THE ELECTRIC LIGHTING SYSTEM
FOR FOUR WHEEL DRIVE TRUCKS
R. M. Newbold, '97

AMERICAN BIG GUNS
United States Ordnance Officer

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VOLUME XXVII

No. 6
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LIKE everyone else, Rose men have been pressed for donations by organizations for the purpose of assisting in the carrying on of the war. At this time, the third great Liberty Loan is well under way, and it is to be hoped that all will strain themselves to the utmost to invest in this business proposition, most essential to the successful prosecution of the war.

Many of us who think that our little mite will be of little material good, will probably be very much surprised to find just what a Fifty Dollar Liberty Bond will actually accomplish:

It will protect 1,000 soldiers from smallpox and 666 from typhoid. It will assure the safety of 139 wounded soldiers from lockjaw, the germs of which swarm in Belgian soil.

It will render painless 400 operations, supply 2 miles of bandages—enough to bandage 555 wounds.

It will care for 160 injuries in the way of "first-aid packets."

It will furnish adhesive plaster and surgical gauze enough to benefit thousands of wounded soldiers.

Every purchaser of a Liberty Loan Bond performs a distinct individual service to his country and to all our boys fighting in France.

FROM time to time, the growing need of engineers and the importance of extreme diligence in each day's work at the Institute has been impressed upon us all. At present, great alarm is felt in England, at the discovery of the lack of trained engineers and facts regarding the same which the war has disclosed.

Professor W. E. Dalby in a recent lecture in London, before the Institution of Civil Engineers, said that Germany at present had a dangerous predominance in numbers of trained engineers. During his visit to Berlin, before the war, he found that there were 10,000 students of engineering over eighteen years of age in the school at Charlottenburg, whereas in British Universities at the same period, there were only 900 of these students. The output of engineers was not one-tenth the German supply, and is today probably much less. The war has taught business men a new conception of what technical education means.

It is feared that ruined industries, when peace comes, will be the order of the day if effective steps are not taken to increase not only the output, but also the efficiency of engineers.

These facts should not only spur us on to greater effort in our studies, but convince us that we are performing for our country a patriotic duty by remaining in school and by making the most of each day.

Mr. A. H. Krom, general secretary of the
American Association of Engineers, in an address recently given before the Savannah Chapter of this organization, defines the American engineer as follows:

“He is that citizen of the United States who is qualified by training and practice to join with his co-workers to direct organizations and harness natural resources which will crush the greatest menace to Christianity and make the world safe for democracy.

He is the man who will after this war solve the great international problems of making all countries safe and sanitary for their peoples.

“He is the man who has for his foundation a broad engineering education that has prepared him to use the natural elements which he has discovered and developed through experiment until today; the Atlantic and the Pacific are speed ways, the air is a high-way free from dust and the shortest distance between two points for travel, and a line for conversation by telegraph and telephone; the swamps are the best fields for grain; and the hills and mountains are producing untold wealth.

“He is the man who recommends the expenditures of millions by his Government or by the business men of the country. All industry, either in war or peace, depends upon the engineer for production and operation. Our profession is extremely fortunate to have the opportunity to step in and be the deciding factor in the war which will mean most to civilization for all ages.

“The American Engineer is the man of the hour.”

THE selective draft has recently taken from the Institute, Claude M. Gray, ’20 and John C. Zimmerman, ’19. Needless to say, their loss will be keenly felt by all of us. We wish them the greatest success, and earnestly hope that the admirable Rose spirit which they have shown during their time at the Institute will ever live with them, for no one of us shall soon forget it.

MR. R. M. NEWBOLD, an alumnus of the Class of ’97, has contributed “The Electric Lighting System for Four Wheel Drive Trucks” for publication in this number. For some time Mr. Newbold has represented the manufacturers of four wheel driven trucks at Washington. While not strictly in Government service, he has from time to time been called upon to serve in a consulting capacity on engineering problems encountered in the Government work.

In “The Electric Lighting System for Four Wheel Drive Ordnance Trucks” the author presents the solution of a problem undertaken by him for the Ordnance Department last July. The article with the accompanying drawings gives some conception of the requirements of the problem together with a detailed description of the accepted design. While of strictly technical nature, it is of unusual interest—particularly to our readers as the work of a Rose graduate.

ARMY NOTES FOR YOUR INFORMATION

An army corps is 60,000 men.
An infantry division is 19,000 men.
An infantry brigade is 7,500 men.
A regiment of infantry is 3,600 men.
A battalion is 1,000 men.
A company is 250 men.
A platoon is 60 men.
A corporal’s squad is 11 men.
A field artillery brigade comprises 1,308 men.
A firing squad is 20 men.
A supply train has 283 men.

A machine gun battalion has 296 men.
An ambulance company has 66 men.
Field hospital has 55 men.
A medicine attachment has 13 men.
A major general heads the field army and also each army corps.
A brigadier general heads each infantry brigade.
A colonel heads each battalion.
A captain heads each company.
A lieutenant heads each platoon.
The Electric Lighting System for Four Wheel Drive Ordnance Trucks

By

ROGER M. NEWBOLD, '97
M. S. '07; E. E. '08; Member S. A. E.; Fellow A. I. E. E.

Shortly after arriving in Washington last April to look after the interests of the Four Wheel Drive Auto Co., of Clintonville, Wis., manufacturers of four wheel driven trucks extensively used by the United States and English governments, I became acquainted with Col. Moody, in charge of the Motor Carriage Division of the Ordnance Department. During one of the interesting chats pertaining to our company's business, he casually mentioned a problem he would like to have solved—the development of an electric lighting system for his department for use on trucks and tractors. By an electric lighting system, Col. Moody meant the generating system and the storage battery. The severity of the service made the storage battery an important element to be considered, for, due to the excessive vibration experienced in field work, the average commercial storage battery proved short-lived in military truck service. Several talks impressed me with the importance of apparatus standing this vibration, and our first step was to rig up an apparatus that would give the equivalent vibration experienced on trucks and tractors, especially the latter.

Storage Battery Testing Apparatus.

