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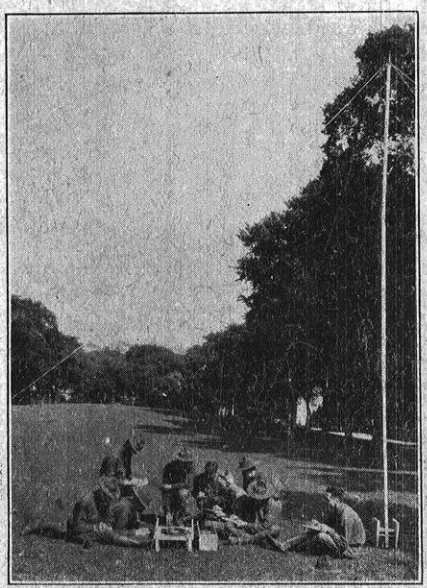
The Wisconsin Engineer

VOL. XXIII OCTOBER, 1918 NO. 1



Students of the Training Detachment Using Radio Set Built by Themselves.

THE FABLE OF THE HUSTLER AND THE PEWTER SHOVELS

Chesterfield Archibald Jones had just landed on his first job. He was fresh from college, but not so fresh that he was green. His boss had sized him for a comer, and Chesterfield was now the big gun on the job and responsible for moving a big chunk of earth for a new railroad. Fifty bohunks were to be unloaded on him next day and there were no shovels on hand. Bohunks

(*Continued on Page ii*)

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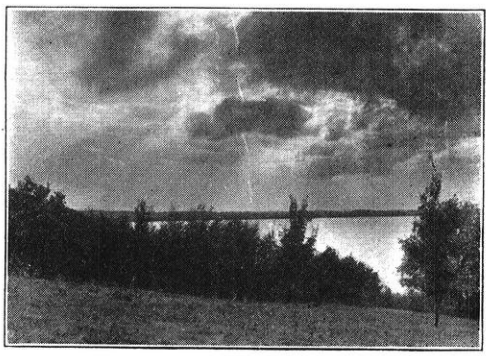

Picnic Point

The Fable of the Hustler and the Pewter Shovels

(*Continued from cover page*)

can't work without shovels, but they can eat as long as there is a bean and a knife in camp.

Chesterfield Archibald Jones was a hustler; which was why he had the job. He loped over to a ranch house nearby, where he had noticed a pretty girl at the door, and obtained a gracious permission to use the rural phone. When central finished in chapter she was on in Ten Nights, she condescended to connect him with the enterprising storekeeper at Bear Rock. The storekeeper hadn't fifty shovels, but would telegraph for them. What kind of shovel did Mr. Jones desire for to have? Mr. Jones didn't know but supposed that any old kind would do to dig with. Next morning he received, by express, fifty shovels of the Any-Old-Kind brand.

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The Wisconsin Engineer

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THE UNIVERSITY OF WISCONSIN U. S. ARMY TRAINING DETACHMENT

In the early part of 1918 the needs of the U. S. Army demanded the training of a large number of men in various technical lines of work. The equipment for training these men was not available in the army training camps, and all the enlisted men qualified to act as instructors were needed for more active service. In order to meet this situation training detachments were established in the various colleges throughout the country, where the existing equipment and civilian instructors could be utilized. The plan has been so successful that it is being continually enlarged. The University started by turning out 450 men every eight weeks, and by the middle of November this number will have been increased to 1,000 men.

PROF. J. D. PHILLIPS
Director of Vocational Training at the University

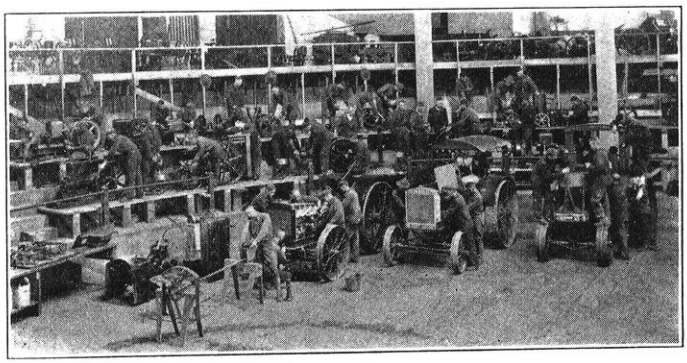
The work is conducted under four main sections: (1) Automobile Mechanics Division, (2) Shop Work Division, (3) Electrical Division, and (4) Radio Division.

AUTOMOBILE MECHANICS DIVISION

An important division of the work in the Army Training Detachment is the Automobile Mechanics Division. In this division the men are given a training which will enable them to go into the field and make all the necessary repairs on motor

cars, trucks and motorcycles. In order to be able to do this, their training must be not only practical, but must consist of a considerable amount of theoretical work as well.

This work started on April the 8th, and one hundred and thirty men have completed the course every eight weeks up until the present time. Beginning with October the 15th, this number will be increased to two hundred and eighty. Many of the men who were trained in the first detachment are now serving in France.



The Automobile Mechanics Division Uses the Stock Pavilion As a Laboratory.

In regard to the actual course of study pursued by these men, Prof. Larson, who is in charge of this work, gave out the following information: Up to the present time the course has been divided into four general divisions, namely: (1) Gas Engines, (2) Ignition, (3) General Automobile Repair, and (4) Stationary Gas Engines. The men spend two weeks in each group. In each division, an hour is spent each day in class room lectures on the work of that particular division. A written examination is given each Saturday morning, covering the class room work and shop work of the preceding week. At the end of the examination each question is taken up and discussed. Each man keeps his notes and a daily record of his work in a "log book". One hour of evening study is devoted to keeping up these books, which are inspected and graded by the instructors at the end of each week. At present we have the men for three and one-half hours in the morning, and two and one-half hours in the after-

noon. On Saturday we have the men for two and one-half hours only, two hours being devoted to examination and one-half hour to discussion.

The work of the first group consists of lectures on the general theory of gas engines, the details of construction and repair operations, with the accompanying shop work. The first week of shop work is devoted to disassembling and assembling motors, valve and ignition timing, and kindred operations. The hourly schedule of the second week is the same as the first, but the shop work consists of "trouble shooting" and carburetor adjusting on various makes of motors. Each man spends one day in disassembling and studying the theory of operation and construction of the various types of carburetors.

During the first week, the work of the second group is devoted to ignition systems, and to a study of the simple principles of electricity and magnetism; to the tracing out of wiring diagrams, and the testing of battery ignition systems and high tension magnetos. The second week is devoted to starting and lighting systems, various types of armature winding, methods of generator regulation, care of commutator and brushes, electrical troubles and methods of finding them.

