PHYSICS

Atom Scientist Nobelist

Outstanding British physicist is honored for his research on cosmic radiation. His formulation connecting magnetism and gravitation was an important contribution.

➤ "FOR the discovery of a connection between magnetism and gravitation."

That might well be the citation of the 1948 Nobel Prize for physics awarded to Prof. P. M. S. Blackett, of Manchester University, one of Britain's outstanding physicists. Actually the award is reported to be "for discoveries in the field of cosmic radiation."

Last year Prof. Blackett presented to the Royal Society of London a mathematical relationship between electromagnetism and gravitation that arises out of the rotation of such massive bodies as the sun, earth and stars.

This formulation was hailed as possibly as significant as the Einstein relationship between mass and energy which was given such powerful reality by the atomic bomb. Like E equals mc^2, the Blackett formula has a cryptic appearance. In it there are: P, the strength of the magnetic field; beta, a constant near unity; G, the gravitational constant; c, the speed of light; and U, the angular momentum or spin of a revolving body.

In some laboratory at the present time an experimental test of this relationship may be under way, since Prof. Blackett proposed an experimental test. It would consist of revolving a large sphere quite rapidly and measuring its magnetic field.

Whether or not the Blackett formulation proves to be the basic connection between magnetism and gravitation, the earlier researches recognized by the Nobel award made important contributions to the understanding of the constitution of matter and radiation.

Prof. Blackett was one of the famous Cavendish Laboratory team of physicists that was led by the famous Rutherford. At Cambridge Prof. Blackett studied cosmic rays and found positive electrons (positrons) as well as ordinary electrons bursting out of cosmic ray showers. He was in the group that made positrons artificially. He estimated that the short-lived positrons were so plentiful that they must account for a thousandth part of the whole material universe. This was as early as 1933.

During the second world war, Prof. Blackett gave up tracking cosmic rays and atomic particles to work on Britain's early radar defense system and track Nazi planes instead. But he is back at his research now, famous and fifty, puzzling out more deep secrets of the universe.

Not all his time is spent on research, however. He is an "atom scientist," adviser to the British government on atomic energy. His book titled MILITARY AND POLITICAL CONSEQUENCES OF ATOMIC ENERGY, published in mid-October, says that Russia would be foolish to accept the proposals of the United States for the control of atomic energy. In his view, the dropping of the atomic bombs on Japan was actually the first act of the cold diplomatic war with Russia now in progress.

Science News Letter, November 20, 1948

CHEMISTRY

Swedish Chemist Nobelist

The winner of this year's prize gained his award for developing two methods of analysis that may lead to new advances in the field of biology.

➤ NEW ADVANCES in treating disease and understanding living things are likely to come from better knowledge of complex but minute chemical substances.

For new methods of separating, detecting and analyzing colloids, particularly the large molecules of proteins and other substances, the 1948 Nobel prize for chemistry was awarded to Prof. Arne Tiselius, of the Institute of Physical Chemistry, Upsala University, Sweden.

Working in the tradition of Prof. The Svedberg of the same university, who won the same prize in 1926, this year's Nobelist has developed two methods of analysis that are finding increasing use in investigational laboratories.

He applied electrophoresis to the separation of the heavy molecules of protein and other substances. He also worked out a new method of analysis based on adsorption and applied it to organic and bio chemical problems.

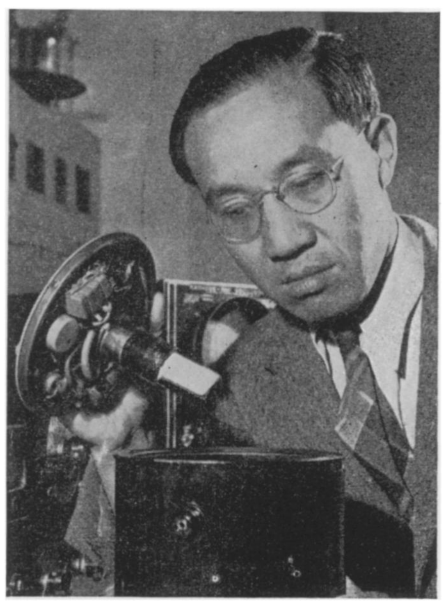
The electrophoresis apparatus of Prof. Tiselius acts like a sorting machine for the separation of heavy molecules in solution. Prof. Svedberg is famous for his work on separating molecules and other substances of different weights by whirling them in the centrifuge. But sometimes the centrifuge method of separation can not be used.

Prof. Tiselius made an apparatus that takes advantage of the different electrical charges which protein particles possess to effect the separation. By placing a solution of such particles between electrodes and applying electrical voltage, it is possible to obtain a migration of the particles. Those with the greatest charge move the faster.

The trick of the Tiselius apparatus is to produce a current in the solution flowing against the motion of the particles. Usually the current flows just as fast, in one direction, as the slower of the migrating particles is moving in the other. These particles, therefore, are like a man on a treadmill who, though he walks swiftly, never really does anything but stay in one place.

Meanwhile the particles with the greater electrical charge are moving just a bit faster than the opposing current so that eventually they reach one end of the chamber and the separation has been effected. The Tiselius method has been used in several laboratories in the United States, particularly in connection with study of living tissues.

The method of adsorption analysis cited in the Nobel award makes it possible to separate and differentiate between proteins, acids, sugars, salts and other substances that



TINY ATOM-SMASHING MACHINE—This Westinghouse device is in reality a neutron counter which detects neutrons, vital building blocks in matter's structure which carry no electric charge. It is demonstrated by Dr. Kuan-Han Sun, Chinese-born Westinghouse research physicist. Containing a very small amount of uranium 235, it generates tiny atomic explosions to reveal the neutrons.