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## Volume 32 - Issue 3 - December, 1922

Rose Technic Staff

*Rose-Hulman Institute of Technology*

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# THE ROSE TECHNIC

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## ROSE POLYTECHNIC INSTITUTE

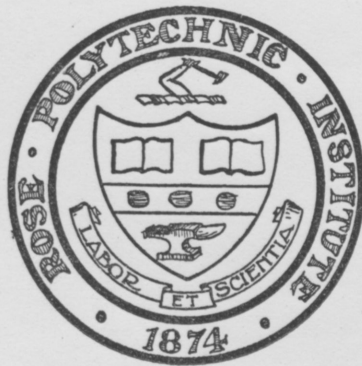
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*Member of The Engineering College Magazines, Associated.*

VOL. XXXII.

No. 3.





COMMERCIAL  
PRINTING  
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Terre Haute,  
Indiana.



VOL. XXXII

TERRE HAUTE, INDIANA, DECEMBER, 1922.

No. 3

## THE TECHNIC

Member of the Engineer College Magazines, Associated.

TERRE HAUTE, INDIANA, DECEMBER, 1922.

A monthly magazine published by the student body and Alumni of the Rose Polytechnic Institute. Member of Engineering College Magazines, Associated.

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The Transit	Iowa Engineer
Colorado Engineer	Michigan Technic
Illinois Technograph	Wisconsin Engineer
Kansas State Engineer	Cornell Civil Engineer
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## INTERFRATERNALISM.

Supporters of Rose, Rose students and Rose faculty members are pleased to note the inauguration this year of the custom of Fraternities inviting men from other fraternities to their social affairs.

It is commendable to note that the animosity between fraternal organizations at Rose has dwindled in the last two years to such a point as to hardly be recognizable as such.

Asking of outside fraternity men to dances will do much toward fostering a closer fraternity among the whole student body; it will elevate rivalry between fraternities to a higher plane—one on which rivalry becomes clean and sportsmanlike.

After all, our first interest, our first allegiance should be to Rose, and the realization of this by every organization will do much toward bringing together the "babes who were lost in the woods."

To the Sigma Nu Fraternity goes the credit for inaugurating the outside bidding to social functions.

## SAMX. YRREM

Say, Fellers, what's the  
Chance to get a  
Little Line about what  
You're all a-doin', if your  
Pal's got a new  
Motorcycle  
And if you saw Jackie Peddle a-sneakin'  
Out to smoke a real sure-nuff  
Ten center,  
'N' if some Frosh  
Has been advertisin',  
As usual, how Green  
He is and gittin' hisself  
All bawled out for sayin' the  
Wrong Thing at the Wrong Time, and  
How many of you flunked that quiz in  
Thermo, and Knippy's Mechanics.  
Jis anything—Whatcher little sister  
Said when she hung down her stockin'  
And found a real  
Rag dolly like Mother uster make  
Aw, say, all you have to do is to  
Write it out and stick it in the  
Technic P. O. Box at the  
Front end of the Corridor, right  
Next door to Froggy.  
Think it over while you 'vacate!  
And after you all absorb this  
MERRY CHRISTMAS and HAPPY NEW YEAR  
Come back at 2 o'clock, Jan. 3, 1923,  
And we'll swap yarns about what  
Santy Claus Brung Us.



## INDIANA INTERCOLLEGIATE CONFERENCE

The Intercollegiate Conference is the name of the organization that takes the place of the former Indiana Collegiate Athletic League. It was formally organized Dec. 9, at the first meeting of the representatives of 13 Indiana colleges, in Indianapolis.

The members are: Rose Polytechnic, Indiana State Normal, Terre Haute and Muncie divisions; Butler, DePauw, Franklin, Indiana, Hanover, Earlham, Purdue, Oakland City, Notre Dame and Evansville. Representatives of Wabash were present, and stated that if the conference accepted their application that the board of trustees of Wabash would rescind their former action against entering the conference.

The proposed constitution, which was drafted last spring, was reported by the members to have been approved in its major aspects by the faculties of their various institutions. Such amendments and changes, however, as remain to be made are but secondary.

The conference expressly disbars freshmen from playing with any member team, and prohibits members of the conference from scheduling contests with schools which do not have strict eligibility and freshman rules.

No attempt was made to set a minimum number of contests to be scheduled between members of the Indiana Conference, but emphasis was put upon the necessity of healthy competition, wherever possible, between them.

The constitution follows closely the outline of the Big Ten, or Western Conference.

The old I. C. A. L., whose membership had dwindled to five schools this year, was the nearest approach to an intercollegiate athletic conference that Indiana has ever had.

The officers selected at the preliminary meeting last spring were confirmed for tenure of office for the next 12 months. They are Nelson A. Kellogg, athletic director at Purdue, president; W. M. Blanchard of De Pauw, vice president, and Birch F. Bayh of Indiana State Normal, secretary-treasurer. The three officers named and H. M. Gelston of Butler and R. J. Ferguson of Hanover comprise the executive committee.

The necessity of selecting athletic teams from members of three classes will mean a deal of sacrifice for Rose. Never, as far as can be learned, has such practice been carried on at Rose. But the standards of American collegiate athletics demand such a code, so that it is well for Rose to begin now—and better than to wait until later.

Engineering is applied common sense —Edison.

## Layman, '92 Presents Motor To School

The latest donation to the equipment of the Institute was made to the Chemical department by W. Arnold Layman, '92, president of the Wagner Electric Manufacturing company of St. Louis, of a three-horsepower electric motor of the latest design. This contribution by Mr. Layman came at a time when badly needed as it is planned to install the industrial equipment in the Chem. Lab. very shortly. The motor will be used to furnish power for the jack-shaft which will be erected along the south wall of the laboratory.

It is also of particular note that Mr. Layman has always been a loyal backer of Rose, and has ever kept alive his interest in his alma mater, both in himself and in fellow alumni in his territory.

It is propitious, indeed, to thank Mr. Layman on behalf of the entire school.

## RELATIVITY

M. Perot of the Mendon Observatory in France recently stated that he believed he had physically proved that time passes more slowly on the sun than on the earth, thus proving the correctness of Einstein's theory of time. The Einstein theory is that time in various parts of the universe varies with gravity. Gravity on the sun is twenty-seven times stronger than on the earth. Dr. Perot compared, in the spectroscope, the vibrations of atoms of the same metals burning on the sun and on the earth. His experiments showed that the vibrations of those on the sun are much slower than those on earth. The difference in vibrations was almost exactly that provided for in Einstein's theory.

—Ills. Technograph.

## MECHANICAL SCULPTURE

A machine for producing bas-relief figures has been invented by Mr. Howard M. Edmonds, '05, Mass. Inst. Technology. This machine consists, essentially, of a pointer and a rotating drill, controlled by a series of levers. The operator of the machine manipulates the levers in such a way as to make the pointer follow certain close-set lines on a previously made photograph.

The drill is so geared that the degree of curvature of the aforementioned lines controls the depth to which the drill cuts.

A person desiring a relief has nothing more irksome to do than to sit before a camera, exactly as he would to have an ordinary photograph made. Lights are so arranged as to throw a series of shadows on the figure, and these lines in the photograph, follow the contours of the figure; the more rounded the features, the more curved the lines. These lines, then, are the ones followed by the operator of the carving or sculpturing machine.

## Fusibility of Ash From Coals of the United States

(Bulletin 209, Department of Interior by W. A. Selvig and A. C. Fieldner.)

Information concerning the fusibility of coal ash has become of considerable value to the consumer of coal, mainly in connection with the troublesome formation of clinker resulting from the melting of the ash constituents of the burning coal. Coal ash is the incombustible residue remaining after the combustion of coal; it is derived from the inorganic mineral constituents of the coal.

The ash-forming constituents are (1) inherent or intrinsic impurities that are present in an intimate mixture with the coal substance, and are derived either from the original material or from external sources such as sedimentation and precipitation while the coal forming plant remains accumulated; (2) impurities, formed either during the laying down of the coal bed, or subsequently, that occur in the form of partings, veins and nodules of clay, slate, pyrite, and calcite; and (3) impurities that become intimately mixed with the coal in the process of mining, such as fragments of roof and floor.

The fusibility of coal ash depends on several factors, such as the ratio of the silica to the bases present, the particular bases, and the percentage of alumina present. Mixtures extremely high in bases are not readily fusible. Ash that is low in iron is usually so highly siliceous that it is not readily fusible. Ash from coals high in pyrite is necessarily high in iron, and the ratio between the bases and silica is often such that easily fusible compounds may be formed. As a rule, coals containing considerable sulphur in the form of pyrite are apt to give considerable trouble from clinker formation.

It is well to bear in mind that the conditions of fusibility tests in the laboratory may not be directly comparable to the fuel bed of a furnace. In a laboratory test the ash forming constituents in are intimately mixed, whereas there is usually no such uniform distribution of the ash forming constituents in coal fire.

Some coal ash is so infusible that little trouble is experienced from the formation of a clinker. Ash that is slightly more fusible will form a porous, spongy clinker which does not seriously obstruct the flow of air through the fuel bed and is easily removed. Coal ash with a low fusing temperature, say 2,100 deg. F., not only melts in the average firebox, but is heated several hundred degrees above its melting temperature, becoming quite fluid and spreading out in a thin sheet over the grate, thereby obstructing the flow of air and localizing the heat in the fuel bed.

There is no expedient to which a man will not resort to to avoid the real labor of thinking.

## LOYALTY

By Jesse L. Tygart.

In every college in the land  
There's a feeling of devotion.  
They stand and sing, every man,  
Till they're heard across the ocean.  
'Tis loyalty that makes them proud,  
They've triumphed o'er their foes;  
And as they by their colors stand,  
We'll stand by Dear Old Rose!

R - O - S - E

Honor all for thee.

Royal loyalty!

