SCIENCE NEWS

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NEW COSMIC RAY DEVICE AT THE UNIVERSITY OF CHICAGO

MORE powerful than any other similar apparatus in the world is the new cosmic ray equipment now nearing completion in the laboratory of Professor Arthur H. Compton, of the University of Chicago.

The heart of the device—a Wilson cloud chamber—is a giant 12-ton magnet whose strong field will bend cosmic rays and the atomic electrified débris so that their energies can be calculated. The magnetic field generated by the new magnet will be 40,000 times as powerful as that of the earth. It was designed by Professor Compton and his research associate, Haydon Jones.

Professor Compton states that the equipment will be used in a new series of experiments by which it is hoped further data can be obtained on high energy particles to see if the known laws of electricity apply to them.

As cosmic rays pass through the moist gas of the Wilson cloud chamber in the field of the magnet, they will leave a fog trail which is automatically photographed. Professor Compton estimates that there should be one cosmic ray entering each second and about one out of fifteen will be moving in the proper direction for photographing.

The magnetic field will bend the paths of the cosmic rays. Very high energy particles are less susceptible to deflection than are those of lesser energy, in somewhat the way that a baseball is harder to curve than is a ping-pong ball. Because the magnetic field will curve the tracks of the paths of particles of high energy to a less extent than it will those of low energy, it will be possible to judge the energy and determine if the particles are positively or negatively charged.

Previous experiments have measured energies up to 20 billion volts, but Professor Compton hopes to extend the measurement with his magnet to energies of 40 billion volts.

RADIO DATA DURING THE RECENT SOLAR ECLIPSE

HOPES that radio observations of the recent eclipse of the sun on June 19 in Siberia would be highly valuable were dimmed as the results of experiments made by members of the National Bureau of Standards were made known. Although few people realized it, a great magnetic storm struck the world just before and during the eclipse.

Despite general cloudiness and other unfavorable weather conditions, which ruined the visual and photographic observations of many eclipse expeditions from the United States and other nations, it was generally supposed that the radio observations would be successful.

There was world-wide cooperation on the radio tests on the recent eclipse. While scientists on the eclipse path were taking their observations of the reflections of radio signals from the ionizing layers miles above the earth's surface, S. S. Kirby, T. R. Gilliland, N. Smith and S. E. Reymer, investigators at Washington, took similar measurements which were to establish the normal pattern of the world's radio "roof" half way round the world. Thus, it was hoped, the effect on the layers of the moon's shadow due to the eclipse could better be ascertained.

What decreases the hopes that the eclipse radio observations will be of value is the discovery that on the two days preceding the eclipse, the eclipse day itself and the following day, the ionizing layers indicated a severe magnetic storm which made the whole world picture a greatly abnormal one. Even if the actual observations in the eclipse zone are different from the usual pattern it will be difficult to estimate just how much of the abnormality was due to the solar eclipse and how much was due to the known magnetic storm.

The National Bureau of Standards observations, reported in the *Physical Review*, mark a new step in what should become standard practice in future eclipse studies with radio.

While the effect of the sun's eclipse on the reflecting layers has been observed before in the actual eclipse zone, there has previously been no attempt to learn what were the normal world-wide conditions and to use this knowledge as a check against the eclipse readings.

STANDARD WHITE LIGHT

THE production of a standard white light or a "standard daylight" is one of the prime needs of investigators who work with color, whose problems are often not unrelated to those of the man who buys a tie and a shirt to match in a department store only to find they clash violently in broad daylight.

A method, by which scientists simply by choosing the thickness of a special color filter, or colored coverglass, can convert any artificial light into standard daylight, has been developed by Dr. H. P. Gage, chief of the Corning Glass Works optical division.

The method, expressed in a mathematical formula, for the specifications for glass filters, is far simpler than any method used heretofore for standardizing light. In fact, it reduces the computations of the daylight-correcting filters sufficiently so that the results can be shown on an 8×10 chart accurately enough for all engineering purposes.

The point is that the color of an object depends not only on the object itself but on the light in which it is viewed. Thus bright red letters on a white paper seen in a blue light, appear black, but when observed in red light disappear entirely. Hence the need for a standard light, not so much for viewing objects, as for measuring their color, a field in which scientists are working to set up accurate specifications. This requires a standard, artificial daylight which will be constant and available at all times of night or day and under all outside weather conditions, and in any part of a building. This has been available for some time by using a high efficiency tungsten lamp, modified by a glass color filter, but its satis-

factory use has been hindered by the complexities of getting the correct filter.

With Dr. Gage's formula, which was presented to the Massachusetts Institute of Technology color conference, it is necessary only to know a few facts about the light source to be standardized, which when compared with the data for average natural daylight, gives the thickness of the glass filter which will transform the light source into daylight.

