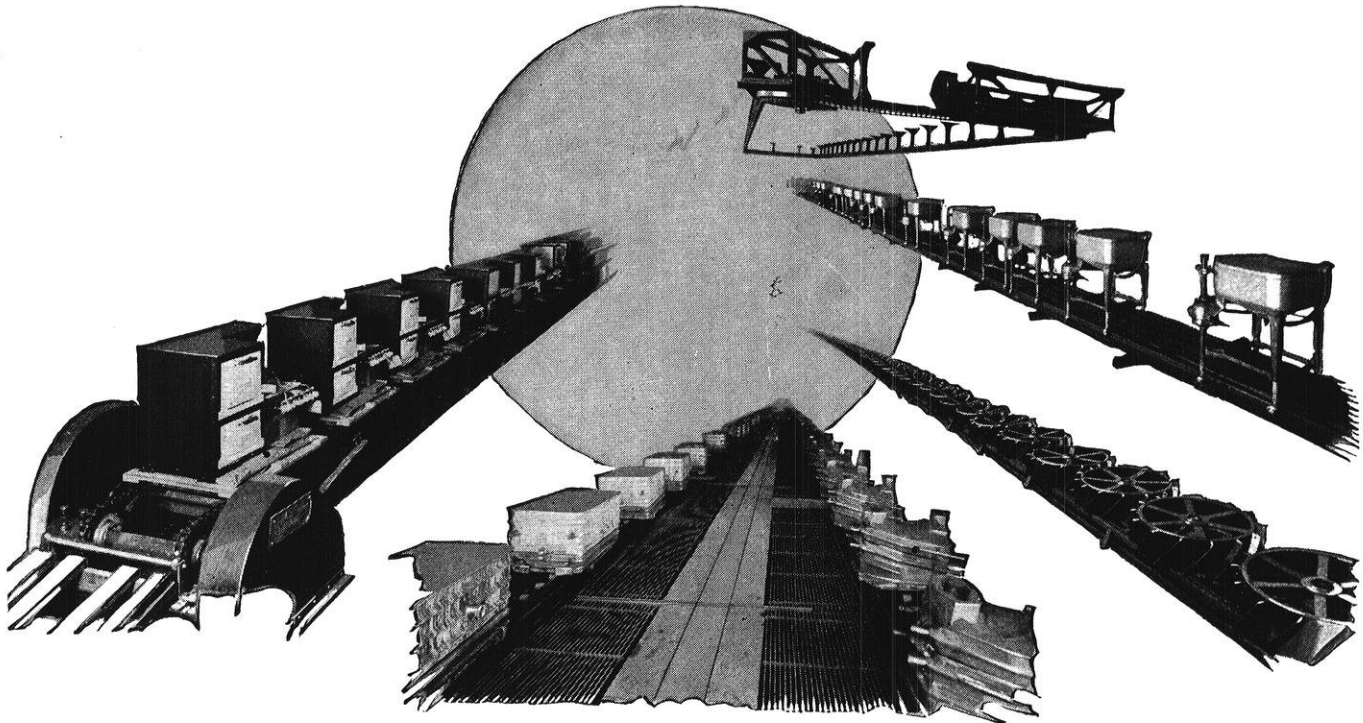
Although the average person seldom realizes it, when he gets a serviceable clock, safety razor, or any of thousands of articles in daily use, his thanks for their low cost are partly due the Brown & Sharpe Automatic Screw Machines. Their ability to keep costs down lies in their automatic operation and the rapidity with which they produce accurately formed parts.



And now, to further increase the production and to make the cost still lower on work similar to the pieces at the left, the Brown & Sharpe Mfg. Co., have placed on the market a line of High Speed Automatic Screw Machines. These machines operate with spindle speeds up to 5000 R.P.M. and are particularly suited for speeding up the production of parts made from the softer metals, such as brass.

Every student engineer should become familiar with these machines which hold so important a place in modern manufacturing. We are always ready to send at your request descriptive material covering these machines.