Drawing T-134 shows the testing apparatus—or what we called the "bumping machine." The platform $A$, on which the lighting apparatus or batteries were mounted, was pivoted at the one end $E$, while the other end rode the irregularly shaped cam $B$. The contour and speed of the cam were arrived at by experimenting until the platform $A$ was made to undergo vibration equivalent to that experienced in field service, this point being settled to the satisfaction of the Ordnance Department. A speed of 560 r. p. m. was found to give the result desired. Post $C$ was fitted underneath the platform to limit the drop. The hold downs $D$ and $D'$ were used for securing the apparatus to the platform. $T-134-B$ shows the exact shape of the irregular cam.

Results of Tests.

The first tests of storage batteries on this bumping machine showed that the connectors between the cells were the weakest link, as only some 110,000 vibrations were obtained before fracture in this member took place. As the tests progressed, weakness after weakness developed in the following order of importance:
connectors, excessive sloppage on the top of the cells, shaking out of active material from the plates, fracture of the plates due to rigidity of the bridges and the loosening of the individual jars within the container.

Re-Design of Storage Batteries.

The manufacturers co-operated closely in redesigning, until finally we were able to get batteries that would stand over a million vibrations as subjected by the testing machine, coming through the test without any sign whatsoever of disintegrating.

Drawing 4703-VS shows the re-design of the connector between the cells, intended to eliminate failure through fracture of the connectors. The moulded lead connector was eliminated and a lead-plated multiple copper strip type substituted. The object of leading the connector is to prevent its corrosion by the electrolyte. The flexible copper strip connector is not affected by excessive vibration and it affords a connection of maximum conductivity.

Drawing 4702-XS shows the method of stopping excessive sloppage on the top of the cells. In this drawing it will be noted that where the group terminals penetrate the jar cover the design resembles the stuffing box around the piston of a steam cylinder. The design as shown effectually stopped sloppage.

The interior of a battery cell is shown in Drawing 4717-V. The soft rubber lip vulcanized on top of the rigid bridge, cushions the plates and minimizes the shaking out of active material. Drawing 4713-WS illustrates the design of the bottom of the individual plates of...
the group so as to have the projected bearing fit on top of the soft rubber bridge.

Drawing 4701-YS is an assembly of the redesigned battery, illustrating the application of the through bolts AA which pass between the cells to tighten them to the wooden container. This cut also clearly shows the multiple leaded copper strip connector between each cell.

**General Specifications.**

The experience resulted in a general specification that the lighting apparatus, rigidly supported, must be capable of remaining in operation throughout and surviving drop tests of at least 1,000,000 drops of not less than one-fourth inch on a rigid base; the drops must be given as rapidly as possible, corresponding to the jolting to which the battery or other lighting apparatus would be subjected in actual service.

Having an apparatus now for making jolting tests, and with the battery problem out of the way, further conferences developed the following general specifications for a lighting system:

1. A system that can successfully operate with either a three-cell lead or a five-cell alkaline battery and keep either type of battery charged regardless of temperature of external air.

2. A system fulfilling condition (1), so designed that either type of battery may be exchanged for the other without necessitating any further mechanical or electrical changes.

3. A system fulfilling conditions (1) and (2) which can also operate the lights without any battery being used.

4. A system which generates its output at low dynamo speed but does not change its predetermined electrical characteristic at any speed within the limits of the gasoline engine.
(5) A system capable of being adjusted to suit the demands of different classes of service and to operate under these different settings without its predetermined electrical characteristic being changed at any engine speed.

(6) A system meeting all the above requirements, and at the same time capable of withstanding severe service vibration equivalent to the vibration tests given electrical devices in the department.

**Working Conditions of Dynamo.**

If the dynamo were operated at constant speed, running with or without the battery, the problem would obviously be easy. However, the truck speed varies from zero to fifteen miles per hour, the generator being directly connected to the water pump shaft of the engine at twice crank shaft speed. Furthermore, the truck is equipped with a three-speed transmission, with the following ratios of the engine speed to rear axle speed: first (low), 35.61; second (intermediate), 17.81; third (high), 8.91. Thus it will be seen that the dynamo operates at a widely varying speed, whereas the lamp load under the two conditions of operation—side and tail lamps, or head, side and tail lamps—is a constant load. In order to operate the lights without a battery, the dynamo must have a closely regulated constant output throughout its range of speed. The severity of this specification eliminates internally controlled dynamos as it is a characteristic of all internally controlled dynamos to have a variable output with variable speed, plotting what is known as the “hump” curve illustrated in Figure 1. Condition (2) of the general specification—requiring the two types of storage batteries to be interchangeable in the system—renders the adoption of constant voltage control impossible, since there is quite a difference of back e. m. f. between a lead battery fully charged and an alkaline five-cell battery fully charged, and also the voltage of the alkaline battery fully charged and that of the same battery discharged.

**Method of Regulation.**

Further analysis led to the adoption of constant current regulation, allowing either type of storage battery to serve as the voltage regulator and using an external current regulator to correctly control the dynamo output at variable speed. The regulating value was determined by the lamp circuit value.

Of a number of standard electrical units that were tested for properties to fulfill the general specifications mentioned above, one appeared to meet them in a creditable manner.

Figure 2 is a schematic diagram of the system, showing the relation of the shunt wound dynamo to the exterior regulator, to the storage battery and to the lamp circuit. The dyna-
mo is mounted on the engine, the regulator on the dash of the automobile and the battery in a cellar on the running board. As the armature of the dynamo revolves with constantly increasing speed, it builds up sufficient voltage to energize the voltage coil 1 of the circuit-breaker, causing the contacts 2 of the circuit-breaker to close. Thus an outlet for the main current into the storage battery 3 is provided; the value of this current still increases until it reaches the predetermined value, according to which the weight W is adjusted. The series coil 4 of the regulator, acting on the plunger 5, starts the regulator arm downward and inserts field resistance. Each attempt of the dynamo to generate more current due to its increasing speed is offset by a further downward movement of the regulator arm, inserting additional field resistance. The shunt field is weakened in proportion to the increase in the speed of the dynamo. It will also be observed that a decrease in speed and a corresponding slight lowering of the main predetermined current in the series coil 4 of the regulator allows the weight W to raise the regular arm, strengthening the shunt field of the dynamo. The field is strengthened in proportion to the lowering of the speed, and thus a constant predetermined output is maintained, regardless of the armature speed of the dynamo. From a study of the diagram it will be seen that this system can operate with different types of batteries having different voltage characteristics, and that the regulator arm simply moves down farther to cut in more field resistance when working against a low back e. m. f. than it does when opposing a high back e. m. f., assuming that for an interval of time we have a constant speed. It will also be observed in studying the diagram that it is not necessary to observe polarity in connecting up the storage battery, since the dynamo can be automatically energized to correspond to the polarity of the battery; furthermore, that in using the force of gravity for regulation, a constant regulating value is obtained regardless of the temperature.

