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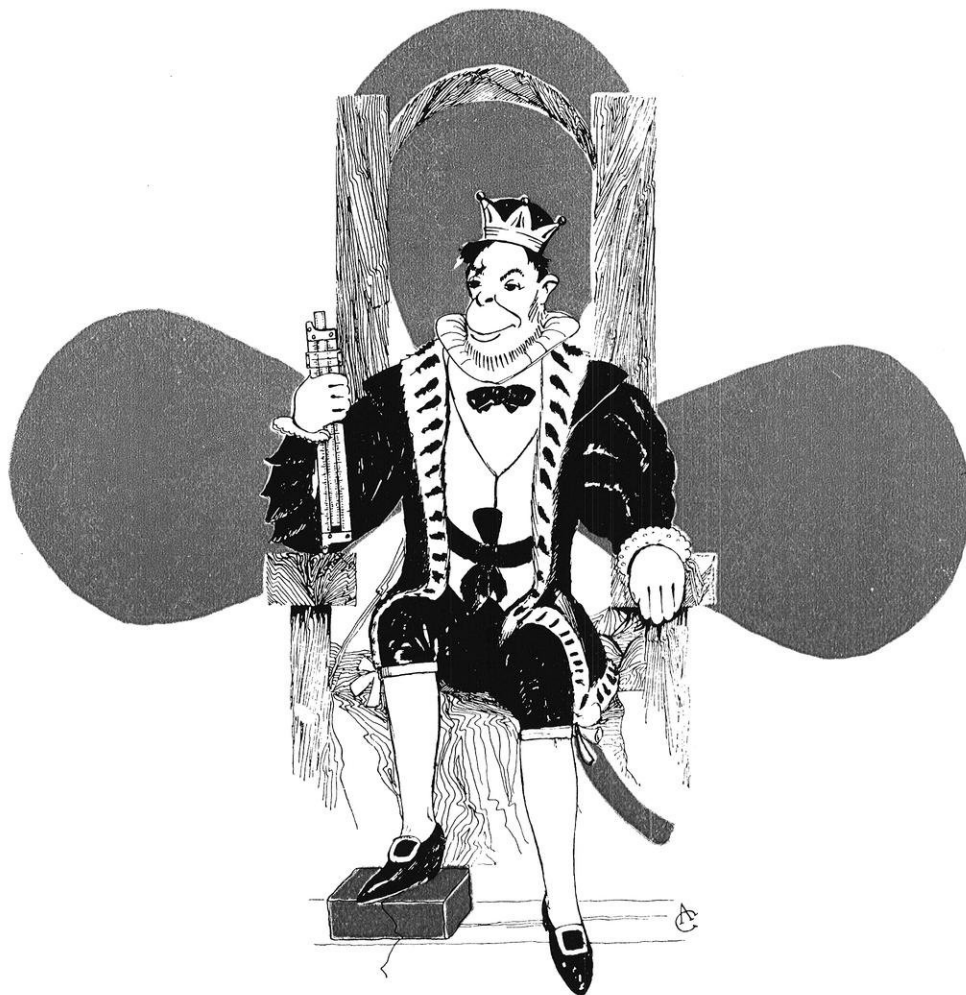
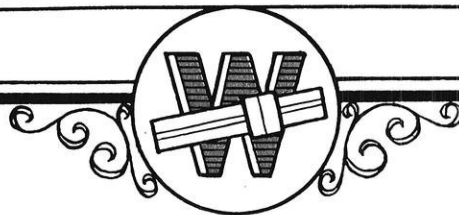
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The WISCONSIN ENGINEER

MEMBER OF ENGINEERING COLLEGE MAGAZINES ASSOCIATED

VOLUME XXXIII

NUMBER VI



PUBLISHED BY THE ENGINEERING STUDENTS
of the UNIVERSITY OF WISCONSIN

March, 1929

800,000 pounds of STEAM per hour from one unit!

N. Y. Times, Dec. 1928

NEW YORK EDISON BUYS 3 RECORD-SIZE BOILERS

Will Drive Largest Single-Unit
Generating Machine in World at
East 14th St. Plant.

Matthew S. Sloan, president of the New York Edison and associated companies, announced yesterday the closing of a contract with the International Combustion Engineering Company for three boilers that will be the largest ever built. Each will be about as high as an average eight-story building. They are to be installed in the East River generating station of the New York Edison Company at Fourteenth Street and will supply steam to drive the largest single-shaft, single-unit electric generating machine in the world, a 150,000 kilowatt turbo-generator now being built by the General Electric Company.

The over-all height of the new boilers, which are of the Double Ladd type with fin tube water walls, will be 95 feet, with furnaces 23 feet wide and extending back 65 feet. Each will supply a maximum of 800,000 pounds of steam an hour at a temperature of 700 degrees Fahrenheit, at 425 pounds a square inch pressure. The height of the boilers is approximately that of an eight-story building, allowing twelve feet for each floor.

With a heating surface of 60,000 square feet each, the compactness of the battery of boilers will make them not only the greatest producers of steam in the world but also the most economical for the space occupied and the coal consumed. Each of the boilers will require 80,000 pounds of coal an hour, or nearly 1,000 tons daily, if operated continuously at that rate.

"Matthew S. Sloan, president of the New York Edison and associated companies, announced yesterday the closing of a contract with the International Combustion Engineering Company for three boilers that will be the largest ever built."

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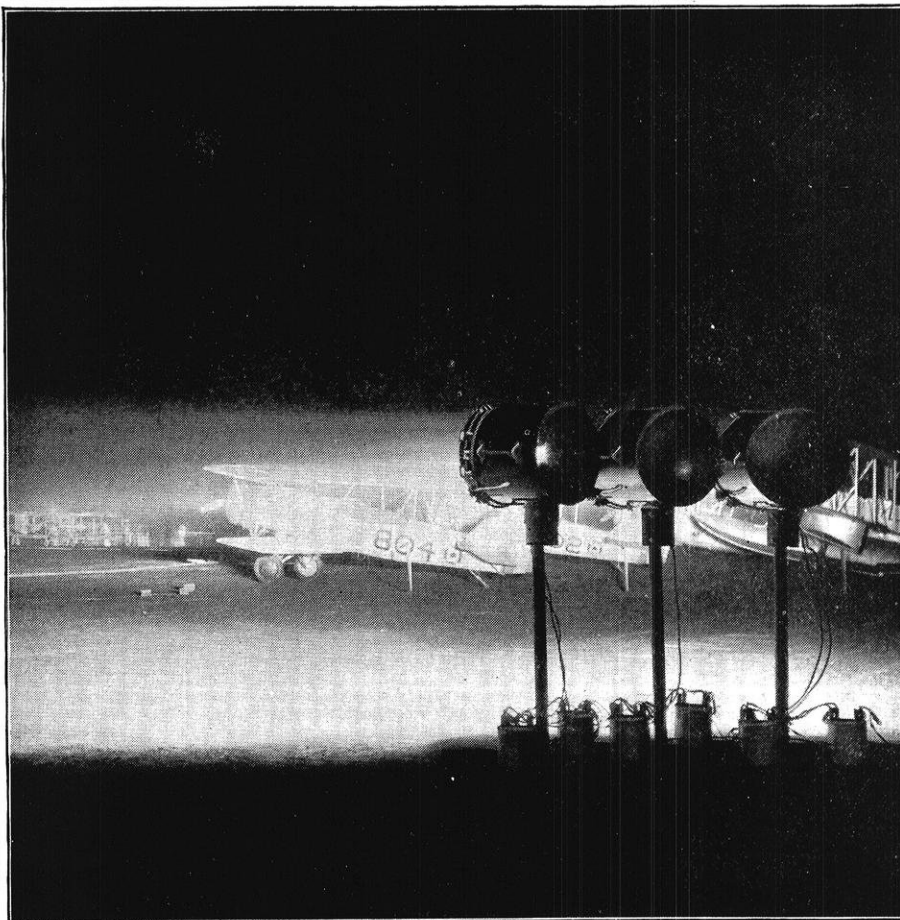
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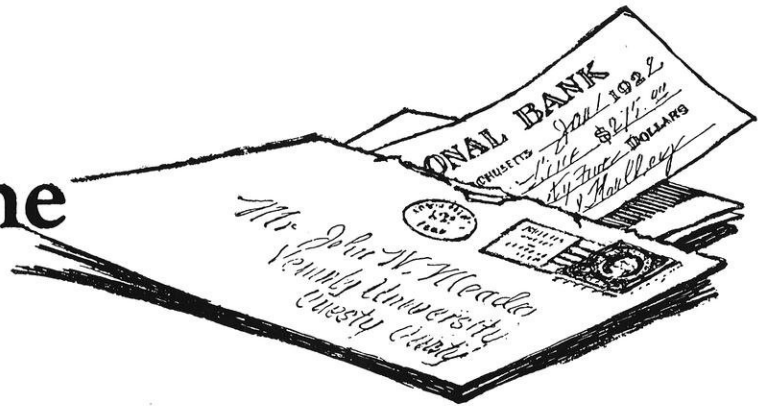
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*Nothing
is wrong with
the mind of the
man who minds
his own business*

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The WISCONSIN ENGINEER

VOLUME 33, NO. 6

MARCH, 1929



Mining Gold in Colombia's Rich Alluvial Deposits

The Most Promising Gold Fields are those where Monitors and Hydraulic Elevators can be Installed and Operated by Modern Methods

By DR. MARIANO OSPINA PÉREZ, M. E., C. E.*

President, Compania Minera de Colombia

ALTHOUGH a great deal has been said in the past about the vast mineral wealth of Colombia and the excellent prospects of the gold mines which require development in the near future, their possibilities have not yet been fully realized by the majority of the people abroad.

The most promising results are obtained from the gold alluvials. No other country in the world enjoys more favorable conditions for the formation and concentration of large zones of auriferous alluvials. The territory of Colombia, particularly the Department of Antioquia and the Province of Choco, and also the Departments of Tolima, Bolivar, Caldas and Cauca are crossed in all directions by rich auriferous reefs, but the country is very mountainous and has numerous rivers, which in a previous geological age were much larger than now, and the effects of erosion have been of considerable magnitude.

During the quaternary period Colombia also experienced

the three general movements of the soil which occurred in Europe and in North America.

The first rising occurred during the Glacial period, and coincided with the enormous increase which took place in the volume of the waters, when a great mass of decomposed and broken rocks must have drifted toward the valleys, carrying the gold from the auriferous deposits in the reefs and veins broken up by this geological movement.

During the period of "The Terraces," when the new elevations of the continents took place subsequent to the "lowering" in the Champlain period, a concentration was registered of the great deposits of gold disseminated in the mass of rock, causing the formation of the rich alluvials now existing in Colombia, which are probably the richest in the world.

One Pound of Gold per Yard

Mr. Franklin White, an English mining engineer, who

for eight years was managing director of the gold mines owned by the Bolivia and Frontino Mining Company, Ltd., of London, said in 1883, referring to the Nechi river in the Department of Antioquia: "If this river is properly



FIG. 1: Map of Colombia. The darker area indicates where alluvial gold deposits are located.

EDITOR'S NOTE—This article was obtained by Jorge Ospina Pérez, senior civil, a brother of Dr. Pérez. Reprinted through courtesy of the Du Pont Magazine.

dredged the gold extracted will greatly exceed in quantity the entire production of Australia. Although I am only venturing an estimate, I believe the River Nechi will yield



FIG. 2: In the Porce River, work is conducted to exploit the ancient river bed; then the river is run through the holes made, and the actual bed is worked.

4,000 tons of gold along the fifty-mile course separating Dos Bocas from the Cauca River."

The above estimate, apparently very optimistic, is based on a working width along the course of the river of 900 feet, and corresponds to a yield of 150 grammes per square yard.

In spite of the high figure attained from the above data, Mr. White insists on the accuracy of his statement, which is to some extent confirmed by the favorable results obtained in numerous dredging operations carried out in the Porce and Nechi rivers, as shown by the following examples:

"In the area dredged by the Pato Company—an English enterprise—at Pato the results have proved that the river bed contains 460 grammes per square yard."

"The operations carried out at Charcon have resulted in a yield of 460 grammes of gold per square yard of river bed."

Mr. White also states that along the Porce River there are many places where the yield per square yard is, on an average, 460 grammes, such as Las Palmas, Guayabal, Guayabalito, Colorados Oralito, Poca, Popal, Pedrero, Socorro, and many others.

It must be remembered that a great many of the experiments carried out by Mr. White took place during the dry season with the aid of natives, and employing very rudimentary methods. His estimate may be somewhat exaggerated, although it is based on data properly ascertained, but in any case it gives an idea of the prospective wealth of the alluvial sands occupying the beds of these rivers.

There are other rivers equally rich and equally suitable for profitable working in the vast territories of Antioquia, Caldas, Bolivar and Choco.

Advantages of Alluvial Mining

The working of alluvial gold mines is a very safe business proposition. It has a great many advantages over other mining operations. With the aid of modern drills, worked either by hand or steam, it is an easy task to make a close examination of an alluvial deposit at comparatively small cost and within quite a short time. It is said that an alluvial deposit, properly examined, is as reliable to the investor as the assaying of a gold bar. In alluvial mining the risks of speculation are considerably limited. In a factory, in produce or cattle raising the balance sheet is influenced by the fluctuations of raw materials, trade depression, heavy competition and many other factors which do not affect the gold market, where the fluctuations are small, or affect the actual working operations on the river bed. Once the amount of gold contained in the sands has been ascertained, no fears as to the destruction of the mineral wealth can be entertained, and it becomes a matter of time and machinery to turn into account the rich contents. With modern installations it is easy to predetermine the number of cubic yards worked per month and the working costs per cubic yard. Knowing from the examination what the average yield is, it will not be difficult to make a forecast of the probable earnings.

Low Operating Costs

In addition to the safety of alluvial gold mining as a business proposition, there is another great advantage, the value of which is of paramount importance in these kinds of enterprises. We refer to the very few experts and workmen required. Labor is an important factor in every industry, in view of the high salaries prevailing and the ever-increasing demands of the trade unions. In alluvial mining nearly all the work is done by hydraulic or hydro-electric power.

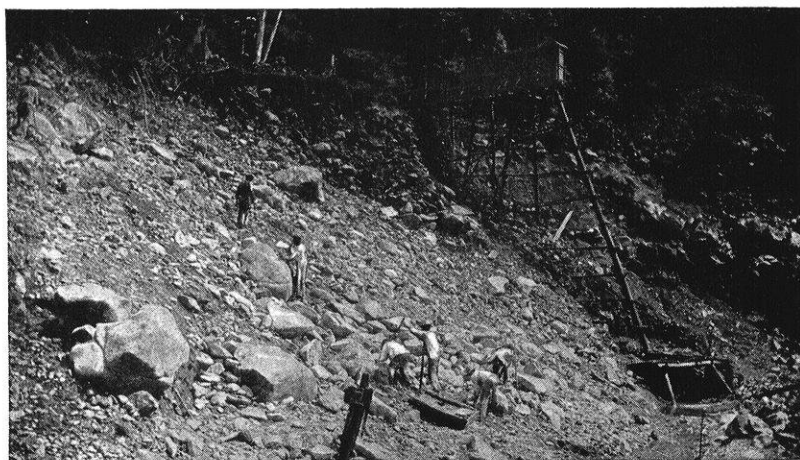


FIG. 3: An alluvial mine in Antioquia where a hydraulic elevator is working in combination with a cableway. Note the large boulders.