BROWN & SHARPE MFG. CO.
PROVIDENCE, R. I., U. S. A.



The trend of manufacturing today is definitely toward progressive assembly and parts transportation

In every field of manufacture, there is today a pronounced trend toward complete conveying systems for progressive assembly and transportation of parts and material in process.

During the past few years, Rex Conveying Systems handling assemblies and parts have been installed in many plants, little and big, producing a wide diversity of products.

Whatever you are doing today, you may be surprised to find "how close to home" some of these conveying systems are working. If you are in manufacturing, it will pay you to consider the opportunities of Progressive Assembly and Parts Transportation.

Whether you are a manufacturer, a graduate engineer or a student it might be well to inquire what this business of mechanical handling holds for you.

REX

MIXERS • Traveling Water Screens • CHAIN
PAVERS • Conveying Systems • SPROCKETS

CHAIN BELT COMPANY

749 PARK STREET

MILWAUKEE, WISCONSIN

STEARNS CONVEYOR COMPANY, Cleveland, Ohio (Owned by Chain Belt Company)

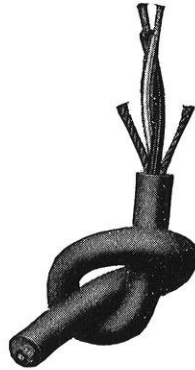
Please mention The Wisconsin Engineer when you write

“OKOCORD”

(An Okonite Product)

**UNKINKABLE,
OILPROOF,
TOUGH**

OKOCORD our smooth, rubber jacketed flexible cord can be dragged through rough, wet or oily places and subjected to the severest usage without deterioration.



The Okonite Company

The Okonite-Callender Cable Co., Inc.

Factories, PASSAIC, N. J.

PATERSON, N. J.

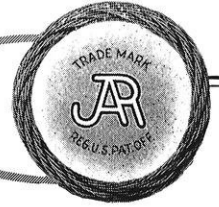
Sales Offices: New York, Chicago, Pittsburgh, St. Louis, Atlanta, Birmingham, San Francisco, Los Angeles, Seattle



Pettingell-Andrews Co., Boston, Mass.
Novelty Electric Co., Philadelphia, Pa.
F. D. Lawrence Elec. Co., Cincinnati, O.



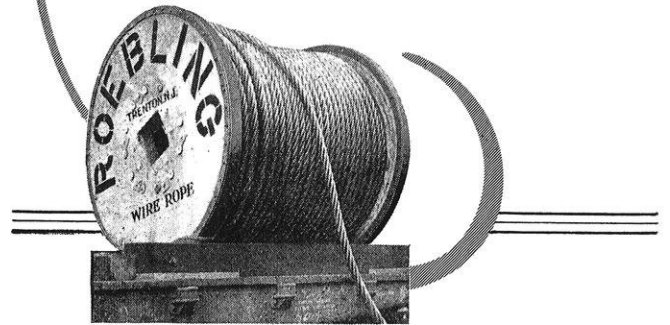
Canadian Representatives: Engineering Materials Ltd., Montreal
Cuban Representatives: Victor G. Mendoza Co. Havana



ROEBLING WIRE ROPE

Successfully and enduringly handles the work it is given to do

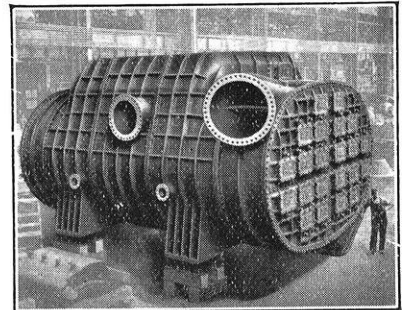
John A. Roebling's Sons Co.
TRENTON, N. J.



ALLIS-CHALMERS CONDENSERS

are built in the surface, jet and barometric types, in all sizes, and include a complete line of condenser auxiliaries.

