News of Science

Nobel Prizes in Physics, Chemistry, and Medicine

Physics

Three Soviet physicists have been named winners of the Nobel Prize in physics: Pavel A. Cherenkov, Ilya M. Frank, and Igor Y. Tamm. The announcement on 29 October by the Royal Swedish Academy of Science in Stockholm cited the three for "the discovery and interpretation of the Cherenkov effect," named for Cherenkov. Cherenkov first observed the effect in 1933 when a bottle of water, subjected to radioactive bombardment, gave off a faint blue light. An explanation of the light was worked out in later years by Frank and Tamm, who determined that the phenomenon resulted when radiation accelerated electrons or other electrically charged atomic particles to speeds greater than the speed of light in the same medium.

Atomic counters based on the Cherenkov effect are used today in laboratories all over the world to record the behavior of high energy particles. As an example, the operation of the cosmic-ray counter in Sputnik III is based on the Cherenkov effect. The Swedish Academy's announcement pointed out that "without the use of Cherenkov detectors, the discovery of the antiproton which was made in Berkeley [Calif.] in 1955 would scarcely have been possible."

Tamm is the best known of the Soviet prize winners and is generally considered one of the world's outstanding theoretical physicists. At 63, he is a member of the Soviet Academy of Sciences and has been in the forefront of Soviet physics, both as a researcher and teacher, for 30 years. He has the reputation of being one of the most independent and outspoken of Soviet scientists; therefore, it has been reported that many Western scientists were surprised when last summer he was included in the Soviet delegation at the Geneva conference on detection of nuclear explosions. He is not a member of the Communist Party, and in October 1956 he led a movement against bureaucracy in the Soviet Academy. Much of Tamm's work has been based on the union of the Einstein theory of relativity with quantum mechanics. Further, in 1950 it was he who suggested the use of electrical charges in ionized gases as a means of obtaining controlled thermonuclear power.

Frank, now 50, is a corresponding member of the Soviet Academy who is a professor at Moscow University. He has specialized in nuclear physics and physical optics. Besides his work on the Cherenkov effect, he has conducted research on the properties of neutrons, and on the conversion of gamma rays into electron-positron pairs.

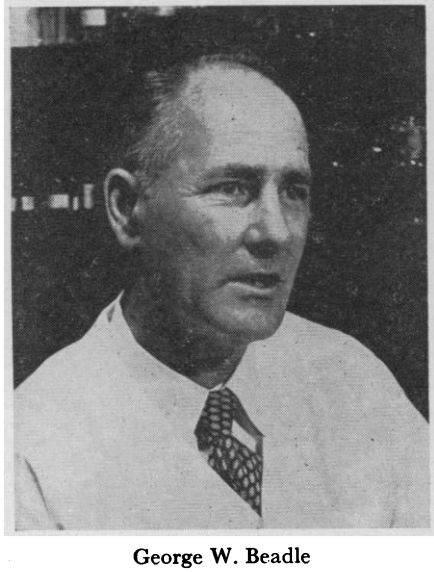
Cherenkov, 54, is a member of the research staff at the U.S.S.R. Academy of Sciences Institute of Physics, where he has spent his entire professional career. He wrote his master of science thesis there under the direction of the late Sergei I. Vavilov, president of the Soviet Academy. It was while he was working on his thesis, which dealt with the luminescence of solutions of uranyl salts, he noticed the phenomenon which has brought him fame. In 1946, with Vavilov, Frank, and Tamm, he received a Stalin Prize for his work on the Cherenkov effect. Among his more recent research interests has been the application of the effect in the study of cosmic rays. Reports describing some of his studies in this area were published in Soviet journals in 1949.