Another great advantage that Colombia offers for the economical development of alluvial gold mining is the considerable number of large waterfalls suitable at small

cost for hydroelectric power plants to supply the dredgers. The water supply is indeed very plentiful, and can also be used to work monitors and hydraulic elevators.

The natives and the Spaniards worked only the surfaces of the veins and reefs, and the alluvial beds of small streams, the machinery and appliances for exploitation on a large scale being absolutely unknown in their time.

Primitive and rudimentary methods were used in the production of gold in Colombia during the past four centuries, and records indicate that the yield for the whole territory during that period was, expressed in round figures, as follows:

In the 16th Century	-----	\$ 53,000,000
" 17th "	-----	173,000,000
" 18th "	-----	209,000,000
" 19th "	-----	315,000,000
Total	-----	\$750,000,000

The gold extracted from the mines in the Department of Antioquia was approximately as follows:

In the 16th Century (2'd half)	-----	\$ 10,000,000
" 17th "	-----	50,000,000
" 18th "	-----	77,000,000
" 19th "	-----	182,000,000
Total	-----	\$319,000,000

The production for 1921 was about \$5,000,000 in the same department, which is the richest in minerals in the country.

Owing to civil wars which prevailed in Colombia during the past century, the mining industry was kept almost undeveloped, particularly the alluvial gold deposits referred to. The past twenty years have registered wonderful results in the gold-mining industry of the country, due partly to the use of modern machinery and partly to the peace enjoyed during the same period. We have now a stable government, and the possibilities of an internal disturbance are very remote.

Monitors and Elevators

In 1870 the first monitor brought to

South America was installed in the mine of "Malpaso" in the Department of Tolima.

In 1880 a company was formed in the United States to dredge along the Atrato River. The company was very unfortunate at the commencement of its operations; its first dredge sank in the Atrato River, and the second was so severely damaged that it soon became useless.

Today, there are several dredges working successfully in different parts of the country. But it is evident that the most promising gold fields at present are those where monitors and hydraulic elevators can be installed, not only owing to the reduced cost of plant and running expenses, but also in view of the greater yield usually derived from the alluvial deposits situated in the higher levels, closer to the gold veins and with a higher concentration of gold per square yard.

The departments of Antioquia and Caldas, and the Province of Choco offer exceptional opportunities in this respect.

The first hydraulic elevator was installed in the Porce River some twenty years ago. During the past ten years several companies have established hydraulic elevators in this river, and the results have been highly satisfactory with all of them. In the mine known as "Hormiguero" a 12-inch elevator has produced in two months 3,200 ounces of gold, and frequently similar elevators each give a yield of 700 ounces of gold per month, at a cost not exceeding \$2,500. Other plants are now in course of erection in other rivers in the Department of Antioquia.

Nearly all these hydraulic mining installations are situated in the Porce River in view of the transport facilities available, the region being also thickly populated and near the important town of Medellin.

Our personal knowledge, together with information we have been able to collect from very reliable sources, leads us to believe that in the rivers of the departments of Antioquia, Caldas and Bolivar and the Province of Choco there is ample room for more than 200 installations of monitors and hydraulic elevators with very good prospects for successful development.

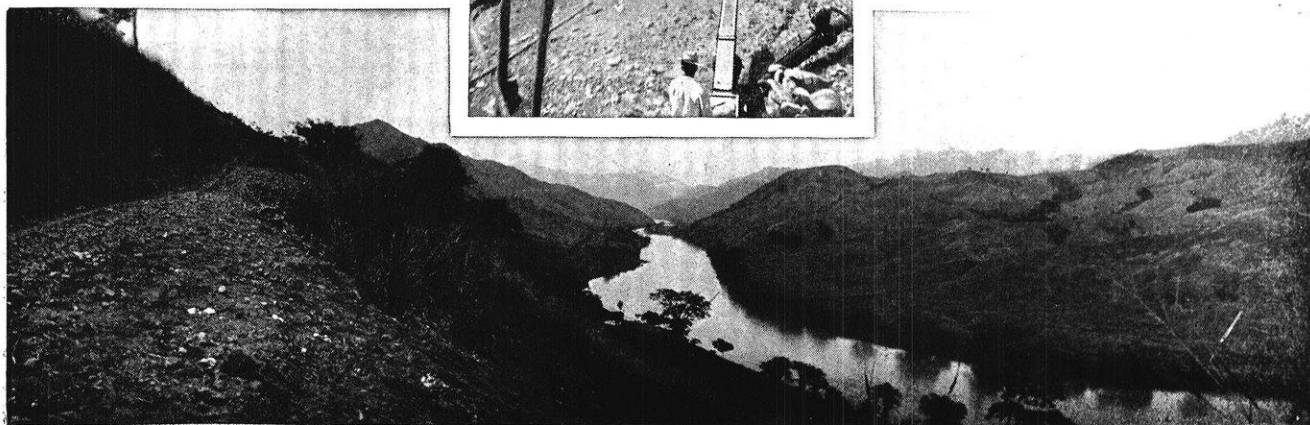
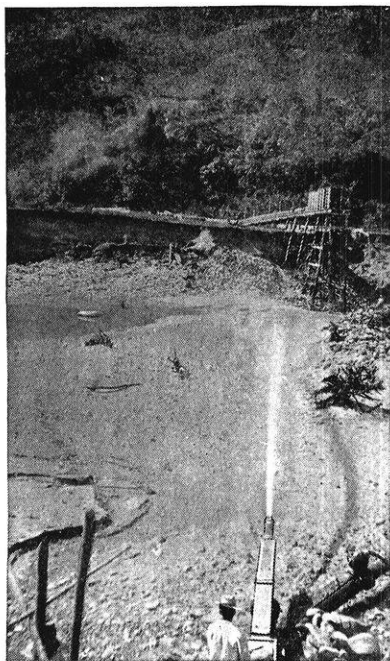


FIG. 4: Looking up the Cauca River toward Bolombolo. The inset—A hydraulic elevator and hydraulic giant in a mine on the Porce River

This Chap Hoover

*A Communication to the Engineers of America
as Received by The Wisconsin Engineer from St. Pat and Translated*

By T. H. PERRY, c'31

“WELL, a shyster started the whole thing by insulting me—inferring that the only reason I succeeded in driving the snakes out of Ireland was that they were too high-hat to live on the same island with me.

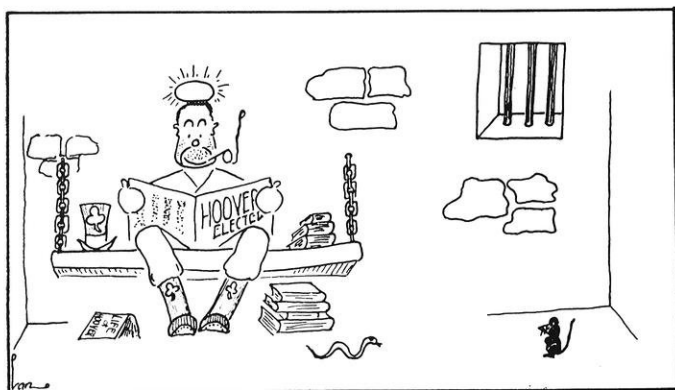


FIG. 1: They put me in the hoosegow for a month.

So I dealt with him as an engineer should and wrapped my harp around his neck. They put me in the hoosegow for a month and seemed to be real put out about me.

“Anyhow the jailkeeper came around just as I was determining whether I or the bars could exert the greater bending moment, and gave me some newspapers. In one of them I found a discussion concerning a recent presidential election in America. It seems that they have at least had the intelligence to elect for president, one of my adopted sons, a chap by the name of Hoover. After having twenty-eight presidents, of which there were nineteen shysters, four politicians (the same thing) three soldiers, one editor, and one teacher, they got disgusted with that sort of rabble and are placing some real talent in the White House. This worthy follower of mine attracted my interest, and after reading more about him I respect him a whole lot. Of course he didn't have any snakes to worry about; but he certainly solved his problems in a fine way.

“His father was a blacksmith among the tall corn of Ioway. He died while young Hoover was still a boy, so this orphan was brought up by his relatives. He had few opportunities, studying by himself in order to enter a university some time. He worked out of doors a lot and liked to fish.

“When he went to a dentist one day he noticed a collection of minerals and became attracted to them. From then on he determined to know something about mineralogy.

“One of his uncles ran a school out in Oregon. Here Hoover was sent to study and work in a strict Quaker atmosphere. Later he took the entrance examinations for Leland Stanford and flunked them hoplessly. Cracking the books again, he showed such promise that the faculty allowed him to enter the Pioneer class of this new institution.

“He was penniless. In the winter time he maintained a laundry agency and in the summer time the U. S. Geological Survey employed him. He managed concerts, fell in love with a sorority girl, organized the university athletics, received a “Con” in English, went to the Senior Ball, and was given the sheepskin in '95 as broke as when he had entered.

“The next few years Hoover was given all the opportunity which had been previously withheld from him. After working on the coast for the famous Janin, he was offered a position by a wealthy mining company of London. They asked Janin to send a man of experience at least thirty-three years of age. Hoover was twenty-three at the time but managed to grow a beard on the way over

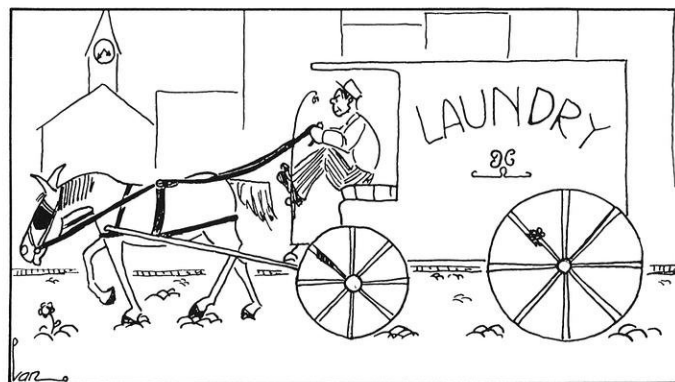


FIG. 2: In the winter time he maintained a laundry agency.

to London. He was sent into Australia as a “trouble shooter” for the failing mines owned by the wealthy Londoners. The region was arid, desolate, and living conditions terrible. Hoover organized new methods, ordered

(Continued on page 230)

The Engineering Society of Wisconsin Holds Twenty-first Annual Convention

THE twenty-first annual convention of the Engineering Society of Wisconsin, held in the auditorium of the engineering building on February 21 and 22, had a registration equal to 40 per cent of its total membership, which is convincing evidence of the interest that the engineers of the state have in their organization.

* * * * *

Membership increased during the past year by 41 net, putting the total well over the 400 mark, in spite of the policy of the directors not to carry dead timber on the rolls. There is still room for growth as the total number of eligibles in the state is between 2500 and 3000.

* * * * *

Leslie F. Van Hagan, professor of railway engineering at the University of Wisconsin, who has been vice-president and chairman of the special committee on the licensing of engineers, was elected president for the coming year.

* * * * *

Other new officers include: Leon A. Smith, superintendent of water works at Madison, vice-president; Adolph Kanneberg, member of the Wisconsin Railroad Commission, trustee; Morton O. Withey, professor of mechanics, trustee; H. V. Tennant, city engineer of Portage, trustee. The hold-over trustee is G. E. Heebink, city engineer of Beloit.

* * * * *

Professor Ray S. Owen, who was made executive-secretary following the death of Charles I. Corp last April, was re-appointed to the position for the coming year. Under his management, the meeting was a great success.

* * * * *

Arrangements were made to enlist the interest and aid of the engineering students in the meeting and they were much in evidence. A select group of them assisted Professor Van Hagan in handling the publicity. The student chapter of the American Society of Civil Engineers acted as host for the social gathering on Thursday evening in the Rathskellar of the new Union building. The same group also assisted Professor L. H. Kessler in conducting the sale of tickets for the joint banquet with the Technical Club of Madison. The local chapter of Chi Epsilon,

honorary civil engineering fraternity, looked after registration, collection of dues, information, and similar matters.

* * * * *

The engineering building was enlivened and made suitably festive with the national colors as the motif in honor of Washington's birthday. Mr. A. F. Gallistel, superintendent of buildings and grounds for the university and a member of the society, was responsible for this feature.

* * * * *

The luncheons, which were held on Thursday and

Friday noons under the management of Professor G. L. Larson, proved to be popular. The banquet room of the University Club was crowded to capacity on both occasions. There was no formal program; members simply visited with one another.

* * * * *

The trustees met on Saturday morning to outline plans for the coming year. The good and bad points of the recent program were reviewed with the idea of making the next meeting even more attractive than this one. Standing committees will be asked to watch developments in their respective fields and to report to the convention next year only in case there is something

worthy to bring to the attention of the members. The committees will also be asked to be ready to answer questions in their fields. It is planned to introduce the question-box plan so that members may have an opportunity to discuss their intimate problems and get such help as may be available.

* * * * *

The trustees spent some time upon the subject of licensing which did not come before the convention at this time. The special committee was continued under the chairmanship of Professor Van Hagan and a liberal appropriation was made for the work. The trustees feel that it is better to proceed somewhat deliberately in spite of the urgings of some members, who are anxious for legislative action.

* * * * *

The secretary was instructed to secure a gavel and block made from the timbers of the frigate Constitution (Old Ironsides) which is being rebuilt.

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. The seniors, under the direction of Professor Van Hagan, attended the gatherings of the society and present here an accurate cross-section of what took place.

—THE EDITOR

Members who recalled the excellent paper on the "Eighth Line Rule" which was presented a year ago by H. S. Tuttle, were interested in the announcement that on the basis of the material presented in that paper and as a result of the efforts of Mr. Kanneberg, the supreme court of the state recalled its decision and modified it so that the eighth-line rule is now only one of the things to be considered in such cases instead of being the sole basis.

* * * * *

One of the most interesting papers that was presented at the meeting was given by Mr. Gerald C. Ward, a senior student in civil engineering, on the subject, "George Washington as an Engineer." Mr. Ward, in preparing his paper, went back to original sources and examined Washington's survey notes, maps, and diary. "George Washington," he concluded, "would qualify for membership in any of our engineering societies of today."

* * * * *

Only three papers received any appreciable amount of discussion aside from the formal (and sometimes formidable) papers presented by the leaders of discussion. They were Professor Owen's talk on "Least Squares in City Squares;" Neff's paper on public utility rates; and Mr. Fellows' paper on "The Selection of Air Ports."

* * * * *

Mr. Neff, presenting material which he has used before during the course of the current public utility fight, demonstrated clearly, as Professor Martin Glaeser pointed out in discussion, that it is useless to compare the rates of one company with those of another that operates under different conditions. State-senator Duncan from Milwaukee, an advocate of public ownership, took part in the discussion with some arguments that were more amusing than convincing to men accustomed to reaching decisions upon economic matters upon the basis of the mathematical theory of investment.

* * * * *

Mr. Perry Fellows, city engineer of Detroit, offered a basis for the "Selection of Air Ports" that will be appreciated by the men who face the problem of making such selections. He has devised a rating card to cover the various features that must be considered in selecting a port. By the use of the card it is possible to give competing sites a numerical rating that is of great value in making the final decision. Mr. Harry R. Burr, former pilot in the A. E. F., gave the results of his application of Mr. Fellows' rating scheme to the Madison situation.

