

GENERAL SCIENCE

Nobelist Linus Pauling

Chemist, honored for his work on the forces that hold matter together, may have passport difficulties. Two German physicists awarded 1954 Nobel Prize in physics.

See Front Cover

► **FORCES THAT** hold all matter together, ranging from forces inside the atom to those that build protein molecules into flesh, hair and blood, are better understood because of the work of Dr. Linus Pauling, chairman of the division of chemistry and chemical engineering at the California Institute of Technology, who was awarded the Nobel Prize in chemistry for 1954.

Structure of the atom as revealed by light emitted by heated materials was one of the fields first explored by Dr. Pauling. This led him to discovery of laws of chemical combination, explained by him in his classic work, "The Nature of the Chemical Bond."

Determination of spiral structure, like the strands of a twisted rope, which make up skin, hair and many other structures of living tissue have won Dr. Pauling recent honors.

He is shown on the cover of this week's SCIENCE NEWS LETTER demonstrating with rope strands how molecules are twisted into the structure of protein.

His recent discovery that some types of anemia are due to defective blood hemoglobin structure opens a new method of attack on diseases like cancer whose causes are now obscure.

Passport Difficulties

► **A PASSPORT** may not be issued to Dr. Linus Pauling, America's newest chemistry Nobel, when he applies for the permission of the Department of State to go to Stockholm Dec. 10 to receive the world's highest scientific honor.

So effective was the smear of McCarthy upon Pauling in 1952 that only with great difficulty did Pauling get a geographically limited passport to attend scientific meetings in England and France that year. Last year, it is understood, Dr. Pauling was invited to India but could not get a passport for travel in a part of the world that the State Department considered "hotter and more sensitive" than Europe.

With an impressive list of scientific honors, including medals from here and abroad and the past-presidency of the American Chemical Society, Dr. Pauling's researches on the forces that hold matter together, particularly the chemical bond and the structure of protein, rate him as one of the world's great scientists.

If the United States government keeps him at home and he can not travel to Sweden to receive the Nobel prize, it will join with Hitler in using restrictions to try

to punish or force into line political dissenters. Hitler did not allow some of the great German Nobelists to accept their prizes. Mussolini, another dictator, also made it difficult for Dr. Enrico Fermi, then an Italian, to receive his Nobel award.

Shortly before Dr. Pauling had trouble getting a passport in 1952, a concept of molecular structure, called the theory of resonance, which he originated, was denounced by resolution at a Soviet chemical conference. Thus, Dr. Pauling found himself under fire from both the U. S. Department of State and the official upholders of the Communist line of scientific thought.

Dr. Pauling's application for a passport, if denied by the Secretary of State, could go before a passport appeals board, a procedure that Dr. Pauling did not use when his permission to travel to India was denied. Since only about a month's time elapses between the announcement of Nobel prizes and their presentation, any delay in passport issuance might effectively keep Dr. Pauling at home.

Evidently the appeals procedure is so burdensome that it has never been used, so far as is known. The State Department considers passport matters confidential.

Dr. Pauling was born in Portland, Ore., in 1901 and since 1922 has been associated with the California Institute of Technology where he is chairman of the chemistry and chemical engineering division. Among many honors he received the Presidential Medal for Merit for scientific services to the government during World War II.

When Dr. Pauling attempted a second time to get a passport in 1952, he said that "refusal of a passport to me would consti-

tute the unjustified interference by the government not only with the freedom of a citizen, but also with the progress of science." At that time he was informed that his "anti-communist statements have not been sufficiently strong." He has denied that he had ever been a communist.

If a passport for Dr. Pauling is not forthcoming, vigorous protests may be expected from scientists, whether liberals or conservatives. It will play into the hands of enemies of America abroad.

But the State Department may be more afraid of the reaction of McCarthy and others in Congress than they are of scientists and overseas opinion.

The granting of a passport is at the discretion of the Secretary of State and is not controlled by the McCarran-Walter Act that has made it so difficult for so many foreign scientists to get visas for visits to the United States.

Many of the difficulties of American scientists in getting passports and foreign scientists in getting U. S. visas do not come to public attention.

Some of the meetings and conferences held in the United States are making a practice of attempting to "clear" the foreign scientists with the State Department before inviting them to be sure that they will be allowed in the country.

Even then almost every meeting with any considerable number of foreigners will have a "no-show" whose visa has not come through for some reason or other. It does not help to have delays laid to the slowness of a clerk in one of our consulates abroad, even when that is the explanation.

Some international meetings were moved out of the United States, in some cases to Canada.

The practice of making it hard for liberals or anyone who has been red-baited is a kind of anti-intellectualism that has shown itself in the Oppenheimer and Condon cases as well (and this applies equally well for either Condon).

If some other government were doing it, Americans would be horrified.

Science News Letter, November 13, 1954

GENERAL SCIENCE

Two Atomic Pioneers

► **TWO PIONEERS** in the conversion of solid matter into invisible energy and vice versa have been jointly awarded the 1954 Nobel Prize in physics.

They are German-born Max Born, 72, a naturalized British citizen now living in Heidelberg, West Germany, and Walter Bothe, 63, of Heidelberg University.

