SCIENCE NEWS

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NOBEL PRIZE AWARDS

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THE Nobel prize awards to Professor F. Joliot and Mme. Irene Curie-Joliot, in chemistry, and to James Chadwick, in physics, recognize two of the most important achievements in physical science in recent years: Discovery of the neutron, now considered one of the three ultimate particles of all matter in the universe—the achievement of James Chadwick, of the University of Liverpool, and at the time of his discovery in 1932 at Cavendish Laboratory in Cambridge, England. Discovery of artificial radioactivity and manufacture of new radioactive elements—the achievement of the Joliots early in 1934.

The award to Irene Curie, as she signs her research papers, marked the first case of child of a Nobel prize winner receiving the Nobel prize. For Mme. Joliot is the daughter of the late Pierre and Marie Curie, Nobel laureates jointly with Henri Becquerel in 1903 for their work on radioactivity. The mother of Irene Curie also received the Nobel prize in chemistry in 1911.

The discovery of the neutron by Mr. Chadwick grew out of the modern alchemy of physics whereby transmutation is accomplished—not the turning of lead into gold desired by the ancients, but more important to science, the turning of many light atoms into other elements in small but significant amounts. Lord Rutherford, head of Cavendish Laboratory, knocked "H" (chemical symbol for hydrogen) out of nitrogen in 1919. There was one light-weight element, beryllium, that resisted similar transmutation, and it was an attack on this metal that produced neutrons.

When bombarded with a stream of helium atomic hearts let loose by that radioactive cousin of radium called polonium, there was produced from beryllium a stream of powerful radiation. The Joliots in Paris and two Germans, Bothe and Becker, thought that it was the well-known gamma radiation so useful in cancer treatment, but Mr. Chadwick recognized it as a stream of electrically neutral particles which had been suspected from theory and had even been named "neutrons" before discovery. Because of its electrical neutrality, the neutron has the ability to plunge itself into places that can not be reached by other atomic particles. It was immediately seized upon as a very welcome tool for prying open the atom.

Two years later the achievement of artificial radioactivity by the Joliots was world-acclaimed. The persistence and unchanging nature of natural radioactivity has perplexed scientists. Try as they will, they can not speed, slow or otherwise change an iota the constant natural disintegration of radium or any other radioactive substance.

Man-caused radioactivity was first produced in aluminum. A stream of helium atom hearts was flung at a thin foil of this metal. Out came first neutrons and then a stream of positrons, another atomic particle discovered in 1932 by Dr. Carl D. Anderson, of the California Institute of Technology. What was unusual and important is that the positrons were flung off for many minutes after the bombardment stopped. The atom was disintegrated not like an explosive shell but like an incendiary bomb. Here was radioactivity made to order. There was great activity in laboratories as atomic particles of various kinds were flung by high voltage current at various substances. A large number of substances were transmitted into new radio-elements that lived for minutes, hours or a few days, and then blew themselves up with release of powerful radiations. There was hope aroused that these new radio-elements would be of medical and industrial importance. To-day it is known that plans are under way in one laboratory at the University of California to produce radiosodium in quantity in the hope that eventually it can be used in the treatment of disease through its injection into the blood-streams of the patients.

The two American centers of research where the researches of Mr. Chadwick and the Joliots have been supplemented most intensively are at the University of California, under Professor E. O. Lawrence, and at the California Institute of Technology, under Dr. C. C. Lauritsen. Both institutions have apparatus for producing the high voltage current necessary for flinging various atomic particles at different sorts of matter. Another atomic particle, the positron or positive electron, was discovered by Dr. Carl D. Anderson at the California Institute of Technology in 1932 shortly after Mr. Chadwick's discovery of the neutron.

THE STRATOSPHERE ASCENT

THE success of the Armistice Day stratosphere flight of the balloon *Explorer II,* bearing Captain Albert Stevens and Captain Orville Anderson to new altitude records, hung in the balance for an hour and a half during preparations for the take-off. Press reports merely said, "A rip in the balloon fabric was discovered during the inflation and repaired."

But both the men in the balloon and members of the advisory committee on the ground held their breath every instant the balloon was aloft hoping the great 20-foot-long patch would hold. It did, and the Army's non-commissioned balloon officers from Scott Field have won thanks which in war time would merit military citation. Their names are Master Sergeant J. H. Bishop and Staff Sergeant Olaf Jensen. Working with them were J. F. Cooper and J. R. Kelly, of the Goodyear Company, which constructed the balloon bag.

When the two stratosphere balloonists reached their highest altitude, they looked down upon what is normally considered the sky. So much of the air and dust particles of the atmosphere lay beneath them that the white or hazy sky, made that color by the scattering of light, was down and not up. The sky above and outward toward the horizon was deep violet, which indicated that the red

and green or longer wave-lengths of light had been captured and dissipated by the lower atmosphere. If Captains Stevens and Anderson had had ultra-violet eyes the sky above them would have been brighter with light shorter in wave-length or, what is the same thing, higher in frequency of vibration. They were to an extent like men on the moon or on Mars in that they could look upon the earth from outside it. What they saw was very much like what could be seen from the earth's satellite or nearby planets, except they had a magnified view.