* * * * *

Mr. H. H. Tubbs, city engineer of Elkhorn, was in attendance as usual at the meetings and at the joint banquet. His seventy-eight years makes him dean of the profession in Wisconsin.

* * * * *

Some familiar faces were absent, but many of the wheel-horses of the society found it possible to be present and to take an active part in the business of the session. Among them were: State-engineer Halbert; W. P. Hirschberg;

George Randall; F. W. Ullius; John C. White; C. U. Boley; B. J. Sunny; and A. A. Oldfield.

* * * * *

As usual, the joint banquet with the Technical Club of Madison, the arrangements for which were in the hands of Professor L. H. Kessler, was a high light in the meeting. The hall was crowded to the limit, even though the number of out-of-town guests was smaller than might have been expected. Professor Paxson's address concerned itself more with immigration than it did with the revered George, but seemed none the less satisfying to the audience. Professor D. W. Mead, who was the principal speaker a year ago when he told of what he had learned as a member of the commission that investigated the Mississippi flood problem, was again the principal speaker, this time presenting another problem of great engineering — "The Boulder Canyon Dam." Again he spoke from first-hand acquaintance with his subject as he had spent the summer studying the problem for the government. It is a tribute to his eloquence and to the interest in the subject that, in spite of a smoke screen that would have permitted those in the rear to slip out unobserved in the semi-darkness necessary for showing slides, he held his audience for an hour and one-half. The Madison Maennerchor added to the enjoyment of the evening with its music.

* * * * *

The creation of the position of "state planning engineer" is asked in a resolution directed to the legislature that passed at the Friday meeting. The suggestion is that the state planning engineer be attached to the Highway Commission and that he co-operate with city planners in the state. It is suggested that it be required that the position be filled by a civil engineer who has had at least five years experience in city work.

* * * * *

That better concrete sidewalks can be made with one-course work than with the usual two-course work, was the interesting stand taken by the committee on materials in a report that was presented by Mr. C. A. Wiepking of the research laboratories of the City of Milwaukee. One-course work, according to the report, gives a homogeneous walk that will not separate into layers.

* * * * *

Unfamiliarity with local conditions, too much emphasis on remodeling existing portions of a city, and a failure to take a personal interest in the success of his plans are the weaknesses in city planners that account for many city-plan failures, Professor Harold F. Janda said in discussing Mr. Osborn's paper. Professor Janda, who is a Wisconsin graduate, returned from the University of North Carolina this year to take the position of professor of highway engineering and city planning left vacant by the retirement of Professor L. S. Smith.

* * * * *

Professor L. S. Smith, by the way, was made an honorary member of the society by action of the trustees on Saturday morning. Professor Smith has purchased a

(Continued on page 226)

George Washington—The Engineer

A Paper Delivered before the Annual Meeting of the Engineering Society of Wisconsin, February 22, 1929

By GERALD C. WARD, c'29

SINCE the recent presidential election, the profession of engineering has taken on new dignity in the eyes of the public. While it has never been an obscure profession, at the same time it remained for Mr. Hoover to popularize it and focus upon it the spotlight of publicity. Mr. Hoover has often since been compared, by preachers, labor agitators, and woman's club speakers, to what they

loose sheets of paper and kept in a bundle, quite contrary to the best teachings of the University of Wisconsin Department of Topographic Engineering, with the result that many of them have become lost.

But Washington's various journals are the most interesting portion of his engineering records, and include not only the actual field notes of surveys, but also a diary or running account of the things that occurred to him while working in the field. They even include the few bursts of poetic sentiment which came to the father of his country when he was alone in the woods and got to thinking of some of the Virginia belles back home. As a poet, Washington was an excellent surveyor!

It was the custom, at that time, for young men who desired to go into the learned professions either to go to England for their education, or to take lessons from a tutor. Washington chose the tutorial scheme, and at the age of 13 had mastered the difficult parts of Arithmetic and Geometry, as well as the commercial forms of the day.

In the autumn preceding his sixteenth birthday, it was deemed that his formal education was complete. The last two years had been spent in studying Geometry, Trigonometry, and Surveying, for which he had professed a liking. During the last summer of his schooling he busied himself surveying the grounds around his home and entering their boundaries, angles, and measurements in his note-



FIG. 2: Washington's Compass now in National Museum.

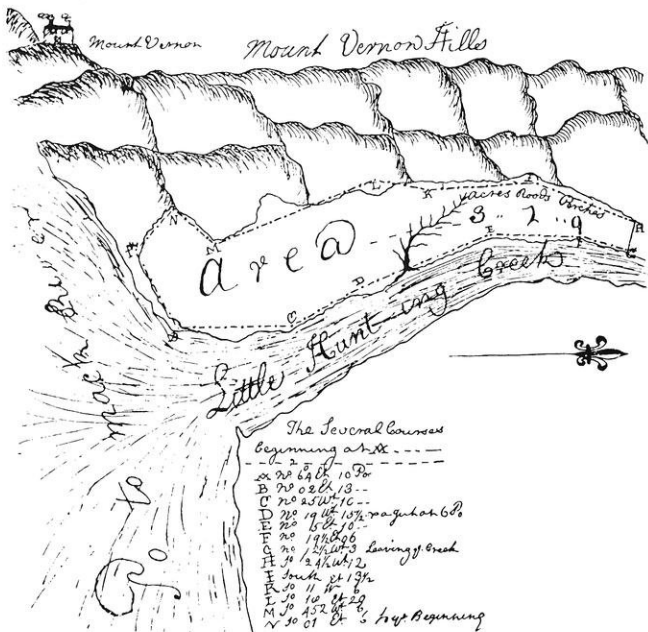


FIG. 1: Map of Washington's property along Little Hunting Creek.

term "the two other great engineer presidents, Washington and Lincoln".

Now, it is very true that Washington was an excellent engineer, and it is recorded that Lincoln did some land surveying — men of the prairies did lots of things in those days. Probably if Lowden had become president, it would have been recalled that Washington was a farmer; if General Dawes had gained the office, out attention would have been called to Washington's temporary employment as a general.

Of all Washington's activities, however, those of an engineering nature are most uniformly outstanding throughout his entire career, and of all his engineering activities, his surveying is perhaps the best preserved for present-day study. We have his original field notes, in a number of small vellum-bound books, closely written on both sides of the sheet with unusual neatness and in uniformly beautiful handwriting.

Many of his land surveys, however, were recorded on

The methods which he used in his surveying and computations are essentially the same as those in use today. We have surveys where he located islands and houses by double intersection, divided plots of land into equal portions, and computed areas by means of latitudes and departures. All of these methods are being taught in the College of Engineering, and this boy of sixteen had not only mastered them but had put them into actual practice in the field. The illustration in Fig. 2 is one of Washington's compass, now in the National Museum at Washington. It is the same type as the instruments issued to our Fresh-

The First Anniversary of

Alpha Tau Sigma

*Finds the Honorary Engineering Journalism Organization Functioning
with its Purpose to Raise the Standards of Technical Journalism,
and Ready to Embark on a Nationalization Program*

By R. V. BROWN, m'29

THE WISCONSIN ENGINEER, being published by students in the College of Engineering who volunteer their services and receive no reward for their work, has stood sponsor of an organization whose purpose is to recognize the efforts of those who have distinguished themselves in its service. It was decided that an honorary society would be the appropriate method of rewarding them. As a consequence, an organizing committee consisting of Marvin Hersh, past editor of the *Wisconsin Engineer*, Gerald C. Ward, past editor, and John H. Kulp, engineering review editor, was formed to discuss the possibilities of organizing this society. Due to the fact that the society was the first one of its type, it necessitated a lot of preparation and individual work, but on March 29, 1928, after months of planning, the organizing committee completed its plans and Alpha Tau Sigma was founded.

During the organization period, the committee, after careful thought decided that this society could fill more requirements than simply the recognition of members on the staff of the *Wisconsin Engineer*. Therefore the plans were so laid and carried out that the society could be made into a national honorary engineering journalistic society. The expansion of the society to national size was to be carried on through the Engineering College Magazines Associated, which is composed of the leading student engineering publications of the country, and of which the *Wisconsin Engineer* is a member. For this reason, the attitude of some of the other engineering college publications towards this type of a society was determined. This was done mainly by personal conferences between the *Wisconsin Engineer* delegates and the other delegates at the Engineering Colleges Magazines Associated convention held in the fall of 1928. All of the delegates interviewed were exceedingly enthusiastic about this society and it is assured that national expansion will be certain and rapid.

Alpha Tau Sigma is fundamentally an honor society but

it is an honor society with a definite aim and purpose which should go far towards raising the ideals and standards of engineering journalism. The purposes of the society as visualized by the organizing committee are the encouragement of engineering students in the field of technical journalism and the raising of the standards of engineering writings and reports. Its secondary purpose is the recognition of those who have performed outstanding service in this field. With that in mind, a constitution was formulated at the first meeting of the society which was approved by Dean Turneaure, Dean Goodnight, and the University Committee on Student Life and Interests.



The Badge of
Alpha Tau Sigma

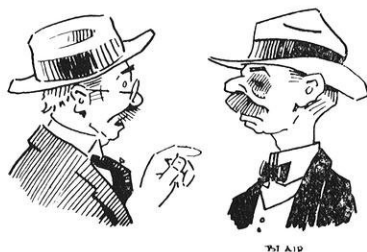
The society has crystalized into its final form and definite plans are being laid for expansion. The charter student members of the organization are: Gerald C. Ward, president; Marvin Hersh, vice-president; John H. Kulp, treasurer; Franklin T. Matthias, secretary; Harland E. Rex; Lawrence J. Beck; and Ernest A. Wegner. The charter members in the faculty are: Prof. L. F. Van Hagan, former chairman of E. C. M. A., Prof. F. E. Volk, former faculty advisor to the *Wisconsin Engineer*, and Mr. Robert T. Homewood, present faculty advisor to the *Wisconsin Engineer*. On January 22, 1929, the society held its first regular initiation at which time the following four members were initiated: Sylvester K. Guth, business manager of the *Wisconsin Engineer*, Rezin S. Plotz, alumni editor; Robert V. Brown, national advertising manager; and Jack H. Lacher, mail circulation manager.

It is felt that Alpha Tau Sigma will fill an important place in engineering journalism, encouraging, as it does, the bettering of technical papers and engineering reports. The fact that several engineering colleges have already written regarding it shows that it has drawn interest and that it will be a worth-while enterprise. The engineering college appreciates the work of the organizing committee, and, in the future, will back up the society as an extremely useful organization.

Alumni Notes

MANY ALUMNI ATTEND ENGINEERING SOCIETY OF WISCONSIN CONVENTION

February 21 and 22 were happy days for many of the alumni of the Engineering college of the University of Wisconsin, for aside from being Washington's birthday and a holiday for many of them, the Engineering society of Wisconsin held its twenty-first annual convention in the



auditorium of the Engineering building. Thursday evening the student branch of the A. S. C. E. entertained the members at the Rathskeller of the Memorial Union building, and incidentally the fifty members who attended consumed 383 glasses of

near beer. On Friday evening the session closed with a banquet at the Congregational church on the square.

The following addresses and discussions by engineering alumni were included in the general program of the convention:

The President's Address by **J. P. Schwada**, c'11; C.E.'26.

"Research in the Water Department of the City of Milwaukee," given by **C. S. Gruetzmacher**, c'14.

"Recent Developments in Steam Engineering", delivered by **G. L. Larson**, M.E.'15.

General Discussion led by **John White**, Hon'28.

Discussion of Power Plant Metering Equipment and Automatic Combustion Control by **E. P. Gleason**, m'10.

Address on "Long Distance Distribution of Gas", by **Fred Hainer**, ch'20.

"Steel Joists in Building Construction", by **W. C. Muehlstein**, c'09.

"A Survey by George Washington", given by **Gerald C. Ward**, c'29.

"The Application of Least Squares in a Resurvey in a Nonmonumented Plat", by **Ray S. Owen**, c'04.

"Financing Highway Construction in Wisconsin", by **Walter Buetow**, c'08.

Discussion on Reforestation by **L. J. Markwardt**, c'12, C.E.'22.

Discussion on City Planning by **H. F. Janda**, C.E.'16.

ELECTRICALS

Tiedemann, Dimitry P., e'28, is at present occupied in the research department of the Physics department of



Purdue University. His work consists in the verification of the Ramon effect which is one of the latest discoveries substantiating the quantum theory of light. This experiment has not, up to the present time, been

substantiated by any American scientist. Mr. Tiedemann was married on June 25 last, to Rosamond L. Whitson, daughter of Professor and Mrs. A. R. Whitson.

Carlson, McKinley S., e'25, has recently been transferred from the Switchgear sales department of the Philadelphia works of the General Electric Company to the Central

Bagnall, Vernon, e'27, has recently been transferred to the Long Lines Engineering Department of the American Telephone and Telegraph Company of New York. He had been working with the Long Lines Plant Department in Chicago. His work now consists of working out transmission problems. Mr. Bagnall lives at 15 Dry Street, New York, New York.

Station department at Schenectady. His present address is 706 South Avenue, Schenectady, New York.

Falge, Robert N., e'16, is head of the lighting division of the General Motors Research Department in Birmingham, Michigan.

Henry, George B., e'23, who was formerly sales engineer for the General Electric Company at Terre Haute, Indiana, has been transferred in the same capacity to 230 South Clark Street, Chicago, Illinois.

Highleyman, Charles D., e'27, is an engineer for the Indiana and Michigan Electric Company at 415 S Street, South Bend, Indiana. His residence address is 1326 Marquette Boulevard, South Bend, Indiana.

Kitzman, Walter L., e'17, is now working for the Bell Telephone Company at San Francisco, California. His home address is 1752 Solana Avenue, Berkeley, California.

Lucas, Thomas J., e'07, formerly chief engineer for the Illinois Power and Light Company is now in the capacity of Consulting Engineer for Lucas and Luick at 231 South La Salle Street, Chicago, Illinois. His residence address is 1300 Greenwood Avenue, Wilmette, Illinois.

Rabbe, John S., e'26, is at present in the South for the Buckeye Cotton Oil Company. Mail addressed to 118 East McMillan Street, Cincinnati, Ohio, will be forwarded to Mr. Rabbe.

Rothermel, Ulla A., e'27, is assistant Meter and Relay Engineer for the Indiana Service Corporation. His residence address is 807 Berry Street, Fort Wayne, Indiana.

Thomas, C. W., e'25, is assistant system operator with the Public Service Company of northern Illinois. His address is Lock Box 313 Niles Center, Illinois.

Wolfe, Harry C., e'26, has recently left the Chromium Plating Corporation of Cleveland, Ohio, to establish a business of his own. While enrolled in the University Mr. Wolfe was editor of the Wisconsin Engineer and was also interested in other student activities. His present address is 17317 Madison Avenue, Cleveland, Ohio.

MINERS

Erickson, Robert, min'22, is an assistant in the mathematics department of the University of Wisconsin. His address is 609 Sheldon Street, Madison, Wisconsin.

Gotham, David E., min'25, is assistant State Highway Commissioner of Missouri and lives in Jefferson, Missouri.

MECHANICALS

Bauss, Richard E., m'00, has changed his address from 17435 Pontchartrain Boulevard, Detroit, Michigan, to 1120 Jefferson Avenue, South Bend, Indiana.

