MILITARY SCIENCE

U. S. Prepares

America Wants to Avoid War, But is Carefully Arming With Rifles, Field Guns, Howitzers, and Machine Guns

By DR. FRANK THONE

See Front Cover

UNCLE SAM is watching the deadly game on the other side of the Atlantic with no more wish or intention of dealing a hand for himself than he had in 1914. No sensible person would ever want to sit in on a game like that, where the stakes are the whole manhood and wealth of nations and the only possible prizes are death and destruction.

Yet, remembering how he was drawn against his will into the first World War and how he had to improvise his weapons in a great and wasteful hurry, Uncle Sam is wisely taking stock of what he has ready for service now, or can produce quickly, if circumstances not now foreseen compel him again to face a foe in arms.

Item number one, in any man's army inventory, is always the infantry rifle. Despite a couple of decades of talk about the man on foot being eliminated in the "next war," by rattling tanks on the ground and roaring airplanes in the air, the doughboy with his individual weapon has shown unexpected powers of survival and resistance. Infantry still remains the final argument in battle.

And in the new Garand semi-automatic rifle, your old Uncle holds a trump card that tops anything in the hands of any nation on earth. It fires the standard .30-caliber cartridge as fast as the soldier can pull the trigger, increasing his rate of fire at least fourfold. Furthermore, despite this almost machine-gun-like rapidity of fire, accuracy is also tremendously increased, because the soldier does not need to take the weapon away from his shoulder and operate the bolt mechanism by hand. The loading mechanism is operated by a part of the energy of the firing itself.

Good Against Aircraft

It is considered probable that the Garand is capable even of anti-aircraft fire, against low-flying planes that suddenly appear to bomb and machine-gun marching columns. A hundred men, each firing his clip of eight cartridges in perhaps half as many seconds, should be able to make a "strafing" flier think he had stumbled into a nest of steel hornets.

Arming of the Regular Army and the National Guard with the Garand is now proceeding apace, and quantity production can be stepped up if the need comes.

Next to the infantryman's rifle, the most important army weapon is the light field gun, the quick-firing, fast-moving piece of artillery that can lay down a barrage of 30 or more shells a minute, and move about at least as rapidly as the infantry which it supports.

No better gun for this purpose has ever been built than the famous French 75, of war-time fame. Although a little more than 40 years old in its design, it is still going strong; and there are some thousands of them in reserve in U. S. arsenals. The exact number is an official secret, but it is admitted that there are enough of them "to equip a good-sized army."

New Gun Carriage

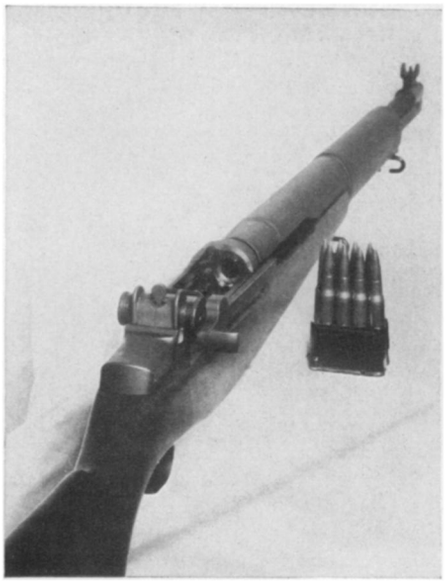
The weakness of the war-time 75 is its carriage, not built for modern motor-towing speeds. However, Army ordnance designers have worked out a new all-steel carriage with rubber-tired disk wheels, that will permit it to go anywhere at any speed. It also permits a much greater elevation, that increases its maximum range from 8,000 to 13,500 yards. This will permit longer firing from a given position before it is necessary to limber up and follow the advancing infantry—a highly important matter when an attack is being developed.

Around these two prime weapons are grouped many others—the heavier artillery pieces, ranging all the way up to the massive 16-inch guns mounted on railway carriages; three-inch and four-inch semi-automatic anti-aircraft cannon; new 37-mm. anti-tank guns that hurl a one-pound armor-piercing shell like a small bolt of lightning; improved trench mortars that lob heavier shells more accurately than their ancestors of 1918; even the old reliable hand grenade, little changed from its original pattern.

Most of these, with the exception of the heavier artillery pieces, have become infantry weapons. The old-time picture of the foot-soldier, armed solely with rifle and bayonet, has been greatly changed since 1918. A modern infantry column on the march does not present the picture of even, serried ranks with sloping bayonets agleam like the even blades of grass in a field. It is more likely to look like a somewhat tidied-up Gypsy caravan, for it includes light and heavy machine guns, automatic rifles, light mortars or howitzers, anti-tank cannon, trench mortars, and light tanks.

