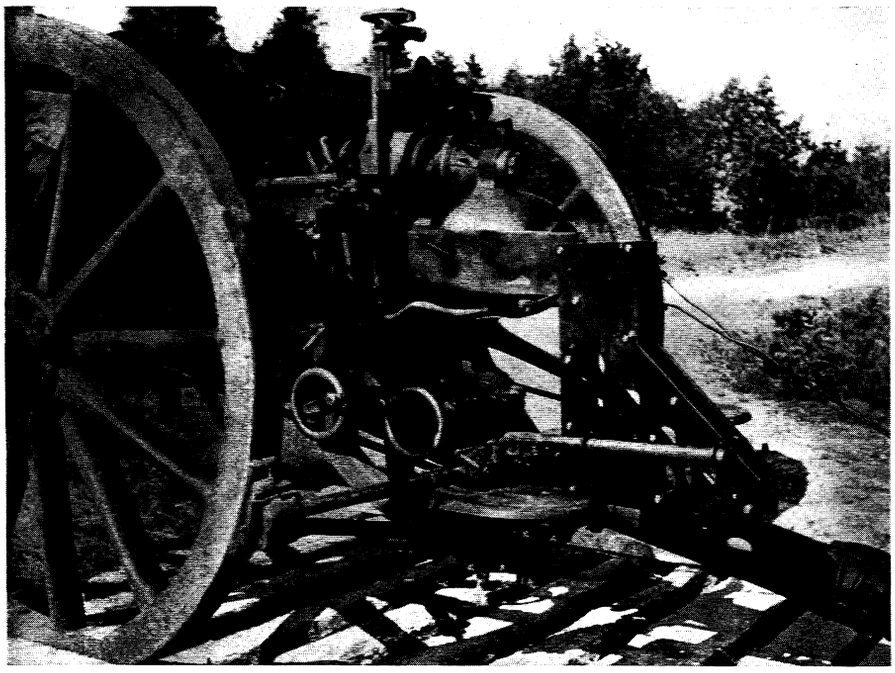

FIRING MECHANISM

An electrically controlled mechanism is attached to an ordinary piece of field artillery for Dr. Rose's Tests.

In field tests at the military camp at Petawawa, Dr. Rose set up metal frames whose upper and lower surfaces consisted of mirrors. A beam of light started from the bottom and was reflected back and forth across the space between the mirrors until its ray finally fell on a photoelectric cell concealed in a small box attached to the upper part of the frame. Thus the entire space within the frame was filled with a light beam which could be blocked out by the on-rushing shell.

Fires Shell

A series of four of these frames were carefully lined up before an artillery piece which at a known, and automatically registered, instant fired its shell through the frames.

Initial firing was merely through paper screens to test the alignment of the gun for its "jump" characteristics and to demonstrate that the automatic firing mechanism was working accurately. In subsequent tests the light beams and photocell frames were employed.

The timing of the speeding shells—which were found to be moving with a velocity of 1585 to 1600 feet a second—was accomplished by having the weakened photocell current swing a sensitive galvanometer. A beam of light striking a small mirror on this instrument was then reflected back to a moving motion picture film. Simultaneously tiny markings created by a constant pitch tuning fork gave time signals on the film. Some 497.7 of these marks represented one second in actual time.

Old Problem

Ever since man fired his first gun determinations of the bullet or shell velocity have been a major problem for military officers. A rough average velocity from the time the shell left the gun until it struck its target could, of course, be obtained by a stop watch and a measurement of the range along the ground. From these facts it was easily possible to compute the length of the idealized parabolic path of the shell through its arc, and hence determine the average velocity. But the effect of air resistance during flight and other factors quickly showed that this was a theoretical answer which has only a fair resemblance to the real facts of speed.

Pioneers in the problem of projectile speed were Robins, 1742, Hutton in 1775-88 and Woolwich and Didion in 1839-40. All these men worked with the so-called ballistic pendulum invented by Robins. Hutton's method, for example, consisted in measuring the velocity of the cannon ball at the muzzle of the gun and at a known distance. The muzzle velocity was obtained by measurements on the recoil of the gun and the velocity at a distance by having the cannon ball strike a heavy suspended pendulum and raise it a measurable height.

Shell Is Magnetized

American experiments late in the 1920's consisted of firing a magnetized shell through a series of solenoid coils thereby generating a slight electric current in the coils. The recording instrument was an oscillograph.

Another method, used widely to determine the air resistance of a shell, if not its speed, is that of wind tunnel tests. The shell, or a model of it, is placed in a wind tunnel and air is driven past it at high speeds approaching or equaling those attained in actual flight.

Object of all the tests is to obtain accurate data which can be correlated into the so-called ballistic tables used in wartime, where the distance of the target in yards or feet means setting the gun in a certain direction and pointed at a given elevation.

Dr. Rose's new method, because of its semi-portable character and its freedom from the need for an actual testing laboratory, can be carried into a combat zone if necessary and attain an accuracy comparable with more elaborate equipment operated in peacetime.

Science News Letter, April 3, 1937

RADIO

Scientists Still Seeking Cause of Interstellar Static

SCIENCE is still on the search for the cause of strange radio disturbances that come from interstellar space.

Four years ago Dr. Karl G. Jansky of the Bell Telephone Laboratories found a sort of continuous static that came from somewhere about the center of the great system of stars in which we live. Its wavelength was 14.6 meters.

Drs. Fred L. Whipple and Jesse L. Greenstein of Harvard College Observatory have investigated the idea that the radiation comes from absorbing material at the center of our stellar galaxy which could act as what the scientists call "black bodies" and radiate at low temperatures. After elaborate computations, set forth in the current Proceedings of the National Academy of Sciences, they conclude that the amount of radio disturbance observed could not be accounted for in this way.

So the solution of this radio mystery is still being sought. The next clue being investigated is whether the disturbance occurrs on other wavelengths.

Science News Letter, April 3, 1937