SCIENCE NEWS

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THE CHICAGO SYMPOSIUM ON COSMIC RAYS

AT the Symposium on Cosmic Rays, sponsored by the University of Chicago, Dr. Arthur H. Compton, professor of physics at the university, suggested that new findings in cosmic ray research are best interpreted if the origin of the mysterious rays is "local," in the galaxy of stars containing the Milky Way, the sun and the earth. Previously, Dr. Compton had tentatively suggested that cosmic rays came from the remote regions of interstellar space, far beyond the confines of our galaxy. He stated that the new theory is also tentative, but that it seems best to fit the new observations. It throws some doubts on the exploding universe theory of the origin of cosmic rays which has been advanced by Abbe G. Lemaître, and which has found considerable acceptance among physicists. The basis for the changed viewpoint of the origin of cosmic rays was the failure to find any evidence of the so-called "galactic effect" in the rays' intensity. It has been previously suggested that there should be a variation of the cosmic radiation, throughout the day, if the rays originated beyond the Milky Way. According to theory, there should be more rays received in the northern hemisphere than in the southern, because the northern hemisphere would be the forward moving side of the earth, in the rotation of the galaxy. The situation would be like a person riding on a merry-go-round in the rain, who would be hit by more rain drops in the face than in the back.

Professor M. S. Vallarta, of the Massachusetts Institute of Technology, described his calculations of this "galactic rotation" effect and its magnitude, if it existed. Observations made throughout the world, Dr. Compton said, have failed to find an effect even a tenth as large. These observations have forced the conclusion that the cosmic rays therefore originate "locally" within our galaxy. "We should continue to think of the cosmic rays as very old, perhaps dating from the origin of our galaxy itself, perhaps being the accumulation of millions of years of some gradual process giving rise to high energy particles. We should not, however, think of them as coming from space which on an astronomical scale is very remote."

A NEW TRAP FOR COSMIC RAYS

USING a new and novel trap for catching piercing cosmic rays, Dr. Carl D. Anderson and his colleague, Dr. Seth Neddermeyer, of the California Institute of Technology, have obtained a photograph of a powerful cosmic ray particle with 10,000,000 electron-volt energy entering the apparatus and emerging with an energy of only 210,000 electron volts. But the particle actually came to rest within the range of the camera and its stopping is recorded. Measurements indicate it is the so-called heavy electron with a mass some 240 times as great as that of the ordinary electron, basic unit of electricity. Although the photograph, which is printed in *The Physical Review*, does not actually show it, Drs. Anderson and Neddermeyer suggest that the heavy electron came to rest and then disintegrated into a positive electron with ordinary mass.

The new cosmic ray trap consists of a special form of a device known as a Wilson cloud chamber in which the tracks produced by the speeding cosmic rays are made visible as they serve a nuclei of condensation of water vapor in the chamber. Through a window a photograph of these tracks can be taken.

In the usual plan Geiger counters near this chamber detect the presence of a cosmic ray and set off the camera mechanism. In the new apparatus, however, these detectors are supplemented further by still another counter inside the cloud chamber itself. This arrangement favors the probability of observing cosmic ray particles near the ends of their ranges when their energies are weak. That the device actually photographed a cosmic ray particle as it stopped and came to rest was a fortuitous happening.

HIGHWAY LIGHTING

STUDIES conducted by C. A. B. Halvorson, of the General Electric Company, at Lynn, Mass., indicate that pavements on highways needing permanent lighting will in future be processed to insure a high order of uniform light reflectivity in contrast to to-day's pavements which are highly wasteful of light from street lamps and other sources.

Literally turning light onto a hitherto dark and neglected subject, the experiments emphasize the rôle played by the way in which a street pavement reflects light. The provision of adequate night lighting is believed to be one of the most effective approaches to cutting the mounting toll of night accidents.