Bemis, Walter S., m'15, is now in residence at 3756 Bay-side Mission Beach, San Diego, California.

Carter, Byron B., m'83, has moved from Hinsdale, Ill., to 1937 North Locust Street, Denton, Texas.

Cook, James K., m'09, is junior assistant in the patent office at Washington, D. C. His home address is 3590—39th Street, Brentwood, Maryland.

Reichelt, Lester O., m'23, is mechanical engineer for the Western Electric Company at 100 Central Avenue, Kearney, New Jersey. He is living at 327 Manor Avenue, Cranford, New Jersey.

Smith, Harold A., m'26, has been with the Sugar Creek Refinery of the Standard Oil Company for the last few months. His work has been of the construction type.

Wertheim, F. E., m'17, has been located in New York for the last few months working on a refinery in the West Indies for the Pan-American Company.

Workman, Dean M., m'10, formerly Gas Engineer with the Illinois Power and Light Company, is now an engineer with the Management and Engineering Corporation at 327 South La Salle Street, Chicago, Illinois. He lives at 125—7th Avenue, La Grange, Illinois.

CHEMICALS

Fanning, Willis M., ch'23, who is chief engineer for the Charles E. Bedaux Company of Illinois, has changed his address to 8100 E. Jefferson Street, Detroit, Michigan.

Greene, Ernest W., ch'24, is again enrolled in the University of Wisconsin. He is living at 1816 Vilas Street, Madison, Wisconsin.

Hanks, William V., ch'23, is a chemical engineer with the Standard Oil Company of Louisiana. His residence address is 2377 Government Street, Baton Rouge, Louisiana.



Hubbard, Honore C., ch'22, M.S.'23, has announced his intention to practice law, specializing in patents, trade marks, copyrights, corporations, and unfair competition. He is associated with the firm of Chindahl, Parker, and Carlson, located in suite 1015 Monadnock Block, 53 W. Jackson Boulevard, Chicago, Illinois.

Krenz, Alfred S., ch'23, is sales engineer for the B. F. Sturtevant Company of Milwaukee, Wisconsin. He is living at Apartment 14, 205—22nd Street, Milwaukee, Wisconsin.

Paustian, Albert F., ch'29, has taken a position with the Proctor and Gamble Company.

CIVILS

McMullen, Ralph E., c'27, is well on the road to recovery from an attack of pneumonia. He has been on a large construction job of which he writes to Professor Van Hagan:

"No expansion or contraction joints have been allowed in either the foundations or the steel work although the buildings are from 250 to 665 feet in length and from 80 to 243 feet in width. As a result rather pronounced vertical contraction joints are apparent in the walls. These cracks are local, since no temperature reinforcement was provided in the design.

"It has been the policy of the company to cease operations at 10 degrees above zero except where materials were to be unloaded, or where men can work under cover."

Bath, John H., c'11, has changed his address from Port Washington, Wisconsin, to 718 Cameron Avenue, La Crosse, Wisconsin.

Birkenwald, Edward C., c'27, formerly with the American Bridge Company of Gary, Indiana, has become affiliated with the Worden-Allen Company of Milwaukee.

Bundok, Mariano G., c'28, is now with the War department in Milwaukee.

Cooley, Donald N., c'25, is cost accountant with the J. M. Nash Company at 844—30th Street, Milwaukee, Wisconsin. His home address is 789—5th Avenue, Wauwatosa, Wisconsin.

Henrichsen, Christian B., c'21, is now employed by the Foundation Company at 120 Liberty Street, New York City, New York.

Howson, Elmer T., c'06, C.E.'14, at present Western Editor of the "Railway Age", may be reached by writing in care of the "Railway Age", 105 West Adams, Chicago, Illinois.

Jensen, Harold W., c'25, has changed his address from 9 South Chester Avenue, Park Ridge, Illinois, to 411 Park Avenue, River Forest, Illinois.

Lindner, O. P., c'25, has recently left the Consumer's Power Company of Jackson, Michigan, and is now Assistant Engineer with the Corps of Engineers, United States War Department, with headquarters in Washington, D. C. His residence address is 1817 K Street, Northwest, Washington, District of Columbia.

Owen, Ray S., c'04, was recently elected vice-commander of the William B. Cairns post of the American Legion in Madison.

Schad, James A., c'16, is now with the United States Gypsum Company with headquarters at Chicago, Ill. Mr. Schad is in the publicity department of the company, and is working on promoting the use of gypsum products.

Smith, Bernard F., c'25, has left the employ of Orbison and Orbison, consulting engineers of Appleton, Wisconsin. At the present time he is employed by the Kimberly-Clark Corporation in their Development Engineering department. He is working on the development of new and more efficient methods of making better paper at a lower cost. He may be reached in care of the above company.

News has just been received of the death of **Ledin, Carl**, c'27. Ledin was a member of Chi Epsilon and attended the Engineer's Camp at Devils Lake during the summer of 1926. From all available information Ledin's death was caused by long exposure during his service in the United States army. His home was Rockford, Illinois.

Summeril, Franklin J., c'28, is at present working out of the United States Engineers' office in Vicksburg, Mississippi. For the past four months he has been conducting economic surveys on flood retention reservoirs in southern Arkansas and Mississippi, and on navigation project on the Red River in Louisiana and the Yazoo River in Mississippi.

Westrich, Charles J., c'27, was married to Miss Alyce Bonniwell of Hartford recently. They will make their home in Oak Park, Illinois. Mr. Westrich is employed by Sears, Roebuck and Co.

Wisner, John C., c'26, is now an Engineer and Estimator for a Rockford contracting firm. His address is 4203 Newburgh Road, Rockford, Illinois.

Zander, K. L., c'23, recently took over the duties of executive secretary of the League of Wisconsin Municipalities.

Campus Notes

DEAN TURNEAURE ATTENDS NATIONAL A. S. C. E.

"Steel Column Research", was the report presented by Dean F. E. Turneure at the seventy-sixth annual meeting of the American Society of Civil Engineers held in New York. Dean Turneure has, for the past year, done a great deal of research work on steel columns.

ENGINEERING SOCIETY OF WISCONSIN HOLDS MEETING

The auditorium in the Engineering Building was used from Feb. 21 to 23 for a meeting place of the Engineering Society of Wisconsin. Late developments in all branches of engineering were taken up. Prof. Larson discussed the advances in steam engineering during the past two years and John White of the Capitol power plant led the comments on this paper. A representative of the Bailey Meter Co. showed how meters can be used to cut down boiler losses. An extensive paper on city planning was presented by G. M. Osborne. Uniformity in traffic signals and signs was advocated by the civil engineers. Prof. D. W. Mead and Prof. W. J. Mead gave a talk and some pictures on their work in connection with the government analysis of the Boulder Dam Project.

Prof. L. F. Van Hagan of the Rails department was elected president for the ensuing term. Prof. Ray S. Owen was elected secretary-treasurer and Prof. M. O. Withey was placed on the board of trustees.

CLAY MANUFACTURERS DISCUSS PROBLEMS

More than 75% of the clay manufacturing concerns in the state were represented at a recent meeting to discuss ways and means for improving the quality of Wisconsin clay products so as to bring them on a par with those of neighboring states. Research at the College of Engineering was advocated as one solution. The problem of reducing freight rates was also discussed.

LARSON, NELSON, AND BRAATZ GO TO CHICAGO

At the annual meeting of the American Society of Heating and Ventilating Engineers held in Chicago the latter part of January, a paper was presented by Larson, Nelson, and Braatz on "Air Infiltration Through Various Types of Brick Wall Construction". This paper is the result of a co-operative agreement between the Steam and Gas Department and the American Society of Heating and Ventilating Engineers.

At the Chicago meeting, Prof. Larson was elected to serve three years on the National Council of the society.

WATCH FOR IT!

There will be a flash of sham-rock on the hill March 18, and every loyal son of the Ould Saint will show his colors!

DEAN MILLAR KEEPS SCHOLARSHIP MAP

There is an interesting map of Wisconsin in Dean Millar's office on which every engineering student of the state is represented by a pin. Each branch of engineering is represented by a different color and a special mark on the various colored pins denotes whether that student has been advised to withdraw, whether he has been completely dropped, or whether he tends toward high scholarship.

The charts show that most mechanicals come from industrial centers, most miners from the mining sections of the state. The records are kept for freshmen only but with four years of records on hand, comparisons can easily be drawn. The map is exhibited annually at the Wisconsin State fair, where it attracts a great deal of attention from persons who have friends in the Engineering College.

A. I. E. E. MEETS WITH SENIOR SECTION

The student branch of the A. I. E. E. held its meeting of February 19 in conjunction with the Madison senior section of the national society.

Dr. J. O. Perrine of the A. T. & T. Co. and representing the Bell Telephone Laboratories presented an interesting talk on "The Photo-electric Cell and its Uses in Communication". A portable sound picture reproducer was exhibited and explained. Dr. Perrine showed how the new art of sound pictures is based upon years of telephonic research in speech and hearing, the conversation of energy between acoustic and electrical systems, and electrical systems and methods for recording, amplifying, and reproducing sound.

A. S. C. E. ENTERTAINS VISITING ENGINEERS

On Thursday, February 21, the student chapter of A. S. C. E. entertained the members of the Wisconsin Engineering Society in a general get-together and talk-fest. Dunc Baillies siphoned beer for the crowd and Wes Bliffert and Johnny Dahlman showed their ability as peddlers of "Cheese-on-Rye" sandwiches and pretzels.

E. T. BRECKEY DIES AT HOSPITAL

Erick T. Breckey, 53 years of age, and instructor in the machine shop for many years, died at a Madison hospital on February 11 after a brief illness.

Immigrating to the United States 18 years ago, Mr. Breckey came to Madison and was employed by the Gisholt Machine Co. for ten years. He joined the staff of shopwork instructors in 1917.

INSPECTION TRIP REVIEW

First engineer on inspection trip, "Hey, fellows, let's all go to the Haymarket when we get to Chicago."

Second tired but dumber engineer, "What the dickens is the Haymarket."

First, ditto, "Oh, it's like the Gayety, only more B. t. u.s."



“Thumbs up”
*the spirit of
 industry . . .*

FOR every race or game or debate that one team wins, another must lose . . . It's forever “thumbs up” or “thumbs down”, according to which side you are on. But in industry there's one side only.



Enlightened industry backseveryman on her teams. For it is to industry's advantage to see that every man makes good.

Here you have an inspiring picture. Co-operation. The “vet” encouraging the novice. All industry rooting for achievement.

It is not surprising then that so many men have found the interests of after-college years fully as broad and as absorbing as those of undergraduate days.

Western Electric

SINCE 1882 MANUFACTURERS FOR THE BELL SYSTEM
 Please mention The Wisconsin Engineer when you write

Editorials

RICH, NOT GAUDY You have heard the most cordial invitation and welcome of the Union for its use by the whole student body, and you have of course marveled at its beauty and richness. Yet it seems not a few have been falsely impressed and awed by its seeming austerity and grandeur, which is at once a tribute to the art and fineness of the Union and an admittance of weakness on our part to appreciate its true significance. Of course, the great rooms and halls are finished in better taste and greater richness than most of us have enjoyed, yet surely this does not preclude their utility and us from a true enjoyment of them.

The very nature of rooming houses makes for isolation in small groups which has in general a deliterious effect on most of us in the matter of the true spirit of college, which is now forming about the Union. Still many of us are shy of the beauty of it and are not availing ourselves of its true value. It would, indeed, be preposterous if in time the Union, paid for and delivered, should admit that only a select group made use of anything but the Rathskellar, and a sadder truth that Wisconsin men in general, were incapable of appreciating true Art and Beauty.

AN APOLOGY In our February number the last sentence in the article on the new Lake-side Turbine Generator read:— Next summer, when the second 1300 lb. boiler is installed, both 1300 lb. boilers will feed the new 1200 lb., 60,000 kw. turbine, —. It should have read:— Next summer, when the second 1300 lb. boiler is installed, both 1200 lb. turbines will feed the new 300 lb., 60,000 kw. turbine, —.

THE ENGINEERS CONVENE During the recent convention of the Engineering Society of Wisconsin, it was gratifying to see the number of students who assisted in the preparations and attended the meetings. It is an indication that our engineering undergraduate is really interested in professional work, and is availing himself of the opportunity to learn to appreciate the problems and

situations that are arising continually before the man in professional practice. Here, before him at the convention, was an example of constructive programs being mapped out for the state by professional men of the state. The convention's resolution, advocating the creation of the position of city planning engineer on the Wisconsin highway commission, was a notable step forward in the future program of state-wide development, and illustrates the sort of thing being done by professional men in professional organizations. This recommendation will undoubtedly be acted upon by the legislative bodies of Wisconsin in the near future. Such action is typical of the work being done by Engineering societies, and the technical student can well afford to become acquainted with their aims and accomplishments.

A PROPHECY FULFILLED*

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

*EDITOR'S NOTE: This editorial is reprinted from the November, 1919, number of the Wisconsin Engineer.

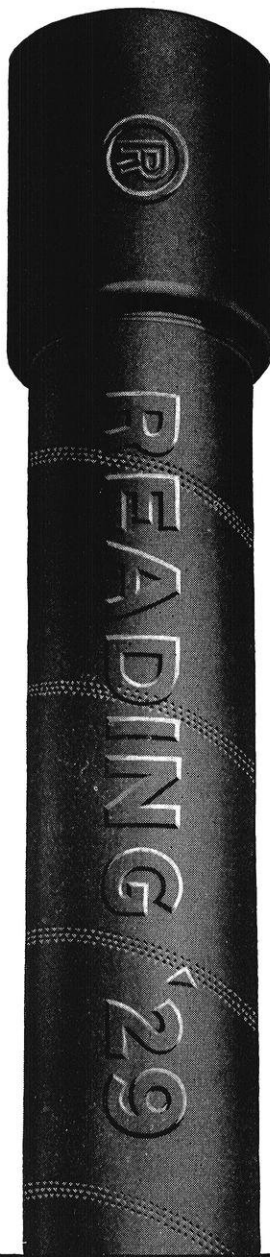
FLYING MAY HELP With the realization that flying is becoming increasingly important in transportation and communication, comes the engineer's consideration of its possibilities in the solution of his problems. One of the most important engineering work, that of surveying and mapping, is being revolutionized by the use of aerial photography. Aerial photography, perfected to a high degree during the last war, can, under certain conditions, produce maps more quickly and more cheaply than could the old methods of topographic mapping.

The appraisal engineer is being affected more than any other type of engineer by this modern method of mapping. He can have an aerial map made quickly and comparatively cheaper, which brings before him all buildings, and fence lines, every tree and bush, and all the things about a town or piece of property that affect its value. While a surveyor's map of such an area would be expensive and probably not accurate as to detail, the photographic map is correct and leaves nothing out.

It is necessary that the engineer appreciates improved methods of doing engineering work. If aerial photography can produce results more cheaply and accurately than the old method survey, it becomes the duty of every engineer to inform himself as to its practical uses and its limitations.



THE FURNACE BEHIND THE FACT



Back of the five remarkable qualities that give Reading Genuine *Puddled* Wrought Iron Pipe its long, long life stands the flame-filled puddling furnace—the time-tested method of making genuine puddled wrought iron.

