

## PHYSICS-BIOLOGY

## Rats Used to Measure Danger From Penetrating Gamma Rays

**R**AT-KILLING with half a million dollars' worth of radium is the expensive-sounding sport which has claimed the attention of Dr. W. G. Whitman of the Johns Hopkins School of Medicine and her husband, Dr. M. A. Tuve of the Carnegie Institution of Washington.

Only it wasn't so expensive as it sounded, and it wasn't done for sport.

The experimenters still had their half-million dollars' worth of radium left at the end of their experiment. And they performed the experiment to get some idea of how dangerous it may be

to work with the two-million-volt gamma ray tube which recently won for Dr. Tuve and his associates the thousand-dollar prize of the American Association for the Advancement of Science.

Dr. Whitman and Dr. Tuve exposed groups of rats to the hardest radiations given off by radium. These are the gamma rays, which are ether vibrations like X-rays, but much more penetrating, so that they will go through layers of metal and other substances that will stop X-rays. They are also more harmful to living tissue.

The two experimenters used six grams

of radium, worth about \$75,000 a gram. To cut off the "softer" radiations, they interposed layers of metal between the radium and the rats. They used, in various experiments, a millimeter of platinum, a millimeter of brass, sixteen millimeters of lead and five millimeters of celluloid.

When all of these filtering substances were in place, less radiation came through, but what did come consisted of the "hardest" gamma rays. When part of them were omitted, the "softer" rays came through in addition. Rats were tested with several different combinations of the filters, as well as with different masses of radium.

The rats all died when they were exposed to the less thickly shielded radium for six hours or longer. The longer the exposure the more severe the bodily injury. With shorter exposures the rats recovered from the direct bodily harm, but died after a time from progressive anemia. The delayed action of some of the harmful effects of the gamma rays indicated that blood-count observations alone are not a satisfactory protective measure for scientists working with high-voltage tubes.

Gamma rays have harmful effects on the reproductive cells as well as on the blood. For this reason experiments are going on to test the effects of the radiations in producing sterility and abnormal offspring. Abnormal young have so far appeared in the litter of only one of the females, but a number of the rats have been rendered sterile, the "sterility" dose of the rays being approximately the same as the exposure able to cause death.

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## ENGINEERING

## New Diesel Racer Will Run 1200 Miles Without Refueling

**A**DAPTATION of the Diesel engine to a racing car by C. L. Cummins and August S. Duesenberg has increased engineering interest in the 1931 Indianapolis Motor Speedway 500-mile race on Memorial day.

The new car is nearly twice as large as the conventional gasoline racer. It is thought to be the world's first Diesel-engined racing automobile and is said to carry sufficient power in crude oil to run nonstop at 100 miles an hour for 1,200 miles. This would give the new car the advantage of not having to stop to refuel, which is estimated to be the equivalent of a five mile start on the rest of the field.

No ignition system is used in the new car, the heat of compression serving to fire the fuel. The fuel tank holds 47 gallons of crude oil and the radiator has a capacity of 42 quarts of water.

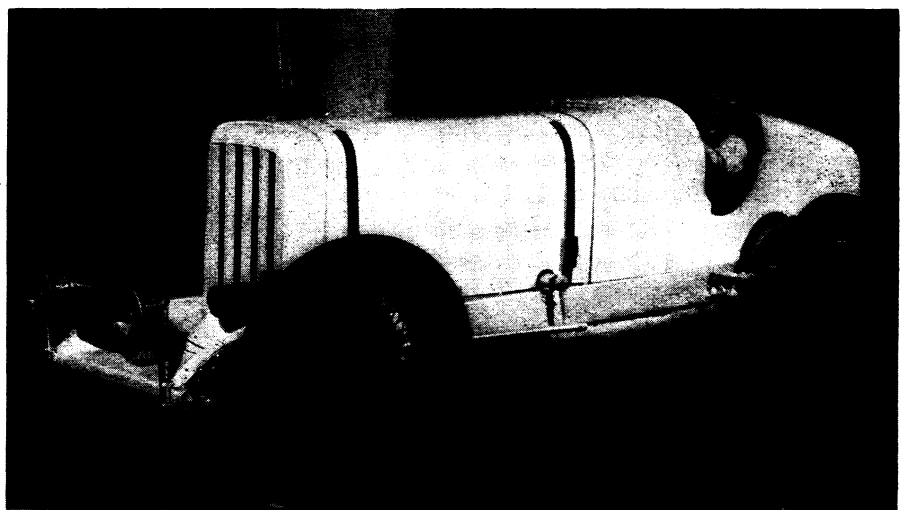
The car cost \$15,000. It is 16½ feet long and nearly four feet high. It is four-cylindere with a piston displacement of 366 cubic inches.

Mileage is 40 miles to the gallon under ordinary driving conditions. At a speed of 100 miles an hour the mileage is about 25 miles to the gallon. When tested for speed at Datona Beach, Flori-

da, the car made 100.772 miles per hour under A.A.A. timing.

Diesel engines offer advantages in strength and economy of fuel and consequently have been adapted to many uses in the past. This is thought to be the first time a Diesel engine has been tried in a racing car, however, though they have been used in airplanes.

*Science News Letter, February 28, 1931*



CONVENTIONAL IN APPEARANCE

*Though somewhat oversize, this racer is anything but conventional in what is under the hood. Its Diesel engine could take it from New York to the middle of Iowa without stopping once to refill the fuel tank.*