Let every true, Rose Engineer

Rise to his feet and give a cheer—

(YELL)

Nuts, Bolts, Screws, Gears,  
Rose, Poly, Engi—neers,  
For R. P. I., for R. P. I.,  
For dear old Rose,

With all due respect to our school song, it is commonly recognized that it no longer seems to fill its niche. It seems to give the impression of a love song to a flower. This is all wrong—witness the Elephant.

What we need is a feeling of loyalty which will restrain us from hurtful actions, and at the same time, be an incentive to further sacrifice for the advancement of our college. The above words are meant to help foster just that feeling.

The amount of musical talent in our school is sufficient to produce an air for the above song and it is hoped that music will be written for this song, even if it be only a melody.

—J. L. T.

## USES OF ULTRA VIOLET LIGHT.

Ultra violet light used to be a curiosity of the laboratory but in these utilitarian days it has been put to work in a remarkable number of different ways especially in the chemical industries.

Among these uses, the most important are:

1. Manufacture of "artists' oil" by bleaching ordinary linseed oil with ultra violet rays.
2. Finishing patent leather in the "solarizing" process by substituting these radiations for ordinary sunlight.
3. Processes for hydrogenation of oils in preparing cooking and salad oils.
4. Testing color materials by ultra violet light instead of sunlight, reducing the time required from about two months to 6 to 15 hours depending on the material and the dyes.
5. Sterilization of water for swimming pools, hotels, steamships, etc.
6. Treatment of tuberculosis, skin diseases, etc., in hospitals.

Virtually all rubber aging and sunburning effects are obtained by use of these radiations.

The most common ultra violet lamps are made of cathode and tungsten anode with a mercury vapor pressure of one atmosphere. The arc is concentrated in a narrow "neck" or "cord" in the center of the tube. This is the most efficient source of the radiations.





# ATHLETICS

## VARSITY FOOTBALL

Sept. 30	Rose 0; E. I. S. N. 7.
Oct. 7	Rose 20; Hanover 0.
Oct. 14	Rose 0; Earlham 6.
Oct. 21	Rose 0; U. of Dayton 33.
Oct. 27	Rose 0; Franklin 62.
Nov. 4	Rose 0; Butler 19.
Nov. 11	Rose 0; U. of Louisville 6.
Nov. 25	Rose 0; Culver M. A. 44.

## TECH TEAM RESULTS.

Sept. 30	Tech 20; Brazil H. S. 0.
Oct. 7	Tech 0; Clinton H. S. 0. (tie)
Oct. 21	Tech 0; Jasonville H. S. 31.
Oct. 28	Tech 0; Worthington 6.
Nov. 25	Tech 20; Merom College 0.

The varsity ended a season of eight games, Nov. 25, with a defeat from the strong Culver Cadets. One win was checked up to the credit of the Engineers. While the season was not successful from the standpoint of games won versus games lost, the men of Rose have no discredit against them. They simply played superior teams, and went against forces greater than opposing football teams. An official, high in Indiana athletics, in writing to Coach Millen, said:

"May I add my congratulations on the football season which you have just completed? While Rose did not win so many games, she always won the admiration of the officials and spectators for her clean sportsmanship, and for displaying on the field those qualities of character that athletics should attempt to develop in college men. Such is not the case in all schools, for too often the coaches emphasize the winning at any cost, rather than playing the game for what character-developing the players might receive."

Such a sincere compliment is pleasing to the ears of every Rose man and alumnus. It shows that the vitals of the game have not been neglected, even if this man or that man was weak at tackling.

So let's give fifteen big rah's for the coach and the "whole damned team", and start making plans now for a big success in 1923 for the Engineers on the gridiron.

Sammy Forsythe, '24, for three years varsity quarterback on the Engineer eleven, was elected captain of the 1923 team, at a meeting just before Thanksgiving vacation. Sammy is better qualified to handle the team than any man on it, and his cool-headed generalship, calm determination and fighting Rose spirit are looked to to bring Rose

out on top next year. Herman Heck, '23, the retiring captain, deserves to be congratulated on his judicious handling of the 1922 squad. Heck played through more contests than any other one man, being in at least half of every game played.

Tyler, Heck, Hager, McDargh and Boyd—all Seniors—"desert" by graduation this year, the football team. The brunt of weight next year will fall on the class of '24 for backfield men, while the line will come principally from the class of '26—as things look now.

The TECH Team won two games, lost two, and tied a fifth game. And last but not least—furnished a scrimmaging machine that couldn't be beaten for bringing out defects in the varsity play.

## BASKET BALL

With the virtual completion of the gymnasium on Dec. 4th, preliminary basketball practice began—after more than a month's delay. There still remained—Dec. 9.—baskets to be suspended, seating arrangements to be completed, and protective wire screening to be put over the windows.

The gymnasium is of maximum size—practically as large as any floor in the state, the playing floor measuring 45 x 87 feet. It is of hard white pine, well finished, and well sanded, and finished with linseed oil. The baskets will be suspended from the roof trusses, free from the seats and walls, and will be provided with glass bank-boards.

The bleachers will be so constructed as to be easily torn down and stored away for social affairs in the gymnasium. They will be constructed in tiers so that every spectator will have a clear view of the entire floor.

This work of finishing up is expected to be completed by the 12th or 13th of December. The first game on the Rose schedule is at home, with the Central Normal of Danville, Dec. 16th.

First practice—consisting of running, passing, dribbling and guarding—was started Dec. 5th, with a turnout of about 20 men. The number of candidates however, will increase as the season progresses and the optimum number is expected to be hitting the floor regularly at the beginning of school, after vacation.

The varsity regulars are either all graduated or have left school. Among those men who are most likely to constitute the Engineer quintet this year are Schoonover, Fox, Tyler, Skeeters, Smith, E. A. Wilson, C. Watson, Anstead and Glenn.

It is likely that the site of the track will be in the huge barn, to the west of the campus. It is amply roomy to accommodate a 220-stretch, and dirt embankments can be laid up around the sides to permit of speed. Then, too, a good of preliminary workouts, sprinting, etc., can be done in the building—in the gymnasium, and in the corridor of the mezzanine floor.

Possibilities are that boxing, wrestling, handball and volley ball will be added to the minor sports at Rose have been under consideration by the authorities recently. It is hoped that these sports can be inaugurated soon so that the idle hours about the 'Tute can be advantageously spent.

Coach Millen spent Saturday, Dec. 9, in Indianapolis. We didn't find out whether he was scouting or purchasing equipment.

Some of the upperclassmen who seem to think a berth is assured on the basket squad are going to awaken very shortly and find a freshman running right along by them—and oh, what a surprise!

The goals were installed Saturday, December 9. At that time, glass for the bankboards had not arrived.

Now's a good time to plan on starting interclass and interfraternity basketball for next year. It would help the coach a great deal if these preliminaries were held at the first of the school year, it would aid in getting the men in condition and would furnish incentive to "get in there and go" at the opening of the season.

## GIANT HIGH VOLTAGE TRANSFORMER

The highest voltage testing transformer equipment that has ever been sold is being built by the Westinghouse Elec. & Mfg. Co. for installation in the new high voltage testing laboratory of the California Institute of Technology at Pasadena, Cal.

A potential of 1,000,000 volts to ground will be produced by this equipment, its capacity being 1,000 KVA or 1340 HP at this extremely high voltage. The apparatus will consist of four special 250 KVA, 250,000 volt testing transformers connected together so that their individual voltages will be added.

This arrangement requires that the transformer tanks be insulated from the ground, the insulation increasing as the transformer voltages increase. This will necessitate mounting of the transformers on wooden platforms at various heights from the ground, the last transformer being on a platform approximately 12 to 15 feet high.

California redwood will be used in building these insulating platforms which in themselves present quite a problem owing to the great bulk and ponderous weights of the transformers they must support. Each of the four testing transformers weighs approximately 23 tons when filled with oil, has a diameter of about 8½ feet and an over all height of approximately 20 feet.

In addition to the testing transformers, two 550 KVA regulating transformers and their induction regulators will be furnished, these weighing approximately 8 tons.

This equipment will be in charge of Dr. R. A. Millikin, the noted physicist, who is now a member of the faculty of the California Institute of Technology. He will be assisted by Dr. C. E. Darwin, Dr. H. A. Lorentz, Professor R. W. Sorensen, and other members of the faculty and also by several engineers of the Southern California Edison Company.

The 1,000,000 volt testing equipment will greatly facilitate scientific research and, it is understood, investigations will be carried on concerning the properties of matter.

The Westinghouse Electric and Manufacturing

Company has previously built for its own use, a single unit, 1,000,000 volt testing transformer but due to the diversified purposes for which the equipment now being built will be used at California Institute of Technology, it was decided that obtaining 1,000,000 volt by four units would prove to be a more flexible arrangement.

It is planned to also use only three of these transformers on a 3 phase, 450,000 volt transmission line and numerous other combinations can also be obtained.

It is interesting to note that a potential of 1,000,000 volts between terminals one meter in diameter, will cause a spark to flash across an air gap of approximately 45 inches and, when between needle points, it will jump an air gap of from 12 to 15 feet.

In this apparatus, the California Institute of Technology will have higher voltage testing equipment than that possessed by any other school in the world, and, due to the fact that power is being transmitted at higher voltages every day, this school evidently intends to keep abreast of the times; in fact, when this equipment is installed, it will be several laps ahead.

The University of Iowa is having an all-steel stadium erected. Eventually it will be completed into a double-decked bowl. The cost will be about \$5.50 per seat and when completely finished it will seat 40,000 persons. This is the first instance of an all-steel grandstand. The American Bridge Co. is fabricating the material on the basis of a new design by B. J. Kambert.

—The Transit. (Iowa).

The Farchild Aerial Camera Co. of New York City, recently mapped the city in 69 minutes. The city was subdivided into sections, each of which was photographed from a plane at an elevation of 10,000 ft. The photographs were then fitted together to form a mosaic of the city. The camera used carried a special lense. City official reports speak very highly of the results.

Princeton News Letter.



