

GENERAL SCIENCE

Name Nobel Winners

Three Americans won the Nobel Prize in Medicine for genetics research; three Russians won the physics award for radiation theory; an Englishman won the chemistry prize.

► **NEW APPROACHES** in genetics research, advancing man's understanding of the life process, won the 1958 Nobel Prize in Medicine for three American scientists.

Half the \$41,250 award went jointly to Drs. George Wells Beadle, 55, of the California Institute of Technology and Edward Lawrie Tatum, 48, of the Rockefeller Institute, New York, who until last year was at Stanford University.

The other half of the prize went to Dr. Joshua Lederberg, 33, currently chairman of the department of medical genetics, University of Wisconsin School of Medicine. Next April he will head a new department of genetics at Stanford University School of Medicine.

Drs. Beadle and Tatum established a new field now commonly called biochemical genetics. By ingenious biochemical methods, the two scientists devised a means of producing organisms with almost any predetermined biochemical specification.

The team was able to accomplish this effect by using the now famous "pink" bread mold, *Neurospora crassa*. The immediate result of their research in *Neurospora* genetics was the use of mold irradiation for wartime penicillin production. In addition, success with the technique led to the realization that genetics is related to definite chemical actions.

The *Neurospora* study has led scientists to the present-day chemical genetics approach to the study of DNA, deoxyribonucleic acid. Scientists believe that DNA, a giant molecule found in chromosomes, may be the substance that determines heredity and governs all cells and life itself.

Drs. Beadle and Tatum, who are now working separately, have both expressed the fear that radiation can cause serious

mutations in the genetic structure of cells.

Dr. Lederberg is well-known for his discovery that certain types of bacteria reproduce by fusing together rather than by the standard cell-division method. The genetic consequence of this discovery is the fact that among those individuals produced by this fusion process, some will contain gene combinations that are not found in either parent.

The scientist has more recently discovered that when a virus invades bacteria, it not only kills the bacteria, but also takes some of its genes. When the gene-containing virus is exposed to bacteria immunized against the virus, it is killed. However, the "swiped" gene is then "transduced" to the immunized bacteria.

In other words, the phenomenon is a substitute for a mating process. This research points to more simple methods of dissecting hitherto difficult bacteria for studies.

Drs. Tatum and Lederberg together in 1946 received acclaim for their discovery of bi-parental inheritance and sexual reproduction in bacteria strains.

► **THE THREE** Russian scientists who won the 1958 Nobel Prize in Physics discovered and developed the theories of the strange blue-white light known as Cerenkov radiation.

Cerenkov radiation is now used to detect high-speed particles, including discovery of the anti-proton in 1955, and also as a means of measuring the energy of these particles. First described by Nobelist P. A. Cerenkov in 1934, it is created when charged particles move through a transparent liquid or solid at a speed faster than that of light in the same material.

Drs. I. Frank and I. Tamm, who share this year's Nobel Prize with Dr. Cerenkov, developed the theory of the strange radiation's origin. Cerenkov radiation is often seen as a blue glow hovering over atomic reactors submerged in water.

It is, in effect, a kind of shock wave, similar to the shock wave produced by a bullet or airplane moving faster than sound. The wave front can also be likened to that formed by a boat moving through water, except that the wave picture becomes electromagnetic and also three-dimensional.

Cerenkov radiation is continuous, but the intensity is greater at shorter wavelengths. It issues forward along the line in which the charged particles are traveling, somewhat like the headlight beams of an automobile.

Although the existence of Cerenkov radiation might seem to contradict Einstein's theory of relativity, it does not. A basic postulate of Einstein's theory is that in a vacuum the speed of light would be constant and the "fastest" thing in the universe.

In liquids and other mediums of light propagation, however, it is well-known that the speed of light is less than the ideal postulate of Einstein's. Thus it is strange but not remarkable that the particles can race through the materials faster than can light rays.

► **THE FIRST** scientist to determine the structure of a protein has been awarded the 1958 Nobel Prize in Chemistry. He is Dr. Frederick Sanger of Cambridge University, England.

Dr. Sanger, who has been studying the hormone insulin for the past 12 years, determined its structure in 1955 when he found that one molecule of insulin contained 777 atoms. The discovery was extremely useful in the analysis of other proteins.

Dr. Sanger's work began at a time when the molecular weight of insulin was believed to be about 12,000. It is now known, by ultracentrifuge and diffusion methods, that its molecular weight is approximately 40,000.

The positions of the amino acids, glycine and phenylalanine, in the insulin molecule were discovered by Dr. Sanger. Largely through his efforts, the structural detail of insulin is known with considerable certainty. No other protein molecule of comparable size is so well-understood as far as structure goes.

Married and the father of two boys, Dr. Sanger has for the last seven years been on the staff of the British Medical Research Council. He was awarded the Corday-Morgan Medal and Prize of the Chemical Society in 1951.

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PRIZE WINNERS IN MEDICINE—Nobel winners are, left to right, Drs. George W. Beadle, California Institute of Technology; Joshua Lederberg, University of Wisconsin, and Edward L. Tatum, Rockefeller Institute.

● RADIO

Saturday, Nov. 15, 1958, 1:35-1:45 p.m. EST "Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Dr. Alexander Gode, chief of the Interlingua Division of Science Service in New York, will discuss "Progress in International Auxiliary Language."