Dynamo.

Figure 3(a) is a photograph of the dynamo, and Figure 3(b) shows the dynamo with the inspection cover removed. The two brush holders are mounted on top the commutator at 90 degrees to each other and each 45 degrees with respect to the vertical center line of the armature shaft. This is done to make the brushes equally accessible when the dynamo is in position on the engine. Either brush can be removed without disturbing the other, and the

**FIGURE 3. DYNAMO.**

(a) Inspection cover in place. (b) Inspection cover removed.
brush tension springs themselves are used as threads for adjusting the tension thumb nuts. The latter are notched so as to automatically lock in position every quarter of a turn. This dynamo, of the full enclosed current four pole type, is capable of generating continuously a net output of 10 amperes to the work circuit when operating at the highest temperature of the engine hood. The commutation has been perfected so that when the dynamo is generating full load and varying in speed from zero to the maximum, practically sparkless commutation is obtained. The armature is of the laminated drum type, with the windings thoroughly insulated and so installed in the slots as to effectively resist the action of centrifugal force. Ball bearings are used on the armature shaft.

**FIGURE 4. REGULATOR AND CIRCUIT-BREAKER.**
(a) Inspection cover in place. (b) Inspection cover removed.

The weight employed in the regulator is selected so as to adjust the dynamo at an output equal to the current value used in the lamp circuit: the “float point” is established whenever the lamps are burning. Thus the lamps burn at normal voltage with the three-cell lead battery and at a voltage slightly above normal with the five-cell alkaline battery. However, the voltage in the case of operation with the alkaline battery is not over 7.5 volts, and consequently the lamps are operated within the manufacturer’s limits of voltage. If this were not true, a voltage as high as 9.5 volts could be obtained in the system, using an alkaline battery and with the regulation so inaccurate as to permit simultaneous charging of and lighting off the battery.
American Big Guns

By
AN ORDNANCE OFFICER

NAPOLEON started on his career as an artillerist in a time when it was thought that every decisive military engagement must be decided by the bayonet. He said that the most important element in the success of any military operation was the strength and support of its artillery.

In looking over his marvelous military career, the student finds that the dominating factor in his success was the superiority of his artillery and the excellence of the French artillerist. The Germans in their preparations for this war followed in his footsteps. Their marvelous heavy ordnance is one of the greatest surprises of the present struggle.

Today, the two dominating factors in the struggle for world supremacy are still the bayonet and heavy artillery. Without the support of either success is impossible.

Big guns play a major part in deciding battles, now as in the day of Napoleon. For this reason it is interesting to know something about the different kinds of big guns being made for our army in France.

Artillery may be divided into two classes—mobile artillery, which includes all guns used in the field, and seacoast artillery, which is used in fortifications on fixed mounts.

It is the mobile artillery which we are vitally interested in at the present time for offensive work on the French front. This mobile artillery is divided into three distinct types—guns, howitzers and mortars.

GUNS.

The first of these are long-range rifles distinguished by high muzzle velocity and long barrels of from 30 to 50 calibers; that is to say, the length of barrel ranges from thirty to fifty times the diameter of the bore, giving a range of from 6,000 to 30,000 yards with a low angle of fire.

These guns are classified as wheel mounts, anti-aircraft (truck mounts), emplacement mounts, and railway mounts. The wheel mounts are subdivided as pack artillery (mountain guns transported on pack mules); field guns, drawn by horse teams and attached to rummles; motorized field guns, drawn by big ammunition trucks; tractor-drawn guns of large caliber; and the so-called horse artillery, drawn by horses, with all cannoneers mounted, for fast field work in support of cavalry.

The wheel-mount guns include the famous French 75 (3-inch) and the 4.7-inch guns, which have created such havoc among their German opponents and which have been responsible for breaking down the greatest military offensives of the Germans in the past three years. The 4.7 are of greater range and caliber but of practically the same type as the 75 mm.

Next in order, according to size, come the 5-inch and the 6-inch seacoast guns, such as our allies have withdrawn from the fortifications and mounted on improvised wheel mounts, for use as mobile artillery.

The second class are the anti-aircraft guns, for which purpose 75s and 4.7s are provided, mounted on a carriage which will allow an elevation of about 85° and a traverse of 360°, set up on a motor truck.

Emplacement mounts are large-caliber guns that are partially mobile. They are taken apart and moved around in sections in tractors as needed, and set up in concrete emplacements. They are, more strictly speaking, siege guns.

The railway-mount guns are converted seacoast and naval long-range rifles of from 8 to 14 inches caliber. They have a mount consisting of a specially designed carriage on a railroad car and they are operated, due to their extreme range and accuracy, far back from the front lines over the heads of our own troops.

This covers the first class of mobile artillery—the long-range rifles. Next in order comes the howitzers.

HOWITZERS.

The howitzer is distinguished from the rifle by a low muzzle velocity, ranging from 1,200 to 1,900 feet per second, and a short barrel, approximately eighteen times the caliber of the gun, developing a range at high angle fire of from 10,000 to 20,000 yards.

The commonest sizes of howitzer in use are the 155-mm., the 8-inch, the 240-mm., and, of course, the famous 16-inch howitzer which we heard so much about in the early days of the war, when the Germans, who first used them, created such dreadful havoc, destroying with them the fortifications of Liège.

The smaller sizes, such as the 155-mm., and
the 8-inch, are used principally for field work, but also for the bombardment of permanent fortifications when necessary.