## WITH THE ALUMNI

### CHICAGO TECH CLUB.

The Chicago Tech club holds a weekly luncheon, on Monday, at 12:15 p. m., at the Engineers club. Every Rose alumnus is invited who can possibly attend, and if any student happens to be around Chicago on these dates, he is expected to drop in.

W. G. Arn, '97, has been appointed asst. chief engineer, Chicago Terminal Improvement of the Illinois Central Railway, effective Nov. 18.

Art Nehf, '14, pitcher with the New York Giants ball club, is wintering in Washington, Ind. He has recently been elected to coach the Merchant's association basketball team there.

### SOUTHERN CALIFORNIA TECH CLUB.

Southern California Tech club came to life Nov. 27, at a meeting called by Max J. Hammell, '01. Paul B. Hamill, '08, was elected president, and Leslie J. Heedwohl, '18, secretary-treasurer. The meeting was held at the University club, with eight members present. The small attendance was due to lack of an up-to-date address book, and, too, to the situation of a number of Rose alumni in the northern part of California.

Max Hammell gave a talk on the past work of the club, and outlined the activities of the present. He discussed the progress being made by the Athletic Finance committee, and passed out subscription cards for the latter. The next meeting will be held early in January, at Los Angeles.

Another laurel has been added to the long string of trophies collected by Rose graduates for the past forty years. John W. Bolton, '18, (M. S. '21) was recently selected as grey-iron representative of the American Foundryman's association, metallurgical committee. This appointment carries with it a great deal of honor, but an even greater significance of the rapid strides Bolton has made in the iron and steel industry as an authority on grey iron. Harry A. Schwartz, '01, who is now with the National Malleable Castings company of Indianapolis, is chairman of the metallographic committee to which Bolton was elected. Bolton is now with the Niles Toolwork company, Hamilton, Ohio.

Walter S. McNabb, '04, has returned to India, where he is manager of the India Iron & Steel company, Asansol, India.

K. L. DeBlois, '22, with the C. C. C. & St. L., railroad, out of Cincinnati, is working on the design of the Louisville and Jeffersonville bridge; address, 249-540 West 7 St., Cincinnati.

F. F. Hunt, '22, is with the DeLaval Separator company, Tulsa, Okla.; address, 337 South Victor Street.

G. K. Woodling, '20, visited the School Nov. 27. He is with the Clyde Iron Works, Duluth, Minn.; address, 415 Mesaba St.

### LOUISVILLE TECH CLUB.

Members of the Louisville Rose Tech Club were hosts at a dinner Saturday evening, Dec. 3, at the Waterson hotel. Mr. Claiborne Pirtle, '98, of Cleveland, president of the Alumni association, gave an interesting informal talk on conditions at Rose and activities of the various Tech clubs in different parts of the country. About 25 attended the dinner. The guests were Miller, Wolfe, McIntosh, Tyler and Maury of Rose.

Another meeting will be held during the holidays. The club will be glad to welcome any fellow who happens into Louisville.

Royer, '22, and Armstrong '21, are the latest additions to the membership of the Louisville club. They have been engaged in the sinking of a condenser well of considerable magnitude, under the direction of A. G. Butler, '10.

Kremer, '20 has been appointed building inspector of the city of Louisville.

### PITTSBURGH TECH CLUB.

The semi-annual meeting of the Pittsburgh Rose Tech club was held Dec. 9, in the parlors of the William Penn hotel.

H. S. Reichert, president of the Pittsburgh club, has recently been appointed chief engineer of the Pittsburgh Plate Glass company.

H. J. Harris, '11, formerly with Cutler-Hammer, Milwaukee, is now located with Westinghouse in the industrial sales division, at East Pittsburgh.

W. H. Junker, '20, is now head of the Physics department of Manual high school, Louisville, Ky.

W. C. Turner, '22 is now located with General Electric company, at Lynn, Mass. Address, 15 Mall St.

Richard Voges, '21 who is teaching in Texas, A. & M. is taking work in advanced organic and oil chemistry, counting toward an engineer's degree.

Fred M. Pence, '20, after deciding that two can live more cheaply than one, is trying to do so.

H. E. Wiedeman, '03, still maintains an office and successful practice as consulting chemist, Chemical Bldg., St. Louis.

Herschel A. Hearn, '19, is now manager of the Dallas branch of the Wagner Electric company; address, 2007 South Ervay St., Dallas, Tex.

A. S. Hathaway, Jr., '08, is now teaching mathematics in the Hibbing Junior College, Hibbing, Minn.

Richard Merriweather, '96, is vice-president and general manager of the Dallas Railways company, Dallas, Texas.

C. F. Harris, '14, went to the Sundh Electric company, as sales engineer, last April, but this is

the first we've heard of it. Address, 7057 Normal Blvd., Chicago.

D. R. Spencer, '22 was married Thanksgiving Day, to Miss Marybelle Jones. The Spencers are at home, at 1634 North 9th St., Terre Haute.

Word has been received that two of the Alumni failed to receive their Technics regularly last year. If any alumnus fails to get his Technic on time, let us know, advising your address too, for we may not have your change of address listed.

F. W. Hahn has been transferred from the Michigan City plant of the Pullman company to the Engineering department at Pullman, Ill., Address him at 10915 South Park Ave., Chicago.

### TRAFFIC TESTS BEGIN AT ARLINGTON

Traffic has been started on the circular track of the Bureau of Public Roads of the United States Department of Agriculture, at the Arlington Experiment Station, in the experiment to determine the cause of waving in bituminous surfaces. The track is composed of 27 sections of asphaltic concrete of different mixtures.

Before starting the traffic, profile measurements of the surface were taken with the autographic profile device especially devised for the purpose. Measurements were taken at frequent intervals and will be repeated from time to time as the tests progress in order to determine the rate of formation of inequalities in the surface.

It is also planned to study the flow of the bituminous concrete under traffic. This will be done by noting the movement of brass plugs placed in the surface both in the upper and lower portions.

The wear test on the circular track consisting of 61 sections of concrete and located at the outside edge of the bituminous track has been commenced. In this test concrete made of a great many different materials and mixes is being subjected to a traffic of two solid rubber-tired wheels loaded with 600 pounds per inch of width of tire or approximately that of a 5-ton truck and travelling at a speed of 20 miles per hour. The device used will be guided by wheels travelling on rails and is electrically driven, the power being transmitted to one of the wheels used to represent the traffic which will make this wheel act as the drive wheel of a truck.

Only men thoroughly trained in gradually overcoming obstacles, and who have in this way grown strong, are able to take up burdens larger than before and carry them through to a successful conclusion.—E. M. Herr.

Members of the classes of '23, '24, '25 and '26 will receive, at graduation, not only a B. S., but a B. A., (Bachelor of Atlas). This is because the faculty, after prolonged study of the above quotation, is convinced that after overcoming the obstacles of this year's building activities, the men of these classes will be able to take up the burden of the Earth itself.

## THE ENGINEER

Sung to the tune of "Son of a Gambolier."

Who is the man designs our pumps  
With judgment, skill and care?  
Who is the man who builds 'em and  
Who keeps them in repair?  
Who has to shut them down because  
The valve seats disappear?  
The bearing-wearing, gearing-tearing  
**Mechanical engineer.**

Who buys his juice for half a cent  
And wants to charge a dime?  
Who when we've signed a contract  
Can't deliver half the time?  
Who thinks a loss of twenty-six  
Percent is nothing queer?  
The volt-inducing, load-reducing  
**Electrical engineer.**

Who is it takes a transit out  
To find a sewer to tap?  
Who then with care extreme locates  
The junction on the map?  
Who is it goes to dig it up  
And finds it nowhere near?  
The mud-bespattered, torn and tattered  
**Civil engineer.**

Who thinks without his products  
We would all be in the lurch?  
Who has a heathen idol which  
He designates Research?  
Who tints the creeks, perfumes the air,  
And makes the landscape drear?  
The stink-evolving, grass-dissolving  
**Chemical engineer.**  
—Bulletin of the Minnesota Federation of Architectural and Engineering Societies.

### SIDE ISSUES

The fellow who isn't fired with enthusiasm is apt to be fired with enthusiasm.

"Go to my father", was all she said,  
And she knew that I knew that her father was dead,  
And she knew that I knew what a gay life he'd led.  
So she knew that I knew what she meant when she said:  
"Go to my father."

The boy stood on the burning deck,  
His head was in a whirl  
His eyes and mouth were full of hair,  
And his arms were full of girl.

Conductor—Don't get the car full of smoke boys, we are going to pick up some women soon.  
Minnis—I didn't know you could pick up women with a street car.

Bledsoe (in hydraulics)—A study of water, such as this, is bound to bring up some fish.





## Give a Corona this Christmas

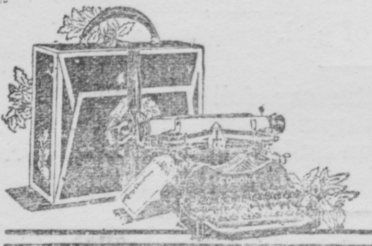
There's someone you know who's been wishing and wishing for one.

Corona is not only an unusual gift, but it is one of the few that are used and remembered long after Christmas is forgotten.

With every passing year a Corona grows more precious to its owner. For boy or girl, for mother or father, for wife or sweetheart, for husband or brother or friend, Corona is one gift that is always appropriate and appreciated. This is the Christmas to give a Corona because a new model has just been perfected, embodying the experience and advice of a half million users.

Let us show you this new Corona today. Come early and be sure of getting one of the special Christmas gift boxes.

Price \$50, including carrying case and special Christmas gift box.



## BALLARD

### Typewriter Exchange

659 1/2 Wabash Ave.  
Tel. Wabash 4772



The first inspection of the Rose Engineer Battalion this year was held Nov. 13, by Lt. Col. David H. Biddle, of the Cavalry. Colonel Biddle, who is in charge of R. O. T. C. Engineer units in the Fifth Corps Area, was highly pleased with the showing made by the Rose unit.

