

Flashless and Smokeless

When the new powder plants, to be built near Louisville, Ky., by the government and operated by du Pont, begin to turn out their 200,000 pounds per day, more than tripling the nation's existing output, they will be making a propellant that is markedly superior to the powder of World War days.

The standard U. S. Army powder is now flashless as well as smokeless. And it does not absorb moisture that interferes with the accuracy of fire.

Intensive research begun in 1919 by the Ordnance Department and private manufacturers resulted in the production in 1924 of a flashless non-hygroscopic smokeless powder for the 75 mm. gun. Since then there have been perfected satisfactory powders for use in the larger 155 mm. gun, using about 25 pounds per charge, as well as in all lesser calibers.

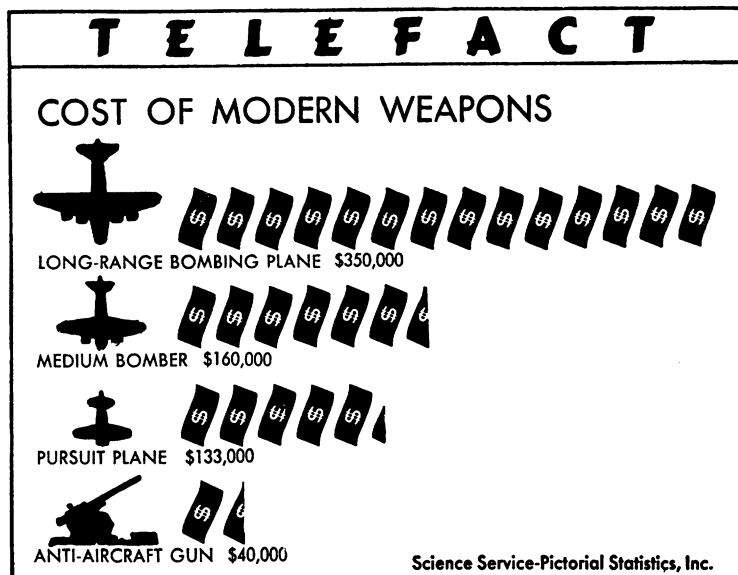
With ordinary smokeless powder there is a blinding flash that allows the enemy to spot the gun, day or night, almost as easily as if the gun belched forth smoke. Over half of the gases produced by the combustion of smokeless powder in a gun are combustible, largely carbon monoxide and hydrogen. The flash beyond the muzzle occurs spontaneously when these hot gases mix with oxygen of the air.

During the World War the Germans added potassium chloride and common salt to their powder to reduce flash. The French added a little vaseline. American practise was to add a cooling agent to standard service powder in a separate cloth bag or packet. These were only partially effective as to flash and did not prevent absorption of moisture. The present U. S. Army flashless powder has flash reducers, waterproofing agents and non-volatile colloid agents mixed with the nitro-cellulose of the powder.

The U. S. powder is entirely flashless. At night there is a small dull-red glow for a short distance in front of the muzzle, but it fails to register on photographic plates. Besides keeping the gun's location a secret from the enemy, lack of flash relieves the gun crew of being temporarily blinded every time the gun is fired.

Even the "bang" of guns using the newer flashless powder is reduced. The gas explosion in front of the muzzle is eliminated and the noise of the gun consists only of the sound of the sudden release of the gases from the muzzle. This makes it difficult for the enemy to locate the gun by use of sound ranging.

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BACTERIOLOGY

Bacteria-Killer From Soil Effective in Cattle Disease

PPROMISING results in the first trials at treating a real sickness with gramicidin, potent germ-killing chemical from soil bacilli or germs, are reported by Dr. R. B. Little, R. J. Dubos and R. D. Hotchkiss, of the Rockefeller Institute for Medical Research.

The power of this chemical from one kind of a germ to kill other germs that cause deadly diseases caused a sensation in both lay and scientific worlds when Dr. Dubos first announced it.

At that time the chemical's germ-destroying ability had been shown in test-tube experiments and in laboratory mice sick with peritonitis which the scientists had given the animals by injections of pneumonia germs and streptococci.

Trial of the chemical as a remedy in cases of real sickness, instead of experimental ones in the laboratory animals, has now been made. The patients were cows at the Rockefeller Institute's department of animal and plant pathology at Princeton, N. J. They had a chronic form of bovine mastitis caused by germs of the streptococcus family. The germs in this disease generally get into the cow's milk and while they may not cause disease in humans drinking it, they have a deleterious effect on the milk.

Treatment of the cows consisted essentially of injecting a solution of gramicidin into the infected quarter after milk-

ing and allowing it to remain until the next milking.

"While the streptococci were not eliminated from all of the infected quarters," the Rockefeller scientists report (*Proceedings, Society for Experimental Biology and Medicine*, July) "they were markedly decreased after each treatment, and the findings thus confirm the results obtained in mice, namely, that gramicidin, when injected directly into an infected focus, exhibits a definite bactericidal effect against streptococci."

The treatment did not produce what might be called a permanent cure in all of the animals treated. This may have been due to the fact that the method of giving the chemical could be bettered. The state of lactation and other factors may have been responsible for the partial failures.

These factors must be considered, the scientists point out, and many more animals must be treated over a longer period of time before the effectiveness of gramicidin in the control of bovine mastitis can be determined.

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To avoid disturbing the *water* around fishermen's boats, Missouri Conservation agents will inspect permits "long distance": the fisherman holds his permit aloft and the agent, in a speed boat, inspects it through field glasses.