The work of the third group is devoted to repair operations of all kinds on automobiles brought in off the road, such as valve grinding, various adjustments, carbon removal, re-lining brakes, etc. The work is so routed as to give each man experience on as many different makes of automobiles as possible. The lectures of this group are devoted to various types of clutches, transmissions, and steering gears, including repair operations.

In the past the work of the fourth group has been devoted to the care and operation of stationary engines and tractors, but in the future this group will devote their time to shop work which will include the brazing and soldering of radiators, etc., babbiting, drilling and similar operations.

In the future the course will be arranged so as to enable the men to specialize more in particular branches. Special courses are being arranged for Tractor Drivers, Motorcycle Drivers, and Repairmen, and groups of men will also be selected from the quota to specialize in carburetor repair, ignition, storage batteries, and engine assembling. It is planned to so arrange the

course that specialists can be trained in any particular branch of the work that the service may require.

SHOP WORK DIVISION

In spite of being handicapped by an old building and antiquated machinery, the Shop Work Division under the direction of Prof. Goddard has been doing some very excellent work. The work is so varied, and covers such a wide field that only a brief summary can be given. Prof. Goddard sums up the work done in this department as follows: The students in the Shop Work courses have numbered from about two hundred to two hundred and twenty. These were distributed in the following manner: blacksmithing, twenty; sheet-metal work, twenty; general machine work, forty; gunsmithing, forty; wood-working, from seventy to one hundred. From five to fifteen per cent of the men in the different classes had had considerable previous experience in the kind of work undertaken.

The blacksmithing course followed the usual lines of work. The sheet-metal work consisted of tinsmithing, roofing, and some heavier work. Considerable attention being given to laying out joints and intersections. The general machine work consisted of the regular engineering machine shop work, duplicated several times to develop speed and skill.

The gunsmithing course, however, was a problem. Having no available material for real gunsmithing, the course was developed along the lines of regular bench work. Chipping, filing, drilling, tapping, and thread cutting occupied most of the time. Tempering and case-hardening was included, and near the end of the period, the cleaning and assembling of an army rifle was taken up.

The wood-working was for the most part joinery and cabinet-making for the first two detachments. This included shop furniture, cabinets, household furniture, etc. For the third and succeeding detachments, rough carpentry was specified. Seven new barracks have been about half completed by these detachments, and this work will be continued. As opportunity offers, bridge and trestle, concrete form, pontoon, and tank construction will be added.

ELECTRICAL DIVISION

The Electrical Division is under the direction of Prof. J. W. Shuster. Most of the instructional work of this division has been in the department of Electrical Engineering. According to Prof. Shuster, the work that this division has been doing is very practical. A few of the details in regard to the work are as follows: The Electrical Department arranged to take on ninety men in the first detachment. This number was increased to one hundred for each of the second and third detachments.

In organizing the work for these men an effort was made to conduct it along practical lines, the time being divided between class and practice work. Each man was in class two hours per day, and in practice work four hours per day. On Saturday a written quiz of one hour was given, covering the class work of the week. Two hours of practice work were given on Saturday morning, which completed the instruction for the week.

The class work consisted of a general lecture to all the students, and an oral quiz. During the quiz the students were divided into small sections. The practice work was divided into three groups as follows: Electric wiring, electric repairs, and electric machine operation. Each group of men was kept at each kind of work for nearly three weeks.

All the work was made to conform as nearly as possible to commercial practice. The third detachment is installing the wiring for the new barracks at Camp Randall.

The following members of the regular teaching staff of the Department have been teaching these men during the summer: Mr. E. A. Lange, Mr. L. E. A. Kelso, Mr. J. R. Price, Mr. J. W. Watson, and Mr. J. W. Shuster.

RADIO DIVISION

The Radio Division is an offspring of the Electrical Division, but from now on will be conducted as a separate division of the Army Training Detachment. Prof. Terry of the Engineering Physics Department is director of this division. During the past summer two groups of forty men each have been given an eight weeks course in Radio work. These were regularly inducted men. This course has been extended and enlarged,

however, and one hundred and fifty men will come in each month from now on. These men will take a thirteen weeks course, which means that there will be about four hundred and fifty men in this division at all times. These men must all be high school graduates, and will be given the rating of Radio Electrician. This is not a rank in the army, but is just a rating given for convenience during their training.

The work during the first month will be divided into two parts. One half of the time will be spent in the electrical engineering department, where batteries, direct and alternating current machines, and various other electrical machinery will be studied. The other half of the time is devoted to buzzer and visual signaling. The second month will be devoted to general theoretical work and laboratory practice of radio telegraphy. During the third month the time will be entirely devoted to a study of standard signal corps radio apparatus. During the entire three months the men will have an hour and a half of supervised study in the evening.

The four divisions of this training have been systematized and coordinated under the direction of Prof. Phillips, Assistant Dean of the Engineering College. The Military Department at the University has in every way possible cooperated with the Engineering Department in the carrying on of this work, and it has moved very smoothly indeed. Some difficulty was experienced in housing the men when the detachments outgrew their quarters on the second and third floor of the gymnasium, but this difficulty has been overcome by housing a portion of the men in North Hall, which years ago was used as a dormitory. The entire detachment is to be housed in the new barracks as soon as these are completed.

The effect of the training of these thousands of men will be felt for years after the war. Industry will benefit to an extent that is difficult to estimate by the addition of thousands of expert artisans. The training that they are receiving will not cease to be of value to the country and to themselves after the treaty of peace has been signed. It is to be hoped that after the war such training of men for vocational work will not altogether cease, and that in the event of another war we shall have an adequate supply of trained men.

SOME METHODS OF GAS WARFARE

OTTO L. KOWALKE
Professor of Chemical Engineering

The use of poisonous gases in the present war was first made by the Germans at Ypres in April, 1915, in direct violation of The Hague agreement. The effect of the first gas attack was extremely disastrous to the British soldiers who were entirely unprepared for such tactics, and caused the entire world to stand aghast at the frightfulness of it all. Major S. J. M. Auld, of the British Army, has stated that a deserter from the German Army advised the British that a gas attack was to be made, but this information was not taken seriously because it seemed impossible that any civilized nation would do a thing so frightful. The story regarding the methods of defense against poison gas is full of thrills; the ability, resourcefulness, and decision of the British and American scientists and engineers in solving the problem should arouse intense pride in the hearts of all loyal Americans.

The two general methods used by the Germans in making gas attacks are, (a) gas cloud attack, (b) gas shell attack.