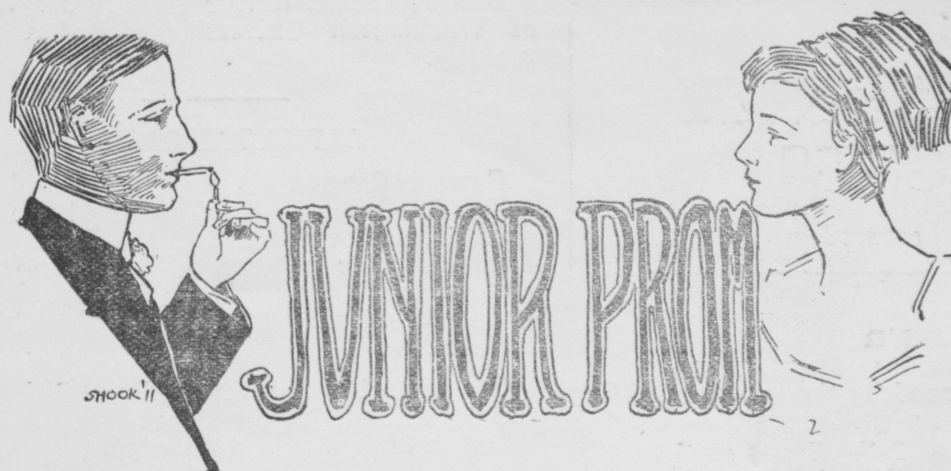
Work on the outdoor range—which is located in the southwest corner of the campus just off the National road—is practically at a standstill, owing to the probability of a change to the worse of weather conditions at any time. Nearly all the excavations for the butts is completed, and in the spring, probably, the concrete will be poured into the forms. The outdoor range will accommodate 100—200—300— and possibly 500 yard targets. There will be six targets in all. The butts are built in the side of the hill, just east of the Squads South creek.

Lieut. Arch Colwell, who was for nearly a year the junior officer of the Rose unit, has resigned from the service and is now engaged in work with the Steel Products company, Cleveland, O. Lieut. Coldwell made up his mind to leave the service, and got his resignation through so quickly that there was no chance to bid him godspeed, and wish him luck; but, "Arch" was extremely popular on the Campus, and was such a good baseball coach that we miss him a lot, and hope he'll come back and visit us soon.

Work on the new office of the Military department—in the west end of the gymnasium, is nearly completed, and the department expects to move in before the holidays.

Plans for an indoor, small-bore range, to be constructed in the basement, near the quartermaster's department, are being drawn up, and it is hoped they will be seen through this winter.

There are 16 Seniors and 28 Juniors enrolled this year in the advanced Military course, besides the Freshmen and Sophomores who will probably elect Advanced next year. The Rose unit has the largest percentage of students enrolled—to the total enrollment of the school—in the Military science and Tactics of any Engineering school in the country. How's that?



These mysterious, strangely appealing words are not all humbug but represent something which we all will realize and remember as one of the most outstanding events of our college activities.

Immediately after their hallowe'en escapades the juniors assembled and vowed to show their appreciation and love for old Rose by starting this new tradition. Such an event, however, is considered old in all other colleges.

Some fellows may laugh when they think of the old gang all "sundied" up in "swaller" tail or a "tux". But, think of what a good impression it would make on the outside world, and yes, even upon themselves. Think of the prestige which

would be developed for the school, as an outcome of such a striking event.

Criticize this move as you may, but down in your heart wouldn't you like to see yourself all shined up in a keen fitting "tux". You know that you would like to slap yourself upon the chest and say that you are going to at least one swell affair with the best girl in town.

All that is needed is a backing from the student body and the affair will be put over in good style. If you do not care to come please do not try to spoil another fellow's good time by knocking. Preparations are being made to secure an out-of-town orchestra of vast fame.

Look for more articles on the "Junior Prom" in the Technic.

## COLLEGE ATHLETICS

By Coach John M. Millen

College Athletics have become a permanent part of College life.

It is true that the boy is sent to College by his parents, primarily, to obtain an education and to become better equipped for life's battles but experience shows that mental development without the physical is incomplete.

Many a bookworm looks back on his College days with regret because he did not avail himself of some of the opportunities for physical development. Mentally, he is active and though he has the will to carry on, his body is broken.

On the other hand, the boy who devotes all his time to athletics will have similar regretful days for he too, will find himself only half equipped. There must be a happy medium—a balance.

Unfortunately, our American system of athletics where teams are composed of a few well drilled men, makes the problem of reaching all the boys a very difficult one. This is being remedied in many of our leading schools by introducing gymnastics, mass athletics and calisthenics. Such a program is rapidly growing in favor in institutions where it is a part of the required work, and it is no unusual sight to see several thousand boys engaged in various contests on the athletic field in a single afternoon.

Many of the lessons found helpful by a college man in after life are learned on the athletic field.

It is here he learns self-sacrifice, the value of team play, loyalty, co-operation, self-confidence, self-control, aggressiveness. He learns determination, will-power, persistency and stick-to-itiveness.

He learns to take a hard knock with a smile and when he gets his chance he knocks back, fairly, but twice as hard.

Athletics should be one the greatest assets in bringing unity to a student body. It should call forth that spirit of loyalty, that desire to co-operate, that wish to make things go, that determination to succeed which is so essential in every organization.

Through its definite influences Faculty and Students should find many of their problems solved.

Often times the true value of Athletics is lost to sight. The desire to win over-rides sound judgment. Athletes are rushed into school, with mysterious ways and means of existence. Scholastic standards are lowered. Win, is the motto of all. This, however, brings but temporary glory. The foundation is of crumbling material. The higher ideals are destroyed, the permanent benefits are lost. Commercialism has displaced school loyalty.

The College that maintains its high ideals, keeping always in mind the fact that on athletic fields many of the basic principles for successful living are developed; that strives ever to win and build manhood, is getting that permanent good for which College Athletics were intended.



## FRATERNITY NOTES

### En

En has been informed by the secretary of Tau Beta Pi, which they are petitioning for a charter, that of the votes of chapters received not a single unfavorable ballot has been cast, and that to date more than half of the required number for admission have been received. The votes of all the chapters of Tau Beta Pi are expected to be in by the holidays, and it is sincerely hoped that the scholastic fraternity Key will be exhibited on the Campus soon.

Four members—Clyde Raeber, J. E. Albright, J. R. Snyder, and D. V. Eichin—were initiated during November.

### SIGMA NU.

Beta Upsilon gave an informal dance at the Deming Tavern, November 21, Bud Cromwell's melodies breathed the spirit of the occasion, harm-and syncopation. Several members from the various organizations were present.

Saturday, Dec. 9th, was a dull day around the house, the majority of the boys being in attendance at the annual Sigma Nu Hoosier Rally at the Lincoln hotel in Indianapolis.

### P. I. E. S.

The annual Christmas dance is to be held Dec. 21st, at the Elks. Decorations will be of royal purple and white. The music will be furnished by the Suwanee Orchestra.

Brother Fred Owens, '21, will be wedded to Miss Margaret Richards, formerly a State Normal student, on Christmas Day. A number of active brothers are planning to attend the wedding, which will be held in the First Baptist church.

A dinner in honor of the bride and bridegroom elect will be given shortly before Christmas at the Fraternity house.

### THETA XI.

Kappa chapter entertained with an informal dance at the chapter house on Tuesday evening, Nov. 28. Mr. Erroll Fox and McCullough were guests.

Brothers Woodling, Wentz, Lyons, Hild, Junker, Royer and Armstrong were recent visitors at the house.

Brothers Scott, Amour of Purdue and Benson of Washington University visited the house recently.

### ALPHA TAU OMEGA.

Gamma Gamma chapter entertained with a delightful dance in the Tavern of the Deming hotel, Tuesday evening, Dec. 12. Representatives from the other fraternities, from non-fraternity men and faculty were guests. Several alumni also attended. Music was furnished by Cromwell's Society Five.

The annual Christmas smoker will be held at the house, Dec. 24, Christmas Eve. A large attendance from alumni is expected.

Brother Tyler spent Thanksgiving holiday with Brother McIntosh, at the latter's home in Louisville.

Three more weeks till finals, after the Christmas holidays. Don't put it off any longer.

The front section of the school—housing the lecture rooms and offices—is being delayed in its completion by (1) inability of the contractor to get plasterers, (2) indecision as to the exact location of the stairway in this section, and (3) non-installation of heating equipment in it. Meanwhile, the noise caused by the carpenters at work in the upper corridor is enough to dull even the most acoustically insensitive ear.

Tommy (to Wesley, just awakened) "It's a sign of a great mind to be able to sleep with all that noise going on around."

Which reminds us of one:

Prof.—Why aren't you taking notes?

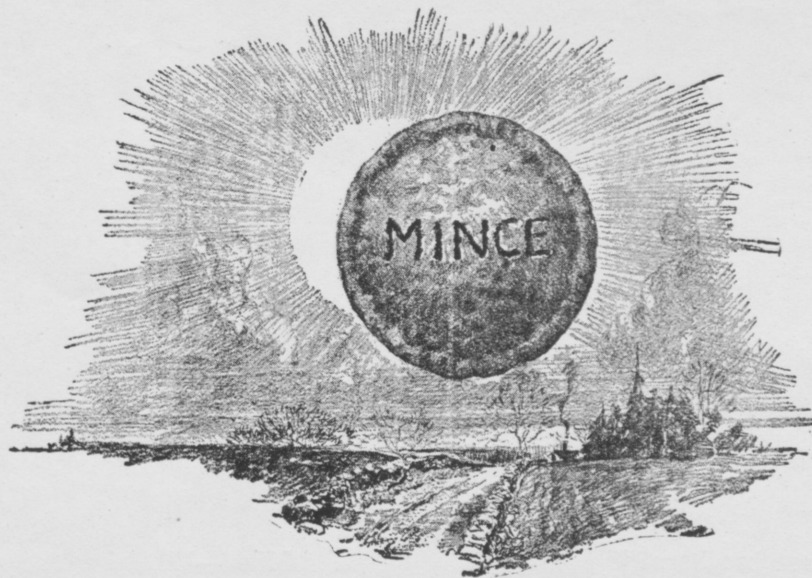
Stude—I don't have to; I have my grandfather's.