Chemistry

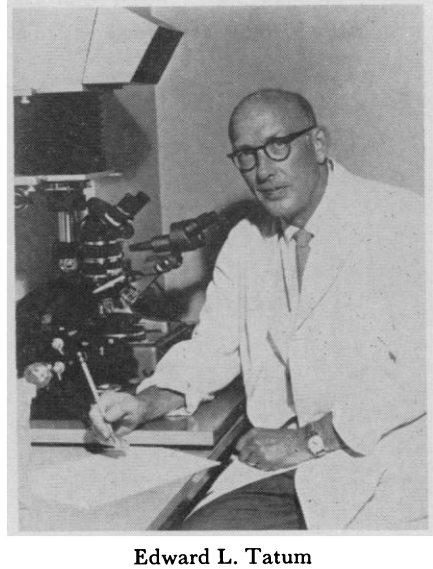
Frederick Sanger of the department of biochemistry at Cambridge University, Cambridge, England, is to receive the Nobel Prize in chemistry. He is being honored for developing a method for studying the structure of proteins, and especially for isolating and identifying the components of the insulin molecule. In announcing the award, the Swedish Academy of Science described the protein as "the most complicated of all substances occurring in nature." The academy's statement went on to say:

"Many hormones, all enzymes so far known, viruses, toxins which cause disease and antibodies which give immunity to disease, are all proteins. In all tissues of the body, in muscle, nerve and skin, proteins form an essential functional constituent.

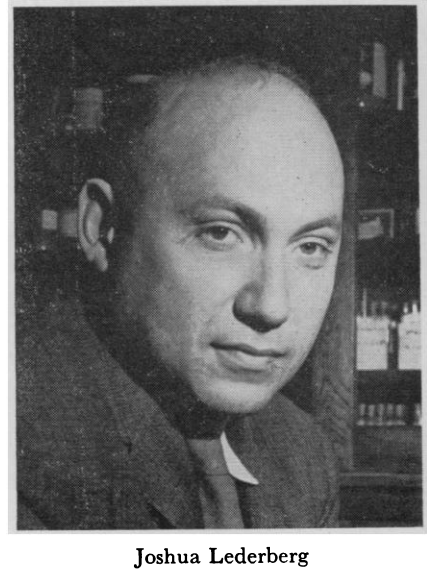
"Sanger's methods and results have opened a road to the determination of their detailed structure and thus one of chemistry's greatest problems has found its solution in principle."



George W. Beadle



Edward L. Tatum



Joshua Lederberg

Sanger, now 40 and a member of the Royal Society, began his study of proteins after having received his doctorate at Cambridge in 1944. That year he and a few associates at the university started to work out the sequence of every amino acid link in the amino acid chains that make up the insulin molecule. It was thought that there must be hundreds of thousands of possible permutations.

By the end of 1952 Sanger had assembled two complete amino acid chains. Two years later he worked out how the chains themselves were interlocked by chemical "bridges" or cross-members composed of sulfur atoms. The results were published in 1954, and biochemists had at last a complete picture of insulin, the first protein to be described in the history of biochemistry.

When interviewed in Cambridge, Sanger commented:

"At the moment, my work is useful mainly in analyzing other proteins. But, since proteins are the most important substances in the human body, understanding them is, in the long run, a step forward in fighting diseases, which attack the body."

Medicine and Physiology

On 30 October the Royal Caroline Medico-Chirurgical Institute announced that three United States geneticists will receive the Nobel Prize in medicine and physiology for their work on problems of heredity: George W. Beadle, 55, chairman of the Division of Biological Sciences at California Institute of Technology and former president of the AAAS (1955); Edward L. Tatum, 48, member and professor at the Rockefeller Institute for Medical Research and a member of the AAAS Editorial Board; and Joshua Lederberg, 33, chairman of the department of medical genetics at the University of Wisconsin. All three men are members of the National Academy of Sciences. At present, Beadle is Eastman visiting professor at Oxford University. Lederberg is to become head of the new department of genetics at the Stanford University School of Medicine in January.

Beadle and Tatum will share half of the $41,420 prize "for their discovery that genes act by regulating specific chemical processes." The other half of the prize goes to Lederberg "for his discoveries concerning genetic recombination and the organization of the genetic material of bacteria."

