

Shooting With Electricity

By H. Gernsback

YEARS ago, when the New York City elevated lines changed from steam to electricity, one of the elevated trains caught fire. An alarm was promptly turned in and in due time the firemen were on the spot. The stream from the high-pressure hose was played on the cars, and to prevent the fire from reaching the wooden structure on which the rails rested, as well as the wooden foot path, one of the firemen of necessity directed his stream on the third rail.

The stars are not intended to indicate what happened and what that poor fireman saw; rather they are meant to illustrate how long he remained unconscious. As a matter of fact the man was almost electrocuted. Since that time firemen do not fight elevated fires unless they are assured that the power has been turned off.

Now, the N. Y. Elevated Lines only carry 500 volts direct current, but this pressure is sufficient to pass from the third rail line, then to the water of the fire hose, and from there into the metallic nozzle held by the fireman. Altho ordinary hydrant water is a poor conductor, a 500-volt current nevertheless finds but little trouble in passing thru the stream of water and thence thru the body of the fireman, with

liquid fire is sprayed upon the enemy, being a parallel to the writer's scheme. While shooting flames over a distance of 50 feet or more has not proven a wonderful success, nevertheless the idea seems to have some merits. And if the Germans can shoot flames at us, why can't we return the compliment by shooting electricity at them? One is as easy as the other, with a few

lines) there is a 10-H.P. gas engine driving a 5- to 8-H.P. Alternating Current Generator. The latter is connected to a step-up transformer delivering from 10,000 to 15,000 volts. A thin but extremely well insulated cable connects with the nozzle carried by the soldier. This cable is connected to one side of the transformer; the other pole

is grounded to earth. If now the stream hits an enemy soldier (who is not insulated from the ground), the high-tension current passing thru the stream of highly conductive acid, runs thru the man's body and thence thru the earth, back to the transformer. In this case he probably will be electrocuted or else knocked senseless by the powerful current. Even standing on a piece of dry wood or a stone will not help him, for the acid running

HAVE you ever stopt to consider that a fireman does not dare to let a stream of water from a nozzle strike an electric wire, carrying any appreciable potential, say a thousand volts or more, as he may be electrocuted. Proverbially speaking, it is a poor rule that will not work both ways. Hence we have the unique proposal by Mr. H. Gernsback, that we charge the enemy with highly electrified streams of acidulated water under high pressure. This unusual invention is not intended as a substitute for guns, but to supplement them. It represents one answer to the German's "Flammen Werfer"—Liquid fire.

points in favor of the latter, it would seem.

Briefly, the idea is as follows: Strapped to a soldier's back is a lead-lined metal tank carrying a solution of diluted sulfuric acid of about 1200° specific gravity. (A solution of chlorid of zinc or even ordinary salt water could be used.) By turning a knob on the outside of the tank a small quantity of zinc or iron filings is thrown into the acid and immediately hydrogen gas is evolved, causing considerable pressure inside of the tank. This causes the acid

down from his uniform will turn the wood or the stone into an excellent conductor and the enemy will almost certainly be rendered unconscious. Probably the most efficient way of utilizing the new scheme will be found in directing the charged stream at a machine gun. The second the stream hits the metallic portion of the gun, the operators will be knocked unconscious or will even be killed. It is also understood that the entire electrocuting outfit, gasoline engine, dynamo, transformer, acid tank



The Germans Invented "Liquid Fire" With Which to Destroy the Enemy. Here Is An American Invention—Shooting the Enemy With Piercing, High-Pressure Acid-Water Streams Charged to An Electric Potential of 15,000 Volts. Trench Gasoline Engine, Electric Plants and Transformers Supply the Necessary Power. The Nozzles Are Heavily Insulated and the Soldiers Wear Heavy Rubber Shoes As Well As Gloves and Masks.

the result that he is knocked unconscious. If the stream had been sea (salt) water, there remains little doubt but that the man would have been electrocuted instantly.

Upon this principle the writer has based his idea of shooting electricity at an enemy, impracticable as the scheme sounds at first thought. Many murderous ideas, of course, have been advanced for trench warfare, the German *Flammen Werfer*, whereby

to be forced out thru the hose attached to the tank and from the hose the acid passes thru the long nozzle carried by the soldier. The acid leaves in a fine stream, less than a quarter of an inch in diameter, and with a fairly calm atmosphere, it should carry from 75 to 100 feet. For most purposes, 50 feet however, will probably be found sufficient.

Now, back in the trench (or behind the

and all the rest of the equipment could be placed in an armored car. In that case, the operators would not be exposed to machine gun fire.

When used by the soldier, however, it is self-evident that his equipment must be such that he himself will not be electrocuted. To that effect he wears a special "high-tension" rubber shoe, capable of withstanding 20,000 volts.* Then too he uses "high-tension" rubber gloves, and in addi-

The Best Way to Aid the President

By HOWARD H. GROSS,
President Universal Military Training League

A FIXT military policy which will protect the nation and strengthen her manhood is the special need of the hour. Each passing day demonstrates this. This League and its sponsors believe that military training lies the nation's chief hope. They therefore urge two things:

First and foremost: Stand behind President Wilson in every way. He is bearing a tremendous burden. Assist him in all emergency measures, whether financial, military or economic.