It is in the puddling furnace that the fiery, hot, pure iron and silicious slag are stirred and worked together until every inmost particle of the iron is coated with corrosion-defying slag. Out of the puddling furnace comes genuine *puddled* wrought iron—the same wrought iron that has been so famous for generations.

You can buy *proved* pipe dependability, freedom from frequent replacements and uninterrupted production by insisting on Reading Genuine Puddled Wrought Iron Pipe. Your protection from untried substitutes is the Reading name, date of manufacture and spiral knurl mark on every piece of Reading Pipe.

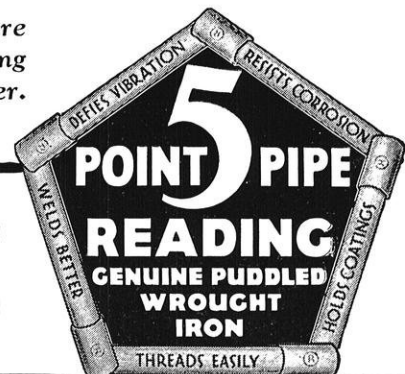
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Engineering Review

PURE MANGANESE PRODUCED BY DISTILLATION

Pure manganese has recently been produced in the Bureau of Metallurgical Research of the Carnegie Institute of Technology. Samples of the metal, which never before has been produced in quantity in such a purified state, and of the furnace in which it was made, were exhibited at the open meeting of the Metallurgical Advisory Board held in Pittsburgh recently.

Pure manganese has a bright silvery luster, and unlike many of the pure metals, which are soft and ductile, it is extremely brittle and hard enough to scratch glass. The pure metal was distilled from crude metallic manganese placed in a pure magnesia crucible over which a similar crucible was inverted to condense the manganese vapor. The whole was placed in a closed silica tube connected with a vacuum pump, and heated with a high frequency induction furnace using an alternating current of several amperes at a frequency of 20 kilocycles.

—Scientific American

SHOOTING DOWEL PINS IN STEEL PLATES

Much interest was exhibited by production men of the Society of Automotive Engineers at Detroit recently in an account of high velocity penetration devices.

The device demonstrated, resembled a pneumatic hammer with an over-size barrel. It is really a gun (which drives a 1/2 in. conical shaped pin into steel plates 1/2 to 1 1/4 in. thick) equipped with recoil and silencing devices.

A cartridge containing about a half of a teaspoonful of commercial powder is used for shooting a 1/2 in. pin into a 3/4 in. plate.

Since the device will pin together adjoining pieces of steel without the necessity of previously punching or drilling holes, it is being developed for erecting members prior to welding joints in buildings, bridges, or tanks. It will also be valuable in applying

patches to ship hulls or in sub-aqueous piping. It has also been successfully applied for fastening parts to automobile chassis.

The pins are made of chromium-molybdenum steel; and are so shaped that they penetrate the plate without punching a slug therefrom. The action is described as one wherein the first small hole is expanded so rapidly that the inertia effects cause the hole to be momentarily larger than the pin tail. Elastic forces soon counteract the inertia effects and the hole contracts so rapidly that the flying pin is caught before it gets entirely through, and is held so tightly that about 20,000 lbs. pressure is required to force the pin out of a 3/4 in. hole.

This principle has possibilities in the field of forging between dies, and in the near future should have an effect on the present methods in this type of work.

—Iron Age

BUREAU OF STANDARDS TO STUDY CHEMISTRY OF PORTLAND CEMENT

An experimental cement kiln, with a capacity of 10 lbs. per day, is being built at the Bureau of Standards at Washington. The purpose is to go beyond the laboratory work with small amounts of pure materials and to work with commercial raw materials in a manner more representative of modern mill practice.

This is expected to have a direct bearing on cement manufacture, following the discoveries already made at the Bureau as to the basic chemistry of Portland cement.

—Engineering News-Record

ELECTRIC MACHINERY COOLED BY HYDROGEN GAS

As much as 50% more power can be handled by the same size electrical apparatus if it is equipped with a hydrogen cooling system developed by the engineers of the General Electric Company, it was announced recently in a report made public recently. The use of hydrogen gas within a totally

enclosed rotating machine has made this increase possible without increasing the operating temperature beyond the point of safety. This temperature has heretofore been the limiting factor in the load which can be carried.

The first commercial application of the new system of hydrogen cooling has been made on a synchronous condenser installed by the New England Power Company at its Pawtucket, Rhode Island substation, which has a capacity of 12,000 kilo-volt amperes as compared with only 10,000 kilo-volt amperes if an air-cooling system were not used. With hydrogen as the cooling agent at 15 lbs. gage pressure, the machine will deliver 15,000 kilo-volt amperes without exceeding the normal temperature range as specified in the guarantees.

Another advantage of the new system, it is said, is to exclude oxygen and dirt. Hydrogen will not support combustion, and fires of any kind, even from short-circuits, are consequently impossible. Hydrogen is also useful in the diminution of the corona effect on the insulation, the report says. The usual air cooled machine must be placed within the building, while the hydrogen-cooled equipment can be placed outdoors, thus saving building costs and cutting down noise.

NORFOLK TO HAVE DIESEL-ELECTRIC FERRY BOAT

A double-end steel diesel-electric ferry boat is now under construction, for service between Norfolk and Portsmouth, Va.

It will have an overall length of 173 feet and an overall beam of 57 feet.

The power plant consists of two diesel engines, each rated at 400 brake H. P. at 250 r. p. m. directly connected to two main generators delivering 250 volts D. C. and 270 KW., and two exciters rated at 30 KW. and delivering 125 volts at 250 r. p. m.

The main generators are of the shunt wound and the exciters of the compound type.

—Engineering Contracting



Where Ocean Breezes Blow

AT Ocean City, New Jersey, a new boardwalk — one of the finest of its kind in the world — was recently completed. The entire structure is of concrete with the exception of the decking and rails which saved the name, boardwalk, from becoming concrete walk.

Supporting this sea shore promenade are 780 concrete piles, each 18 inches square, 32 feet in length and sunk 24 feet in the sandy beach. Each pile, which weighed more than six tons, was lifted and located with a Koehring Heavy Duty Crane.

Another feature of this construction was the speed and adaptability of the Koehring Crane in setting the piling. The last pile was sunk four days ahead of the specified schedule. The entire contract was completed and accepted one day before the time limit.

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RECORD DAM IS OPENED IN INDIA

The Lloyd dam, the most stupendous mass of masonry, ever constructed by the hand of man, and the largest dam in the world, was recently opened at Bhatgar, near Poona, by the Governor, Sir Leslie Wilson, in the presence of large crowds.

This dam, brought the inestimable boom of perennial water to a large irrigation tract in the Nira canal system, and was a part of the works designed to remove from Bombay and the Deccan the dread specter of famine, to which the area was formerly liable.

The terrible famine of 1899-1902 cost the Bombay Presidency over \$15,000,000 in money alone, apart from the toll of suffering. When all the present irrigation schemes were completed, it was estimated that there would be an increased yield of crops of over \$20,000,000 yearly against a total capital expenditure of only double that sum.

R. T. Harrison, chief engineer of the project, stated that the Wilson dam opened two years ago at Bhandardara was beaten by the Exchequer dam in America for pride of place as the world's highest dam but in the present instance they had "gone one better," and claimed the Lloyd dam was the largest in volume ever built anywhere.

The last two systems of Phavara and Nira were the last of the large irrigation works undertaken in Bombay since 1903, and were the result of the recommendations of the Irrigation Commission convened by the far seeing Viceroy, Lord Curzon.

With other irrigation works the area benefitted in Bombay and the Deccan approximated 2,000,000 acres, a record of which any government might be proud.

The superintending engineer stated that the new dam commanded an area of 800,000 acres. Its outstanding feature was the volume of masonry, which included 21,000,000 cubic feet. The cost of the dam itself, about \$6,250,000 was considered very moderate, comparing advantageously with the Assuan dam in Egypt, which was 2,000,000 cubic feet less in volume but cost fifty per cent more. The work had occupied fifteen years.

NEW PROCESSES FOR THE UTILIZATION OF COAL-TAR CRUDES

In a paper presented before the Second International Conference on Bituminous Coal in Pittsburgh this fall, A. O. Jaeger, Technical Director of the Seldon Company of that city, discussed certain new processes for purifying various crude aromatic hydrocarbons, such as light-oil fractions, crude naphthalene, and, particularly crude anthracene by selective catalytic oxidation. One of the chief obstacles to the production of vat dyes derived from anthraquinone has been the difficulty of obtaining high grade anthracene from the crude material. This has long been one of the most baffling problems in the coal-tar distillation industry. Of the last fraction coming over in the distillation of coal tar, the so-called green oil, 15 to 30 per cent is anthracene; and with the present methods

of extraction and purification only 6 to 10 per cent is recoverable as crude anthracene. The anthraquinone used in this country as intermediate for dyes has been made largely by the synthetic process, which has serious disadvantages and so cannot solve the problem.

SIGNAL LIGHTS FOR DAYTIME

Electric lights as railroad signals may now be used in brightest daylight, by employing great intensity, color and the grouping of lamps in conjunction to make sure that their meaning shall not be misunderstood. These lights are described as a "fairylane of blinking color flashes."

"Vertical bands of green light," Charles Adler explains in *Popular Science Monthly*, "speed fast expresses on their way. Slanting lines of amber counsel caution, and red crossbars halt puffing locals."

"These new 'color-position-light' signals, electric-lighted warnings, visible in brightest sunshine and darkest night are intended to remove forever the possibility that an engineer may mistake their meaning. They represent the latest step in the safe control and dispatch of trains by visible indicators."

"Strong colored electric lights with powerful reflectors, tried out on several roads, have proved to be visible by day and night, and dispense entirely with the moving semaphore arm."

"An ingenious substitute for moving semaphores has been devised. Rows of powerful amber lights, arranged on a black circular background, replace the swinging arm, and may be flashed on in different groups, giving this type its name of 'position-light' signal. Three lamps in a horizontal row mean 'danger' when illuminated, corresponding to the 'danger' position of the older semaphore. Lighting three lamps in a vertical row signals 'clear,' and a slanting row of lamps designate 'caution.'"

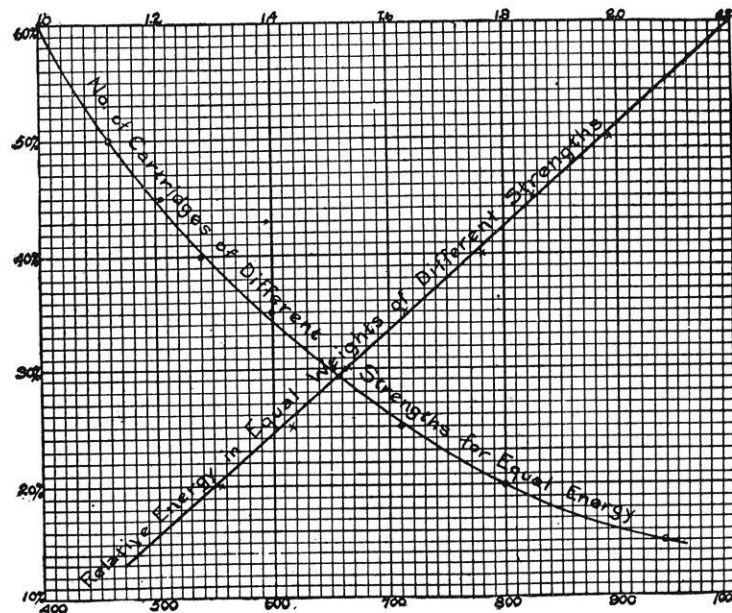
When hand-operated semaphore signals with painted, moving arms, mounted upon a tower, were introduced in 1841, they were regarded as a tremendous step forward for safety. But they were unsuited to control the fast through trains of today, where a signal operator's failure might cause a frightful wreck. Automatic block signals, now used on all but a few local and suburban lines, removed the menace of the careless signalman, and now the signal lights, plainly visible during the daytime to the engineer of a train, make the signal system practically infallible.

TWO GREAT BRIDGE PROJECTS

Active construction has been begun on the two newest and greatest bridges in the world—the 1,675-ft. Kill-van-Kull steel-arch bridge and the 3,500-ft. Hudson River suspension bridge, both of which are to be erected in the metropolitan area of New York City.

The Kill-van-Kull bridge will constitute the closing link in a highway between Staten Island and Manhattan and promises traffic relief, improved communications, and trade

Action of Explosives



Lesson No. 1 of

BLASTERS' HANDBOOK

ALL explosives are solids or liquids that can be instantaneously converted by friction, heat, shock, sparks or other means into large volumes of gas. That sounds simple, but this fundamental principle of the action of explosives is modified by a host of circumstances.

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expansion for the sections which it joins. It is to be operated as a public toll-refunding project, the potential earning powers of which have been determined to be ample to assure its ultimate operation as a free bridge. Arch construction was adopted after careful investigation of the conditions affecting the erection had indicated an estimated saving of about a million dollars over the only other suitable type of construction—a suspension bridge. The Kill-van-Kull bridge is a two-hinged parabolic arch, 1,675 ft. center to center of arch bearings and rising 274 ft. from the centerline of the bearings to the centerline of the lower chord. The bottom chord member is the main arch member and carries all loads as a thrust into the skewbacks on the foundations. It is therefore, the largest member in the bridge, its maximum outside dimensions being 5 ft. 5 in. x 6 ft. 10 in. It is a nickel-steel double-box section with cover plates top and bottom, a center web plate with the necessary reinforcing plates on the side webs and on the center web. The upper chord is a silicon-steel box-member having outside dimensions 4 ft. 1 in. x 5 ft. 1 in. Carbon steel is used in the web members joining the upper and lower chords. The difficulties of erection are complicated by a requirement of the permit for the bridge, issued by the War Department, which states that during the construction of the bridge a channel in effect 100 ft. wide must be kept free from obstructions. In order to complete this portion of the structure over this channel, which, it happens, is not in the center of the span, without any falsework, it will probably have to be erected initially as a cantilever. Perhaps the most interesting technical detail of the entire structure is the utilization of alloy steel for over 50 per cent of the steel used in the arch, the latter making it possible to carry the tremendous thrust of over 28,000,000 lbs. on a gross arch-rib area of less than 1,000 sq. in.

The 3,500-ft. Hudson River suspension bridge to be built at the north end of Manhattan Island will utilize 36-inch alloy-steel cables containing a greater cross-section of wire than all the other long span suspension bridges in this country combined. Its structural towers will rise to the height of a 45-story building and the methods of constructing open cofferdams for the placing of foundations will extend to new depths and new conditions. Due to the large amount of testing necessary during the construction of the bridges, the Port of New York Authority is considering the construction of a modern laboratory building to house testing machinery of the latest type for testing all materials used in the bridges, ranging from gravel for concrete to steel girders and wire cables.

But despite the unprecedented magnitude of these enormous projects, which tends to make the engineer on the small job and the engineering student think that there is no intimate relation between his work and these great monuments, the design and construction are based on engineering principles and practices of wide application, and, although only a chosen few of the engineering profession will have an opportunity actually to work on these projects, it is worth the time and effort of every engineer and engineering student to study them. The reward of

the study of such epoch-making structures is not only detailed technical knowledge, but a broader vision and greater appreciation of modern methods and materials.