Seventeen years ago at Stanford University, Beadle and Tatum opened up the whole field of biochemical genetics when they embarked on a research program using *Neurospora crassa,* a bread mold, instead of fruit flies or corn, the traditional tools of geneticists. They proposed to prove the tenet that all biochemical and enzymatic reactions are controlled by genes. This they did by using x-rays, ultraviolet light, or chemicals to produce mutations in *Neurospora.* When offspring of irradiated molds were found to be deficient in one or another aspect of the nutrition process, the two investigators observed that these mutations were passed on to successive generations of nonirradiated *Neurospora.* This method of creating mutations can be used to produce organisms with almost any desired biochemical characteristics, a finding that brought new life and activity to the young science of genetics.

At the age of 21, when he was a student of Tatum's at Yale University, Lederberg became codiscoverer with Tatum of the phenomenon of sexual recombination in the bacterium *Escherichia coli.* This discovery was a direct result of the previous work, and was made possible by use of biochemical mutants in bacteria that corresponded in all respects to the mutant strains of bread molds obtained by Beadle and Tatum in 1941. Using sexual recombination as an experimental tool in subsequent analysis of *Escherichia coli,* Lederberg found clear-cut evidence that the cells of bacteria are much like those of animals and plants, and probably have nuclei containing genelike units in chromosome-like groupings, too. Further work along these lines led to his codiscovery with a student, N. D. Zinder (now with the Rockefeller Institute in New York), of "transduction," or the transfer—via an infecting virus—of genetic characteristics from the host bacterial cell to another cell.

All of the Nobel awards in science, each amounting to $41,420, will be conferred at a dinner to be held in Stockholm on 10 December, the anniversary of Alfred Nobel's death in 1896.

News Censorship during the Moscow IGY Meeting

Soviet censorship greeted American reporters who covered the International Geophysical Year meeting in Moscow in late July and early August. National Association of Science Writers members present were myself and Alton Blakeslee of the Associated Press. On our arrival in Moscow, the resident Western correspondents told us how we must file stories in triplicate at the bleak Central Telegraphic Agency in central Moscow. Later, we would get one copy back showing a story had cleared—if it had cleared—and showing any deletions if the censor had made any. The "later" might be 15 minutes or 2 hours or 6 hours or 24 hours later, or never.

On the third day of the IGY meeting, Friday, 1 August, we wrote a story saying that the chief of observations in Japan's weather bureau had told the meeting that almost all the big radioactivity peaks in Japan had come from Soviet and not American bomb tests. The censors censored it.

The AP got the story out by a subterfuge I won't describe here. But, as of the next day, not a word had been officially passed or cabled.

Reporters representing AP, UPI, the *New York Times,* Reuters, the *Minneapolis Tribune,* and the Chicago Daily News Syndicate (I was representing the last two) gave protest letters to Sydney Chapman, president of CSAGI, the international special committee directing the IGY. On the following night, the censors refused to pass a part of a *New York Times* story reporting that American scientists were saying that disagreement with the Soviets over Soviet failure to release certain rocket and satellite information would be one of the issues of the meeting. This event was added to the protest.

To quote from just one of our protest letters:

"I hope the CSAGI bureau will see fit to protest, and agree that in areas where the public of our nations is concerned, there can be no freedom of inquiry or scientific reporting unless there is also freedom to communicate with the public. It would seem intolerable to hold great scientific meetings in a place where their results cannot be communicated to the people who must support science in our countries."

The protest obviously embarrassed Soviet IGY scientists, when it was relayed to the CSAGI bureau, as promised to us, by Chapman. Chapman himself answered us on 5 August by saying: "It is the view of the CSAGI bureau that the press should be able to transmit to the public the views of the participating IGY committees on purely scientific matters."

To my view at least, the right of the press should also include much broader free interpretation and comment, but we were still indebted to Chapman's prompt and forthright action. Within a few days of his reply, candid interpretive accounts of the touchiest issues—principally, intense dispute over the matter of release of satellite information—were in fact passing without trouble. On the night of 5 August, even some of the Japanese radiation cables began coming back passed, though my own story on the subject never was sent, to my knowledge.

The censorship did not end completely. Reporters wrote that an American scientist had found that the carrier-rocket of Russia's first Sputnik fell over Communist territory, disproving Khrushchev's contention last December that the