Experiments recently made at the Bureau of Standards by G. W. Vinal and F. W. Altrup show that at 170 degrees below zero C., both storage and dry cell batteries reverse their voltage.

It was observed in the storage battery test that at 80 degrees below the voltage was normal, that between 80 and 100 degrees below there was a slight increment of voltage, while from 100 to 170 the voltage fluctuated between 10 minus and 10 plus. The cell when brought back to normal temperature showed no ill effects from the chilling, and delivered its rating.

A dry cell, put through the same test, reduced its voltage at 115 below zero and at 170 degrees reversed its voltage.

The Bhandardara irrigation dam near Nasik, India will soon be completed and will be 250 feet high, storing the greatest depth of water of any dam yet completed.



## Eclipse of the sun

**T**HIS is the month when the sun is outshone, and we mortals draw greater warmth and sustenance from that homely provender—mince pie.

It is the warmth of the holiday spirit, which causes human hearts to glow when temperatures are lowest. Mother's cooking—the family united—Christmas trees and crackling logs—what would this world be without them?

In promoting the family good cheer the college man's part is such that modesty often blinds him to it.

It would hardly occur to the glee club man to sing over the songs of Alma Mater for the still Dearer One at home.

The football man would scarcely suspect that his younger brother is dying to have him drop-kick for the "fellers".

The Prom leader would not presume to think that among those sisters who have been waiting to share his agility at fox-trot may be his own sister.

And in general, college men would scorn to believe that any conversational prowess they might possess on books, professors or campus activities could possibly interest a certain Gentleman Who Foots the Bills.

*But just try it, all of you.* The welcome you get will warm the cockles of your heart.

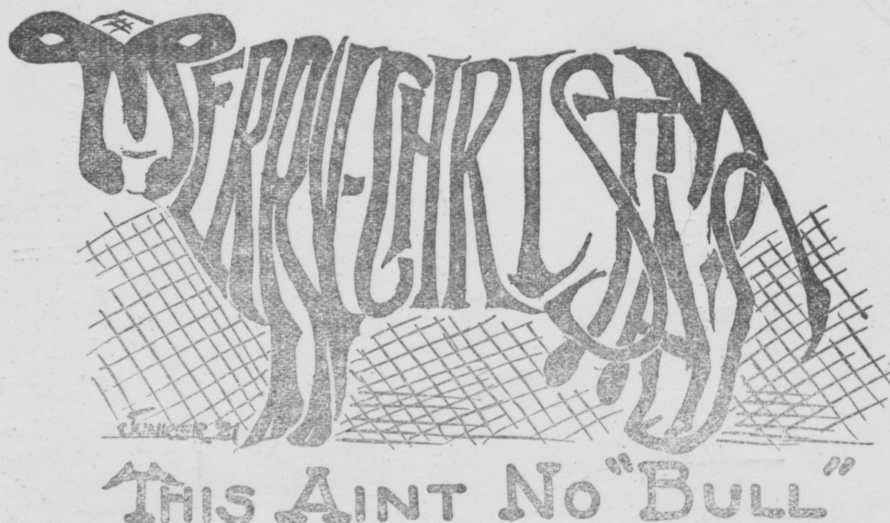
This suggestion, amid sighs as they look back across the years, is the best way a bunch of old grads here know of wishing you "Merry Christmas".

*Published in  
the interest of Elec-  
trical Development by  
an Institution that will  
be helped by what-  
ever helps the  
Industry.*

# *Western Electric Company*

*Since 1869 makers and distributors of electrical equipment*





"How are your brothers?"

Young brother—"Just fine."

Post Grad—"What are they doing now?"

Young brother—"Oh! One is an engineer, and the other one works."

"May I kiss your forehead?"

"Not unless you want a bang in the mouth!"

A certain railway engineer who had made a complete study of the oil losses on his particular run, made it his first duty to instruct new firemen in the care of oil so as to eliminate these losses. On one occasion he was quizzing a new fireman on the duties of his post.

"What would be the most important thing to do in case of an unavoidable head-on collision?" he queried.

Without a moment's thought the fireman shouted, "I'd shut off the lubricator, grab the oil can, and jump!" —Ex.

#### (One of Kinkle's Pupils)

"L. H. Davis, with 197 targets out of a possible 200, won the Massachusetts crapshooting championship at the Montclair Gun Club yesterday."

—The Sunday Herald, Boston.

F ickle  
L ovable  
A rtful  
P ert  
P icturesque ....  
E xtravagant  
R avishing

"Uncle Pete, how old are you?"

"I'm close to a hundred son," said Chiggersville's oldest inhabitant.

"Been using tobacco all your life, haven't you?"

"No, son. Up to the time I was ten years old I'd never had a chew in my mouth."

—Ex.

Miles—What became of the girl you made love to in the hammock?

Smiles—Oh, we fell out.

—Ex.

Cash—I sure do miss that cuspidor.

Cash—So I see by the looks of the floor.

Doc White—Wake that fellow next to you, will you?

Stude—Aw, do it yourself, you put him to sleep.

Colyumist—Where do you get your jokes?

Contrib—Out of the air, so to speak, Why do you ask?

Colyumist—Oh, just curious. I'd merely suggest that you go some place where there is fresh air.

Tyler—"Going out tonight Smiley?"

Johnson—"No, I ain't going out."

Tyler—"Why?"

Johnson—"Because I saw a girl on Blank street."

He—Do you call that thing on your head a hat?

She: (icily)—Do you call that thing in your hat a head?

The wife of a particularly lazy darky was called Combustion.

So they named the darky Nitrogen, because he wouldn't support Combustion.

Lehner—Do you drink?

King—Why, no.

Lehner—Then hold this quart while I tie my shoe lace.

Awake, Awake!

The dawn is here.

The air is filled

With atmosphere.

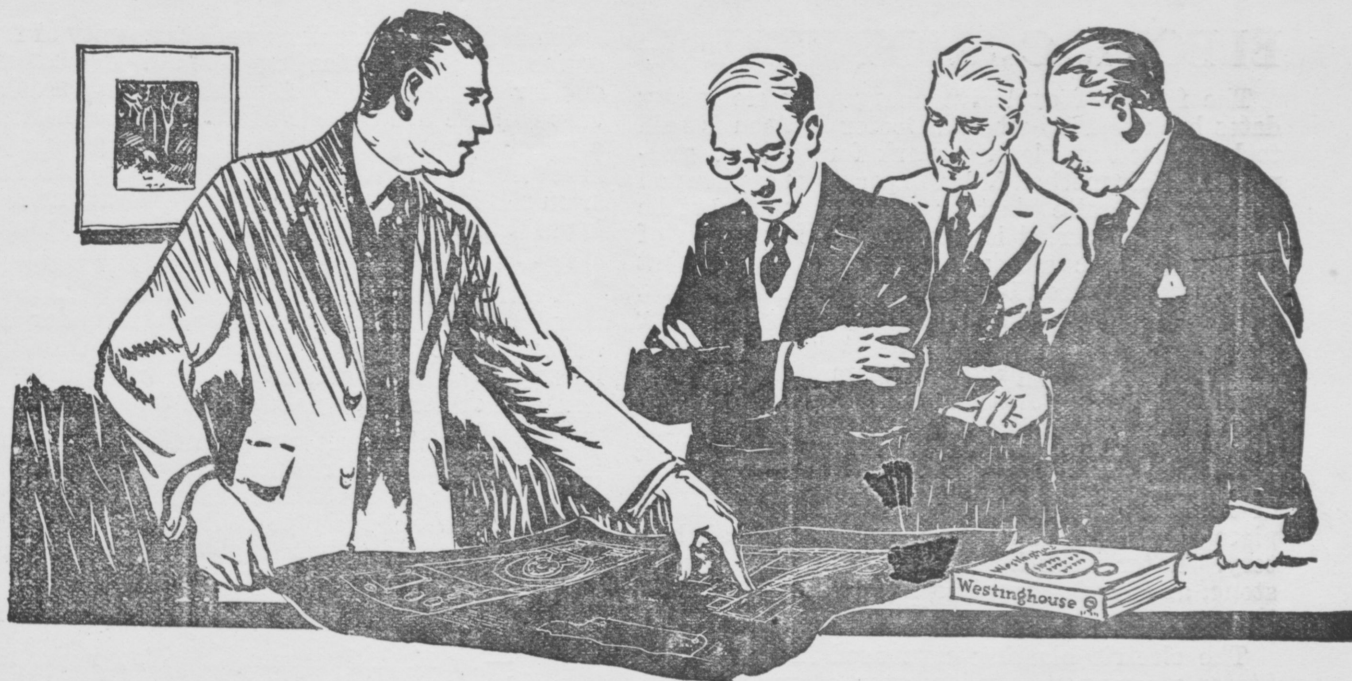
This college life is coming to

A mighty pretty pass,

When a student has to study,

Before he goes to class.

—Ex .



## Engineering Sells, Too!

A whole lot of the make-believe has been eliminated from selling operations in the past ten years. The old idea that salesmen were born to the sample-case, that they carried some sort of a special diploma from the University of Pooh, has had to break camp, along with the other exploded theory which insisted that a salesman must be a "good fellow", a man of strange habits, tremendous stories, and unquestioned qualities both as a mixer, and as an assimilator.

Now we believe—nay, we *know*—that the best salesman is the man who knows most about his goods, and can talk most *interestingly* about them.

This being the proven case, it isn't so queer that engineering should find a real and effective application in the selling

field, especially if the merchandise marketed is an engineering product that is bought and operated by engineers.

Every engineer who now engages in the sale and distribution of Westinghouse products feels that he is doing work worthy of his training—for he is carrying Service and Sincerity to Industry, and to mankind! He is out where the fighting is often the fiercest, and he is putting up a battle for the things that he believes are right. And a man can't expect, nor ask, a bigger chance than that!