The gas cloud attack was the first to be employed by the Germans at Ypres in 1915, and the particular gas used was chlorine. Chlorine is 2.5 times heavier than air, has a greenish yellow color, and can be liquified by cooling to 0°C. and compressing to 90 lb. per sq. in. It attacks the mucous membrane tissues, particularly in the throat and lungs, causing violent coughing, and finally death by suffocation. Chlorine in large quantities can be easily made by passing a direct electric current through a solution of common salt in water. When free from water, chlorine does not attack iron, hence the liquified product is put into steel cylinders similar to the carbonic acid cylinders supplied to soda water fountains. It is in the liquid form, in steel cylinders, that chlorine is used in gas warfare. The cylinders are placed in holes near the parapet of a trench and carefully concealed, and protected by sand bags so that they may not be hit by the enemy rifle or shrapnel fire. A long lead pipe is attached to the outlet of the cylinder and laid over the parapet, and for

some distance in front of it so that the gas when escaping does not blow back into the trench. Great care must be taken in the placing of the chlorine gas cylinders, so that the gas does not get into ones own trenches. In-as-much as a line of trenches does not always present a straight front, but is usually zig-zag, a slight shifting of the wind will blow the gas back into the trench from which it came. The angle, enclosing the safe area over which an attack from one cylinder is usually made, is about 40 degrees.

A gas cloud attack requires a great deal of preparation, and its success depends on the degree of surprise and state of unpreparedness of the enemy. The most favorable times of the day are early morning or early evening because at these times the wind is usually light, and the currents are more likely to be downward. Dampness is also a favorable factor. The velocity and direction of the wind are the most important conditions, and a velocity from 4 to 12 miles per hour is most favorable. Winds stronger than 12 miles per hour carry the gas upward and disperse it so much as to make it ineffective. Gently sloping ground, away from the chlorine cylinder, is of advantage; wooded country is also favorable because it holds the gas onto the ground. It is now apparent that a gas cloud attack must be preceded by extensive preparations of many kinds, and that, to be successful, atmospheric conditions must be right and the opposing army must be taken by surprise. The German regiments detailed for this work were composed of highly trained men and officers, including engineers, chemists, and meteorologists. In our own army, the 30th Engineers, "Gas and Flame Regiment," has done some very fine work in meeting the Germans more than half way at their own game.

Too much praise cannot be given the women of England who responded to Lord Kitchener's appeal for simple pads of cotton cloth that were to be tied over the mouths and noses of the men. Within 4 days after the first attack sufficient numbers of these pads were made by the English women. These pads were saturated with a solution of sodium carbonate and sodium thiosulphate to absorb the chlorine. These same chemicals are still used in the cannisters of the present gas masks and are most effective. In the absence of a mask, the soldier may protect him-

self from serious injury by breathing through a cloth wet with water or burying his face in damp earth.

Bromine is another gas that was used by the Germans and afterwards also by the Allies. Bromine is dark reddish brown in color. It can be easily liquified at room temperature. It vaporizes readily and is about twice as heavy as chlorine. Bromine irritates the eyes and the mucous membrane of the mouth and throat and produces wounds that are painful and difficult to heal. Bromine was made in Michigan in considerable quantities and sent to the Allies for use on the Western front earlier in the war. Being heavier than chlorine, bromine is not so easily dispersed and can be sent when desired with more certainty. Bromine is absorbed by sodium carbonate and sodium thiosulphate similar to chlorine.

The employment of gas cloud attacks is not so frequent now as two years ago due mainly to the uncertainty of the conditions, and the fact that the opposing armies are well supplied with gas masks and the troops are trained in their use.

The gas shell attack is the method of gas warfare now in common use. Gas shell warfare consists in filling shells with substances that can be gasified upon the explosion of the shells after they have been shot from the guns. Shells filled with gas producing chemicals are made for the various sizes of guns in the artillery, and are discharged in very much the same manner as other ammunition. The advantages of the gas shell attack over the gas cloud attack are in general three-fold: (a) The gas can be put where it is wanted independently of wind or weather conditions, (b) A vastly greater variety of poisonous chemicals are available, (c) Gas can be dropped into concealed gun positions.

The shells used by the Germans are marked with paint in various ways to designate the chemical contained therein, and this has helped the Allies very much. Of all the shells fired by artillery, about 20 percent are gas shells, and this number is sufficient to produce a concentration of poisonous gas which is fatal. The German shells are of various sizes, but on the average will hold about 7 liters (1.84 gallons) of poison-gas producing chemical. The shells are made of steel, about $\frac{1}{4}$ inch thick, and, if the liquid is put into the shell directly, are lined inside with lead about $\frac{1}{8}$ inch thick. In many cases the gas producing

liquid is put into glass bottles and these are put into the shell and surrounded with sand. After the gas producing chemical is put into the shell, a cover containing a high explosive with a time fuse is screwed on. At a fixed time after being discharged from the gun, the shell is burst by the discharge of the high explosive in the cover and the poisonous chemical is gasified and scattered in all directions. This method of sending poisonous gas into our lines is now used almost entirely by the Germans. The Allies are also using gas shells with good effect on the enemy, and the superiority in this department no longer rests with the Germans.

The various types of poison gases used by the enemy may be grouped roughly into five classes:

1. *Lachrymatory* or "tear gas." This chemical has the property of making the tear glands act so vigorously that the soldier is blinded with tears and cannot see to shoot. It incapacitates him temporarily but does him no permanent harm. He is in great danger, however, of being attacked by the enemy with the bayonet. The chemicals used by the Germans for this purpose are chloracetone, bromacetone, and benzyl bromide.

2. *Asphyxiating gases.* In this class belong chlorine, bromine, and phosgene. The actions of chlorine and bromine have already been described. Phosgene is a compound that works insidiously. Its effect is not noted at first, but later on the person affected becomes extremely sick and may die. Phosgene is a gas which can be liquified. For a long time no effective reagent for gas masks was found to take care of it. A Russian finally made the suggestion to use hexamethylenetetramine $(CH_2)_6N_4$, commonly called urotrapine, and this is very effective. All our gas masks are supplied with it.

3. *Suffocating gases.* In this class belong hydrogen sulphide, sulphur dioxide, nitrogen peroxide, and carbon monoxide. Due to the fact that these gases are all lighter than air, they diffuse rather rapidly, and soon lose their effectiveness and are rarely if ever used. The hydrogen sulphide and sulphur dioxide are most easily obtained.

4. *Paralyzant gases.* These gases attack the nerve centers and cause paralysis particularly of the heart. Arsine and hydrocyanic acid (prussic acid) are the chief examples. While

the Germans threatened to use it, no particular trouble seemed to come from this source. Charcoal and alkaline permanganate are effective reagents to remove chlorine, phosgene, prussic acid, and tear gases.

5. *Mustard gases.* The chemicals used to produce mustard gas have given the Allies some very bad experiences. Mustard gas produces very painful burns on the skin, and is specially active when the skin is wet from perspiration or from water. The Germans would shell an area during a rain so that the grass, bushes, and other things would be covered with a solution of the mustard gas. When soldiers touched objects exposed to the gas they were terribly burned. The Allies soon found that the Germans shot over the mustard gas in lanes, and so the Allies simply left the exposed area, knowing that the Germans would not come in there. The gas persists for some days, but heat and dry weather drive it away. Mustard gas is dichtoro-diethylsulphide,—and no very satisfactory absorbent has been found. The gas goes through rubber, cloth, and leather, but linseed oil coatings such as oiled "slickers" are very effective. Our chemical service section has devised some very interesting and effective ways of avoiding fatal results from exposure to this gas.