—*Engineering News-Record*

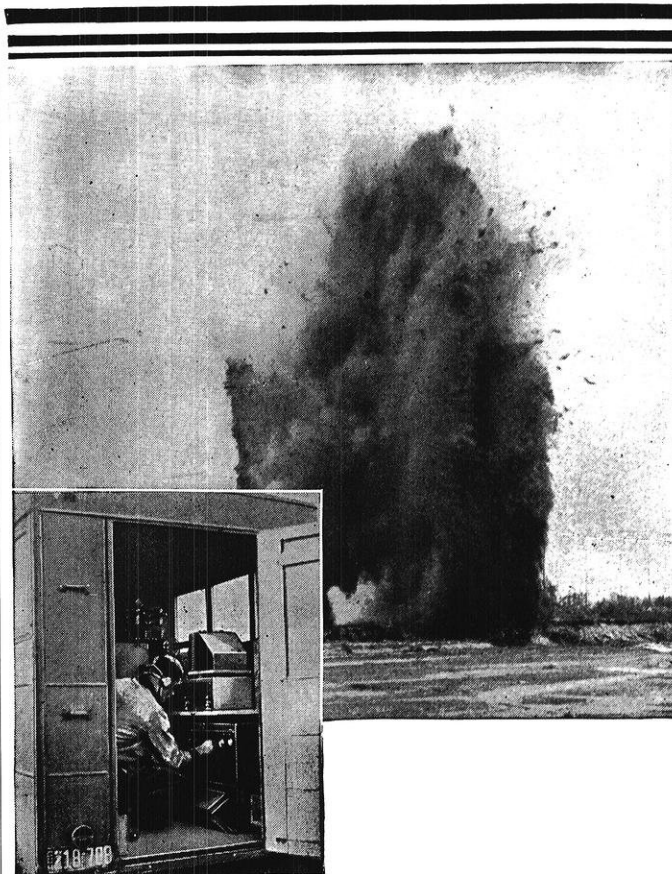
MECHANICAL APPLICATIONS OF CHROMIUM PLATING

Very thin plating of chromium has been used to impact hardness and wear resistance to certain machine tools and parts. Chromium may also be used as a plating on plumbing fixtures, etc., to resist tarnish. This article discusses the results of such uses as have been made of chromium plating and explains the reason for their success or failure.

Chromium plating is done electrolytically. Electrolytic chromium is probably different in composition from chromium produced by other means and thus its properties cannot be assumed to be the same. It is not safe to assume that the properties of a thin film of chromium will be identical with those of a larger mass. Hardness is difficult to measure; scratch hardness tests being the only means applicable to thin films, e. g. .0001 to .001 inch thick. Brinell and similar methods are not accurate due to the effect of the plated material upon the test. From the tests that have been made it is found that the hardest chromium is harder than any other metal or alloy tested. So far as known, no data are recorded upon the tensile strength and ductility of electrolytic chromium. Qualitative tests show that it is extremely brittle. This fact largely accounts for the tendency of relatively thick chromium deposits to chip when subjected to impact. The thermal expansivity of chromium influences greatly its adherence to the metal upon which it is deposited. That is, if the difference between the thermal coefficient of expansion of the chromium and the base metal is large, the materials will separate if subjected to any great change in temperature. The expansivity of chromium is similar to those of glass and platinum, but is much less than those of iron, copper, nickel, and zinc. The density of electrolytic chromium has never been accurately determined. This property is of interest as it serves as a basis for calculation of the thickness of deposits, the weight and area being known. The value of 7.1 for cast chromium is used pending further measurements. The melting point of chromium (2950 deg. F.) is sufficiently high to eliminate the possibility of fusion in use. It is much higher than that of any of the metals on which it is commonly plated. The electrical conductivity of the metal is almost identical with that of aluminum.

The occasional failure of chromium to adhere to the base metal is one of the severest limitations of its use. To get good adherence the article being plated must be perfectly cleaned; it is often beneficial to make the article the anode for a minute or less before making it the cathode and plating it. Alloy steels are much harder to plate than plain carbon steels.

Many liquids, including water and molten metals do not readily wet a chromium surface because of surface



Artificial Earthquakes

High explosives have been the tool of scientists and engineers ever since Alfred Nobel toiled in his laboratory to produce dynamite which he invented in 1867.

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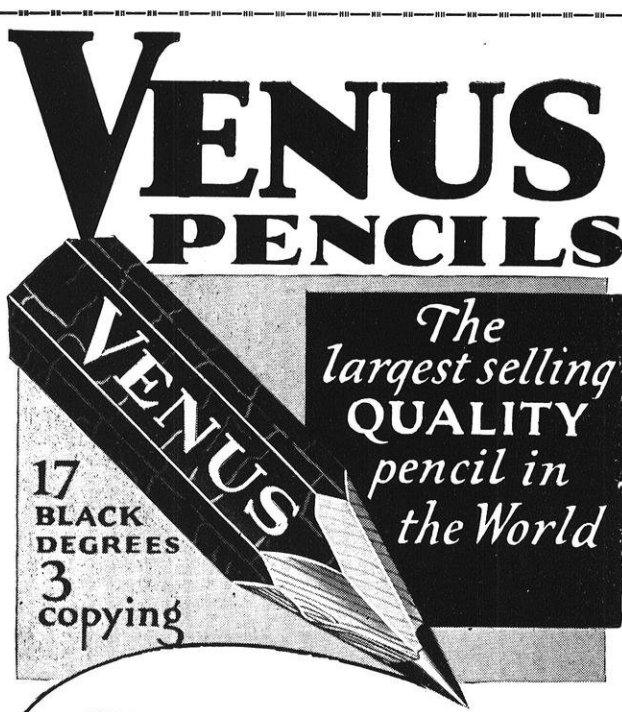
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films. This increases the tarnish resistance of the metal. Chromium is valuable as a bearing surface because of its low coefficient of friction and its resistance to abrasion and chemical action. It is possible to use lard oil, which has a low coefficient of friction, but whose free acid attacks most metals, in chromium bearings.

—Mechanical Engineering

THE DE LAVAUD AUTOMATIC TRANSMISSION

From the very inception of the automotive industry there has been a search for a satisfactory system of continuously progressive changes in speed. Many different types of transmission have been proposed, but none of them has been able to displace the conventional sliding gear type with direct drive at the highest speed. Among the systems proposed have been the friction disc and roller, the braked differential and hydraulic transmission by variable discharge pumps. All of these, however, have been found to be inferior to the sliding gear type of transmission and are of no commercial interest because changes in speed are not made automatically with changes in engine torque and road resistance.

A new type of automatic transmission has been proposed by D. Sensuad de Lavaud, an automotive engineer of Paris, France, the purpose of which is to vary automatically the speed reduction in accordance with variations in wheel resistance and engine torque. Briefly, the transmission consists of a wobble-plate which actuates six connecting rods that operate as many one-way roller clutches on the rear axle. Changes in speed result from varying the inclination of the wobble-plate, and this is controlled automatically through the combined effects of inertia and the reaction of resistance. The principle thus involves a change from the rotary motion of the engine crankshaft to a reciprocating motion of varying amplitude of the six connecting rods and then a change back again to a uniform rotary motion of the rear axle at the one-way clutches. The transmission is combined with a gearless differential and a planetary reverse-gear.

Some of the principle advantages claimed for the de Lavaud transmission are the savings in fuel consumption, in wear and tear on the car mechanism, and in maintenance costs due to the reduction in the average number of engine revolutions per mile of car travel. A number of automotive engineers, in discussing the transmission, which was the topic of a paper presented by the inventor at the semi-annual meeting of the Society of Automotive Engineers, expressed approval of simplification of the control system in the modern motor car and were of the opinion that such simplification would come about only as a result of a radical change in design such as the automatic transmission and not as a result of the gradual evolution of present-day systems.

Criticism of the design of the transmission was based chiefly on increased complication and expense, increased unsprung weight, predicted short life for the one-way clutches, and the fact that the transmission does not allow the engine to act as a brake. In answering these criticisms

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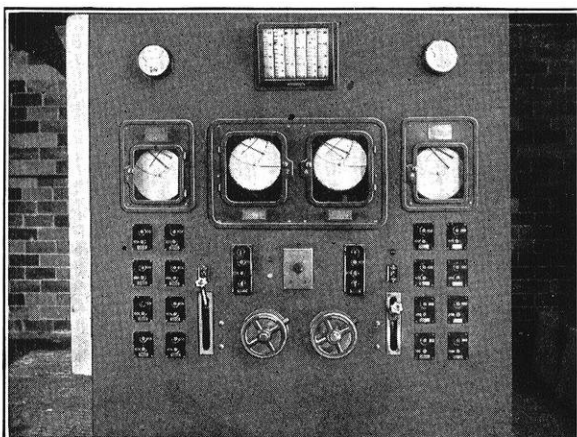
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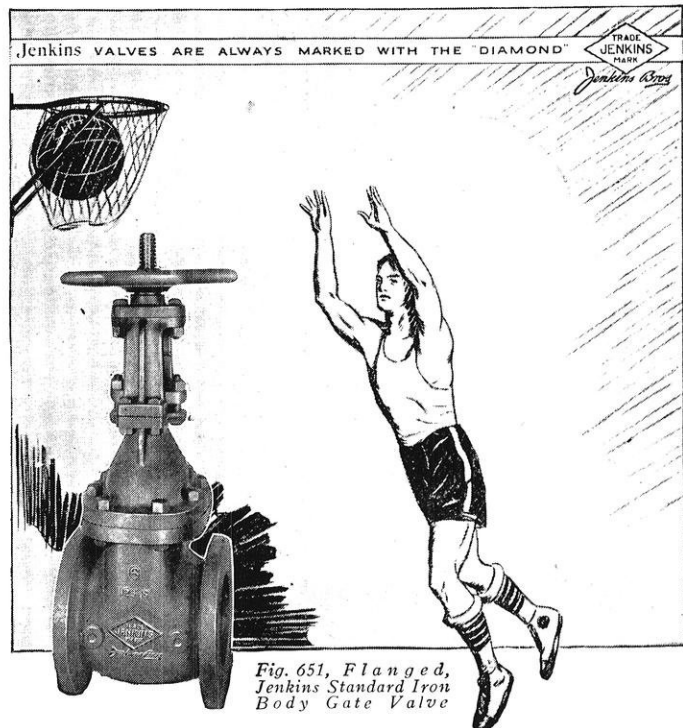


Fig. 651, Flanged,
Jenkins Standard Iron
Body Gate Valve

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M. de Lavaud claimed that in quantity manufacture, the cost would not be any greater than that of conventional equipment, that the additional unsprung weight is not objectionable, that the one-way roller clutches have proved to be as durable as any other part of the car, and that the practice of using the engine as a brake is undesirable.

The characteristics of the transmission have been thoroughly worked out and analyzed in France, where the transmission is being produced, and a test on an early model at the Arts et Metiers Laboratory indicated that at an output of 6 to 40 hp. and an engine speed of 1000 to 2000 r.p.m. the mechanical efficiency varied from 85 to 90 per cent. M. de Lavaud states that recent improvements in the design indicate that an efficiency of at least 90 per cent may be expected throughout the useful range of output of the newer models. The transmission has been in actual use in cars of a certain type, some of which have been running for more than four years. It seems entirely possible that an experimental adaptation of the automatic transmission to American-built cars may be developed in the near future.

—S. A. E. Journal

SULFUR DEPOSITS DECREASE IRON ORE MINING

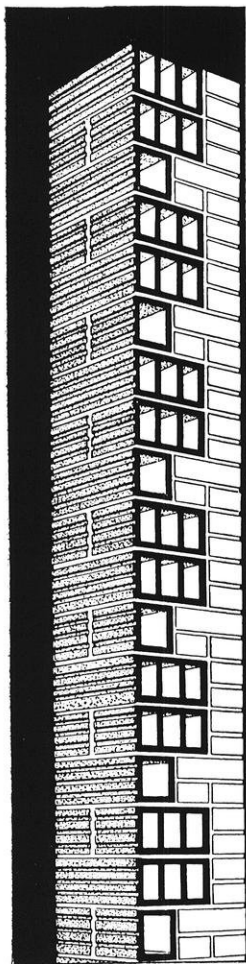
A new difficulty is constantly arising in many mining districts of Michigan which calls for immediate aid and study by the research engineer. Unless he can soon find

a practical remedy, the excess amount of sulfur in the form of gypsum which is now found in the iron ore, may invariably result in the closing of a large number of mines. So serious has the situation become that mining companies are arranging to raise almost unlimited funds to assist in the research and study of the problem. Large quantities of sulfur-contained iron ore are accumulating in the northern part of the state, due to the fact that company officials are encountering considerable difficulty in getting the smelters to treat it. For this reason, research engineers are endeavoring to find some way by which the sulfur can be removed before going to the smelter; or, to develop some new method of smelting that will satisfactorily take care of the sulfur at a considerable less expense than the present known methods.

PULVERIZED COAL MAY BE USED TO RUN AUTO

A possibility of solving motorists' gasoline problems by using pulverized coal or even such odd explosives as powdered rice husks, was explained at the second international conference on bituminous coal held recently at Pittsburgh. The paper was presented by Rudolph Pawlikowski, general manager of the Kosmos company, Gorlitz, Germany.

Pawlikowski described the success of internal combustion engines built by his company and operated experimentally for several years. The present need for such



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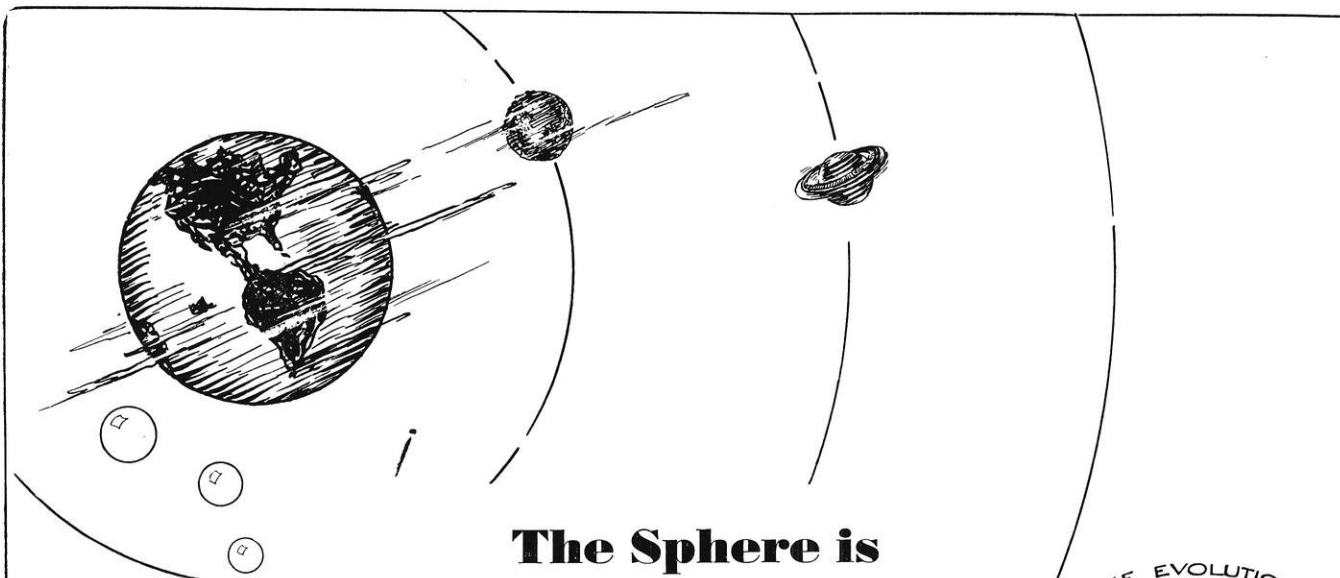
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engines, he thought, is confined to countries with plenty of coal, but lacking the rich oil deposits of the United States.