All these are necessary on or near the front line in both attack and defense. The handiness of the 45-mm. howitzer was especially well demonstrated in the Spanish Civil War. Keeping close behind the advancing infantry, it could go into action quickly, to blast out stubborn machine gun nests with its light shells.

No less necessary are anti-tank weapons. Even the flexible 75 is not nimble enough to catch these monsters on the



DEADLY

Here is the new, famous semi-automatic Garand rifle which shoots bullets as fast as a soldier can press the trigger and turns infantrymen into virtual machine gunners. Invented in the U. S. this semi-automatic type gun will undoubtedly play a leading role in warfare for it outshoots bolt action rifles four to one and makes possible more accurate fire. This gun is also shown on the front cover of this week's SCIENCE NEWS LETTER. The soldiers in that photograph are demonstrating that they can operate the rifle while protected with gas masks.

PREFERRED

Still the best for general use in wartime is the French type 75 which, although 40 years old in design, has been modernized by a split trail, above, which enables a greater range of fire.

crawl, and its shell is unnecessarily heavy, anyway. Better is the high-velocity one-pound missile of the long-barreled 37-mm. piece designed especially for the job, which goes right up with the troops and can see the lumbering enemy approaching.

Of dual usefulness is the .50-caliber machine gun, which hurls a stream of heavy slugs half an inch in diameter. It can be cocked back at high angle, to defend the front line against approaching airplanes, and it can be brought down to the horizontal again, to hammer away at approaching tanks. With armor-piercing bullets the .50-caliber machine gun is effective against light tanks at close and medium ranges.

Every soldier, of course, will carry his gas mask at the alert, as he learned to do during the first World War. The new American gas masks are both more efficient in excluding gas and more comfortable to wear than were the rather crude masks of those days. Then, a company or a battery was "neutralized"—virtually out of action for the time being—as soon as it had to put on its gas masks. Soldiers wearing masks can now breathe so comfortably and see so well that they are able to go right on firing. There are special masks with optically perfect eye pieces for artillery officers who must read and set delicate scale markings for proper range. And such officers' masks frequently are of the diaphragm type with a special mouthpiece so that commands can get out but poison gas cannot get in. Such masks are also of extreme value for the men of the signal corps who act as telephone operators at the front in wartime.

Gas mask canisters, holding the chemicals which neutralize the deadly effect of the poison gases, are more compact than ever before. Yet they hold chemicals that will combat more different gases and they have a longer "life" before need comes for replacement.

All around, then, Uncle Sam can look over the situation, if not with smug self-satisfaction, then at least with the knowledge that he is ever so much better off than he was in 1917, and knows what he needs to do to meet deficiencies that still exist.

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PSYCHOLOGY

Teachers' Marks Do Not Match Child's Achievement

ABOUT 33,000,000 children in the United States are now working for the first "marks" of the new school year.

Parents may have offered bribes or threatened punishments. Teachers may have encouraged the spirit of competition in an earnest effort to make those marks shining ones.

The two million puzzled first-graders who have never been marked before and do not know that they will never be marked after school life is over may be wondering just why those symbols on the report card should be considered so extremely important.

Psychologists and educators are beginning to wonder, too. The school mark is so ancient an educational device that its origin is lost in the mists of antiquity. We can only guess who was the inventor of such a troublesome system.

That both teachers and parents should cease placing a high value upon it is indicated by recent research by Dr. Clarence Carl Moore, of the Colorado State College of Education.

"There is not," said Dr. Moore in a report to the *Journal of Genetic Psychology*, "a high degree of relationship between the marks that teachers assign their pupils at the end of a semester and the standing of pupils on either standardized tests of achievement or intelligence."

This conclusion was based on studies of the fifth and sixth grades in Glenrock, Wyoming, Branson, Colorado and Grover, Colorado.

The closest correlation between teachers' marks and actual achievement was in mathematics. Reading was next, language and literature third and social science fourth

Dr. Moore urges that educators work out some new schemes for measuring the progress of their pupils and the efficacy of their educational methods.

Standardized tests of achievement should receive more study. "Some," he said, "are limited to a general survey of pupil achievement while others sample more definitely specific interests.

"However, most standardized tests of achievement do not sample adequately the fields of the pupils' specific interests to give an adequate picture of the whole child."

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METALLURGY

Russian Iron Deposit Will Yield Ore in 1940

AN EXTREMELY rich and large deposit of iron ore which contains about half of the total world iron resources will begin in 1940 to yield ore at the rate of 300,000 tons a year.

It is known as the Kursk magnetic anomaly because of the immense effect that it has on the magnetic needle.

The Kursk ore carries up to 67% iron content and the ore layers average 200 feet thick.

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