

PHYSICS

16,000,000 Volts From Skies To Produce Super X-Rays

**With Greater Potentials Ready, German Scientists Test
New Rubber, Paper and Metal Tube at 2,600,000 Volts**

THE PRODUCTION of X-rays as penetrating as cosmic rays, with voltages of sixteen million, was forecast to the American Association for the Advancement of Science in Pasadena when a report from Drs. F. Lange and A. Brasch of the University of Berlin was read by Dr. Alexander Goetz of the California Institute of Technology.

Working in a small valley between two mountain peaks in northern Italy, a place where thunderstorms occur frequently in summer and early autumn, Drs. Lange and Brasch emulated the famous early American scientist Benjamin Franklin, by snatching electrical energy from the skies. With their gathering system, suspended from heavily insulated hemp ropes strung across the valley, they obtained discharges of electricity which sparked 55 feet and measured sixteen million volts.

Assured by these experiments on Monte Generoso that nature would provide the high tension electrical discharges for their experiments, Drs. Lange and Brasch returned to their laboratories at the University of Berlin to construct a new type X-ray tube, which would withstand such powerful discharges. They succeeded in building a tube of alternate rings of paper, rubber and aluminum which has been tested at 2,600,000 volts, continuing for an interval of a millionth of a second.

Most Powerful Yet Produced

These 2,600,000-volt X-rays are the most powerful yet produced, exceeding any so far produced in America. Electrons are so speeded in this tube that they drill holes an inch deep in a brass plate.

The new X-ray tube, made of rubber and metal instead of glass, is less than a dozen feet long, despite the high voltage it withstands. It is estimated that an ordinary X-ray tube to withstand such voltages would need to be 50 feet long.

When a tube now building has impressed upon it the high potentials of the natural electrical discharges at the

mountain laboratory, there will be produced gamma rays equivalent to a hundred thousand grams of radium, which is at least a thousand times as much radium as there is now available.

When this experiment is performed, the super-X-rays obtained will equal the cosmic rays in penetration and the experiments projected should settle the question of the nature of the cosmic rays. X-rays produced with 2,600,000 volts in the Berlin laboratories have already penetrated lead a yard thick.

In their work on the new type X-ray tube Doctors Lange and Brasch discovered that the most effective tube is short and crooked, so as to break up surface effects along which the voltages could leak. For this reason they made the doughnut-like layers of paper insulation, rubber and aluminum of the tube

of different diameters inside.

Instead of using a hot cathode source of electrons to be speeded up in the X-ray tube, the scientists actually obtained sufficient electricity for their purpose from a small porcelain tube that is normally regarded as an insulator.

In another respect they flouted previous experience. Instead of using a high-grade oil for insulating their very high voltages they found that old automobile crank-case oil would do, and then finally used plain water, which theoretically is just what should not be used.

In Berlin a new seven-million-volt surge generator is being built to be used on a Lange-Brasch tube of that voltage. This tube will be devoted to cancer research and physical experimentation.

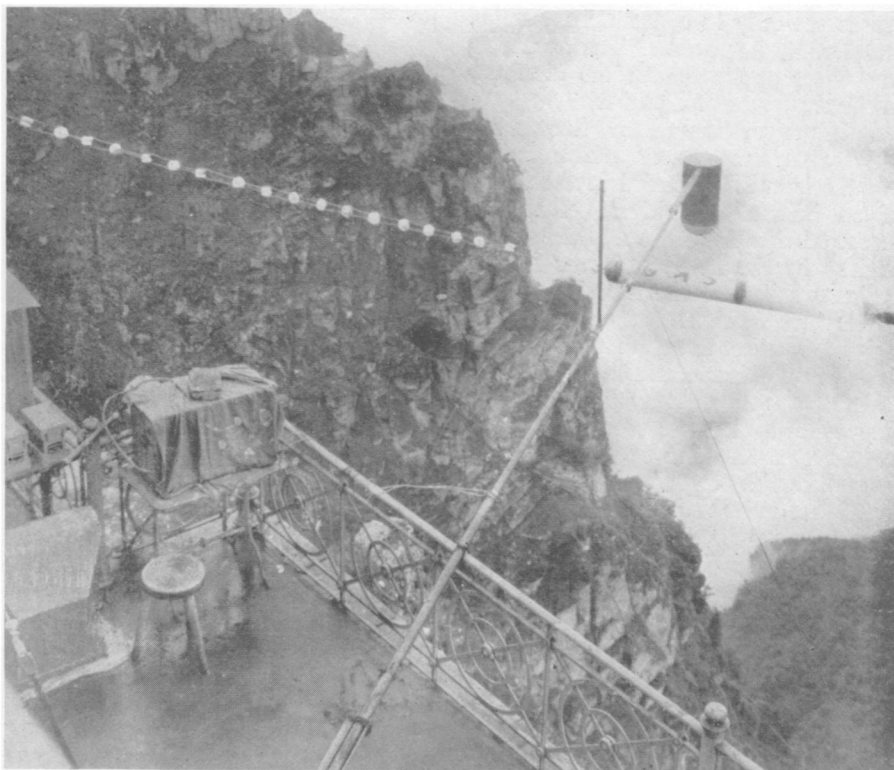
Science News Letter, June 27, 1931

ENGINEERING

Used Oil Proves Superior In Auto Operation Tests

DON'T change the oil in your car, if you want the best lubrication.

This may sound contrary to general belief, and it is contested by many engineers, and yet tests on more than 250 trucks by a large telephone company have found it to be the best policy, it



COLLECTORS OF ATMOSPHERIC ELECTRICITY *Wide World*

Hollow cylindrical conductors instead of wire of small diameter are used to collect electricity in the storm-infested area because charges do not leak readily into surrounding atmosphere from large conductors.