One experimental engine of 80 horsepower, has run 9,000 hours, equivalent to operating an automobile eight hours a day for about three years. Its exhaust is so clean that a factory wall nearby shows no trace of black. Pawlikowski said this engine operates equally well upon pulverized coal or oil, and has been run satisfactorily on fuels made of the dusts of peat, rice husks, and meal. It can be switched from coal to oil without stopping operation.

For coal operation the pulverized dust is drawn into a chamber adjacent to the firing cylinder, compressed by air and then forced into the explosion chamber. The engine starts without other fuel. As a test to make sure it was dust, and not lubricating oil that contributed to starting the explosions, the engine was run on soap water as its only lubricant for two days, he said.

PROGRESS IN STEAM-POWER ENGINEERING

During the past few years strikingly new developments have been observed, but great progress has been made in raising the average standard of steam-station design and operation throughout the country. Some of the major objectives attained were:— The development of fuel preparation and burning equipment to permit efficient burning of all grades of coal from lignite to anthracite; the development of equipment to enable wide varieties of coal in a given installation; the improvement of boiler plants to permit the steam required for a 75,000 kw. turbine to be generated in a single boiler unit; the production of larger turbines up to 200,000 kw.; the development of high pressure installations and the utilization of higher temperatures; improvements in reheaters; the continued development of water wall and air cooled furnaces; improvements in condensers, economizers, and air preheaters; development of mercury-vapor-steam-cycle equipment in units up to 20,000 kw.; improvements in combustion control equipment; reduction of makeup water needed, and improvement of feed water treatment; improvement in coal and ash handling equipment.

There is a crying need in the modern stations for higher intelligence and better education in the men who operate the equipment because the reduced labor required for operation increases the responsibility of each man. Every man in a station should have an opportunity to acquaint himself with the constructional details and operating principles of the equipment he operates.

One of the most interesting problems in all engineering at the present time is the continued reduction of the cost of electrical power. The excellent work so far accomplished makes any further improvements increasingly difficult, but difficulties have never served to discourage progress in engineering.

—Mechanical Engineering



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The lighting of a swimming pool is a matter both of beauty and safety. Not only is the crystal clear water more inviting filled with iridescent bubbles from sinuous swimming figures, but one is also less likely to dive in and have one's teeth kicked out by some careless neighbor.

Previous experiments resulted in the appearance this year of a special underwater unit for this work, based, oddly enough, upon the undersea diving lamp developed for the salvage of sunken ships.

The beauty of the lighted water is well shown by this new pool at the University of Toronto—in size, 75x35 feet, and up to nine feet deep, despite the refraction which makes it seem shallow. Its 690 tons of water are purified by continuous filtration.

Twenty underwater projectors, each with a 400-watt lamp, are placed on a ledge along the sides below the surface.

This is one of the first pools originally designed for electric lighting.

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.

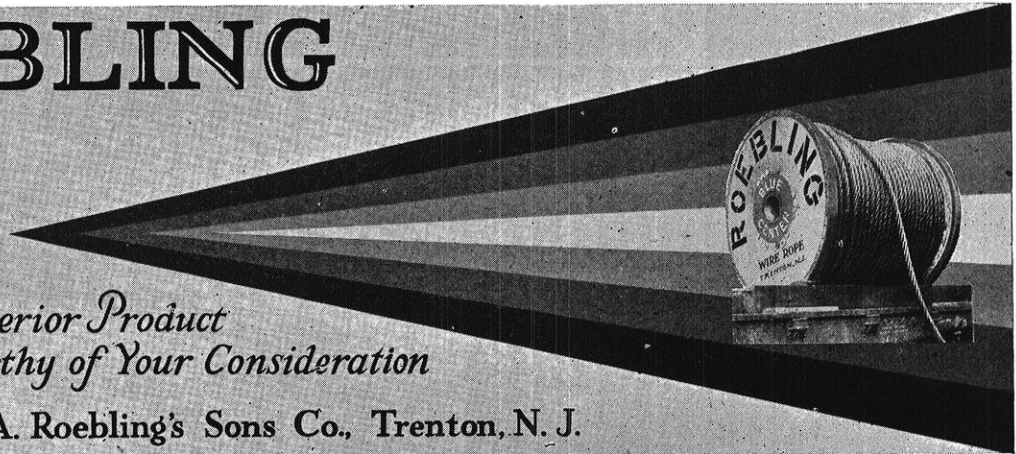
The tests gave an ultimate absorbing power of about 3,200 foot lbs. per foot of fabric or 32,000 ft. lbs. for a ten foot span. In stopping an automobile or truck, the road guard must absorb the kinetic energy of the moving vehicle; for example, the energy of a 4000-lb. car moving with a velocity of 40 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 guard fence seems to be a solution to the safety problem of our public highways.

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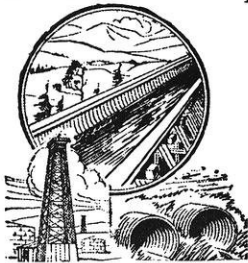


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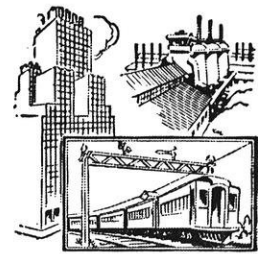
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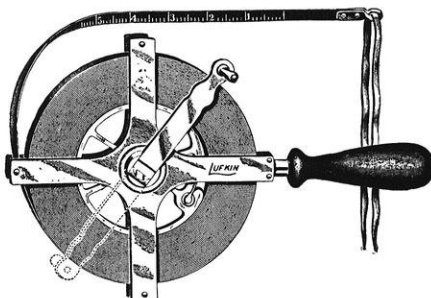
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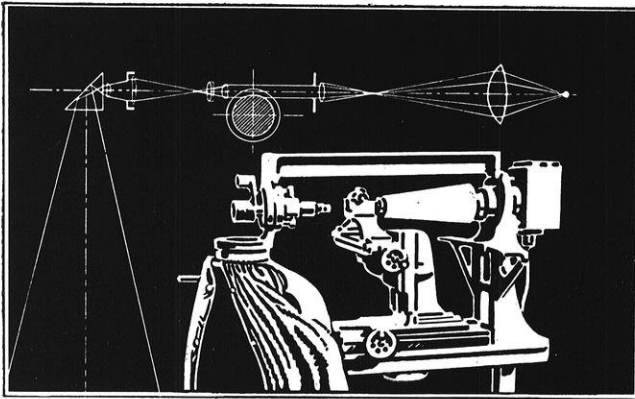
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ENGINEERING SOCIETY HOLDS CONVENTION

(Continued from page 202)

home in Beverly Hills, California, and is taking an active interest in the development of Southern California.

* * * * *

Right at the end of the convention a flare-up came over a resolution asking the legislature to revise the law so as to require fewer permanent monuments in platting. It was passed by a close vote.

GEORGE WASHINGTON — THE ENGINEER

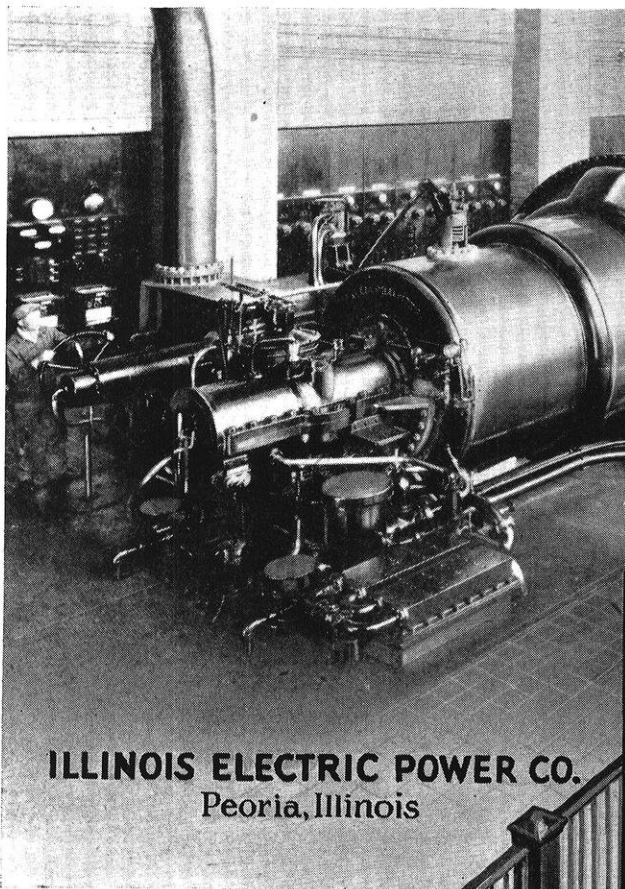
(Continued from page 204)

was surveyed by both himself and James Genn, who ran slightly different traverses, as shown by the dotted lines. The area was apparently checked by individual calculations, and is found to be correct by both the polar planimeter and by calculation under present-day methods. No doubt the pole used was a full sixteen and a half feet, this time.

The western trip lasted two months and, after his return, Washington took the money he had earned and took a brief course at William and Mary College, in order to pass the examination and secure a license as a surveyor. He was successful and sought, and obtained, the job of county surveyor of Culpepper County.

It was at about this time that, according to tradition, he surveyed for Lord Fairfax the line between Augusta

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Where roads are to be made, rivers bridged—where men mine the earth or use its soil for growing grain or pierce it deep to tap the oil supply—there again are Timken Bearings and Timken benefits.

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and Frederick Counties, Virginia. The line was surveyed as a straight course between the heads of the Hedgman and Potomac Rivers. The approximate course was first determined by building bonfires on intervening high points, after which the line between was run by compass. One would hardly expect such a line to check out with the one run a few years ago by the Forest Service surveyors, yet these men are authority for the statement that the line was run so carefully that very little variation was found in it.

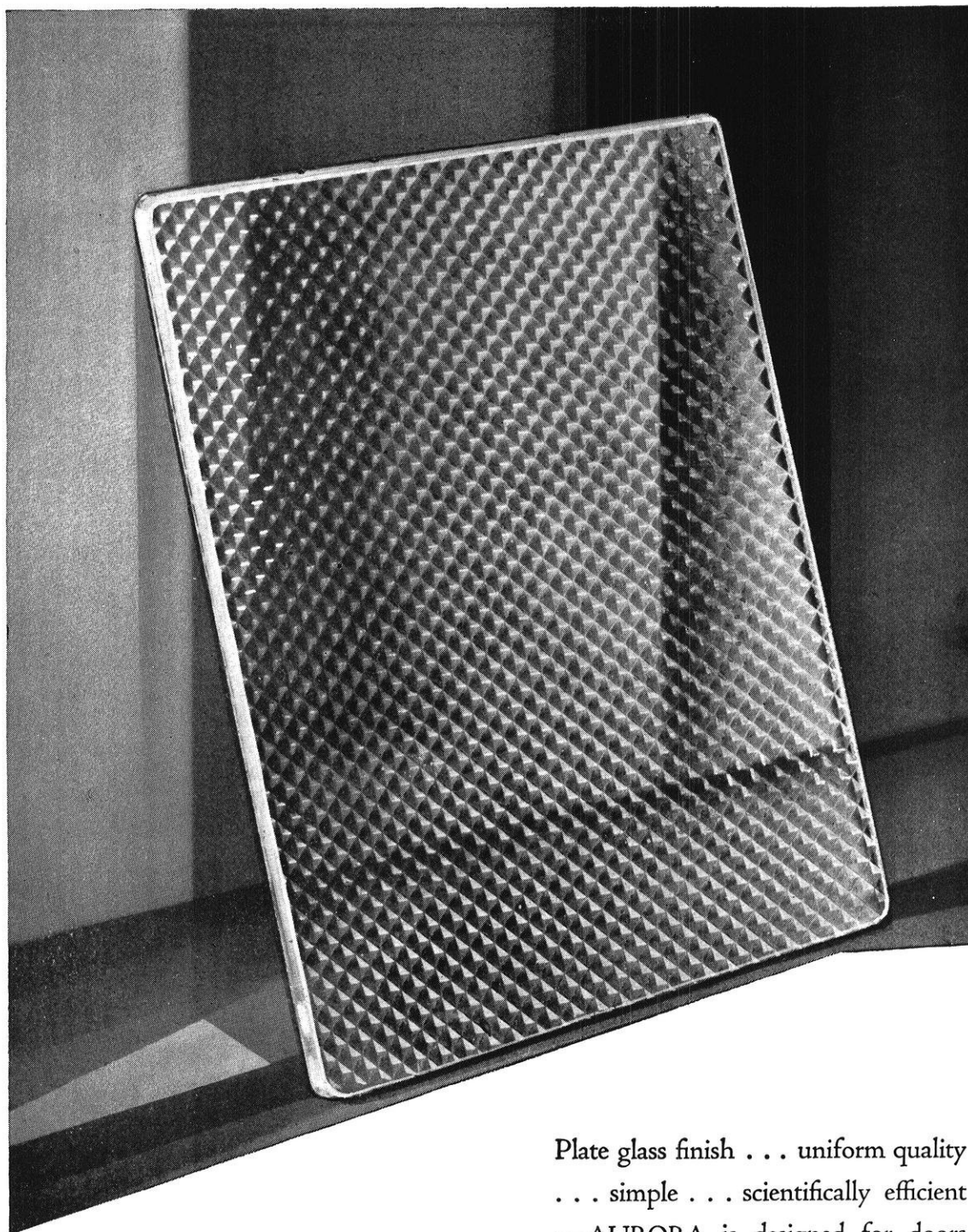
In the latter part of 1753, Washington was delegated by the Governor and the Council of Virginia to undertake an important mission to the westward, across the Allegheny Mountains, to the valley of the Ohio River. While on this trip he made an extensive reconnaissance survey of the country, and on his return to Williamsburg he endeavored to impress upon the colonial government the importance of establishing a line of communication between the eastern and western settlements.

At this time, it is presumed, he first conceived his project for a canal between the tide waters of Virginia and the headwaters of the Ohio, the canal to be located approximately as shown in Fig. 3 by the upper dotted line. This map is taken from the original which he made for his report to the Governor and the Council upon his return to Virginia. His report is very extended and resembles in all its details the type of report engineers of today make on large projects.

Braddock's Road was the accepted route for travel to the west, but it was long and dangerous, and therefore costly. Washington thought to use barges or bateaus on the rivers and canals, and thus have an all-water route between the eastern and western settlements. There were many difficulties, however, and the project was never realized. Its feasibility is attested, however, by the fact that the Baltimore and Ohio Railroads uses almost this identical route at the present time.

Washington's experience with mechanical engineering was confined to a device invented by James Rumsey for propelling boats in shallow waters by means of a steam engine. It seems to have made use of a number of poles, pushing against the river bottom. He brought Rumsey to Virginia and had him demonstrate the boat on the Potomac River. After his death, interest in the invention lagged and it was never developed. Bushnell's submarine, in which Washington was also interested, was also forgotten after his death.