In 1931, Dr. Bothe and Dr. H. Becker tapped the energy of the atomic nucleus. They bombarded a beryllium target with alpha particles, causing the beryllium to emit X-rays of considerably more power than the bombarding particles.

Commenting on these experiments, Prof. Arthur H. Compton foresaw the possibility

of getting useful energy from the atom, now a reality.

Prof. Born was one of the first physicists to attempt to reconcile classical physics with quantum mechanics, in order to explain the structure of the atom, work basic to today's atomic piles and hydrogen bombs.

Prof. Born was cited for his fundamental research in quantum mechanics, particularly his statistical interpretation of the wave function.

Prof. Bothe was honored for the discoveries resulting from his method of coincidence counting. By this technique, two Geiger-Muller tubes are connected in series,

and only those atomic reactions making both tubes conducting simultaneously are recorded.

Coincidence counting was used by Prof. Bothe and the late Dr. Hans Geiger to establish that cosmic rays observe the prin-

ciple of energy conservation. Some physicists in 1925 thought that energy was not conserved in the individual scattering process, but only as the average for many such processes.

Science News Letter, November 13, 1954

PHYSICS

Experiments Explained

By PROF. W. BOTHE

► Our experiments show that energy is gained if any alpha particle is shot into the beryllium nucleus. That is to say, by addition of an alpha particle to the beryllium nucleus, a carbon nucleus of atomic weight 13 is produced which contains less energy than the two original nuclei together.

These experiments give a hint as to the way in which the building up of the atom nuclei actually takes place in the universe: The heavier nuclei are produced by steps from the lighter.

The hypothesis which Dr. Robert A. Millikan has made to explain the "ultra-rays" (cosmic rays), that the heavy nuclei are formed direct by the sudden combination of a great number of protons and electrons, is accordingly very improbable.

In still another connection the gamma radiation from beryllium is of interest in connection with the problem of the cosmic rays. The new rays are much harder than the known radioactive gamma rays, their penetrating power approaches close to that of the softest components of the cosmic rays.

Thus in the beryllium rays one can study the properties of a gamma radiation which has approximately the penetrating power

of the cosmic rays. As is well known, my earlier experiments with Prof. Werner Kolhorster (see SNL, Feb. 1, 1930, p. 76) showed that the properties of the cosmic rays are very different from those of a gamma radiation, and that the cosmic rays behave rather as a corpuscular radiation.

Dr. H. Becker and I have now carried out the same experiments with the gamma rays from beryllium; it turns out that these still behave completely like a normal gamma radiation and quite differently from the cosmic rays.

This is further strong support for the idea that the cosmic rays have a particle-like nature in the lower layers of the atmosphere.

A series of other light elements, as well as beryllium, can be artificially excited to gamma ray emission. The production of artificial gamma rays is just as general a phenomenon as the breaking up of atomic nuclei.

In this radiation we have a means of studying the structure of the lighter atomic nuclei; we are standing at the threshold of a "nuclear spectroscopy."

Indeed the light atom nuclei are of special interest.

(Reprinted from SNL, March 12, 1932, p. 159.)

Science News Letter, November 13, 1954

certain broad spectrum antibiotics in the treatment of amebic dysentery may be largely related to their activity against associated bacteria.

The possibility that another organism, not yet identified, may act as an antagonist to the ameba will be investigated in future studies. Existence of such an agent might explain why some individuals who never show symptoms of amebic dysentery are nevertheless carriers of the ameba.

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The average Frenchman drinks 40 gallons of red, white and pink *wine* a year.

More than 8,000,000 *lightning* strokes, on the average, strike the earth in one day.

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PARASITOLOGY

Amebic Partnership

► AMEBAS, THE germs that cause amebic dysentery, cannot survive, much less cause dysentery, without the aid of other, smaller microorganisms.

This discovery, made with the aid of germ-free guinea pigs reared at the LOBUND Institute of the University of Notre Dame, Ind., was reported by Bruce P. Phillips, medical protozoologist of the U. S. National Institutes of Health, Bethesda, Md., at the meeting of the American Society of Parasitologists with the American Society of Tropical Medicine and Hygiene in Memphis.

Associated with Mr. Phillips in the research were: Drs. W. H. Wright and C. W. Rees, also of the National Institutes of Health, and Miss P. A. Wolfe and Drs. H. A. Gordon and J. A. Reyniers of the University of Notre Dame.

Germ-free guinea pigs and conventional guinea pigs that harbor the common intestinal bacteria were used in the experi-

ments. Both groups were inoculated with bacteria-free amebas.

The scientists reported that none of the 35 germ-free animals developed amebic dysentery, where 34 of the 37 conventional animals came down with the disease, and the remaining three were shown to harbor the infecting agent when sacrificed.

In another experiment, two series of germ-free animals were fed respectively with single species of two common intestinal bacteria, *Escherichia coli* and *Aerobacter aerogenes*, prior to inoculation with bacteria-free amebas. All of these animals also developed acute amebic disease with typical lesions.

These findings supply concrete evidence for the first time that bacteria have a role in the experimental production of disease by the agent of amebic dysentery. Whether this relationship involves more than two species of bacteria is not yet known.

The results also suggest that the value of