Howitzers have the advantage of being cheaper to make than guns, and use cheaper ammunition. Also the life of the gun is longer. Indicative of this the life of a howitzer of the same caliber as a gun would be about two-thirds longer. But they are not as accurate and have not as long range as the guns and consequently are not adapted for all work.

The life of the guns ranges from 8,000 rounds for the small field type down to 600 or 700 for the converted seacoast guns.

These figures denote only the actual accuracy life. It is probable that the guns will be fired up to 50 per cent above these figures before retiring them. By relining the barrels the life of the gun is practically renewed.

MORTARS.

Mortars are distinguished by even lower muzzle velocity, from about 480 to 2,000 feet per second, and by a length of barrel of about 10 calibers, with a range of from 2,500 to 15,000 yards. This extreme range is obtained by a very high angle of elevation. The common French type is the 240-mm. mounted on a railway carriage.

This practically covers the principal guns which are used by our allies today and with which our troops will be equipped in France. The 3-inch and 4.7-inch guns, U. S. Army Model of 1906, are practically the same in general principle as the French 75 and 155, which are of the corresponding caliber. But it must be remembered that our allies have had three years actual experience with which to perfect many of the minute details which are so important in the effectiveness of a field gun and which are only discovered under actual field conditions of long duration. This has led to great improvements over the guns originally in use.

As indicative of the tremendous amount of material that one regiment of 75s comprises, it is interesting to know that there are approximately 300 vehicles, exclusive of the actual fighting material, to each regiment. These vehicles are trailers, tractors and trucks, and artillery repair trucks and supply trucks. In the actual fighting material there are 24 guns, 36 caissons, 60 limbers, and the reel carts for the field telephone, making a grand total of approximately 430 vehicles to a regiment.

The estimated cost of the motorization of the artillery alone of the United States Army is $500,000,000, of which approximately $210,000,000 had been expended on the first of February. Ammunition trucks and vehicles are being completed faster than they can be shipped. Up to the present time the sum of $776,000,000 has been expended by the Procurement Division of the Ordnance Department in the purchase of projectiles. With this sum about 65,000,000 projectiles have been purchased. These include shrapnel, high-explosive type, and gas and anti-aircraft shells for howitzers and guns, weighing from 12 pounds to 1,600 or 1,700, and costing from about $10 to $125 each, exclusive of the cost of explosives or of loading the complete round.

The rapidity with which our ordnance work was accomplished is marvelous when one realizes the enormous amount of preparation that it required. When the war came to Europe in 1914, there was not a single manufacturer in the United States properly equipped to turn out large quantities of field artillery. The work was rapidly taken up by our manufacturers for our present allies. The magnitude of the problem is indicated by the fact that thousands of duplicate gauges had to be made to equip machinists for large quantity production.

First, there must be made what are known as grandmaster gauges, flawless in their dimensions. The grandmaster gauge is only used to check up a number of master gauges, and these master gauges in turn are relied upon to keep a large number of actual working gauges up to standard. Not only are tens of thousands of gauges required to equip a factory for the production of arms and artillery but the gauges must be regularly replaced. Nearly a year was spent by private manufacturers in this country preparing gauges for machine tools for arms for Great Britain, France and Russia. Even after production had been started various adjustments had to be made to keep up with the evolution of their guns into the present types. Both the allies and the Germans are constantly improving on various parts in the construction of their heavy ordnance with the result that the standard type today may be changed before the dies have been made to carry on the work. We, for our part, had to train the man to use the guns as well as make the guns themselves, and we depended upon our allies to hold the forces of the enemy in check until such time as we could be adequately equipped to take the
field. As the result of the efforts of our observers at the front and the Ordnance office at home, we have today reached a production of field artillery which is equal to 50 per cent of that of France.

The United States Government has maintained a large staff of military observers on all fronts since the war began, and it has been their duty to report the result of the allied armies' experience in the field, so that our own forces might be supplied with the very best possible equipment with which to meet the enemy.

It is a fact well known in military circles that British, French and Italian artillerists do not entirely agree in their theories of the proper construction of artillery and the control of artillery fire. It has been the duty of our observers in reporting from the front to sort the good points from each of our allies' methods and incorporate these in our own guns, with the result that foreign military observers in this country admit that the artillery which is to be supplied to the American troops by the American arsenals and munition plants will be unsurpassed by anything used on the front today.

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**NOTES ON THE WAR**

Since the outbreak of the present war fifty-two declarations of war have been made. In addition, twenty-one documents have been issued severing diplomatic relations.

The American soldier receives four times as much pay as the British soldier, eighteen times as much as the French and nine times as much as the German.

The largest service flag in America contains 19,135 stars. The flag is that of the United Mine Workers.

The average cost of training a soldier in the sixteen national army cantonments is $158. The highest in any camp is $182, at Camp Devens, Massachusetts, and Camp Custer, Michigan. The lowest cost is $142 at Camp Lewis, Washington. The cost at Camp Funston is $153 per capita.

It has been announced at Washington that a new invention for chasing submarines has been invented. The first one will be ready for use within six months.

There are now 38,000,000 men in the armies of the warring nations.

The American Red Cross membership now totals over twenty-four millions, more than the combined membership of all other countries.

The country boys were not superior physically to the city boys, figures from the selective draft shows.

It is estimated that there are 1,266,061 women in war work in the United States. One hundred thousand of these are working in munitions factories alone.

Maximum prices for all ores, coke, pig iron, steel and steel products have been fixed by the President.

Great Britain now has 7,500,000 men in the field, and is calling a half million more. Of those now in service England has furnished 4,530,000, Scotland 620,000, Wales 280,000, Ireland 170,000 and the dominions and colonies 90,000, and India, Africa and other dependencies over a million.

The United States is spending $24,000,000 a day to carry on the war.
A Letter From Over There

THE following is from a letter written by William L. Edwards, '10, now in France, to Dr. Mees. Mr. Edwards was exempted from service being a member of the Quaker Church which is conscientiously opposed to war, but being eager to serve his country applied last June and became a member of the Society of Friends for relief and reconstruction work in France:

Caserne du Luxembourg,
Dommartin-les-Toul, France.
March 11, 1918.