After his return to private life, he devoted himself largely to the management of his own estate and to his executive work in connection with the Dismal Swamp project, a huge drainage and lumber venture in the south. His last recorded survey was made about this time. It was not a land-line survey, but a problem in drainage, and it is the only record we have of his use of a level. He carefully tied in his levels with an old plank bridge, which seems to have served as a bench mark for his entire estate.



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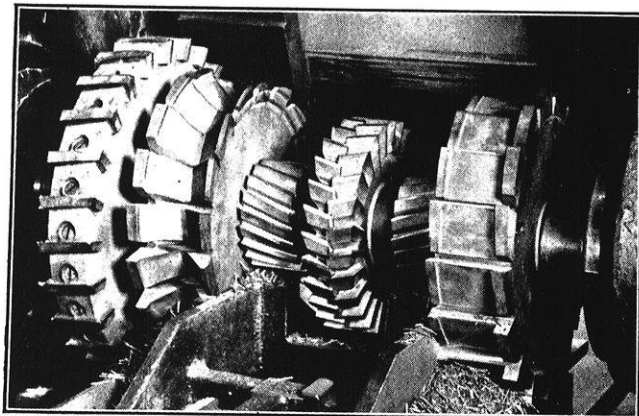
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From these latter instances, it will be seen that Washington had a broad understanding of the principles of engineering practice; civil, mechanical, and executive. So, judged by the standards of engineering of the eighteenth century, the man who was "first in war, first in peace, and first in the hearts of his countrymen" might easily have qualified for membership in any American society of engineers.

THIS CHAP HOOVER

(Continued from page 200)

new mining machinery from the United States, hired and fired men, and what is most important, he succeeded.

"From Australia he went to China. The boxer rebellion broke out while he was engaged here. He was appointed to manage the food supplies in the city where he was marooned. This was his first bit of experience of what was to make him the foremost American in the war. Leaving China, he retired. In fact he retired more than half a dozen times before he was elected president.

"At one time he went to Mandalay in search of a mythical mine which was supposed to have supplied the Orient during the Ming dynasty. As a result the richest silver and lead mine in the world was discovered and developed.

"Becoming interested in Agricola, Hoover made a translation of this classical treatment of mines, which has balked most Latin scholars. It was published in 1911 and the mining engineers of America sent him a medal in recognition of his work. At this time he was probably the foremost mining engineer in the world.

"The outbreak of the war found Hoover sitting in the Savoy Hotel. Panic stricken Americans, who had lost their fortunes, were in need of help. Hoover was in need of something to do. He directed the aiding of these people, lending them money enough to pay their transportation, and losing very little money.

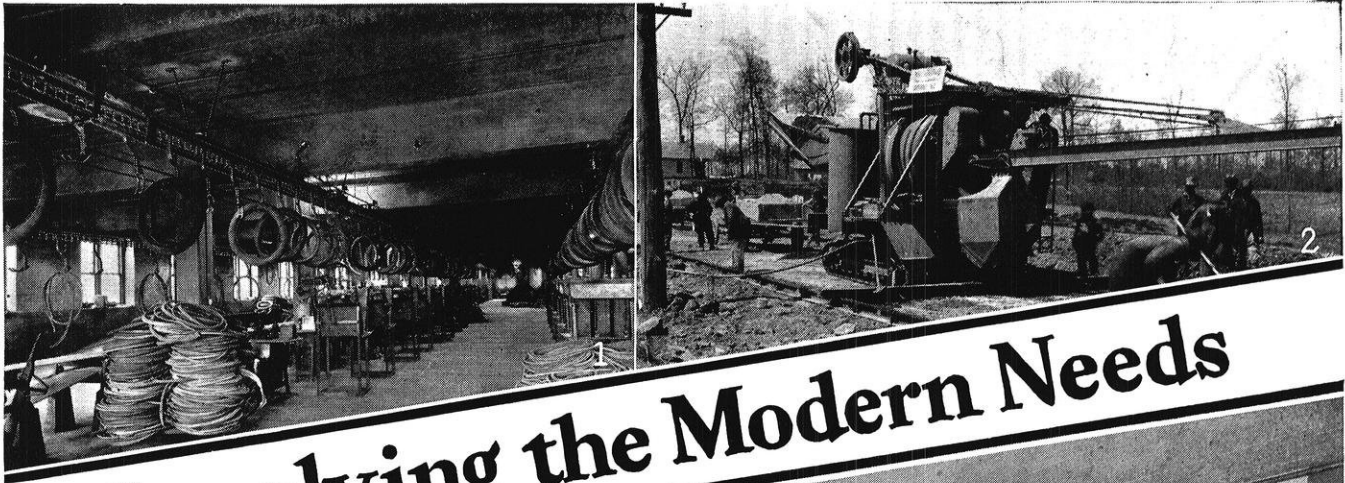
"Next came the Belgian relief, the position of Food Administrator; finally peace and more starving people. Hoover was it. Everywhere he was applauded and toasted and yet was embarrassed when people cheered him.

"The war over, Hoover returned to accept the folder of Commerce in Harding's cabinet. He was it again, settling disputes, satisfying labor, aiding business. He compiled statistics, facts, the real dope on all the prominent economic problems. He solved the problems.

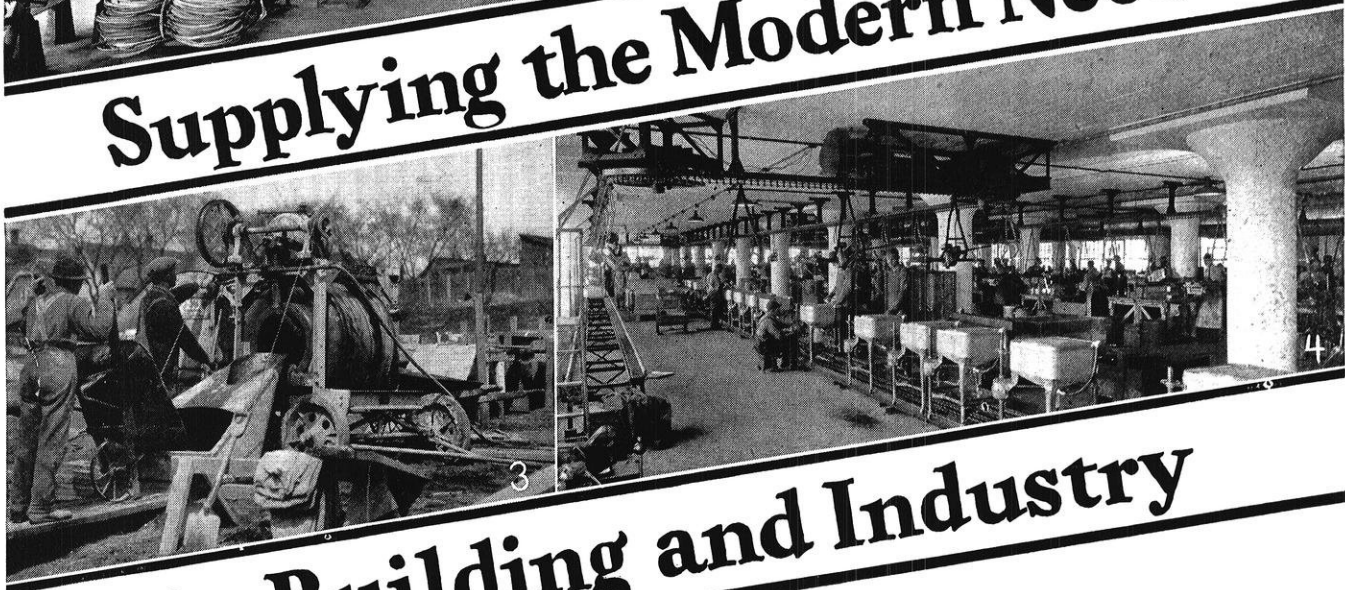
"Now it seems they have elected him president. A technical education, a wide experience and a sound judgment will make him a successful executive.

"Well, I guess the shysters can sort of pawn their tommyrot and canes, and get at the facts and slipsticks to some advantage. And if things don't work smoothly over in the states during the next four or eight years, then Saint Pat will just lose his harp and robe against anything that anyone wants to bet. And if this sort of thing continues in America, I may have to move my headquarters there,—after I get out of jail."

ST. PATRICK.
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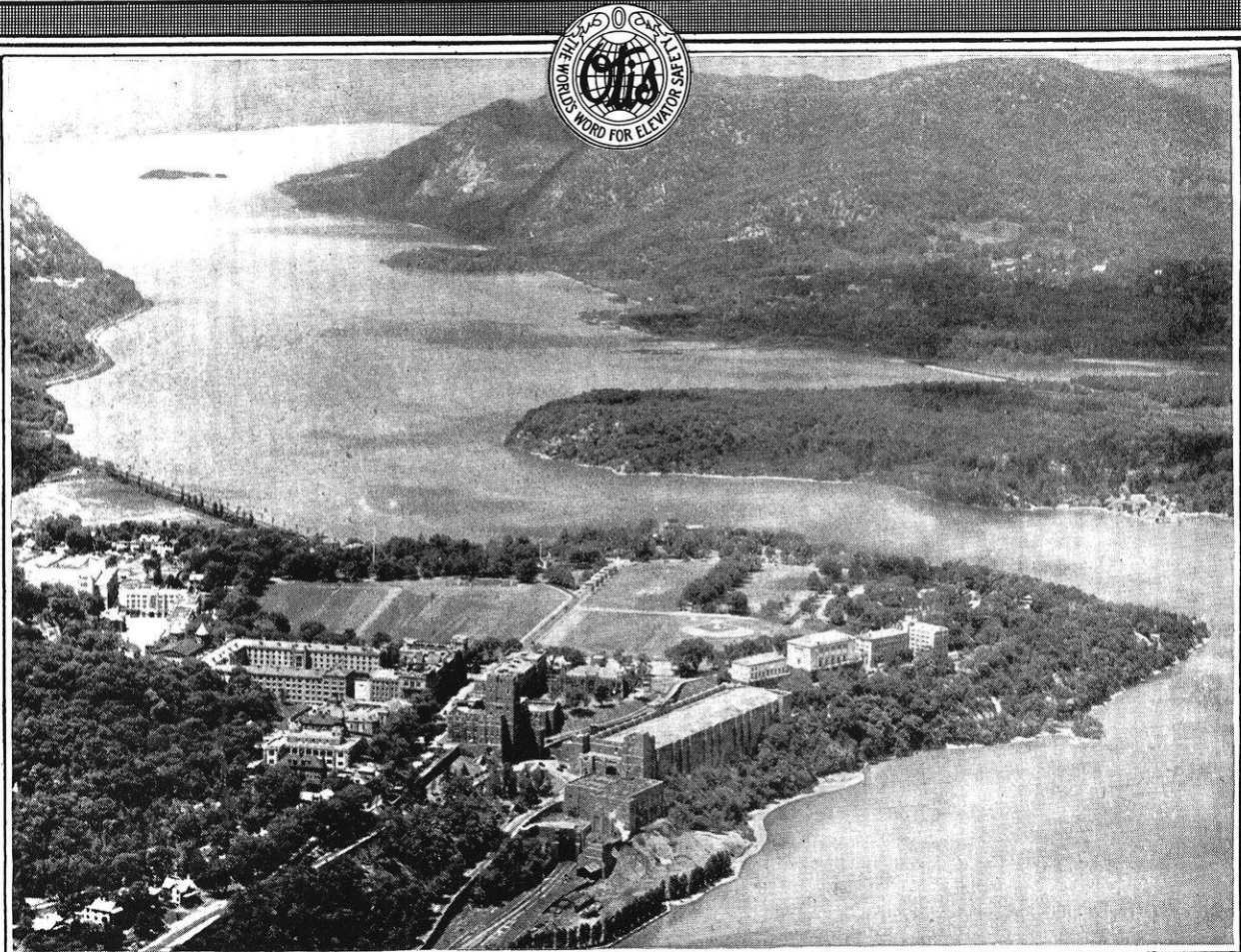
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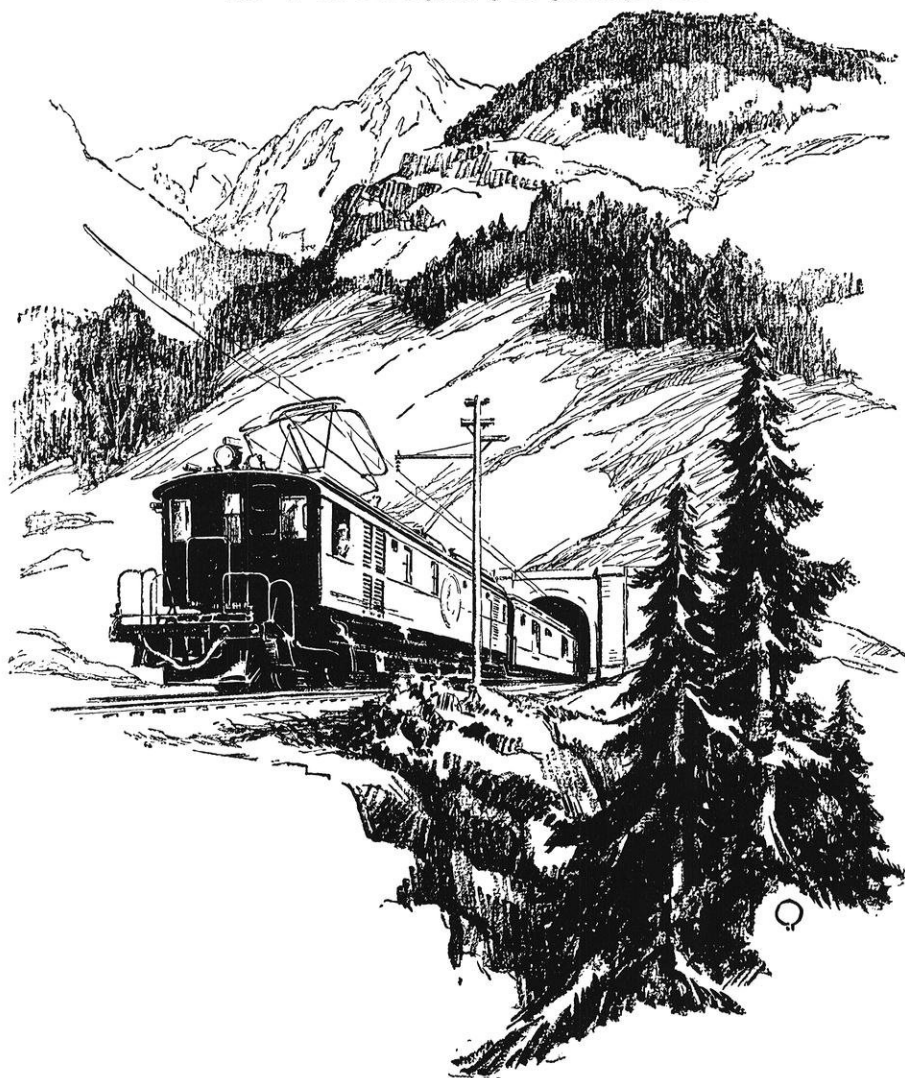
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