To protect the soldier from poisonous gases the United States army has provided him with a gas mask which consists of a rubber mask that fits closely onto the face. The mask is provided with two glass windows and projecting through the mask is a tube which can not kink nor collapse, and which has at one end a mouth piece that rests on the tongue, and on the other end a can with various chemicals through which all air taken in must pass. The chemicals are active absorbent charcoal, alkalis, and alkaline permanganates, and are sufficient in quantity to last 36 hours in strongly concentrated gas atmospheres. The cans are easily replaced with fresh ones. This American mask with its accessories is superior to any other in the world today.

THE EFFECT OF THE WAR ON ENGINEERING EDUCATION*

C. R. MANN

(Dr. Mann has been engaged for several years in making a study of engineering education for the four national societies of civil, mechanical, electrical, and mining engineers, and the Carnegie Foundation for the Advancement of Teaching.)

Three years ago most of us thought that a world war could not last long because, however much kings and kaisers might wish to continue, the banker would stop it. But the financiers have not come up to our expectations in this matter, and we have therefore been compelled, unwillingly perhaps, to recognize that money is not the ultimate measure of national strength. National credit is the result and not the cause of intelligent industrial production; the engineer, not the banker, is the real power behind the throne.

This fundamental fact now seems so simple and self-evident that it is rather hard to remember the time when we thought otherwise. But though the rugged outlines of this fact are now sharply silhouetted against the ruddy dawn of the new age, the details of its meaning are but dimly discernible through the haze of speculation over the significance of the struggle. Naturally the engineer is intensely interested in the development of the details of the picture, for on him devolves the duty of interpreting the coming conceptions in terms of materials and organizations of men. And if education makes men, engineering education must be the first to feel the thrill of the dawning day.

Three elements in the picture can now be plainly perceived. These indicate that the engineer is from henceforth vitally involved in the control of credit, in the interpretation of the daily news, and in the organization of industry and commerce to make goods cheap and men dear.

In performing the first of these new functions, the engineer becomes the partner of the banker to determine which projects are worthy of financial support and which not. As the en-

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gineering spirit is more and more infused into this dispensing of credit, public service rather than excess profit becomes the inspiration for enterprise; intelligence in production becomes the best security for loans; ability to deliver the goods becomes the sure basis of financial success; and the control of tools gradually passes from the hands of those who own them legally into the hands of those who can use them effectively.

Newspapers and periodicals already sense the expansion of the engineering spirit in the struggle to make the nation strong. The distribution of wheat, the supply of sugar, the transportation of coal and the price of bread are now subjects which occupy an amount of space in the daily press that only a murder trial could formerly command. The public has never before realized how vital and how interesting factories, freight cars, warehouses, terminals, trucks, and ships really are. Some faint conception of the necessity of organization for the common project of liberating life by winning the war seems to be taking shape; while an impelling desire to serve and to subordinate personal preferences to community interests appears to be dimly developing. These faint feelings of fraternity may grow into driving impulses, if editors continue to extol engineering enterprise rather than private profit in their interpretations of the daily news.

In many communities chambers of commerce or groups of engineers have organized to build up business and boom the town. Through their efforts living conditions have been improved and many a city is being made a better place for homes. But the progress has always been hampered by the vested rights of individuals and of corporations, so that none has yet dared to envisage an entire community as a single working plant for the purpose of organizing it for the most intelligent production of human wealth. This can now be done. The war is opening many hitherto blind eyes to see that each gains more than he loses when he merges his strength with the might of all in an organization that is constructed for the purpose of releasing creative energy by giving each the work he is best qualified to do. The time has come for such an organization in every community and every state, because the federal government is struggling to shape the nation into an organization of this type.

Only so may the nation be strong; only so may communities add their utmost to the nation's strength. The responsibility for this work must finally be shouldered by engineers who are both masters of the mechanic arts and moulders of men.

For many years this country has been drifting toward the realization of these requirements. The war has but accelerated the process and precipitated conclusions that were bound to come, otherwise men trained by experience to meet the present crisis could not now be found. Continuity demands that the same conclusions remain valid long after the war is ended. Therefore engineering schools will render service in proportion as they grasp the implications of these conclusions and express them effectively in the daily work of instruction.

The possible conclusions for engineering education are many and complex, but two stand out in bold relief, namely, there must be closer cooperation between school and industry, and there must be more attention to the appraisement of values and costs.

The essential feature of the cooperation with industry is not the skill, the knowledge of workmen, or the feel of the machines which the student acquires from shop experience. Important as these are, they cannot compete with *the spirit of investigation* which must develop if the cooperation between school and industry is real and vital. There are thousands of unsolved problems in even such rough shop work as freshmen are permitted to do. The boy should be trained to discover these unsolved problems and to bring them back to school for discussion and solution. By making shop work in industrial plants the source of problems for solution in school, and by relating the class and the laboratory work in some degree to the problems raised, conditions most favorable to the self-development of the student may be realized. As he progresses, the problems become more and more intricate, until in his last year, if he has shown real engineering ability, he may be assigned as helper in industrial research, either at the plant, or in the school laboratories. After such a training in defining and solving problems, closely coordinated with instruction in science and drill in mathematics, he should be able on graduation to take a responsible position

without serving several years as an apprentice, as is usual under present conditions.

To the faculty this type of cooperation with industry brings incentives for creative work in production and in education. For cooperation makes the school the source of solutions of industrial problems, not only with respect to the technique of manufacture, but also concerning the correlation of the community's productive processes with the training of its citizens as intelligent workers. Hitherto manufacturing companies have stood aloof and regarded one another with suspicion—and the Federal Trade Commission discovered that 200,000 of them are not paying expenses; but now they are ready to cooperate. Similarly in education, many manufacturers are supporting corporation schools to train their own help, while more than half the children in the entire country quit school at the sixth grade without being trained to earn a living; but they too are now ready to cooperate. If the men who are teaching in engineering schools rise to the responsibility and organize for the systematic study of community production, they could soon create a true university, with its feet firmly planted in industry and its soul consecrated to the task of utilizing science and literature to liberate the creative energies of men.