"The call by the Society of Friends was for one hundred men to serve without compensation. We were to meet the middle of July at Haverford College for a six weeks' training before sailing for France, but quite unexpectedly I with four eastern men was given a chance to sail immediately for France and so we sailed from New York on July 23rd. I believe a strong reason for my being given this honor was on account of my technical education at Rose.

"We spent a week in Paris and then went to a town by the name of Dale in the Jura Mountains, not far from Switzerland, where the English Quakers had established and were operating a quite complete wood-working and machine shop where they manufactured the parts for sectional wooden houses, which were later set up in the devastated districts of northern France for housing refugees. The English Quakers had been doing relief and reconstruction work in France ever since the beginning of the war. I worked there at Dale, principally in the machine shop for three months and in the meantime our organization became affiliated with the American Red Cross in the Civilian Branch of its work. About the last of October a call came for six Americans of our unit to go to Toul to put in shape a hospital for refugee children. I was accepted as one of the party and three of us have been here ever since. This hospital and home for refugee children is one of the two largest undertakings of the Civilian branch of the American Red Cross in France and you have probably seen accounts of it in the papers or you will when the A. R. C. spring drive for money is sprung. You may see my picture in the act of putting up a stovepipe. We have been doing a little bit of everything up here. One thing that might interest you is that I started a wood-working class among the older French boys living here. We procured several sets of French tools, which though shockingly crude, compared with American tools, we managed to get along with. I started the kids out on the same exercises, as near as I could remember them that I made under Daddy Wires at Rose a good many years ago. I have acquired a very little French over here, living so much with Americans, but I used what little I knew to the limit and I get along famously with the kids. Later the shop had to be discontinued because the space was needed for hospital purposes and the boys were sent to a trade-school in Toul. They stood it about a week and then came to me en masse and begged me to open my shop again, saying they learned so much more under me.

"Toul is now famous as you know as being
the nearest town of any size to the part of the line held by the Americans. We often get a chance to talk with men direct from the trenches and I often wonder if there are some Rose men there now.

"Tomorrow, I start on a new job of running a Ford ambulance and I will be stationed at Luneville, about twice as close to the lines as we are now and the place where the first Americans killed are buried. A dispensary is being started there for the civilian population and branch dispensaries in surrounding towns to which we will make regular trips.

"I signed up with this organization for nine months and my time is nearly up, but I will probably stay for the duration of the war. By the way, I don't know what I would do over here without my slide rule that I got at Rose for changing measurements of length, weight, money, etc., into terms our minds can grasp.

"Well, I am getting some experience over here and have the satisfaction of feeling I am doing my bit, but as far as finances are concerned I am as bad off as if I had no job at all. I hope to get back with the Farquar Furnace Co., when I get back, but of course, everything is uncertain these days."

Word was received recently that Albert L. Somers, '16 arrived safely abroad.

Robert N. Miller, '01, of Louisville, Ky., is at present in Washington, D. C., working on taxation questions. His present address is Law Division, U. S. Treasury, Washington, D. C.

James E. Fitzpatrick, '03, has received a commission as Captain in the 20th Engineers Regiment.

Robert D. Heinl, ex-'04, is editor of the "Emergency Fleet News," published by the U. S. Shipping Board, Washington, D. C.

C. L. Douthett, '09, is with the Universal Portland Cement Company, in Chicago.


Harry W. Knox, '17, is now at the Naval Training Station at Long Island.

A card from Lieut. Chesleigh Gray, '13, announces his safe arrival in France.

John B. Campbell, ex-'96, is secretary of the Y. M. C. A. at Camp Funston.

Second Lieutenant, Roland M. Smith, '05, is now in the Aviation Corps at Wichita Falls, Texas.

Second Lieutenant, Ruel Burns, '15, has recently been stationed in the concentration camp at Dallas, Texas.

First Lieutenant, A. W. Worthington, general military railways, has arrived safely overseas.

Second Lieutenant, Harold E. Smock, '16, is at present stationed at Kelly Field, San Antonio, Texas.

Shelby S. Roberts, '98, has taken a position on the staff of C. H. Markham, Regional Director of Railroads, Healy Building, Atlanta, Ga.

William G. Arn, '97, has been promoted to rank of major of the 13th Railway Engineers now in France.

Harry S. Goldman, '14, has recently been promoted from Second to First Lieutenant of Company H, 56th Engineers and is now stationed at Washington Barracks, D. C.
MILITARY APPOINTMENTS.

After having had classes in military training the greater part of the winter, the courses terminated in an examination upon which the appointments for the spring term were based. The new officers are:

- Major—John C. Zimmerman.
- Adjutant—Kenneth M. Huston, second lieutenant.
- Quartermaster—Frank F. Peker, first lieutenant.
- Assistant Quartermaster—James S. King, second lieutenant.
- Sergeant—Harold L. Kessler, attendance officer.

**Company A (Sophomores).**

- Captain—Rudolph Wiedemann.
- First lieutenant—Norman A. Ruston.
- Second lieutenant—Robin E. Woodruff.
- Signal and first aid unit—Captain Frank M. Stone.
- Sergeants—First, George L. Brown; second, Lester S. Stinson; third, Richard F. Gillum; fourth, Donald C. Maxwell.
- Corporals—Reinking, Crapo, Reinhard, Cash, Mansor, Maxwell, G.

**Company B (Freshmen).**

- Captain—Dewitt P. Cromwell.
- First Lieutenant—Herman S. Schlaman.
- Second lieutenant—Stuart C. Stimson.
- Signal and first aid unit—First Lieutenant, Joseph A. Engelhard.
- Sergeants—First, William C. Bryan; second, Herman J. Lauterbach; third, Clift W. Young; fourth, Adolph A. Geiger.
- Corporals—Clark, Reibel, Ronald, Rosenbaum, Armstrong, Owens.

WAR SAVINGS CLUB.

