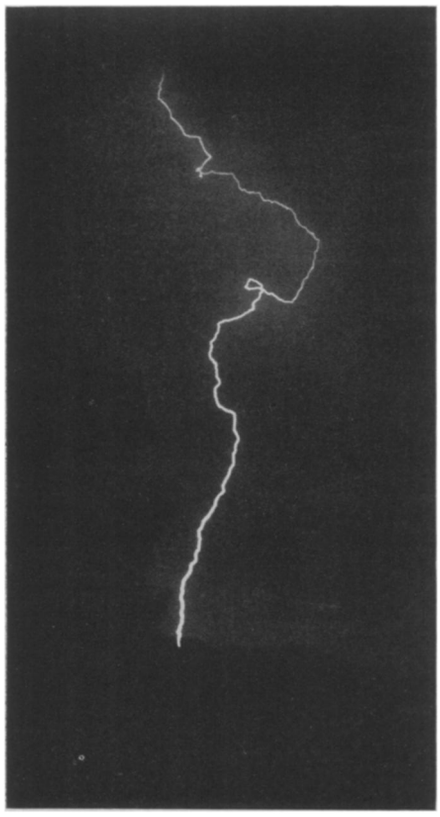

LIGHTNING TWISTS

This is a snapshot taken by Phil F. Brogan, weather observer of Bend, Oregon, during a fierce 3-hour storm when he and Mrs. Brogan, aided by a stopwatch counted 41 bolts to the minute, or a probable total of 7,380 lightning flashes during the one storm. In explaining his success with "snapping" the flash, instead of leaving the shutter open to take what came, Mr. Brogan said that he might have aimed at an earlier flash and caught this one by luck.

bumpiness in Diesel fuel is caused by an almost opposite happening from that which causes the comparable knock in gasoline.

Gasoline knock—and the accompanying octane rating—comes about because the gasoline starts to burn evenly in the automobile cylinder, and then suddenly the unburned part explodes all at once with the resulting knock.

For smooth combustion with a knocking gasoline, the burning of the gas must be retarded. Tetra ethyl lead will bring about this deceleration and is widely used for the purpose.

With Diesel fuel, combustion is not set off by spark plugs—there are none—but by the spontaneous ignition due to compression of the fuel which raises its temperature above that needed to make it explode.

If too much fuel spontaneously explodes at once, there is the knock. The way to stop it is to have the fuel burn as soon after it enters the cylinder as possible; speed up combustion instead of slowing it down as is done for gasoline.

To test the comparative values of Diesel fuel, the important point is to measure the ignition lag, the time between the injection of the fuel and its ignition, and make it as small as possible.

The contribution of Prof. Schweitzer and Mr. Hetzel to Diesel fuel science is the development of an ignition lag indicator which employs the principles of a phonograph pick-up device used with a radio loudspeaker.

One pick-up is connected to the fuel injection nozzle and gives a surge of current when the fuel first enters; the other is connected to a small diaphragm on the walls of the firing cylinder and indicates when the fuel ignites.

Standard Diesel fuels and special laboratory test fuels are compared for performance over a wide range of compression values within the testing engine.

Science News Letter, October 5, 1935

MILITARY SCIENCE

Civilian Population Without Adequate Poison Gas Defense

GAS WARFARE against civilians is one point where the old military axiom of a strong attack providing a good defense holds true. The menace to civilization of attacks on cities by poison gas delivered from the air has all Europe worried. The inhabitants are being put through gas mask drills and defense technics, but Great Britain's best known science journal, *Nature*, states (Aug. 3), that it is generally agreed that there is no effective means of defense. Attacked countries will be obliged to retaliate in kind on the cities of the aggressor.

Against trained troops war gas does not appear to cause any more casualties than an equal number of high-explosive shells; but military training and discipline are hardly possible among the civilian population.

Arthur Marshall, veteran British chemist, writing in the journal, points out that the greatest damage to the population, both physical and moral, would probably occur if squadrons of low-flying airplanes sprayed gas over a city and then were followed by others dropping high-explosive bombs. On a day when low clouds were prevalent such an attack could be undertaken with little counter damage from anti-aircraft guns and defending airplanes.

The British Science Guild, Mr. Marshall points out, recently learned from Davidson Pratt, formerly an official of the Chemical Research Defense Department, how civilians can protect themselves in gas-proof rooms. It would be necessary to devote a properly sealed room in the upper story of a home for this purpose, just as the mid-western farmers of the United States have their storm cellars for refuge against natural instead of man-made emergencies.

To make such rooms really effective involves stopping all cracks with putty or mud, boarding up the windows from the outside and covering the inner window surface with wet blankets; also in laying in stores of provisions, water and other essentials. In well-to-do homes this might be possible but is certainly impractical for the homes of the poor.

For civilian protection against poison gas a cheaper but efficient mask is also needed, Mr. Marshall contends, in place of the military masks now developed. Little progress has been made in this direction.

Science News Letter, October 5, 1935

AERONAUTICS

Valve on Parachute Allows Descent to Be Controlled

TESTS of an improved parachute which can be controlled in its descent have been reported from Moscow.

A special valve allows the parachutist to open his 'chute only partly at first and then gradually slow up his fall by allowing the parachute to fill with air.

The new development is said to allow a parachute jumper more latitude in selecting the spot where he wishes to land and greatly to reduce the jerk inevitably occurring in the delayed jump with the ordinary parachute.

Science News Letter, October 5, 1935

A large deposit of molybdenum ore is to be exploited in Turkey.

Nevada has built a museum—the Lost City Museum, near prehistoric Indian ruins.