Sixty percent, approximately, of the engineering graduates who come to Westinghouse find their way eventually into some phase of selling. And we are proud to have them there—and they are glad to be there!

# Westinghouse

## ACHIEVEMENT & OPPORTUNITY





## ELECTRIC SHOT FIRING

The firing of explosive charges by electricity dates back to 1745 when a Doctor Watson is said to have used an electric spark for igniting gunpowder. His method failed in practical application because, to ignite blasting powder, heat must be applied for a period longer than the duration of an electrostatic spark; Wheatstone found that this does not exceed 1-24000 sec. The usual result, therefore, of an electric discharge in gunpowder is to scatter the grains, without igniting them. Benjamin Franklin partly overcame this difficulty by confining the powder and crushing grains that lay in the line of discharge. In 1822, after the primary cell had been discovered by Volta, Robert Hare, professor of chemistry at the University of Philadelphia, noticed the heating of a short piece of wire placed in the circuit of a voltaic battery. Later work by Oersted, Faraday, Wheatstone, and Henley resulted in the development of the magneto blasting machines.

The electric blasting caps used in the United States are copper cylinders open at one end, containing an explosive charge that is detonated by the heating of a fine bridge wire when an electric current is passed through it from wires sealed into the end of the cap opposite the explosive charge. Electric blasting caps, either No. 6 or No. 8 strength, can be obtained with copper or iron wires. The maximum length of the iron wire is usually 8 ft., copper wires are furnished in any desired length.

Waterproof electric blasting caps are designed for depths of water up to 30 ft. but not for submarine blasting. They have enamelled wires insulated sufficiently for use in sea water. When blasting is done in depths greater than 30 ft., and where considerable time may elapse between the loading and firing of the shots, submarine electric blasting caps should be used; these are usually manufactured only on special order. Nothing weaker than a No. 8 cap is recommended for submarine blasting.

Delay electric igniters consisting of copper cylinders made on the same principle as an electric blasting cap but instead of an explosive charge at the end of the capsule, a piece of high-grade fuse is crimped firmly against the priming composition. These fuses vary in length from 2 to 12 in. When the igniter is used for firing high explosives, a blasting cap is crimped on to the end of the fuse; for black blasting powder, the blasting cap is unnecessary. The current passing through the cap ignites the fuse. Different delays in detonating the explosive are obtained by varying the length of the fuse in the igniter.

Delay-action exploders are similar in principle to delay-action igniters except that a blasting cap is securely crimped on to the fuse and the exploder waterproofed by the manufacturer. A hole is left through the sulphur plug of the exploder so that the gases from the burning fuse may escape. This hole is closed by a shot valve and a waterproofing compound, which prevents any water from entering until the interior gas pressure is sufficient to keep it out.

Small blasting machines with a capacity of from one to five electric blasting caps are very convenient for certain work. A small blasting machine that will fire five electric blasting caps consists of a permanent magnet, in the field of which a coil is revolved by twisting a handle that is detachable from the machine. This type of blasting machine is particularly suited for much coalmining work.

### Special Self-Contained Electric Detonator.

A self-contained electric detonator, particularly adapted for shooting torpedo gelatin under high fluid pressure in wells has recently been developed. It can also be used satisfactorily where Jack squibs are used or for casing shots and trouble work.

This detonator is lowered on a stout copper or iron wire to the desired position. When ready to fire, a 1-in. pipe, about 15 in. long is dropped over the wire. When the pipe strikes the firing head, contact is made which explodes the detonator. The chief advantage of the squib is the saving cost of the double insulated wire required in regular electric firing.

—By N. S. Greensfelder, (Copyright 1922, by American Institute of Mining and Metallurgical Engineers. —)

## STUDENT RATINGS

John Palmer Gait, who probably has more personal knowledge about different American colleges than any other man, says that the student in most colleges can be divided into four groups as follows:

Group 1—The socially prominent and personally popular. Prominent in athletic and other undergraduate activities. Financially comfortable as a rule with small proportion working their way. Few of high standing in scholarship. Few Phi Beta Kappas and excessive proportion of low-grade students. About 25% of total students in this group.

Group 2—Men of lesser prominence. Engaged in minor sports and activities. Better grades than group 1. Members of less prominent clubs and fraternities. A large proportion working their way. Few Phi Beta Kappas. About 30% of total students in this group.

Group 3—The real students. Not conspicuous socially but monopolizing the Phi Beta Kappa. About one-fifth of this group working their way and having a hard time financially. Have no time or money to waste and take college very seriously. About 20% of total students in this group.

Group 4—The recluse and entirely obscure. Half or more earning their way and in serious financial straits. Includes those living in nooks, corners and attics of the neighborhood and getting education under the greatest handicap. Various scholarship grades from highest to lowest. About 25% of total students in this group.

—Princeton E. A. News Letter.

It is said that ancient palaces of Rome show traces of elevators—vertical passages—the stones on the landings being worn deep by the ropes used to hoist the primitive elevators of those days.

The Board of Control of the California Institute of Technology has set up a Student Traditions Court, consisting of nine members—four judges and five deputies. The deputies are all Sophomores, and have therefore the actual say about handling recalcitrant Frosh; but, are constrained in a measure by the more serious advice of the upperclass judges.

The Carnegie Institute of Technology has just closed a drive, the proceeds of which will go to purchase kilts for a 60-piece band. An innovation such as this will create a tremendous stir in collegiate circles as Carnegie claims to be the first school in the country to adopt the custom.

Research in "magneto-striction," or the effect of magnetization on iron, steel, nickel and other alloys, is being carried on by Dr. S. R. Williams at the California Institute of Technology. It was upon the observed phenomenon of change in magnetic properties of a steel with the change in hardness that tests were conducted during the war on steel for rifle barrels for the United States Army.

Rensselaer Poly has added four courses to their Chemical Engineering curriculum, leading to the degree of Ch. E. They are: Industrial Chemistry Laboratory, treated from an engineer's point of view; Theory of Chemical Plants and Equipment, Chemical Engineering Design, and General Chem-

istry Laboratory, embodying instruction in the setting-up and manipulation of extremely delicate apparatus in experimental problems.

Dr. Edward Curran, of the International Transportation and Manufacturing Company of Los Angeles, recently demonstrated a new gas, **currenium**, having a weight of six and two-tenths pounds per thousand cubic feet at a pressure of thirty inches of mercury and a temperature of forty degrees F. Its lifting power is practically equal to that of hydrogen and it has the advantage of being incombustible, except when very greatly diluted with oxygen. Currenium can be produced electrolytically at a cost of one hundred dollars per thousand cubic feet. The process was developed in 1918, but the inventor was not satisfied with the purity obtained by the process as first developed and continued his research work to date.

The transmission of power from Niagara Falls to New York by Wireless has been predicted as a possibility of the near future. The prediction came as a result of the success of a sixteen-hour test of electron tubes in the place of large alternators in transmitting wireless messages across the Atlantic Ocean. Scientists have, for some time, believed that wireless transmission of power might come to pass.

# LET POWERS' TAKE CARE OF YOUR WARDROBE

Appearance is not everything—but it is an advantage. It not only helps you socially but in a business way, and really saves you money on clothing, as a clean suit wears longer.

Whether it be the overcoat, hat, cap or gloves for the home trip or the fancy vest, shirt or suit for the holiday dance, POWERS will get it ready for you, and the quality of our work and service will please you.

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# REVIEWS

②

"Technical Exposition," by K. O. Thompson.

This book covers diction, sentence and paragraph structure in business letter, journalistic exposition, advertising and technical reports. Of value in an English course at a technical school.

Pitman's Technical Primers:

"The Testing of Transformers and Alternating Current Machines."

"Electric Power Systems."

"High Voltage Power Transformers."

"Practical Accounting Problems, Theory, Discussions, and Solutions," by Paul J. Esquerre.

A. L. Sherwood, '23

Editor.

"Catalysis in Organic Chemistry," by Paul Sabatier, Dean of the Faculty of Science, Toulouse, translated by E. T. Reid, Professor of Organic Chemistry of Johns Hopkins University; D. Van Nostrand company, New York; \$5.00.

This work brings to the hands of English and American research chemists the valuable work of Sabatier and other continental scientists during the past few years. The one subject, perhaps, of greatest value treated in this text is the hydrogenation of oils, fats and greases, with respect to catalytic action to promote them.

"The Theory of Relativity," by Albert Einstein, is announced for early publication by the Princeton University Press. It will contain the latest developments on this much discussed subject and, of course, cannot but be fully authoritative.

I. B. Crandall, Wisconsin '09 A. B. Princeton '10 A. M. and '16 Ph. D., is the author of an article on "Analysis of Energy Distribution in Speech" originally appearing in "The Physical Review" and reprinted in the July issue of the "Bell System Technical Journal." Dr. Crandall is in the Engineering Department of the Western Electric Co. He has published papers on infra-red optical properties; condenser transmitter; thermophone, etc.

From the Forest Products Laboratories at Madison, Wisconsin, comes word of the invention of a new process of de-inking old newspapers for reuse. From Utah is reported the possibility of using timber heretofore found fit to make wood pulp. This is important news in view of the fast thinning American forests which in turn threatens the supply of print paper.

The de-inking process involves the use of bentonite, a clay-like substance formed from the volcanic ash found in Wyoming.

We have all learned in our physics that sound can not travel in a vacuum but travels at a definite rate in gases, liquids and solids. We have proved these by electric bells in vacuum jars, watching men cut down distant trees, etc., and have talked against barns and buildings, when we were boys, to hear the echo. Many, no doubt, have the idea that these properties are merely freaks and are good for nothing but experimentation. But nothing is useless—all of these properties were used in the recent war and are being used in peace.

The position of gun batteries were determined by a series of stations equipped with microphones connected with a central machine, recording the time interval between the arrival of the report at two distant stations. Submarines were detected by their sounds traveling far under water and many a darkened vessel in the war zone was saved collision by a submarine microphone to determine the position of other ships and land objects.