An organization to encourage systematic saving and thrift has been organized at Rose. This saving club was formed at the suggestion of Professor Faurot and every student signed the pledge which agrees to adopt systematic saving, to refrain from unnecessary expenditures that will cause delay to products more essential to the propagation of the war, to encourage thrift, to invest in thrift stamps, to get other members for this organization. An election of officers was held and Alvin Barnes, '19 was elected president and George Brown, '20, secretary.

SOPHOMORE CLASS MEETING.

A meeting of the Sophomore Class was held Thursday, April 11, for the purpose of electing a new president to take Mr. Gray’s place. Mr. F. M. Pence was elected and Mr. Maxwell (Tubby) will fill the vacancy left by Freddie in the Student Council. After the election a short time was given over to practice in hand grenade throwing with “Romey” as the target.

STUDENT COUNCIL MINUTES.

FRIDAY, APRIL 12, 1918.

Meeting called to order at 4:05 P. M. by President Crapo.

Roll call. Wiedemann absent. Mr. Gilbert present.

Minutes of previous meeting read and approved.

Report of St. Patrick’s Day Committee by Barnes as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount collected</td>
<td>$77.70</td>
</tr>
<tr>
<td>Band</td>
<td>3.50</td>
</tr>
<tr>
<td>Music</td>
<td>12.00</td>
</tr>
<tr>
<td>Hippodrome</td>
<td>23.10</td>
</tr>
<tr>
<td>Phoenix Club</td>
<td>15.00</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>7.45</td>
</tr>
<tr>
<td>Printing</td>
<td>8.00</td>
</tr>
<tr>
<td>Decorations, etc.</td>
<td>8.41</td>
</tr>
</tbody>
</table>

Total: $77.46

Balance: $0.24

Moved by Maxwell, seconded by Pence that report be accepted. Motion carried.

Mr. Gilbert’s monthly report read and approved.

Rolshausen, '20, unanimously elected Financial Secretary of Student Council for balance of Mr. Gray’s term—until Jan. 1, 1919.

Moved by Pence, seconded by Stinson that Mr. Gray receive his one percent commission for money handled by him to date. Motion carried.

Moved by Skinner, seconded by Maxwell that in case of necessity, Mr. Gilbert be allowed to borrow money from Financial Secretary Rolshausen, to the amount of $200.00, same to be paid back as soon as possible.

Moved by Maxwell, seconded by Skinner that meeting be adjourned. Motion carried.

Alvin N. Barnes,
Secretary.
THE Inter-frat games produced two exciting combats but in different lights. The first clash was between representatives of Alpha Tau and Theta Xi. Referee Gilbert lost his whistle and as a result an interesting encounter took place. Held balls wherein each and every man on the floor figured, featured the game. On one occasion three ambitious subs cast off their sweaters and waded into the melee. The final score was Alpha Tau 29, Theta Xi 7. On the same afternoon the Sigma Nu five defeated the Barbs 2 to 0.

The final was a thriller. Out of the varsity squad, Sigma Nu claimed four and A. T. O. a like number. To say the teams were evenly matched is putting it mildly. A. T. O. scored on the first play and soon piled up a 12 point lead. The Sigs came to life at the end of the half, however, and cut the margin down to a 13 to 7 score at the close of the period. Play was fast and furious in the second stanza and the intense rivalry put fight into the teams that made the game a thrill-o. Sigma Nu was within one point of tying the score when the A. T. O. gang cut loose for a second time and ran their total to 26. The Sigs gathered 20 points. Good team work won for Alpha Tau. Most of her baskets were results of series of passes that bewildered the Sigma Nu five. Floyd and Briggs were perhaps the stars of the contest.

Here are the line-ups and scores in detail:

<table>
<thead>
<tr>
<th>A. T. O. (26)</th>
<th>Sigma Nu (20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Froeb (Capt.)</td>
<td>Reinking</td>
</tr>
<tr>
<td>Burns</td>
<td>Biller</td>
</tr>
<tr>
<td>Reinhart</td>
<td>Floyd (Capt.)</td>
</tr>
<tr>
<td>Streeter</td>
<td>Brophy</td>
</tr>
<tr>
<td>Briggs</td>
<td>Krausbek</td>
</tr>
</tbody>
</table>

Substitutions—Barnes for Streeter; Hearn for Reinking.

Field goals—Froeb, 3; Burns, 3; Streeter, 3; Reinhart, Briggs, Krausbek, 3; Floyd, 3; Biller, 2; Brophy.

Poul goals—Froeb, 2; Streeter, Briggs, Floyd, Biller; Reinhart. Scorers—Gillum and Maxwell.

By winning the Inter-fraternity Basket Ball tourney, Alpha Tau Omega took possession of the much-coveted Inter-frat cup. The same cup is up at present for the Track Champs and Coach Gilbert has arranged for a track meet to be held in the near future to settle the dispute. The varsity in track, captained by Floyd, is working out whenever the weather will permit. Crapo, Wiedemann and Goodman are good lookers in the sprints and runs. Burns and Piety are practicing faithfully in the high jump and pole vault.

Captain Floyd is at home with the weights and has “Little Alvin” as a mate. Said Floyd is also a hurdler of no mean quality. Track has never been a strong card in the hand of Rose Athletics, but we should hold our own this year. Let’s hope so, anyway.

BASEBALL

At the present writing baseball for 1918 is well under way. From last year’s squad, there remain Captain Reinhart, Rolshausen, Meadows, Pence and Brophy, all of whom were among those present at the first practice. Among the new men, Gillum, Reinking, Steffan, Barnes and Krausbek loom up as likely material. The hole left when we lost “Sis” Bake will,
no doubt, be Gil’s chief worry this year, but in Krausbek, Tech seems to have a backstop of no mean quality. “Rosey” has bum feet but a good arm. He and Gillum should fill the box with ease. Captain Reinhard looks like Maranville at short, and Meadows, Pence and Reinking are playing well with him. Our Fly Grabbing Corps is filled by such old timers as Hearn, Barnes, Brophy, Ruston, Sewell, etc. Gil should have little trouble in selecting a nine of first quality.

Following is the schedule as she stood on April 10, 1918. Professor Gilbert wishes it known that it is subject to change.

