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 biochemical 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.

are of biological importance.

Adsorption is action of a substance holding another substance on its surface. It is aDsorption, not aBsorption, which is what a sponge or piece of blotting paper does to water.

In past years various kinds of adsorption methods have been used in organic chemistry and biochemistry. Willstatter and his followers used adsorption for the differentiation of various enzymes. Chromatographic analysis which is being applied widely is based on adsorption phenomena.

Prof. Tiselius may be said to have mechanized and made automatic the method of adsorption analysis.

Previous investigators had shown that the chromatography of colorless substances was possible in some cases by observations of the various layers in the column of material upon which the substances being investigated had collected. When the various substances gave a color, their detection was relatively simple. When they were colorless, it was sometimes possible to differentiate them by their fluorescence. Or the parts of the column could be tested with different specific reagents, either on the column directly or after it had been cut into sections and extracted.

Prof. Tiselius worked out a new and more general method. After passing through the column of adsorbent and before any mixing has taken place, the solution is allowed to flow through an arrangement for determining continuously the concentration by measuring some property of one of the chief substances passing through. This is done by connecting the outlet of the column to a small cell in which the refractive index, light absorption, conductivity or some other suitable property of the solution is observed continuously. The readings are plotted against the volume of flow. Apparatus that is self-registering and operates relatively automatically has been developed.

Science News Letter, November 20, 1948

Find Oil Off U. S. Coast

➤ LARGE petroleum accumulations exist under the American continental shelf and it is physically possible to get the oil from them, the American Petroleum Institute was told in Chicago by Mercer H. Parks and James C. Posgate of the Humble Oil and Refining Company.

Continental shelf petroleum production has passed the initial planning stage and as a result of successful drilling operations, at least two oil discoveries of possible major importance have been made, they said. These are both in the Gulf of Mexico.

Operations in open water encounter problems of the elements in addition to those usual on land. Auxiliary operations, such as transportation and drilling site preparation, they stated, become major items from technical and financial viewpoints.

The drilling sites now in use involve large platforms capable of supporting everything needed for drilling operations, as well as smaller platforms serviced by floating barges in a manner similar to that used in sheltered waters.

The two oil discoveries of possible major importance to which they referred are a producing well off Terrebonne Parish, La., of Kerr-McGee Oil Industries, Inc., and one drilled by the Humble Company off Jefferson Parish, La.

The first is a very shallow well, producing from a supercap sand through perforations about 1,750 feet deep. The Humble discovery came at a depth of about 8,650 feet in a second well drilled in the area. Until other wells are drilled, no proper evaluation can be made of the discovery, but the prospect is promising.

As generally understood, a continental shelf is the land mass lying submerged off the coast in less than some 600 feet of water. The United States continental shelf covers 750,000 square miles, of which 129,000 are in the Gulf of Mexico. This strip averages about 75 miles in width. It is in this Gulf shelf that oil men expect to find the best oil reserves.

Science News Letter, November 20, 1948

GEOLOGY

Find Ancient Seas Were Warmer than They Are Now

➤ A HUNDRED million years ago the sea water off the coast of western Europe was warmer than it is now, with temperatures ranging from 64 to 80 degrees Fahrenheit. Evidence pointing to this conclusion was obtained in a hitherto unused way by Prof. Harold C. Urey and associates at the Institute for Nuclear Studies at the University of Chicago, who presented their data at the meeting of the Geological Society of America in New York.

The Chicago scientists have discovered that the limy shells of sea animals contain a slightly higher percentage of heavy oxygen than is found in the dissolved limestone (calcium carbonate) in the surrounding sea water. The difference is less when the water is warm, greater when it is chilly.

Assuming that conditions in ancient seas were the same as they are today, Dr. Urey and his group analyzed fossils from the chalk deposits of England, laid down as sea-bottom ooze in upper Cretaceous time, about 100,000,000 years ago. The limy remains of squid-like mollusks known as Belemnites proved to be their best "paleothermometer," with readings as stated.

Fresh evidence that this continent had human inhabitants during the Pleistocene ice age has been found just south of the Scripps Institution of Oceanography at La Jolla, Calif., stated Dr. George F. Carter of the Johns Hopkins University. Here, in a river-deposited soil formation quite definitely of ice-age date, he found the charcoal of ancient fireplaces, stone tools, and shells left after the sea-food feasts of this long-gone people.

Science News Letter, November 20, 1948

MEDICINE

New Camera May Help Save Stomach Cancer Victims

➤ A NEW CAMERA which shows promise of saving victims of stomach ulcer by making mass X-ray detection studies possible was reported by Drs. John F. Roach, Robert D. Sloan and Russell H. Morgan, of Johns Hopkins Hospital, Baltimore, at the meeting of the Public Health Cancer Association in Boston.

Stomach cancer kills 60% of its 100,000 victims each year. The start of the disease is so insidious that there is no warning signal to attract either the patient's or his doctor's attention while the malignant growth is still in its early, curable stage.

The lens system of the camera uses reflection type optics. Its high speed makes it possible to get pictures for examination with one-twelfth the exposure to X-rays the patient would undergo with older equipment to get pictures giving the doctor the same amount of information for diagnosis.

The pictures are taken on 70-millimeter film and their low cost adds to their advantage as a mass stomach cancer detection method.

"A real reduction in the mortality of gastric cancer may be expected," the Hopkins doctors reported, if results with the camera during the first six months of a planned five-year study continue.

Science News Letter, November 20, 1948

GENERAL SCIENCE

British Rodman Medal Awarded to an American

➤ FOR THE FIRST time in its 13-year-old history, the British Rodman medal, awarded for outstanding work in photomicrography and related fields, is conferred upon an American. Harold F. Sherwood, of Kodak Research Laboratories in Rochester, N. Y., is the recipient. The award was made at the recent annual International Exhibition of the Royal Photographic Society held in London.

Mr. Sherwood exhibited microradiographs of thin sections of metal, wood and paper. Microradiography is a form of photography employing X-rays of low penetrating power. It is similar to medical and industrial radiography except that the X-rays used are of longer length. A typical microradiograph in his collection showed the depth of ink penetration in the paper of a postage stamp.

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