

PHYSICS

# Mesotrons Penetrate Solids Easier Than They Do Air

## Subatomic Particle Is Found To Be Radioactive; Breaks Down in Average of Two Millionths of Second

**S**TONE walls may make a prison and strong armor plate will stop a shell but physicists are now studying an amazing atomic particle which will penetrate dense solid material better than it will air or a gas.

The particle is the heavy electron discovered in 1937 by American scientists in cosmic ray studies, to which the name mesotron has now been given.

In two reports (*Nature*, Dec. 3) two outstanding scientists, Dr. P. M. S. Blackett of the University of Manchester, and Dr. Bruno Rossi, Italian physicist now at the Institute for Theoretical Physics, Copenhagen, describe new properties about the strange mesotron. The mesotron has an electrical charge like an electron but has a mass intermediate between that of an electron and a proton.

The mesotron, declares Dr. Blackett, has been shown to be radioactively unstable and breaks down with a mean time of decay of about 0.000002 seconds (two millionths of a second). It is this

hitherto unrealized instability which explains the baffling differences of absorption of mesotrons in air and in dense materials like lead.

It is this factor, probably, which explains the discovery that mesotrons penetrate deeply into the earth and appear in experiments performed deep under ground in mines and caves.

Dr. Rossi reports experiments made at altitudes of 7,775 feet in which it was found that the mesotrons were much more reduced in intensity in passing through air than they were in passing through an equivalent amount of dense lead.

"The difference between the lead and the air absorption," states Dr. Rossi, "for which no satisfactory explanation had been found at that time, can now easily be accounted for on the disintegration hypothesis (of mesotrons)."

The seemingly queer disintegration of a single atomic particle is explained by saying that the mesotron breaks up into an electron and into a neutrino with the

original heavy mass of the mesotron appearing in its offspring as great kinetic energy.

*Science News Letter, December 10, 1938*

GENERAL SCIENCE

## Theory vs. Test Is Science Conflict in Nazi-Jew Fight

**O**BSCURED by the violent outburst of persecution of the Jews in Germany is a related scientific controversy that involves science leaders from Aristotle to Einstein.

Theory vs. experiment. Dogmatism vs. pragmatism. Induction vs. deduction. Invention vs. observation. Idealism vs. realism. Those are some of the labels of the conflict. In one sense the problem is as old as science itself, but unhappy misunderstanding flames anew under the prod of Nazi intolerance and intellectual bigotry. Not entirely made in Germany, some of its most acute symptoms arise there.

Earlier this year Prof. J. Stark, Nobelist in physics in 1919 and now president of the Physikalisch-Technischen Reichanstalt of Berlin-Charlottenburg, made a rather vicious attack on the dogmatic type of mentality in physics, charging that "the natural inclination to dogmatic thought appears with especial frequency in people of Jewish origin." Einstein and "his dogmatic imitators" were particularly attacked.

Prof. Stark's statements met with cold disfavor among physicists, many of whom felt that they carried their own refutation. But now a half year later, also in the British journal, *Nature*, Prof. A. S. Eve, retired from McGill University and living in England, answers and discusses foundations of physics in the light of modern relationships between theory and experiment.

No hard and fast line can be drawn between theory and experiment. One rises out of the other, in fruitful cycles. This has been particularly true of recent advances in the realm of the atom and the universe: Relativity, radioactivity, quantum, quantum mechanics, etc. Ideas called dogmatic by some have led directly to the pragmatic.

And who would have expected Faraday's experiment enriched by Maxwell's theory to lead to radio and telephones on one hand and the electrical power industry on the other?

Reviewing the practical (pragmatic) results of theoretical (dogmatic) work, Prof. Eve feels that "to link such discoveries mainly with the Jewish people is a poor compliment to the rest of mankind." *Science News Letter, December 10, 1938*



YOUTH ARMY—ANCIENT ROMAN STYLE

When Italy's Duce reviews his youth army of child black-shirts, he is doing what the Romans did, long ago. This carving shows a Roman youth parade, with the embryo warriors on pony-back in close formation, following a forward-pointing banner. Treasured at Klagenfurt Museum, in what was formerly Austria, the carving is a relic unearthed nearby at the provincial Roman town of Virunum.