April 19—Notre Dame U. at Rose Field.
April 26—Purdue at Lafayette.
May 4—Wabash at Crawfordsville.
May 11—Normal at Parsons Field.
May 18—DePauw at Rose Field.
May 23—Normal at Rose Field.
May 25—Indiana at Rose Field.
May 28—Normal at Rose Field.
June 1—Normal at Parsons Field.

TRACK

INTER-FRAT TRACK.

ALPHA TAU OMEGA retained the Inter-fraternity cup by winning first place in the annual field meet with a total of 62 points. Sigma Nu came in second with 52 points to her credit. Theta Xi trailed with 8 points. No records were broken in this early season meet but the showings made give Tech high hopes for a first class track team.

Captain Floyd of the varsity, was the individual star of the meet annexing 19 points. “Slivers” took firsts in the hurdles and discus, and seconds in the quarter and high jump. Freddie Crapo grabbed second honors by scoring 13 points. Fred won firsts in the 100 yard dash and in the 440. Reinking, Barnes and Gillum followed in the order named.

Two “dark horses” were Floyd in the high jump and Gillum in the 1 mile. Piety took first in the former event but “Slivers” managed to outjump Johnny Burns. Dick Gillum ran a pretty race in the mile. Assuming a 50 yard lead at the start, he was never headed although Tip Young pushed him at the finish. The two were almost neck and neck at the tape.

Following is the summary:

100-yard dash trials—Firsts, Bryan, Barbarians; Hearn, Sigma Nu; Reinking, Sigma Nu; Crapo, A. T. O.; seconds, Gillum, Walker and Cromwell, A. T. O.; Kremer, Theta Xi.

100-yard dash final—Crapo, A. T. O., first; Reinking, Sigma Nu, second; Hearn, Sigma Nu, third.

120-yard low hurdle trials—Firsts, Floyd, Reinking and Brophy, Sigma Nu; seconds, Engelhard and Walker, A. T. O.; Froeb and Streeter, A. T. O., were disqualified in their heats.

120-yard low hurdle final—Floyd, first, Reinking, second; Brophy, third. Time, 16 seconds.

Shuttle shot put—A. T. O., first; Sigma Nu, second; Theta Xi, third.

Shuttle standing broad jump—A. T. O., first; Sigma Nu, second; Theta Xi, third. Juniors, sophomores and freshmen in order.

Discus—Floyd, Sigma Nu, first; Streeter, A. T. O., second; Barnes, A. T. O., third. Distance, 101 feet.

Mile run—Gillum, A. T. O., first; Young, A. T. O., second; Wiedemann, Theta Xi, third. Time, 5 minutes 22 seconds.


Broad jump, running—Barnes, A. T. O., first; Hearn, Sigma Nu, second; Bryan, Barbarians, third. Distance, 19 feet, 4 inches.

Running high jump—Piety, A. T. O., first; Floyd, Sigma Nu, second; Burns, A. T. O., third.

Interesting Technical Articles of the Month

The Journal American Society of Mechanical Engineers, April, 1918.

Our Industries and the War.
A timely discussion before the New York section on the open question of the adjustment of our industries for effective war work.

Machinery, April, 1918.

Loading and Assembling Time Fuses.
By G. C. White. Detailed description of methods used and tools, jigs and fixtures employed.

Business Methods in the Drafting Room.
By Edward K. Hammond. Description of methods used in S. F. Bowser and Company’s drafting room.

Concrete, March, 1918.

What French Industrial Dwellings Cost.
By Henry J. Harms. The author has stated the actual time given to each part of the work so that close estimates can be made of the cost of work done by similar methods under any conditions.

American Machinist, April, 1918.

Making Concrete Metal-Planing Machines.
By Ethan Vaill. The machines described in this article are a radical departure from anything heretofore attempted in the machine-tool line.

Book Review


A HANDY and convenient pocket-size year-book for analytical, manufacturing and investigating chemists, chemical engineers, and students. The book presents that numerical data which is of general interest and utility. A thorough revision of all tables has been made in accordance with new data which has been published. Forty-eight new tables have been added. These tables include tables on the properties of elements, calibration and true volume of glass vessels, use of indicators, properties of oils and alloys, glass, etc., specific gravity, vapor pressure, weights and measures, capacity of tanks, conversion of units of heat, electricity, etc., freezing point mixtures, etc.

An interesting and valuable feature is the list of books, both American and foreign, which have been published since 1913.

This book contains much information which other year-books omit. It deals almost entirely with tables and is so indexed as to require a minimum of time for finding desired data.

The Annual is of convenient size (5x7½ in.), well bound in flexible leather, and well printed on a good quality of paper.


In the words of the author, “The purpose has been to present the principles of physics in a reasonably complete form, so as to round out the information of a well educated man who is not aiming to qualify as an engineer or technical expert, but who nevertheless desires to be well informed in this branch of science.” The author avoids the use of higher mathematics but gives enough numerical examples to illustrate the principles.

Each chapter is supplemented with a series of illustrative experiments. Although not intended for engineering students the book should be of great interest to them in its capacity to make clear physical conceptions which are too often vague.
Our Sentiments, Too.

Sergeant (lining up colored troops): "Well, Sambo, to what branch of the service do you belong?"

Sambo: "I doan know, boss, but I sho would like to be in B class."

Sergeant: "B class, what's that?"

Sambo: "Why, boss, I'd like to BE there when they go and BE there when they come back."—Volante.

R. P. I.

Froeb, in recent track meet, just before running the 100 yard dash: "Say Jake, can you do this in better than eight"

R. P. I.

In Mechanical Drawing a few days ago, a Freshman drew a picture of a hen so life-like that when he threw it in the waste-basket, it laid there. Henry, call the undertaker.

R. P. I.

Wife (returned from an over-night visit): "Did you get yourself a good dinner last evening, dear?"

Hubby: "Yes, there was a bit of steak in the ice-box, and I cooked it with a few onions I found in the cellar."

Wife: "Onions? Jack, you've eaten my bulbs."

R. P. I.

Heard at a Training Camp. Midnight.

Recruit on Sentry Duty: "Who goes there?"

Approaching Party: "Officer of the day."

Recruit: "Well, what in the hell are you doing out this time of night?"