Second: Use every influence to impress upon our Senators and Representatives in Congress that emergency war measures now pending will not solve our military needs except temporarily. They may carry the country along for the present, but they will not do for the future. The most democratic program as a *fixt* military policy for the United States is that of *universal compulsory military training*. It treats all alike, makes use of young men before they reach the age where their earning capacity is high and when they are yet unmarried, and gives them six months' intensive military training. Then it sends them back to work. These trained youth will form the backbone of a great, democratic citizen army. This is the only definite, simple and patriotic plan that will make America safe and ready.

I earnestly hope that every American will stand by President Wilson and the Government officials who, with the President, are bearing a gigantic responsibility. I have just returned from the national capital and I know and sense in a measure the weight that is taxing our silent and conservative Chief Executive. It would be shameful to see his plans for meeting this crisis defeated. Therefore, as should all citizens, I bespeak general co-operation with President Wilson in these mighty works.

tion to this the nozzle is heavily insulated from his hands by means of a special insulator, as grafically shown on our front cover. The tank of course must be well insulated by soft rubber pads from the back of the operator. Thus equipt he is in little danger of being shocked by the current.

In order to prevent the wind from driving his own acid spray against the operator's face, he is also equipt with a soft rubber mask, as illustrated on our front cover and on opposite page.

From a humanitarian standpoint, the scheme is far ahead of the German flame shooter; sulfuric acid of 125° does not blind, nor does it destroy animal tissue, unless it remains in contact with it for a long period. Sprayed on the skin, but slightly itching results after a lapse of

They are emergency measures, as he has said. This universal military training plan is supplementary to the President's emergency measures. It goes further and will last longer. While he is doing all that he can do safely to pilot the ship of state

while the unpatriotic rejoice in secret in the opportunity to remain safe and sound at home, pile up money and have a good time.

Such a false premium upon patriotism is not only disgraceful in a national military program, but it is decidedly uneconomical and wasteful. In nine cases out of ten the slackers are able-bodied, and under proper tutelage would make good soldiers, while the patriotic fellows who rush to the colors are the sort who are needed most to man the commercial and financial craft of the nation. The best brains will go into the ranks as privates and leave the sluggards at home to conduct the nation's affairs. This is fundamentally bad in a democracy.

Selective conscription no doubt may be necessary at times, but it never will be popular. *Universal military training*, on the other hand, is, thru its very universality, plain, simple democracy. It says that all having the blessings of our institutions should, in time of need, contribute their aid to defending these institutions. It says, further, that the untrained

soldier is so much "cannon fodder," and that the chances of the trained lad returning home in health from war are about three times greater than the untrained boy's.

Therefore, in universal military training, the secret of our general military and naval needs for today, tomorrow and All Time is found.

The Universal Military Training League makes special appeal to the people of the country to write their Congressmen to back President Wilson in all his emergency measures and to eradicate forever the doubt, uncertainty and weaknesses of present muddled military policy by establishing in law a *fixt* plan for universal, compulsory military training and service.

Stand by your President and strengthen your nation!



What Military Training Does For a Man. Compare the Two Recruits on the Left With the Two Erect Figures on the Right. They Are the "Same Men," Photographed Before and After Being Trained for Five Months in the U. S. Army.

thru the eddies just ahead. I ask all patriotic citizens not only to strengthen his arm in this effort, but to aid the nation as a whole in supplementing the President's labors by the establishment of universal military and naval training.

The benefits resulting from such a democratic plan for raising an army in emergencies cannot be over-estimated. The last few weeks have shown how weak and futile other devices have been. The *volunteer* system is unfair, and because it is so thousands of young men who are as patriotic and loyal as the best in the land will not offer their services. They have come to realize that the strong, highest types of manhood go forward while the cowards and slackers only too gladly stay at home. The best blood goes to the front

several minutes. On the other hand, the high-tension current kills either outright, or otherwise puts the enemy out of the fighting for the time being, with little bad after-effects. The acid, plus electricity, does not cause horrible burning wounds or burned off limbs as does the liquid flame.

As with all war-schemes, the wise ones will now ask the usual question: What happens, if the enemy, too uses the electroting apparatus?

In answer the writer asks another question: What happens, if the enemy *too* uses liquid flames, or if the enemy *too* uses machine guns?

*This shoe was described on page 24, May, 1917, issue of this journal.

AUXILIARY SIGNAL CORPS UP-TO-DATE.

Perhaps the finest single auxiliary signal corps possess by any army has been given to the United States by the American Telephone and Telegraph Company. About 500 engineers already have been selected and some of them have been sworn into army service. The differences between government pay and their salaries with the telephone companies will be paid by the latter.

The corps will be made up of general plant and traffic engineers to plan, set up and operate telephone, telegraph and wireless plants. If the regular force of the army proves to be too small, men also will be provided to assist in the wireless work.

DATE OF ISSUE.—As many of our readers have recently become unduly agitated as to when they could obtain THE ELECTRICAL EXPERIMENTER, we wish to state that the newsstands have the journal on sale between the fifteenth and the eighteenth of the month in the eastern part of the United States and about the twentieth of the month west of the Mississippi River. Our subscribers should be in possession of their copies at these dates. Kindly bear in mind, however, that publications are not handled with the same dispatch by the Post Office as a letter. For this reason delays are frequent, therefore kindly be patient and do not send us complaints as to non-arrival of your copy before the twenty-fifth of the month.