THE HEALING EFFECTS OF UREA

UREA, ordinarily considered a waste product of the body, is good medicine for slow-healing wounds. Its successful use on patients by physicians all over the country is reported by Dr. William Robinson, entomologist of the U. S. Department of Agriculture, in the current issue of *The American Journal of Surgery.*

A two per cent. solution of urea, made with sterile water, is applied directly to the wound. Relief of pain and rapid healing has followed in cases of varicose and diabetic ulcers, carbuncles, extensive infected burns, mouth infections, osteomyelitis and certain skin infections. No ill results have so far been reported from this use of urea, and its low cost, about fifty cents a pound, makes its extensive use quite practicable. The solution is bland, colorless and odorless, and as used medicinally comes from a manufactured product having no connection with body wastes.

The urea solution apparently achieves its effect by stimulating a "vigorous growth" of new tissue with abundant blood supply. It does not have any direct germ-killing effect on the organisms involved in chronic, pus-forming wounds. Its cleansing effect on these wounds is produced indirectly through the stimulation of the growth of new healthy tissue.

The healing effect of urea was discovered through investigations of maggots made by Dr. Robinson. A war-time discovery by the late Dr. William S. Baer, American surgeon, showed that these tiny creatures, loathsome as they might seem when crawling around in an open wound, had the power to clean up the wound and stimulate healing of the tissues. Dr. Baer died before he could find why the maggots in many cases surpassed other means of healing wounds. Government investigators continued his work, breeding clean, germ-free maggots and studying them. The first clue to their healing power was the discovery that they produced allantoin, which in itself is a healing agent.

Further study showed that this was not the only substance with healing power present in maggot excretions. The chemical structure of allantoin suggested the possibility that urea, which can be formed by adding hydrogen to one of the chemical groups that make up allantoin, might be the active agent with which maggots were healing wounds. Whether or not this is the case, the suggestion led to a trial of urea itself, with the success reported by Dr. Robinson.

Urea can be made by combining ammonia with carbon dioxide. It occurs in human tissues and also is of common occurrence in plants. Its name comes from the fact that it was first discovered in one of the body's waste products. If, as Dr. Robinson points out, it had first been discovered in spinach, where it also occurs, its name would probably seem more pleasant.

ITEMS

SOVIET aviators unofficially broke, late last month, the world's long-distance airplane record with a non-stop flight of 5,825 miles. Remaining aloft nearly 56 and one half hours, pilots V. P. Chkalov, G. F. Baydukov and navigator A. V. Belyakov took their heavily-laden, single-motored ANT-25 plane under adverse weather conditions from Moscow to the tiny island of Udd on the Siberia Coast just west of Nikolaevsk-on-Amur. Deliberately they flew out over the Barentz Sea and the Arctic Ocean for more than half of the flight. While the distance covered exceeds the record of 5,657 miles made by the French aviators M. Rossi and P. Codos in 1933, it can not be entered as official because it was not in a straight line. Take-off and landing points alone are considered in the records. But the Soviet pilots were seeking knowledge of Arctic conditions which is more important than records

ON August 29 the National Bureau of Standards will start a two-week test broadcast of sending out continuously, night and day, the four hundred cycle note that is A on the piano. The broadcast will be held at the request of musical organizations that need a really accurate and truly-pitch A. Musical instrument makers, piano tuners and others who have need for an accurate standard of pitch are asked to write the radio section of the bureau for further details and comment on the new service. The only time, day or night, when the "A" will not be broadcast will be Tuesday, Wednesday and Friday from noon to 3: 30 P. M., E.S.T. While the older receiving sets may not pick up the signals the newer sets and the "short wave" receivers will. Transmission will be on 5,000, 10,000 and 15,000 kilocycles per second.

NATURE, not man, preserved New Guinea's mysterious group of human "mummies," found sitting knees-to-chin in a long cave in the Morabe goldfields district. With this verdict, two British investigators have apparently upset the earlier pronouncement on discovery of the mummies, that New Guinea natives once knew how to mummify bodies as the Egyptians did, and perhaps learned the art from distant Egypt itself. The mummies appear to be dried-up, not embalmed, according to E. L. Gordon-Thomas, in an article in the scientific journal *Man.* That conditions in the limestone cave, high above the sea, served to dehydrate the bodies, is the supporting view of Dr. E. T. Brennan, principal medical officer of New Zealand. Finding the light-skinned corpses—over 60 of them—may shed light on problems of New Guinea anthropology. The ancient chapters of New Guinea's habitation by man have been little probed. Present-day natives can not explain the burial customs that mummies of the cave tomb represent, nor can the natives show how people would handle and use the huge stone pestels and mortars which have been found in this area.