The 52,000 square foot surface condenser shown above is operating with the 35,000 K.W. Steam Turbine Unit at the Waukegan Station of the Public Service Corporation of Northern Illinois, also a 32,000 sq. ft. condenser with the 25,000 K.W. Unit. A 57,000 sq. ft. condenser is now being installed with the new 50,000 K.W. Unit.



These three large generating units, condensers and auxiliaries together with transformers and Reyrolle Armored Switchgear in this station are of Allis-Chalmers manufacture, another example of Allis-Chalmers "Undivided Responsibility."

ALLIS-CHALMERS MANUFACTURING CO.

MILWAUKEE, WIS. U.S.A.

Please mention The Wisconsin Engineer when you write



He harnesses words to help sell electricity



E. L. ANDREW

merchandising and advertising as well.

Andrew liked engineering and had an excellent record in his work. But even in his high school days, he had been interested in writing. And that interest grew as he wrote for the annual, was successively editor and business manager of the Wisconsin Engineer, and was advertising manager of the Engineers' Famous Minstrel Show. He received his degree fully determined to harness words to help sell electricity.

At that time railroad advertising fascinated him. There was romance—and adventure—in the great tangle of tracks spread across the continent. So he applied and was accepted for a place in the Westinghouse Graduate Students' Course, hoping some day to do railroad advertising.

A month after he started the course he

“OH, ST. PATRICK was an engineer,” lustily caroled the senior engineers at Wisconsin in the spring of '16. But to E. L. Andrew, St. Patrick has become the patron saint of

“What's the future with a large organization?” That is what college men want to know, first of all. The question is best answered by the accomplishments of others with similar training and like opportunities. This is one of a series of advertisements portraying the progress at Westinghouse of college graduates off the campus some five—eight—ten years.

was made an instructor. For six months he had classes in the morning—then was free all afternoon to browse through the Westinghouse plant and learn those things that have made him valuable in the direction of Westinghouse advertising. But that's getting ahead of the story.

Andrew left the educational department to be a requisition clerk handling requests for literature on Westinghouse irons, fans,

toasters, percolators. Here he got his first glimpse of merchandising electrical appliances—an activity that was soon to rank with railroad electrification, marine engineering and the other important branches of the Westinghouse business. Andrew grew up with this development. He was one of the men who organized the merchandising section of the advertising department, which has remained under his charge since that time.

But his activities have been wider than this. Because of his understanding of both electricity and advertising, he was made assistant to the advertising manager, giving particular attention to national advertising. With the growth of the merchandising department, sales promotion also came under his charge.