While close cooperation between school and industry gives that practical experience which is essential for mastery of the mechanic arts, it is not in itself sufficient to enable the schools to meet adequately the fundamental requirements of engineering in the new epoch. The Germans are technically well trained in the mechanic arts, yet they are but brutally strong. In order to strengthen the nation by infusing the engineering spirit in the control of credit, in the interpretation of the daily news and in the organization of industry for the production of human wealth, the engineer must have sound judgment in the appraisement of values and costs. This requires not only an understanding of finance and the meaning of money, but also a *sympathetic appreciation of the things humanity holds to be most worth while.* Even a practical project like building a bridge is ultimately controlled by some man's decision that the resulting value is worth the cost; and this decision is more difficult and subtle when it concerns profoundly the production of human

wealth and the appraisement of human values and costs. The engineer is too often obliged to be only the employee of the bank, the corporation, or the state commission, because he believed that engineering is wholly a matter of technical skill; when control in this, as in everything else, is really vested in the decision of the question whether the game is worth the candle.

Training in the appraisement of values and costs does not require the addition of formal courses for that purpose, but rather the injection of this point of view into every branch of school work. For example, experiments in chemistry need not always be of the type: Analyze this baking powder. The project: Make baking powder and find out if it is cheaper and better than any you can buy, is vastly more effective as a training exercise. Presented as a personal effort to appraise the human values and costs in life's experiences, literature fascinates engineering students. Economics delights them when it is a critique of proposed solutions of the social problems defined by their daily cooperation with labor. Such exercises also foster the development of those homely virtues, which always make the working people the bulwark of a nation's strength—the sense of justice, feelings of neighborly kindliness, devotion to right, and respect for God and man.

Thus because the war has revealed a profounder appraisement of human values and costs, and because the war has hastened the transformation of the individualistic man, selfishly seeking his own personal profit, into a community man willing to do his best for the common welfare, the ideal that was set for the engineering schools in the passage of the Merrill Act in 1862 may now be achieved. For many of the first schools founded under that act were called "industrial universities;" but they soon dropped the "industrial" from their titles, fearing least they lose caste in academic councils. But now, if they gladly grasp the opportunity opening before them, they will claim with pride their abandoned surname and proceed to demonstrate that the engineer, the creator of a new earth, is also the prophet of a profounder philosophy of life.

EDITORIAL

THE JOB AHEAD OF US

The opening of the new school year finds the University on a military basis. In common with other colleges and universities, this institution is now essentially a part of the war machine of the United States, and the greater part of its energies will be exerted directly in the training of men for efficient service in the army and navy.

The extension of the draft laws and the necessity of largely increasing the forces under arms created a serious problem in relation to the education of young men. After long study, this problem has been solved by the War Department in a manner which offers to young men a great opportunity for college training in connection with their military preparation, so that, to a very large extent, those who have prepared themselves for college or have begun a college course are able to continue the same in connection with their military training until called into active service. This arrangement is of particular advantage to students of professional schools, such as medicine and engineering. In a circular issued by the Committee on Education and Special Training of the War Department, the following paragraph appears:

> "It is good general advice to all student soldiers who have been pursuing or had planned to pursue some technical course to continue along that technical line or in preparation for it."

While it is distinctly stated that no promise is made relative to the length of time during which engineering students will be allowed to remain in college, it is plain that the technical course is considered of relatively great importance, and that students who are doing well in their studies should continue these until otherwise ordered. Engineering students may thus continue their preparation for civilian life with the knowledge that they are, at the same time, pursuing the correct plan in preparation

for service in the army or navy. Such an opportunity has probably never been offered by any other country at any time. It is hoped that every student will make the most of this great opportunity.

To the entering class we would give a word of warning. Your numbers are unusually large, and it is hoped that peace may come before the younger among you are called into service. However that may be, it is certain that no slackers will be tolerated in the academic work any more than in the military activities. At least three-quarters of your time is given you for study, and your academic record will count largely in your chances in the army. Those who cannot keep the pace will lose their opportunity. Our advice is: Make a quick start and get into the game.

The Wisconsin Engineer will be published this year as usual. Its quality we expect to be unusual. There are good reasons why the Engineer should be particularly successful during the coming year. *Esprit de corps* among soldiers is vitally necessary. The Marines are noted for it. *Esprit de corps* among students is of great value. The engineers have been noted for this quality in the past, and we should see to it that the results of our work under the new conditions will justify this reputation. The Wisconsin Engineer is a student publication of the College of Engineering. It will contain this year material of unusual interest. It will tell what the alumni are doing to win the war and what the students are doing to prepare for it. We anticipate the cooperation of all engineering students to make it a strong factor in promoting the *esprit de corps* of the college.

FREDERICK E. TURNEAURE, DEAN.

BEHRENS AND BLOWNEY

The Board of Directors of the ENGINEER wishes to make public its appreciation of the services of Manager Behrens and Editor Blowney who are now in the service. Both of these men contributed generously to making the ENGINEER what it was last year and it was hoped that they would be here this year to complete their engineering education, and, incidentally, to carry

on with the magazine. Mr. Behrens is at the artillery school at Camp Taylor; Mr. Blowney is at Great Lakes. Our best wishes go with them.

A NEW ENGINEERING SOCIETY

Dean Turneaure stated to one of the Engineer staff that he would sponsor the formation of a new Engineering Society at the University. The new one is to be erected upon the ashes of all the old ones, which have fallen into the discard along with so many other things since the coming of the S. A. T. C. The Dean suggested that the new society might hold meetings for one hour every Friday night, and that all the sophomores, juniors, and seniors be invited to spend one of their two study hours there. Engineering papers by various students could be read, and all would receive both a great deal of information, and a training in public address which could not help but be of value later. Some system of leaving the bulk of the routine business to a Board of Directors could be adopted so as to prevent the waste of a lot of time with such matters at the regular meeting. Such a plan as this if carried out, would be of genuine value to the engineering students; it should meet with the approval of the faculty and of the military authorities. G. B. W.

DEMOLITION

Savages—both the civilized and the uncivilized kind—are destructive. Both kinds take pleasure in pulling apart or tearing down what another, at considerable pains perhaps, has created. They lack the power to appreciate the creative art. They obtain more satisfaction from the act of destroying than they do from the presence of the thing destroyed; more pleasure from the crash of a broken vase than from a contemplation of its beauty of form and coloring. It requires education to appreciate creative ability.

The engineer is a creator. He derives his keenest pleasures from a contemplation of the works he has built. Into the category of things worth while and beautiful he puts many things

that might seem out of place; a smoky, thundering locomotive; a gaunt, steel bridge; a garbage incinerator. He puts them there because he knows and appreciates the difficulties of their design, the niceties of their proportions, and the worth of their successful functioning. It is inconceivable that an engineer should be a destroyer except under the imperative stress of war. A destructive engineer would be an anomaly. L. F. V.