Surfacings now in common use "soak up" of waste light in varying degrees, having a light reflectivity from less than four to more than 30 per cent., according to their color character, Mr. Halvorson has found. These surfaces also reflect light differently, some diffusely like snow and some specularly like polished metal. Most roads combine both types of reflection and do not provide uniform reflection which is essential to proper seeing at night.

A problem facing highway lighting engineers is the fact that road surfaces, with but one or two exceptions, change their reflecting characteristics when wet. Wide variation is also found to occur in accordance with the specific intensity, direction and angle of light applied.

Experiments conducted on a model road near Lynn with test objects and test lamps made it clear that vision in highway lighting is primarily accomplished by means of contrasts between objects and pavements.

A special "pavement" represented by truncated conical cups light in color was tried and found to give excellent reflectivity characteristics under conditions representing day and night, rain and shine.

The lighting engineers must look to the paving in-

dustry for assistance and research on the problem and to bring the experimental results gained in these studies into practical application.

THE NEW FOOD AND DRUG LAW

WHILE the provisions of the new Food and Drug Act will not, in general, be effective for another year there are three important exceptions which take effect immediately.

From the tragedy caused by the Elixir of Sulfanilamide comes regulation of the introduction of new drugs into interstate commerce. Effective immediately, any person introducing a new drug for sale between states must first file with the Secretary of Agriculture an application which contains complete information on the chemical contents of the drug, the proportions used, any chemical reactions which take place between the drugs, all tests made to determine the usefulness and safety of the drug, and send in five samples. The latter must contain the actual material being submitted for sale and the proposed labels.

From this information the secretary shall act, either to permit sale or prevent sale through a restraining order. If the applicant receives no notice from the Department of Agriculture within 60 days, approval of the sale of the product is automatic. Such regulation over new drugs, it is felt, will prevent a repetition of the sulfanilamide tragedy. While it would not prevent a case like that which caused death by injection of the cancer drug Ensol (because Ensol was being used only experimentally and was not for sale in interstate commerce), such a drug would come under the act immediately it was offered for sale.

Two other provisions of the new act are also effective at once. They are the prohibition of drugs which are dangerous to the consumer when used as prescribed on the label and a prohibition of cosmetics which may be injurious to the users.

Other important changes in the act, which will go into effect a year hence, include:

1. The new law has jurisdiction over all cosmetics except toilet soaps. This means that the American public will be protected against dangerous cosmetics such as eyelash dyes that have been known to cause blindness.

2. Brings therapeutic devices under control. In the past, many curative claims have been made for devices such as electric belts which have no value.

3. Regulates drugs intended for diagnosing illness or for remeding underweight or overweight, or otherwise affecting bodily structure or function. Included in this group are the so-called "slenderizers," many of which have caused blindness and death.

4. Requires adequate testing of new drugs for safety before they are put on the market. The elixir of sulfanilamide which caused the death of nearly 100 persons last year emphasized dramatically the need for this provision.

5. Provides for the promulgation of definitions and standards for foods. The old law contained no such authority except for canned foods. This means that the definitions and standards which under the old law were not binding, but merely advisory, will now have legal force and effect.

6. Increases penalties for violations. Under the old law the maximum fine for the first offense was $200. Under the new act a first offense may be punished with a fine of $1,000 or one year imprisonment or both. For subsequent offenses under the old law the maximum fine was $300 or one year imprisonment or both. Under the new law this penalty is increased to a maximum of $10,000 or three years imprisonment or both. Even for first offenses where the court finds evidence of fraud or deliberate intent to violate the act the maximum penalties are $10,000 fine or three years imprisonment or both.

7. Provides authority for the Federal courts to restrain violations by injunction.

8. Eliminates the necessity for proving fraudulent intent in the labels of patent medicines. Under the new law any such medicine proved to be worthless may be removed from the market.

9. Requires drugs intended for use by man to bear labels warning against habit formation if they contain any of a list of narcotic or hypnotic habit-forming substances, or any derivative of any such substance which possesses the same properties.