The human eyes of the two balloonists could not see through the mistiness of the atmosphere below them as well as the mechanical eyes that their gondola carried in the form of cameras with red and deep red filters. These infra-red photographs when developed will have detail that a mere human eye could not see.

A number of scientific men gathered at the headquarters of the National Geographic Society during the ascent of the balloon, which rose to a new record height of over 74,000 feet. By radio they not only heard what was going on in the balloon, but were able to act as "cerebral screwdrivers or pliers" as one of them put it. Dr. W. F. G. Swann, member of the scientific advisory committee of the flight and with valuable cosmic ray apparatus automatically working aboard the balloon, was in New York city and Captain Stevens was twelve miles up in the stratosphere over the now barren winter-touched Nebraska countryside.

Nothing went wrong with the cosmic ray equipment but by radio Dr. Swann would have been able to offer emergency advice if it had. In Washington, Dr. Lyman T. Briggs, chairman of the advisory committee and director of the National Bureau of Standards, talked with Captain Stevens about the progress of the experiment on measuring the electrical conductivity of the stratosphere.

To Dr. Briggs and Dr. L. B. Tuckerman, also a member of the committee, Captain Stevens told of opening the apparatus for catching spores just after the balloon reached its peak altitude and began the descent. At each whirl of the automatic camera-exposing mechanism they relaxed, for they knew the multi-cameras were taking pictures of the ground below and making permanent records of the invaluable data being registered on the dials. What those dials read during the flight will tell many things. How does the temperature vary high in the stratosphere is only one, for example. Of keen interest also are Captain Steven's observations on the color of the sky at the maximum altitude. Was it black as previously reported, or a normal blue? The answer seemed to be a very dark blue-black, almost a deep violet.

RICKETS AND VITAMIN D MILK

DISCOVERY in recent years of methods of adding the sunshine vitamin D to milk and other foods seems to justify the hope that the public health problem of preventing rickets can be solved, according to Dr. Fred O. Tonney, of the Chicago Board of Health, who spoke at a conference on irradiation held in New York City by the Wisconsin Alumni Research Foundation, which holds patent rights to one method of adding vitamin D to foods and medicines.

The individual child may be safeguarded from rickets by the guidance of his own doctor, but for the great mass of children in the country, many of whom do not obtain medical care unless seriously ill, preventing rickets seems to be the problem and responsibility of the health officer.

One measure of protecting large numbers of children against rickets may be the addition of vitamin D to milk. Dr. Tonney pointed out that the value of vitamin D milk from the public health standpoint can not be estimated definitely, yet because of the short time since its introduction and the small amount consumed. However, in Chicago during the past year, the consumption of fluid and evaporated vitamin D milk has amounted to 16 per cent. of the total milk sales. During the same time severe rickets has disappeared and milder forms have declined noticeably in a group of pre-school children examined regularly every year at child welfare stations. It is, therefore, believed that vitamin D milk should be given a more general trial as a rickets-preventing agent.

The parentage of vitamin D presents a knotty problem. Some of the latest angles uncovered in the search for the original substance that produces vitamin D under the action of ultra-violet light were described by Dr. James Waddell, director of the biological laboratory of the E. I. du Pont de Nemours and Company, at the American Institute meeting on ultra-violet light in relation to human health.

From the comparatively simple discovery that vitamin D is produced from ergosterol when irradiated with ultra-violet light, investigators have found that vitamin D is produced by the action of ultra-violet light on a great number of substances, including cholesterol, and that there is marked difference in the effectiveness of the vitamin produced from the different sources.

PURCHASE BY THE U. S. S. R. OF LOW TEMPERATURE APPARATUS AT CAMBRIDGE

SOVIET RUSSIA is to buy from Cambridge University the low temperature apparatus, including one of the world's most powerful electromagnets, which Professor Peter Kapitza has used in his experiments in atomic physics near absolute zero.

Professor Kapitza is the brilliant investigator who for some years did his research at the University of Cambridge in the Cavendish Laboratory of Lord Rutherford. Last spring he went home for a visit to Russia and was "detained" permanently because Soviet authorities decided his work was so valuable it might well be done in the U. S. S. R.

In an interview Lord Rutherford announced that a decision to accept the Soviet offer to purchase Professor Kapitza's apparatus had been reached by a joint committee of the University of Cambridge and the department of scientific research of the Royal Society. Lord Rutherford said: "I am thoroughly in favor of the scheme as adopted. I think, on the whole, it is the happiest solution which could have been found for this difficult problem. The amount of payment, you will understand, must be treated as private. A new large electromagnet will be installed at the Mond Laboratory

at Cambridge which will produce temperatures within a few thousandths of a degree of absolute zero.''