R. P. I.

Becker—"Sergeant Smith, you should make out your reports so clearly that even the dumbest could understand them."

Heinnie—"What is it you don't understand, Captain Becker?"

Huh!

Tilley—"Surveying a little?"

Mac: (laconically)—"No, surveying a lot."

R. P. I.

Professor (in Chem. Lab.)—"This is a very explosive substance and it might blow us all sky high. Come closer, gentlemen, so you may be better able to follow me."—Widow.

R. P. I.

I Don't.

My parents forbade me to smoke,

I don't!

Nor listen to a naughty joke,

I don't!

They made it clear I must not wink

At pretty girls, nor even think

About intoxicating drink

I don't!

To dance or flirt is very wrong,

I don't!

Wild youths chase women, wine and song,

I don't!

I kiss no girls—not even one;

I do not know how it is done,

You wouldn't think I have much fun,

I don't!

Missouri Miner.

R. P. I.

Modest Johnny.

Teacher—"Do you know, Johnnie, where shingles were first used?"

Johnnie (modestly)—"I'd rather not tell."—Milestones.

R. P. I.

Doctor White to Freshman chemistry class:

"At the next meeting, we will take nitric acid."

R. P. I.

Jack—"Why do you call Miss Prettyone a silent belle?"

Tom—"I kissed her the other night and she never tolled!"
King, endeavoring to explain something, we know not what, in Light:

"When a man thinks he see—."

Jo Jo interrupting: "How about the women and children?"

R. P. I.

Jo Jo "— and we come into this world oftentimes—."

Probst: "Oftentimes? Gee, I only came into it once."

R. P. I.

While walking through a jail one day, a man stopped to ask a fine looking prisoner what he was in for, and the prisoner answered:

"Well, you see I was born in the fog of London, and everything I touched was mist."

R. P. I.

Angry Prof.: "Do you think this class is a joke, young man?"

Stude: "No, sir, I'm not laughing at the class."—Jack-O'-Lantern.

R. P. I.

Lawyer: "Do you drink?"

Witness (quite huffy): "That's my business."

Lawyer: "Have you any other business?"

R. P. I.

TROUBLE IN THE TRENCHES.

She: And what was your most terrifying experience during your two years in the trenches?

He: (Grimly) The night—

She: Yes, yes—

He: When, with the Boches only 150 yards away—

She: Go on—

He: And gas bombs raining and liquid fire coursing upon us—

She: Yes, yes—

He: When suddenly we discovered—

She: Yes, go on—

He: There wasn't a cigarette in our whole detachment.

R. P. I.

Doctor—"What stone is your birthstone, Plodder?"

Plodder—"Grindstone."

THE TARGET.

"Does your wife break many dishes?"

"Not any more. I'm learning to catch them."

—Judge.

R. P. I.

BRIGHT.

"Who was the first electrician?"

Noah. He made the arc light on Mount Ararat."

R. P. I.

"Gee, but I had an awful fright last night."

"I know. I saw you with her."—Cornell Widow.

R. P. I.

DIS-HONOR SYSTEM

Stude to Prof.—"Can I be hopeful of this course?"

Prof.—"Young man, always hitch your wagon to a star."

Stude to Self—"I'll do better than that, I'll sit next to one."

R. P. I.

Green Island—She reminds me of the sea. Howzat?

She looks green—but sometimes she's awfully rough.—Widow.

R. P. I.

"There's room at the top."

The Senior said,

As he placed his hand

On the Freshman's head.

—Missouri Miner.

R. P. I.

THINKING

If you think you are beaten, you are,

If you think you dare not, you don't.

If you'd like to win, but think you can't

It's almost a cinch you won't.

If you think you'll lose, you're lost,

For out of the world we find

Success begins with a fellow's will,

It's all in the state of mind.

If you think you're outclassed, you are;

You've got to think high to rise,

You've got to be sure of yourself before

You can ever win a prize

Life's battles don't always go

To the stronger or faster man;

But soon or late the man who wins,

Is the one who thinks he can.
Before leaving the good old United States with some Military Organization have a good
PHOTOGRAPH
Taken for that Mother, Wife or Sweetheart
They will appreciate it!
GEORGE GRAHAM HOLLOWAY STUDIO

Brutus—“How many eggs did you have for breakfast?”
Caesar—“Et tu, Brute?”
R. P. I.

Jones—“Don’t patronize that restaurant. They charge ten cents for pie.”
Bones—“What of it? I’m a piece-at-any-price man.”
R. P. I.

“Has he a sense of fairness”
“Goodness, yes! He can tell them a block away.”—Gargoyle.
R. P. I.

I roam around and feel half gone
And have an awful cough—
But I’d rather be a-roamin’ on
Than be a Romanoff.—The Widow.

One: Why does an iron ship float?
Two: Because it’s cast on water.
R. P. I.

The Chicago woman was on the witness stand.
“Are you married or unmarried” thundered the counsel for the defense.
“Unmarried, four times,” replied the witness unblushingly.
R. P. I.

“No, Fessor, the man who said ‘There is no such word as can’t never tried to make an eight by taking a North Thirteenth Street car.’”
R. P. I.

Prof. Wickersham to Brophy in English:
“You are next, Mr. Murphy.”
Remark: “We know he’s Irish, ’Fessor.”

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VIGO WAR FUND.

When the Vigo War Fund was organized they came to Rose to get the students to take part in the campaign. The student body entered it with the same enthusiasm that they displayed in the Y. M. C. A. and Red Cross campaigns and undoubtedly contributed much toward its success. The school was divided into teams and each team given a certain district to canvass and besides helping in the actual campaigning the students themselves took out subscriptions in many cases. The Vigo War Fund held a special appeal to the Rose students for besides the many brothers it will help, there is the large number of alumni in the service that will receive its effects, as well as the patriotic appeal that caused the Rose men to take such an interest in it.

THE world’s largest concrete ship, 7,900 tons, christened the “Faith” was launched at a Pacific port in March. With the successful completion of this ship, according to her builders, the construction of fifty-four similar vessels will start. The “Faith” was launched just six weeks after the concrete was poured into the forms.

ARTHUR M. HOOD
Rose ’93

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