10. Requires the labels of non-official drugs (those not listed in the Pharmacopoeias and Formulary) to list the names of the active ingredients, and in addition to show the quantity or proportion of certain specified substances.

ITEMS

THE United States ranks fourth in the number of Nobel Prize winners, it is shown in a survey completed by Professor Harrison Hale, of the University of Arkansas, for the American Chemical Society. Eighteen Americans have been honored with the prize since it was first inaugurated in 1901 under the will of Alfred Nobel, discoverer of dynamite. Germany leads the list of nations with 37 laureates, England comes second with 23.5 and France is third with 20.5. The fractions mean that some years the prize has been split between two men. The Nobel Prize, granted for outstanding achievement in physics, chemistry, medicine, literature and on behalf of international peace, has changed in its award pattern in the last decade. In prizes awarded during the last ten years England and the United States lead with 10 each. Germany comes next with 9.5 and France has dropped behind with only four. During this time the relative position of the United States has improved 63 per cent.

Nature reports that two British investigators, F. C. Rawdon and N. W. Pirie, have succeeded in producing crystalline nucleo-proteins from two strains of the potato virus X, the cause of a plant disease. The second virus to be so isolated and crystallized, crystalline nucleoprotein derived from potato virus X is held definite proof of the protein nature of the filterable viruses, the mysterious causes of disease in plants, animals and humans alike. The filterable viruses are so small that they pass through the finest filters and are invisible under the most powerful microscopes. The first one to be successfully

crystallized as a nucleo-protein of high molecular weight was the virus that causes tobacco mosaic, a wide-spread disease of tobacco plants. This was done by Dr. Wendell M. Stanley, of the Rockefeller Institute for Medical Research. It is pointed out that "potato virus X is perhaps more typical of viruses in general than tobacco mosaic, so it seems more probable that all viruses may be specialized nucleo-proteins." Two strains of the potato virus were crystallized, the S and G strains.

GEYSERS in Yellowstone National Park, spectacular enough at all times, appear to be putting on a special show this season. Old Faithful has been spouting to unprecedented heights. Recently an eruption reached the height of 223 feet, which is 73 feet above its 150-foot averages and 32 feet higher than its previous record of 192 feet. Grand Geyser has taken a new lease on life, with 200-foot eruptions at thirty-hour intervals. The Giantess, largest of all geysers, has erupted four times in nine months, which is about double its usual rate. National Park Service observers are not yet certain whether there has been a general increase in geyser activity or simply a shift in underground water flow, increasing the activity of some at the expense of others.

DON'T tidy up forests too much, by removing fallen timber and otherwise clearing the ground, is the advice of a leading Swiss ecologist, Dr. Arnold Pictet. If you clear away all such accumulations of "rubbish" you deprive the forest of much of its biological working capital. Trees are a soil-exhausting crop, Dr. Pictet points out. They withdraw a large proportion of the soil's original store of nutrient substances and lock it up in their stems. When they fall, the swarming destructive life of the forest floor—insects, worms, fungi, bacteria—unlock these hoardes and return the accumulated capital to the soil as humus. Lumbering operations inevitably carry off a good deal of this capital to market. Fire destroys it, not to be replaced for centuries. Fallen trunks, and forest litter generally, can re-invest a part of it in the soil.

AN easily readable device that tells the navigating officer how much a ship is off a pre-determined course has been patented by Francis West, Jr., of Chilmark, Mass. An electrical set-up enables the compass to be kept at one place and to operate an indicator on the bridge to inform bridge officers the ship's direction in terms of the course set, according to the specifications for the patent. It can replace with a simple needle swinging across a dial the complex compass card that requires considerably more than a glance to read it. So long as the ship is correctly headed a needle rests at zero on a dial. A condenser of a particular type is actuated by the compass so that when the ship moves off course a capacity bridge is no longer kept in balance and the bridge-actuated needle swings to one side. Amount of swing informs the navigating officer how much the vessel in his charge is off course. Mr. West claims that the device is suitable for use on ships, airplanes or other means of transportation requiring compass-steering.