In peace today, ship locations are found by the first method modified, in that the ship desiring its location drops a depth charge or generates underwater sound waves by means of a large steel plate—vibrated by electromagnets—called the oscillator. Distant shore stations check up among themselves the time interval for sound to reach them and having determined the ship's position wireless or signal it by other means.

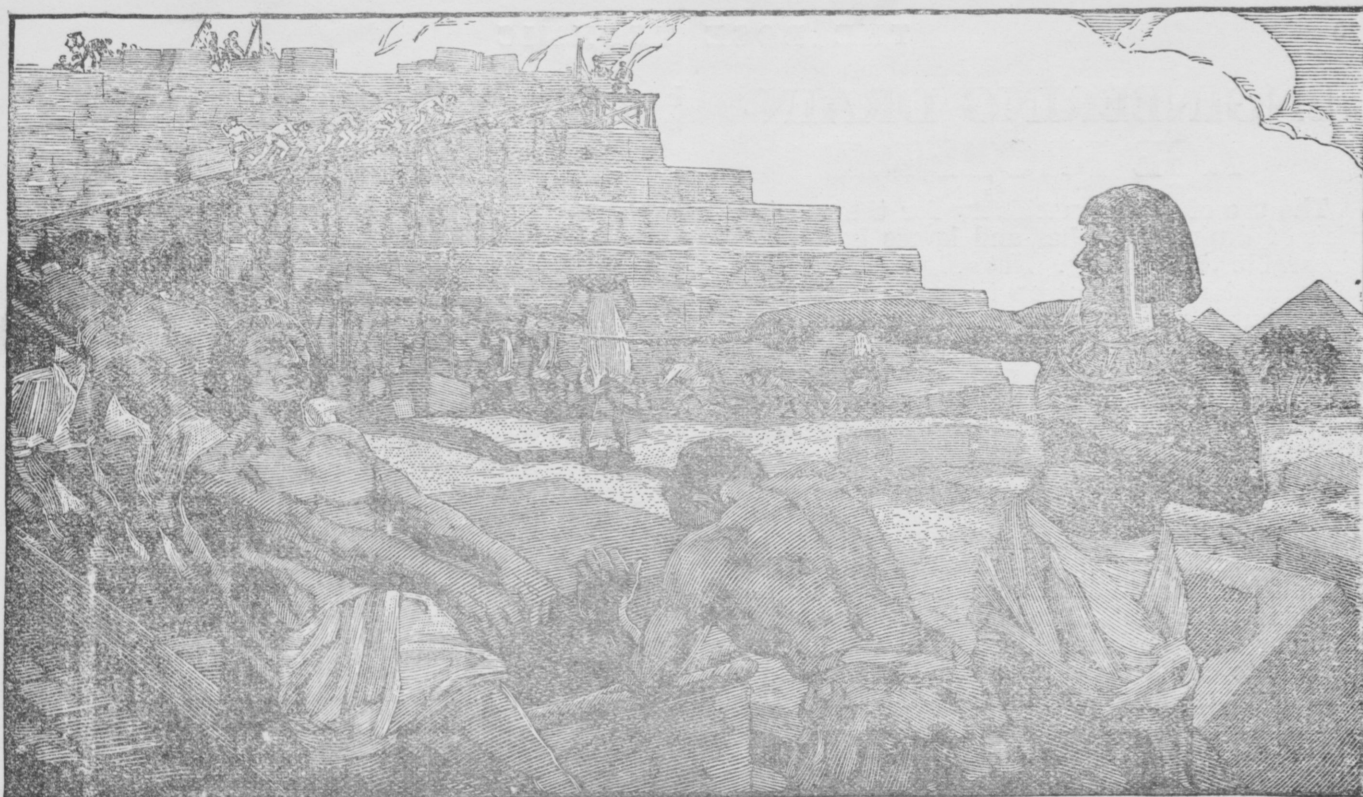
The echo principle finds application in sounding, by determining the time required for a sound from the ship to return after reflection from the bottom. Icebergs are also very easily located by this same method.

We read in the columns of an eastern contemporary that:

A seven foot coal vein has been found on the Campus of the Rose Polytechnic Institute at Terre Haute, Indiana. It has been decided that students will work the mine. A number of those taking the mining engineering course have enrolled to sink the shaft. With coal at its present price we think this find at Rose Poly is a good as an endowment fund.

If we had only known it! Gosh!

Within a year from 8,000,000 to 10,000,000 cubic feet of non-explosive helium gas will be available for the inflation of army dirigibles. The use of this gas in the place of hydrogen will avert such accidents as the destruction by fire of the dirigibles Roma and the C-2.



## The Pyramids of Gizeh

Herodotus records that 100,000 workmen toiled for a generation to build the great Pyramids of Gizeh, tombs for Egypt's kings.

Cubes of stone as large as ten feet were quarried by driving wooden wedges into grooves in the rock and then soaking them with water. The swelling of the wedges cracked the stone which was transported to the Nile over mountains and valleys on water-bound, rock roads similar to macadam roads.

Explosives have replaced slave labor and have made possible the economical production of ore, coal, and rock products required by modern civilization. But in choosing the most economical explosive for each job there still remains an opportunity to prevent waste.

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## ENGINEERING DRAINAGE PROBLEMS

The use of power machinery for the construction of drainage ditches and levees has become general in this country. Not only have new types of excavators been put on the market in recent years, but the older ones are being constantly improved to meet the requirements of drainage work. It is essential that the drainage engineer, upon whom rests largely the responsibility for the proper planning and execution of drainage undertakings, keep himself informed not only of the improvements constantly being made in excavating machinery but also as to the special advantages and limitations of the various types of machines. Contractors usually are required, when submitting bids, to describe in a general way the machinery they intend to employ. Only by being familiar with such machinery will the engineer be able to decide as to its suitability for his project or to estimate intelligently the cost of the work.

Power machinery is available that will construct outlet drainage ditches of all sizes and under all conditions of soil and water cheaper than can be accomplished by any other method. The floating dipper dredge is more widely used in drainage work than is any other type of excavating machine. No other excavator will equal it in constructing ditches from 100 to 1,200 square feet in cross-section through wet, timbered land. It is the most efficient machine to use where numerous stumps will be encountered. Owing to its limited reach, it is not generally applicable to levee construction. Dipper dredges range in capacity from three-fourths cubic yard to 5 cubic yards; the sizes most commonly used vary from 1 to 3 cubic yards.

The clam-shell and orange-peel dredges are not widely used in ditch construction except in soils such as the muck of southern Louisiana and California, which are free from stumps and logs. If equipped with a long boom such a dredge can be economically used to construct levees where there is water to float the machine.

The drag-line scraper excavator is well suited to the construction of ditches and levees, especially those of large cross-section, where the ground is sufficiently stable to support the machine. It is also adapted to clean-out work and to ditch enlargement. It is a flexible machine, adapted to a wide range of working conditions.

The various forms of dry-land machines find extensive use in drainage. The walking dry-land dipper dredge is especially useful in drainage districts where ditch cross-sections are small and there are many short, detached ditches. The grab-bucket dredges of the dry-land class are suitable where sufficient water can not be had to float a dredge.

### Wheel Type

The wheel type of excavator is applicable to open flat land where the soil is neither too hard or too wet. The ditches cut by these machines

have a more uniform cross-section than can be cut by other excavators.

The hydraulic dredge is not suited to ordinary drainage ditch construction. Where water is available it is applicable to the construction of very large channels and also for building levees where the material is such as will remain long in suspension.

Teacher—What is the meaning of 'furlough'?  
Tommy—It means a mule.

"Why no, Tommy, what makes you think that?"

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Tommy produced the book and showed a picture of a soldier sitting on a mule. Underneath was written, "Going home on a furlough."

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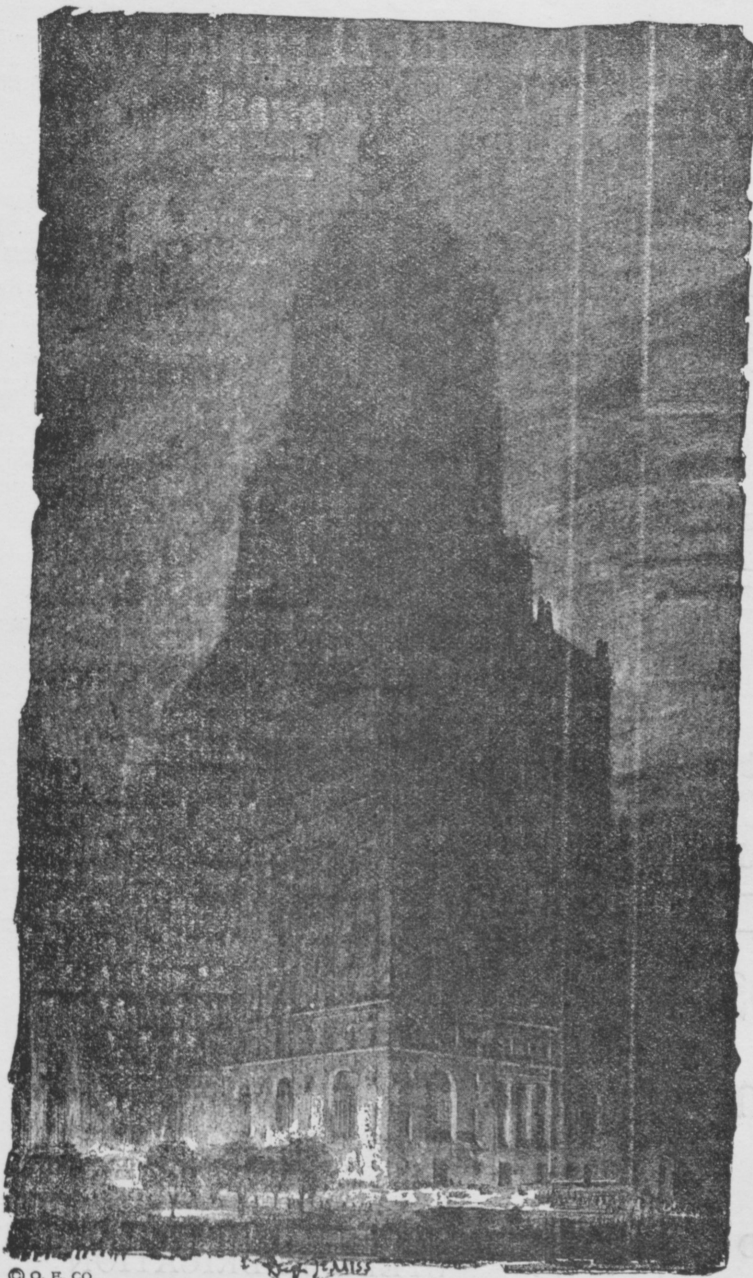
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## ABOUT SCHOOL

Since school began this year, much progress has been made in the internal assembly of shop machinery and equipment.