CREATIVE WORK

Wisconsin should be justly proud of the creative and development work which has been done here. The physics department has been instrumental in perfecting a device for submarine detection that has already helped to send many Hun U-boats to the bottom; one of the engineering students has succeeded in developing a new farm tractor which bids fair to make a great place for itself in the industry; and one of the faculty members in the College of Engineering holds seventy one patents which he himself has taken out, and has just perfected a new poison-gas filter for the government. These are but three examples out of many. Such work as this should be fostered and encouraged, not only among the faculty, but among the students as well. There are opportunities and equipment available here which the student will perhaps never find again, and he should be encouraged to utilize them for research and experiment. It has often been said that the "man who spends many years in school oft-times forgets that the real object of life is to be and to do, and not to read and to brood over what other men have been and done." Wisconsin men should not be allowed to get into this state of mind. G. B. W.

WITH THE COLORS

ARTHUR M. ANDREWS, senior chemical 1917–18 has entered the West Point Military Academy.

RAY E. BEHRENS, junior civil 1917–18 and Manager of THE WISCONSIN ENGINEER, is now at the artillery school at Camp Taylor. He spent a month in the R. O. T. C. work at Fort Sheridan early in the summer, was drafted and returned to the University as a student in radio work with the vocational detachment, and was finally transferred to the artillery.

HERMAN A. BLAU, senior civil 1917–18, is with the 472 Engineers, stationed at Washington, D. C.

W. EDWARD BLOWNEY, junior electrical 1917–18 and editor of THE WISCONSIN ENGINEER, has been ordered to report to the Great Lakes Station.

ROGER B. BUETTELL, c '13, is a captain in the Ordnance Department. He has recently been on detached service at Kenosha.

BUNSEN HEYN, ch '15, Chief Machinist's Mate, U. S. N. R. F., has been transferred to New Navy Nitrate Plant which is being erected at Indian Head, Md.

RUSSELL H. CARPENTER, m '14, is captain in the Aviation Section. He recently made a flight to Madison from Rantoul Field.

BERNARD M. CONATY, c '18, has been commissioned 2nd Lieut. in the Ground Service, Aviation Section.

ROBERT W. CRETNEY, sophomore chemical 1917–18, has been commissioned a 2nd Lieut. in infantry and has been assigned to Kansas University, Lawrence, Kan., to serve in the S. A. T. C.

LIEUT. ROBERT C. DISQUE, formerly assistant professor of electrical engineering, has been commissioned captain and has been in charge of the army school of aviation, radio, and telegraphy at Columbia University, New York City. He has recently been relieved however for special investigations which he is conducting at the Western Electric Co.

TRUEWORTHY O. D. DURGIN, junior chemical 1916–17, has been appointed Ensign in engineering, U. S. N. R. F. and will go to Annapolis for further training.

HARRISON L. GARNER was commissioned Captain in the Engineering Corps last June. Capt. Garner served with Company G of Madison as lieutenant at the time it was on border duty. He was a member of the company for eleven years, but resigned shortly before it was incorporated into the national army. Capt. Garner visited Madison recently on his way to Lakehurst, N. J. where he will act as an instructor in the army Gas School.

FRED P. GERHARDT, senior civil 1917–18, who enlisted last May as Machinists Mate in the N. R. F., has recently been appointed Ensign in engineering. He visited the College recently, previous to entering the training school at Annapolis.

PAUL C. GILLETTE, C. E. '18, is in the Engineer Corps stationed at Washington, D. C.

LT. ARTHUR P. GOCKEL, ch '17, Pioneers Infantry, France.

DONALD L. HAY, m '17, and LOUIS B. SLICHTER, junior mechanical 1916–17, have received their ensign commissions. Ensign Slichter has been sent to France with Prof. Max Mason.

ALFRED G. HOPPE, m '17, is 2nd Lieut. with the 148 Machine Gun Battalion. Address A. P. O. 727, A. E. F.

SGT. OLAV A. HOUGEN, Ch E '18, formerly instructor in Gas and Fuel Analysis and L. T. RICHARDSON, ch '13, are now at the Chemical Plant of Edgewood Arsenal, Saltville, Va.

KARL F. KOTTLER, e '18, has been appointed Ensign in engineering, U. S. N. R. F. and will take the course in the Ensigns' School at Annapolis.

HAROLD W. MEAD, junior civil 1916–17 and son of Professor D. W. Mead, is at the artillery range at Coetquidan in Brittany, where his division is practicing. He is 1st Lieut. and Observation Officer on the Regimental Staff of the 329th Field Artillery.

ARTHUR L. McCAFFREY, son of Prof. McCaffrey, is at a base hospital in France suffering from shell shock, gas, and shrapnel wounds, received, apparently, in the attack on Fismes. He is a private in the Medical Corps of the 127 Infantry, which was the old 1st Wisconsin.

CAPT. KIETH S. McHUGH, ch '17, Machine Gun School, Ordnance Training Camp, Camp Hancock, is in charge of the only machine gun school in U. S.

LIEUT. PAUL D. MEYERS, junior chemical 1916–17, was recently decorated with the Croix de Guerre.

WILLIAM H. NEGLEY, junior chemical 1917–18, enlisted in the navy in August and is stationed at Great Lakes, Ill.

ARTHUR O. OLSON, sophomore civil 1917–18, is at the Artillery School at Camp Taylor.

CARL R. OESTREICH and CHARLES W. BLODGETT, the two men whose pictures appeared on the cover of the May number of this magazine, have both received promotions. Lieut. Oestreich is supply officer at Camp Dodge, Iowa. Blodgett is an ensign.

J. ALBERT SCHAD, C. E. '16, is a private in the Photographic Map Making Division, Aviation Section of the Signal Corps. He spent five weeks at the Eastman Kodak Company's plant at Rochester taking a course in photography. This was to be followed by advanced work at Cornell or Columbia. Before going into this work he was one of the group of Wisconsin men in the concrete ship work of the Shipping Corporation.

C. B. SHAFER, c '14, who has been associated with his class mate Perry Fess in contracting work at Madison went into training at Fort Stevens, Oregon, in April.

PHILIP H. SMITH, c '18, who has been at the Municipal Pier, has just been commissioned Ensign in the Engineering Department, U. S. N. R. F. He visited Madison October 5 before leaving for further training at Annapolis.

DAN N. STALKER, sophomore electrical 1917–18, who enlisted in the Navy last November, has been commissioned Ensign.

HOWARD C. SWEET, Ch E '18, is at Radio School, College Park, Md.

HENRY W. TABOR, C '16, 2nd Lieut. in the Engineers Corps, has been stationed at Camp Humphreys, Va.

JOHN W. TANGHE, c '16, enlisted in the gas service and is in France.

1st LIEUT. ENG. H. D. VALENTINE is now in France.

CLARENCE H. ZARZE, junior chemical 1917–18, enlisted in the Coast Artillery last May.