Lord Rutherford and Professor J. D. Cockcroft, assistant director of the Cavendish Laboratory, were reluctant at first, it was disclosed, to continue researches on the problems of Professor Kapitza unless the latter, as a pioneer in the field, so desired.

The payment from U. S. S. R. will be amply sufficient to pay for the cost of building a new and more powerful electromagnet in England. Opinion regarding the purchase is that science will be aided in the end, for while a slight delay will occur in the low-temperature atomic research, eventually there will be two sets of equipment for the problem where there was but one before.

One line of research which will also be undertaken with the new Cavendish magnet will be atomic bombardment with apparatus of the cyclotron type such as used by Professor E. O. Lawrence at the University of California.

ITEMS

THE possibility of an influenza epidemic in the United States this winter appears in a radio report from Hawaii just received at the U. S. Public Health Service at Washington. In Honolulu there are approximately five thousand cases of influenza, three thousand of them among school children, Dr. L. D. Fricks, chief quarantine officer for the U. S. Public Health Service in Hawaii, reported. The influenza outbreak there started two weeks ago. The last big epidemic of influenza in the United States started in Hawaii, health authorities in Washington pointed out. That was in 1932. Starting with about ten thousand cases a week in Hawaii in June, the disease crossed the ocean and spread across the United States, reaching a peak of 90,000 cases which were reported the last week of December. At present, there is no appreciable increase in reports of influenza cases in the United States, but health authorities are watching the Hawaiian situation with considerable interest.

DEATHS from malaria are increasing to an alarming extent in the United States. The seriousness of the situation is pointed out by officers of the Metropolitan Life Insurance Company, who refer to ''the rising menace of malaria'' in their current *Statistical Bulletin*. According to their estimates, at least 900,000 persons are suffering from this preventable disease at the present time. This estimate is far too low, in the opinion of Dr. L. L. Williams, of the U. S. Public Health Service, who is in charge of malaria investigations. Dr. Williams estimates that there were two million cases of malaria in 16 southern states during 1934. He thinks the number of cases has dropped off a little since the 1934 peak, but the 1935 figures will not be available until the end of the year. The number of cases is not known exactly, but is calculated from the deaths reported. Some authorities estimate 200 cases for every death, but Dr. Williams believes 500 to 1,000 cases for each death is more nearly accurate. Malaria accounted for 4,520 deaths in the United States during 1934, the latest year for which figures are available.

POULTRYMEN are now being told how to color the egg inside the shell, making the yolk pale yellow or deep orange, to suit the egg-buying customers. Deep-colored egg yolks are liked for cake making, to give the cake a golden color. They are also in demand for some ice creams. Poultrymen can get hens to lay pale or deep yolks by the simple device of feeding them accordingly. Small amounts of pimento or Chili pepper in regular rations will give the yolks a deep orange-red color. Feeding white corn, instead of yellow, and limiting the green feed will make the yolks pale. But, hens on this latter ration will need cod-liver oil to supply the vitamin A they miss from not getting yellow corn. Richer shades of yellow may be obtained by increasing yellow corn and green feed in the ration, but too much green feed will give the yolks a brown or green off-tint.

THE process of making gasoline out of natural gas and waste refinery gas, known chemically as polymerization, has increased the nation's potential sources of motor fuel by 25 per cent. Speakers at the recent meeting of the American Petroleum Institute declared that with efficiencies now obtainable approximately 110 million barrels of polymer gasoline could be produced each year if necessary. Polymerization is the chemical process whereby waste refinery gases are made to combine in such a way that two or more molecules join and form a larger molecule, known as a ''polymer.'' Not only can gasoline be secured in this fashion but also benzol, toluol and xylol, all important solvents.

DISCOVERY of the complete skull of a primitive carnivore, a flesh-eating mammal about the size of a cat, which lived in the lower Paleocene Epoch about ninety million years ago, has been announced by Dr. Glenn L. Jepsen, of the department of geology of Princeton University. The skull was found by the 1934 Scott Fund Expedition, of which Dr. Jepsen was the field director, in the Big Horn Basin of Wyoming about 25 miles northeast of Cody. With the exception of specimens uncovered by the 1935 expedition, which have not as yet been studied, it is believed that this is the only complete skull of this type which has ever been found. Among the finds of this summer's expedition, which are to be studied this winter, is part of a skull of the earliest known primate, the order to which monkeys, apes and man belong. Jaws of this species had been found by previous Scott Fund Expeditions, and it was tentatively given the name *Plesiolestes problematicus*, but it is probable that it will be reclassified in view of the more complete information made available this year.

SURFACING roads through vineyard regions, by the hot tar process, brings about bad flavor in the wine, is the claim advanced by German vintners. The tar vapors, that fill the air while the road work is going on, condense on the grapes, and tar particles settle on them out of the dust later on. Surfacing of roads with a cold asphalt emulsion is recommended as a way out of the difficulty.