### MECHANICAL LAB.

Work has been progressing less rapidly in the Mechanical Lab. Professor Wagner's work has been handicapped by the work of plumbers in completing the mezzanine floor toilet just above his department, and by the delay in the setting of the foundations for his engines. Two engines have been placed, entirely by the aid of the Senior Mechanicals.

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### MACHINE-SHOP.

In the machine shop, Mr. O'Neill has erected nearly a dozen complete sets of line and special shafting for lathes, drill presses, planers and a metal-sawing machine. Practically all of the high-speed lathes, heavy duty turret lathes and special cutting machines have been installed and are now in operation in this department.

### ENGINEERING LAB.

The arrival of cold weather has stopped, until spring, further work on the concrete laboratory, which will be underneath the materials testing laboratory. Prof. Thomas was anxious to get this laboratory outfitted before the onset of winter, but was delayed on account of necessary excavation in the basement.

### ELECTRICAL LAB.

The Electrical Lab. has progressed with good speed. Due, however, to the large amount of machinery and equipment which will be housed in this department, desired speed of installation could not be maintained—to avoid making mistakes. Here, too, as in the Mechanical Lab., the work has been done largely by the Seniors. Nearly stalled and numerous transformer units have been placed. As soon as a space can be assigned to a wireless room—to be under lock and key on account of the value and scarcity of such equipment—work will be commenced on the installation of the school radio department. This will probably '20, himself a former radio operator, and assistant in the Electrical Engineering department. be under the direct supervision of Frank M. Stone,

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**WOODSHOP.**

Extension of woodshop has begun. The migration is headed westward, to displace the temporary military office and a classroom. Jack-shafting has already been started along the north wall of the woodshop compartment. It is apparent that the desks and cabinets will be left on the east side of the corridor, while the power planers, drilling machines, and speed lathes will occupy the west side.

**CHEMICAL LAB.**

Work on the installation of the desks and cabinets in the Chem. Lab. has been put off until over

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the holidays on account of the time required for surfacing the floor and making sewer, gas and water connections for the equipment. The two filter presses, coal grinders, compressor and exhauster will be installed along the southwest wall. A still that connects directly with the boiler steam lines will supplant the old gas-heated still for furnishing distilled water.

**FORGING.**

Mr. Nicolson, in the blacksmith shop, however, was delayed by the necessary excavations and drain-tiling for his down-draft forges. Eight in all have been installed, of the Buffalo type. Draft

is made into the main boiler stack, while the flue for the cupola of the foundry is specially built in the extreme northwest corner of the building.

This flue, incidentally, will be cut into later on for exhaustion of gases from an oil-burning muffle furnace to be constructed on the floor above—in the Chemistry Lab.

#### FOUNDRY.

In the foundry division, Mr. Henry had an early start. His cupola was finished shortly after school started, and the construction of benches for moulding practice, compartments for storage of models and other apparatus took but four or five weeks.

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### Rifle Shooting in Colleges

Since the close of the great war small-bore rifle shooting has become a prominent minor sport in many American and Canadian colleges and universities. Over fifty institutions have affiliated themselves with the National Rifle association, and have participated in its annual intercollegiate matches, and in addition many of the college teams have carried heavy schedules of dual meets in which conspicuous records have been made.

Rifle shooting is unique in being the only college sport in which it is unnecessary for the opposing teams to meet on the same field. As the bulk of the shooting is done on indoor ranges, weather conditions may be neglected, and the match may be carried on with each team shooting on its home range and exchanging scores by telegraph. Thus, it is possible to carry on intersectional matches without the expense of travel to a common meeting place.

The schedule of an eastern college rifle team may throw it into competition, not only with its neighboring rivals, but with the colleges of the south, the west, Canada and Great Britain. However, during the last two years, owing to controversies and close decisions, the need has been felt for a distinctive college organization for the standardizing of intercollegiate shooting conditions; with the result that in the spring of 1921 an intercollegiate association of Affiliated Rifle Clubs, open for membership to all college rifle clubs affiliated with the National Rifle association. During the season of 1922 its membership included fourteen colleges and universities.

Besides the standardization of conditions for college dual meets, the association has an important function in the ranking of the teams, and of their individual shooters, and for this purpose it has planned for the coming season an association match, open only to the members of the Intercollegiate association. This match will be fired sometime in February, and will include firing in all positions. Appropriate trophies will be awarded to the winning team and to the highest ranking indi-



vidual shooter. An official ranking list of the individual team members will be made and published at the end of the season. This individual rating will serve as the equivalent of All-American selections in football.

### Rose Riflers

There is no reason why Rose should not have a rifle team to represent the school in these and other matches. This is one sport in which the small colleges have equal opportunities with the big ones, and often furnish unexpected upsets. The local R. O. T. C. unit took seventh place in the Engineer R. O. T. C. unit team competition, small bore, on the indoor range, last year. There were thirteen teams representing the Engineer units throughout the country, entered in the match. The Rose unit finished seventh also in the Fifth Corps Area Intercollegiate rifle match. The showing of the team from this unit was considered excellent, considering the class competition and the limited time available for shooting.

Rose will have an indoor range in one of the basement rooms, or in one of the buildings on the campus, this winter, and it is hoped more interest than ever will be shown in this form of sport.

During the past year, Professor Lockwood of Yale, assisted by the student engineers, has conducted a number of important tests on Rolling Resistance of Rubber Tires, Heat Transmissions, Automobile Radiators, Dynamometer Testing of Automobiles, Tractive Resistance of heavy auto trucks, 4-cylinder Buda gasoline motor, strength of iron pipe fittings, air flow through tin plate orifices, friction of Ball and Roller bearings. Also Professor Breckenridge has conducted tests on heat transfer of hot blast Radiators, fuel tests of high volatile coal in heating boiler. Professor Waters has conducted tests on Design and Construction of a Domestic Refrigerating machine using Ethyl Chloride.

—News Letter of the Yale Engineering Ass'n.

The results of an experimental study carried on at the Carnegie Geophysical Laboratory in Washington on the synthesis and the delimitation of conditions for the formation of a group of minerals known as melilites, and a comparison of the artificial products with the natural minerals was published by Professor A. F. Buddington of the Dept. of Geology in the American Journal of science in the January number. A knowledge of the melilites is not only important mineralogically but has also value in a study of slags formed in various smelting processes.

## ELECTRICITY AND UNIVERSAL PROGRESS

By Edward H. Sniffin, Westinghouse

The world as a whole, considered electrically, is in its infancy. One might casually suppose that in the United States everyone was using electricity, that its rate of consumption might be some-

what near the point of saturation. That is far from true, for there is still but 65 per cent of our population living under electric wires.

We have developed but 15 per cent of our water power which totals some sixty odd million of horsepower. Our steam plants and steam locomotives now in use, which aggregate about 24,000,000 hp., are consuming about twice the amount of coal they would use if modern apparatus and modern methods were employed. Seventy-five million tons per annum, or 12½ per cent of our total fuel consumption, to be saved. Over fifty million hydro-electric horsepower to be developed—twice the total power now in use.

The country increasing a million and a half people a year, a million of them using electric current. Every man, woman and child in the electrified communities now consuming more than one kilowatt hour per day. Great power zones to be established, railroads to be electrified, thousands of isolated plants to be discarded. Almost every day finding some new use for electric power. It is evident, therefore, that while the United States in a comparative way is electrically quite highly developed, in point of fact it has scarcely scratched the surface of its opportunities.

The people of Europe and of North and South America are a minor part of the Earth's population—about 39 per cent. More than one-half of the earth's people are engaged in hard, bare-handed labor, meagerly productive, struggling for bare existence. In some countries nearly 50 per cent of the population is engaged in one form or another of transportation. In the United States it is about 7 per cent.

There's nothing cheap about manual labor if mechanical labor can take its place. It sounds cheap enough if we pay a coolie, let us say fifteen cents for a day's labor or twelve hours, in which he carries a burden of 60 lbs., two miles per hour. On this basis the cost of a ton mile of transportation would be 20.8 cents, whereas the great transportation systems of the United States were built up on an average freight charge of 1 cent per ton mile.

And so on examples might be multiplied to show that the world's economic necessities can no longer be supplied by human brawn. Production must be increased, new national wealth created. The countless millions of people now living in terrible poverty must find alleviation by a cheaper transmutation of the earth's elements to human use.

Special progress and moral advancement have been and always will be a problem of the ages, slow to come as are the reactions of human nature. But a single generation can forever leave its impress upon the world's economic condition, which after all vitality effects the world's happiness. And there never was a time in human history when there was so much to be done and when we knew so well how to do it. Electric power provides the means.

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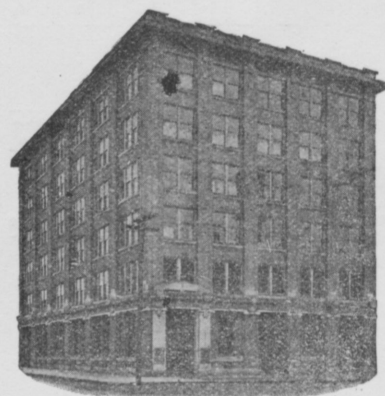
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