CAMPUS NOTES

It looks like the same old building and the same old campus but my, oh my, how times have changed. No more loafing on the steps watching the co-eds hurrying up the hill. No cigarette stubs scattered far and wide in front of the old building. Instead the measured tramp, tramp, tramp, as the classes are marched to and from the various rooms. No crowd to shout derisively at the law school, and no law school to shout at. Instead the military cry "Fall In." We shall surely have to put signs out so that old grads can find the building. With all the students marching to classes and no chance of being tardy we are going to miss Louey's morning talk for the benefit of the stragglers to Chem. lecture. Even the sky-rocket may be done away with which, "please to remember," will save one minute for each student, a total of three hundred minutes or a half a day.

Could anyone imagine a drawing class under Pat Hyland conducted in a military manner. Shades of St. Patrick! what are we coming too?

This is the story of how our faculty members spent the vacation months during the summer of 1918:

DEAN TURNEAURE and PROF. L. S. SMITH, in Washington, working for the U. S. Housing Corporation of the Department of Labor.

PROF. PHILLIPS in Madison as Director of Vocational Training for the University.

MR. KARTAK in charge of the State Standards Laboratory, which is located here at the University.

PROF. BENNETT, MR. CROTHERS, and MR. JONES, in research work at the University. The remainder of the staff of the electrical department was engaged in teaching vocational students.

PROF. McCAFFREY as research metallurgist for the Illinois Steel Company at Gary.


THE "FLU" SUSPECT
"SAUGSTAD'S NAVY" ON PAY DAY
THE LAST MAN IN TO MESS
THE "LIT" SOCIETIES
"WOW! ITS COLD!!!"
THE WINGRA PARK PROF WHO HAS BOTH A 7:30 & A 12:30 CLASS
MECHANICS HERE! MATH TUESDAY TO THURSDAY! FINE!-- OH, HELP!!! I FORGOT DRILL
THE PROF WHO MAKES THE SCHEDULES
THE LATE BATHER
WHAT'JA MEAN BY COMIN' OUT HERE UNDRESSED? WHO'JA THINK YOU ARE, LITTLE EGYPT?
PING
THE WEARER OF THE UNFASTENED BUTTON
THE LAW SHOP

S. O. L.

PROF. D. W. MEAD in consulting practice which covered a report on the Mussel Shoals dam for the government, and an appraisal of the Portsmouth waterworks for the company.

PROF. CALLAN in designing labor saving machinery for the Eastern Manufacturing Company, a paper company of Bangor, Maine.

PROFESSORS CORP, KOWALKE, and VAN HAGAN at the S. A. T. C. training camp at Ft. Sheridan.

PROF. KINNE with the State Highway Commission.

MR. WARD running the farm of his father who was seriously ill.

MR. HYLAND on special work for the State Engineer.

PROFESSORS WITHEY, LARSON, BERGGREN, instructing vocational students.

PROF. O. P. WATTS in solving problems in electroplating of lead on gas shells for the War Department. He was successful in putting the production of a large plant on a basis where it met the requirements of the War Department.

PROF. TERRY, of the Physics Department, at New London where he worked on the development of submarine detectors. Extensive experiments were carried on with a device designed by Professors Mason, Robuck, and Terry. Practically every one of Uncle Sam's sub chasers now carries one of the Wisconsin instruments. A school has just been established at New London which will train men in the use of submarine detectors. The graduates will be commissioned ensigns and assigned to duty with destroyers and submarine chasers.

PROFESSORS MAURER, KOMMERS, and MR. MACLEAN at the Forest Products Laboratory.

A new Universal Farm Implement has just been developed by Mr. Charles D. Elwood, who is a resident of Madison, and has been, for the last two years, a student at the Engineering College. The feature of the new machine is its wide range of usefulness; it will do anything that a horse can do. The machine is small, and is so designed that it can be built cheaply enough to be available to the average small farmer. It is so arranged that the tractor, and the farm implement which it is drawing, can be operated as one unit, by a single operator. Further de-

tails are being withheld for the present, due to the fact that the machine is not yet fully protected by patents. An interesting feature of the development of this tractor is that Mr. Elwood himself built the working model in the University shops. He made his patterns, and from them made a set of cheap castings which he assembled in order to check the accuracy of the patterns. From the corrected patterns he then made a set of steel and malleable castings, and assembled them into the working model.

On May 21, A. E. VAN HAGAN, Traffic engineer for the Michigan State Telephone Company, gave an illustrated talk to the engineering students upon the subject "Equipping Camp Custer with a Telephone System." He told how the company had great difficulty in estimating the size of the system necessary to accommodate the soldier city of 40,000 men. An organization of telephone men, sent to Canada in 1916 by the company for the purpose of studying the Canadian system, aided greatly in solving the problems relating to the establishment of the Camp Custer telephone service. A number of views were shown to illustrate the layout of the camp system.

The following men were taken into TAU BETA PI at the spring election: David J. Blattner, Walter E. Blowney, Leo. J. Peters, and Edmund M. Wise, electrical engineering; Herbert Glaettli, civil engineering; Ethan W. Schmidt and Glenn B. Warren, mechanical engineering.

The American Architect for Sept. 25, 1918 contains an eight page abstract of our Engineering Experiment Station bulletin No. 897—"The physical properties of Magnesia Cement and Magnesia Cement Compounds" by R. T. Roark.

The electrical department, in addition to giving its regular courses, is training 150 radio-electricians each month in the fundamentals of electricity.

LAMENT OF SAUGSTAD'S NAVY

Oh why did we do it? We shouldn't have done it.
We all joined the navy last spring,
And now we are sorry, dejected and gloomy
For see what the autumn did bring.
No barracks, no bugle, no loud mouthed lieutenant,
No rifles to make our hearts glad,
No marching, no drilling, no uniforms nifty
Oh surely we ought to be sad.
We try to keep smiling, elated and happy
But down in our hearts there is woe,
We envy you students with no fussing courses,
Do we? Oh, well! I don't know.

Faculty changes for the present quarter are as follows:

PROF. D. W. MEAD will not have any classes this quarter.

PROF. C. I. CORP has left to accept a commission as captain in the Sanitary Corps. He is sanitary officer for the camp at Linda Vista, Calif.

PROF. R. M. KEOWN has resigned to accept the position of safety and sanitary engineer of the State Industrial Commission.

MR. R. H. MORRISON has left to accept a position with the Scanlon Morris Company of Madison.

MR. H. G. GRENOBLE is with the Forest Products Laboratory.

MR. J. D. LIVERMORE has been appointed instructor in drawing. He was graduated from the course in architecture at Armour Institute in 1910 and has been engaged chiefly in architectural work since that time.

MR. J. H. V. FINNEY has been appointed instructor in steam and gas engineering. He was graduated from the electrical engineering course of the Colorado Agricultural College in 1910. He spent some time at the University of Colorado teaching physics; he also taught at Purdue in the steam and gas department. He will give half time to teaching the starting, lighting, and ignition group of the vocational students.