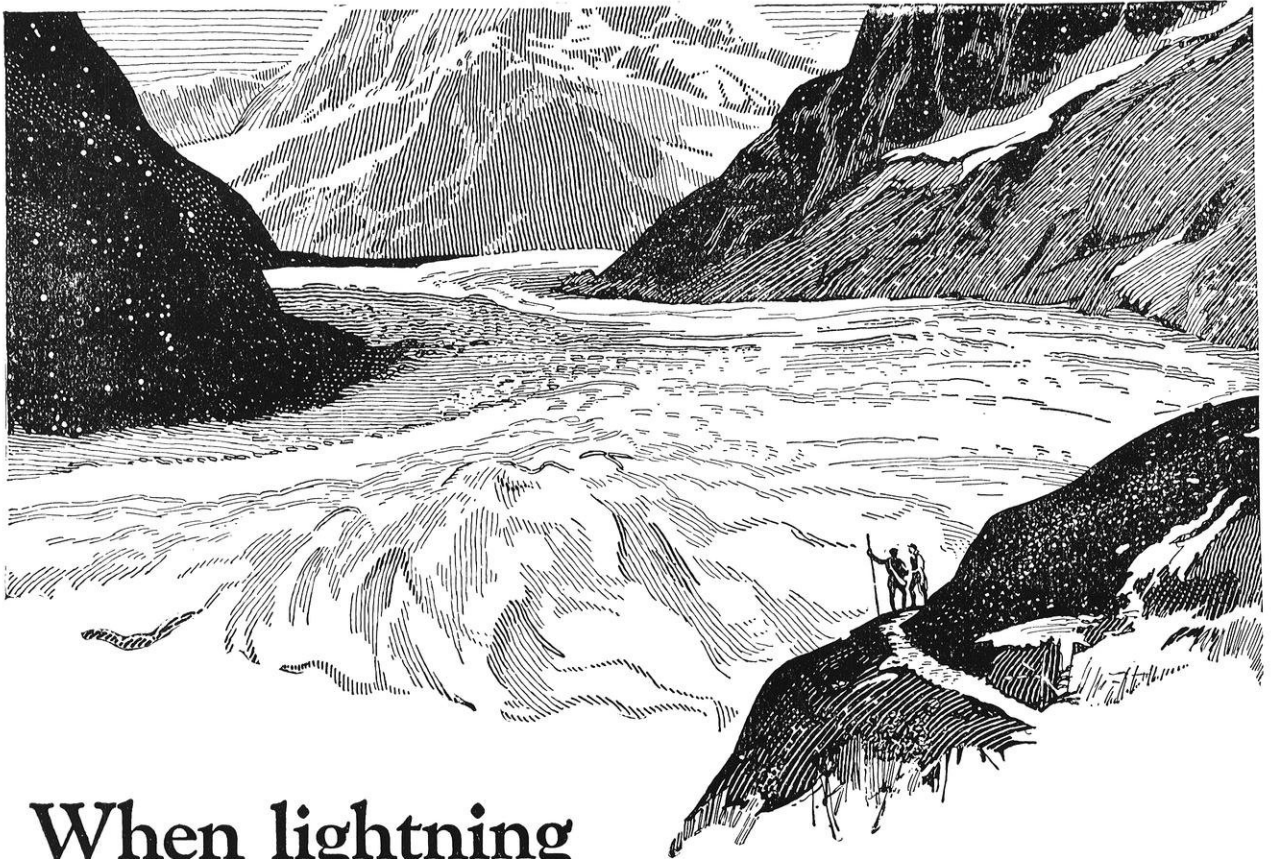
Today he is manager of the sales promotion section of the merchandising sales department, head of the merchandising section of the advertising department, and assistant to the advertising manager.

To engineering graduates interested in technical writing and advertising, Westinghouse offers an opportunity for realizing ambitions to the full.

Westinghouse



Please mention The Wisconsin Engineer when you write



When lightning seems as slow as a glacier

It is easy to photograph a glacier because it moves but a few feet a year. But to photograph the effects of lightning on electric circuits—effects that come and go in millionths of a second—would seem impossible. Yet there is a man-made machine operated in the laboratories of the General Electric Company that does just this. It makes even lightning seem slow.

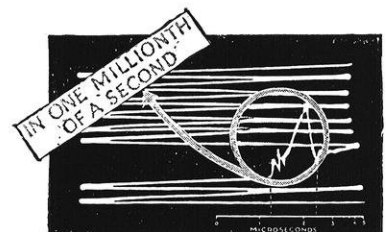
In the machine a swift-moving stream of electrons flashes across a photographic film. It dances out of its path when the freakish currents, caused by lightning, surge along the

wires. There on the film is the footprint of lightning.

It has made possible a study of the working of a lightning arrester—the ingenious device that protects the costly equipment of the power house as well as the very lights in your home.



Upon such scientific achievements as the cathode-ray oscillograph—lightning's camera—is the confidence in General Electric equipment founded. Many of these achievements are better known. The modern developments in x-ray, the service that has made MAZDA lamps a staple of commerce, the modern small motor that has taken drudgery out of household work—these are some of the milestones of progress.



Above is one of the photographs—oscillograms they are called. The jagged curve is produced by the lightning. The surge traveled at the rate of thirty miles a second but it was recorded, and in the amazingly short time of one-millionth of a second.

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK

Please mention *The Wisconsin Engineer* when you write

610-19DH