

PHYSICS

Brilliant Italian Scientist Wins Nobel Prize in Physics

Discoverer of Elements Heavier Than Any Known Before
He Has Also Found That Over 40 Are Radioactive

ITALY'S outstanding atom-smashing scientist and theoretical physicist, Prof. Enrico Fermi of the Institute of Physics at the Royal University is the 1938 winner of the Nobel Prize in Physics.

Born on Sept. 29, 1901, Prof. Fermi has won fame in both experimental and theoretical fields of research.

He was the first man to predict and determine experimentally that the bombardment of elements by neutrons would cause transmutation of the elements. Working quietly at Rome, Prof. Fermi was able, within six months after the discovery of artificial radioactivity by the Curie-Joliot, to study the bombardment of over 60 elements with neutrons. Out of this number he found more than 40 to exhibit radioactivity.

Prof. Fermi was also the first scientist to show that the capture of neutrons could be facilitated by water and by making them travel at low speeds. These "slow" neutrons are now a valuable research tool in the field of nuclear physics.

In theoretical physics Prof. Fermi is best known for his development of the so-called Fermi-Dirac statistics, a mathematical method of dealing with the problems encountered in predicting atomic structure and behavior.

In mathematical physics, too, he developed a hypothesis known as the Fermi theory of beta-ray decay which attempted to fit the atomic particle, the neutrino, into the still baffling problem of the liberation of the beta rays (electrons) from radioactive materials. While this theory is far from correct it is still the only one, of the many suggested, which appears to have a semblance of plausibility.

During his intensive research on the bombardment of many elements with neutrons Prof. Fermi used uranium as a target. He was able to make the neutrons stick in the nuclei of the uranium atoms and create super-heavy elements.

At first the scientific world was amazed and skeptical that Prof. Fermi had been able to create an element, No. 93, heavier than the heaviest of all known elements, uranium, No. 92.

However, the discovery was amply confirmed and it has since been found that science can create artificially elements still heavier, Nos. 94 and 95.

Through his atomic experiments Prof. Fermi was able to show that the ability of the nuclei of atoms to capture neutrons was far larger than had been supposed. There appear to be conditions of resonance in the nucleus which aid in this unsuspected capture.

Co-workers with Prof. Fermi at Rome have been a group of scientists whose names should not be forgotten. They are Drs. E. Amaldi, F. Rasetti, E. Segré and B. Pontecorvo.

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GENETICS

Bearers of Heredity Called World's Most Precious Stuff

WHAT is the most precious material in the world? Gold? Platinum? Radium? Rare precious jewels?

Gold is mere cheap stuff, even at its higher price in effect since 1933, compared with radium, which is something like \$21,000 a gram nowadays. And it is quite possible that some of the rare jewels might surpass radium's value, weight for weight.

Suppose we be generous and agree that \$100,000 a gram, which is about a thirtieth of an ounce, is just about top value for any such stuff. Investigation shows that any such material is almost valueless in comparison with the minute chromosomes, within germ cells, from which each of us began life.

Since the turn of the century when Mendel's laws of heredity were rediscovered, the secrets of the mechanism of passing life from one generation on to another have been discovered in an amazing exploration into the submicroscopic depths within the cells.

Principal actors in the beginning of life are the two sets of chromosomes, one male, the other female, that come together. This hereditary material is almost inconceivably minute.



PROFESSOR ENRICO FERMI

If all the first cells of the two billion inhabitants of the earth could be assembled and their chromosomes weighed, calculations by Prof. A. V. Hill, British Nobel, show that the total would be found to weigh less than a single drop of water or less than an ordinary sized pin. Thus, observed Dr. Albert F. Blakelee, Carnegie Institution of Washington geneticist, all the future developments of the human race are contained in chromosomes that weigh about 80 milligrams, about a twelfth of a gram. How can a money evaluation be placed on this material?

What is all the human life in the world worth? A thousand, a hundred or just a dollar per person? At one dollar, which is low enough, the human chromosomes from which we sprang are valued at the rate of \$24,000,000,000 per gram.

Science News Letter, November 26, 1938

SURGERY

Machine Age Is Also The Age of Surgery

THE machine age might also be called the surgical age, judging by the increase in numbers of surgical operations in the present century. In the U. S. Army and Navy, for instance, the number of operations per 1,000 men is about twice what it was in 1910. For the general population, the annual number of operations performed per 1,000 persons is now 65, Selwyn D. Collins of the U. S. Public Health Service found in a survey of nearly 9,000 families in 130 localities in 18 states.