PROFESSORS PRICE and WITHEY joined the Amalgamated Order of War Dads during the summer. David Price arrived July 13, and Loren Harker Withey reached town August 14.

PROF. A. V. MILLAR

MR. H. H. FRENZEL has been appointed instructor for the concrete group of vocational students. He received his B. S. degree at the Oklahoma A. & M. College and his C. E. at Wisconsin last June.

MR. E. DAVID FAHLBERG, ch '18, was appointed as instructor in Chemical Engineering in place of Mr. STANTON UMBREIT who resigned to go into industrial work. Mr. Fahlberg will have charge of the laboratory work in metallography and pyrometry.

PROFESSOR A. V. MILLAR has been made chairman of the Freshman Adviser Committee, assuming the duties formerly performed by Prof. Phillips, who is devoting his full time to the army vocational work of the University.

T. B. MULLIN, HENRY GUMPRECHT, L. A. KIRCH, L. R. BALCH, LIPPERT, and C. N. WARD have been appointed instructors in the surveying department.

It is planned to organize the engineering students into four companies. They will constitute companies E, F, G, and H of the Engineer Battalion of the 2nd Regiment. The engineers have been assigned to six barracks under command of cadet officers as follows: Beta house, Capt. G. B. Kuebler; Delta house, Capt. T. B. Maxfield; Chi Phi house, Capt. W. M. Fanning; Lathrop, Capt. R. F. Lammert; Kappa Sig house, Capt. M. O. Flom; Phi Kappa Psi house, Capt. Murdock; Phi Delta Theta

house, Capt. E. E. Adams. Regimental Headquarters are at the Kappa Sig house. Cadet Captain Maurice M. Hanson with 1st Sergt. Harvey has general charge of all the engineers.

DONALD SLAKER and ED WERBA spent the summer with Prof. Holden at Mina Carlota, near Cienfuegos, Cuba.

Shop practice for students in the collegiate courses has been suspended; the shops are fully occupied by the vocational students.

JO and ALF IHLEN, AXEL TARANGER, and THOMAS NORDBERG SHULTZ, four students from Christiania, Norway, have entered the University to take up chemical engineering. These men are all from the Christiania Gymnasium, and will enter as sophomores. Mr. Albert Schmedeman, American ambassador to Norway, and formerly of Madison, was instrumental in sending them to Wisconsin. They were much impressed with America, and admired very much the stupendous size of our cities, buildings, railroads, and engineering achievements.

The vocational students in concrete have been busy during the summer months. Among other things, they laid the concrete base for the Lincoln statue, put piers under the old grand stand, set up the ornamental lamp posts on the upper campus, built two aprons for the rustic bridge, laid 2,000 feet of one-piece sidewalk at the dairy barn, and put in the concrete footing for the barracks. H. H. FRENZEL was the instructor in charge.

The registration figures up to October 5 were as follows:

2,624 S. A. T. C. men, 406 civilian men, 1,731 women, total 4,761. The engineering students in the collegiate courses number almost 1,000—more than the college has ever had before, and there are in addition 500 or more vocational students in the engineering courses.

ALUMNI NOTES

ONWARD BATES, C. E. (hon) '97, on May 1st, received the degree of Doctor of Engineering from the Rensselaer Polytechnic Institute.

HORACE P. BOARDMAN, c '94, C. E. '11, has been engaged upon the construction of the U. S. Explosives Plant C at Nitro, W. Va.

A. E. HENRY, e '17 who is with the A. T. & T. Company at Detroit was married May 6th to Majory C. Ostrander, of Madison. Mrs. Henry was formerly a Graduate nurse at The Madison General Hospital.

W. H. LOERPABEL, min. '15, who has been in Cuba for some years, visited the College recently. He has recovered from the serious wounds he received at the hands of revolutionists at the time of the latest uprising. It is understood that he is now in the Engineer Corps.

ROGER E. MOORE, who was a student in civil engineering from 1911 to 1914, died October 2 at Camp Taylor, Louisville, Ky., of pneumonia following an attack of influenza. He was a son of Prof. R. A. Moore of the College of Agriculture, and was an instructor in mathematics at Wisconsin.

CAPT. WILL DAVID MOYER, m '12, M. E. '13, of the Coast Artillery, was married June 5th at Portland, Maine, to Ellen Fessenden.

E. E. PARKER, c '07, is in charge of government ship construction yards at San Diego.

FREDERICK N. SCHUSTEDT, c '17, was married October 4th to Helen S. Haner, L. & S. '16 of Sun Prairie. Schustedt is a 2nd Lieutenant in the Aviation Corps and has specialized in night flying.

W. R. SCHMIDLEY, e '05 is the father of a son, William Robert, Junior, born May 14.

EDWARD F. SINZ, c '05, engineer with the Central Aguirre Sugar Co. of Porto Rico, visited the college recently in search of engineers for his company.

WESLEY WILLIAMS, ch '18, is at Nitrate Plant No. 1, Ordnance Department, Sheffield, Ala.

The Fable of the Hustler and the Pewter Shovels

(*Continued from page ii*)

Troubles started early. The digging was hard and the shovels were made of pine and pewter. The handles broke in fifty different places and the blades curled up and melted. Chesterfield Archibald swore roundly and smoked a Camel. Then he beat it to his office shack and burrowed into his chest. He came up with a copy of a technical journal in his mitt and a smile on his map. There on the cover was the ad of the Honest-to-Goodness Shovel Co. Next day C. A. Jones had the Honest-to-Goodness shovels on the job and the dirt was flying.

(*Concluded on page vi.*)

(Continued from page v.)

MORAL

Don't wait until you get on the job before you read the Ads and learn the Names and Products of the Manufacturers who make the Tools with which you will make your Reputation.

Cheering Him Up.—SERGEANT-INSTRUCTOR (to Cadet)—"Na, ye'll no mak' an officer. But it's just possible if the warr keeps on a while an ye practise harrd—verra harrd—ye micht—*micht,* mind ye—begin to hae a glimmer that ye'll never ken the r-rudiments o' the wurrk!"—*Punch.*

Shocking.—An elderly lady of very prim and severe aspect was seated next a young couple, who were discussing the merits of their motor-cars.

"What color is your body?" asked the young man of the girl at his side, meaning of course, the body of her motor.

"Oh, mine is pink. What is yours?"

"Mine," replied the man, "is brown with wide yellow stripes."

This was too much for the old lady. Rising from the table, she exclaimed:

"When young people come to asking each other the color of their bodies at a dinner-party, it is time I left the room."—*Tit-Bits.*

OH, MABEL

There was a young lady named Banker
Who slept while the ship lay at anchor,
She woke in dismay
When she heard the mate say,
"Now hoist up the top sheet and spanker."