

SCIENCE NEWS

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X-RAYS AND EVOLUTION

X-RAYS can speed up the processes of evolution and they can also reverse its direction, undoing changes which they themselves have caused. This was announced at the meeting of the Sixth International Congress of Genetics at Ithaca by Dr. N. W. Timofeeff-Ressovsky.

The discovery of the evolution-reversing power of x-rays was made as the result of researches conducted at the Kaiser-Wilhelm Institute for Brain Research in Berlin. It agrees with similar results obtained by other workers in the same field.

Dr. Timofeeff-Ressovsky worked with fruit flies, classic experimental animals in genetics, using the x-ray technique for producing hereditary changes developed by Professor H. J. Muller, of the University of Texas. Bombardment of their reproductive cells with x-rays caused marked changes in color, shape, size, etc., of eyes, wings and other body parts in their offspring. Dr. Timofeeff-Ressovsky discovered that a second bombardment inflicted on these same offspring would often reverse the changes, causing the third generation to have a normal appearance again. He also found that the first generation x-raying often produced opposite changes at the same time; for example, producing red eyes and white eyes among the offspring of normal brownish-eyed flies.

From his results he argued that the effects of an x-ray bombardment are not merely destructive of the genes, as has frequently been stated. He pointed out that while the production of an abnormality might look like a destructive effect, the return to normalcy by a second x-ray bombardment makes this conclusion absurd.

Other strange effects of x-ray bombardment were demonstrated by Dr. Lewis Knudson, of Cornell University, with a series of cultures of ferns in their earliest stages of growth. The spores from which they sprouted were treated with x-rays at varying intensities and lengths of exposure. Doses of 2,500 and 5,000 roentgens increased the rate and quantity of growth. But doses from 7,000 to 30,000 roentgens stopped growth altogether. These heavier x-rayings, however, did not kill the sporeling ferns, for examination with the microscope has shown that they produced one or two massive cells that continue to live but do not grow, although they have been kept for over six months.—*Frank Thone.*

MEASURING ULTRA-VIOLET RAYS

A NEW machine for measuring ultra-violet light accurately has been developed by Ernest Victoreen, working under the direction of Dr. Hugo Fricke who is head of the department of biophysics of the Biological Laboratory at Cold Spring Harbor. The machine makes use of the principle of the photoelectric cell, Mr. Victoreen explained in describing it to his associates at the laboratory. It is expected to be useful in measuring ultra-violet light from artificial sources when used in the treatment of rickets and tuberculosis, and also for de-

termining exactly the amount of ultra-violet light from sunlight available in various localities for treatment and for building up general bodily resistance.

Methods of measuring ultra-violet light in general use depend on chemical or biological effects, such as the oxidation of oxalic acid, blackening of sulfides, bleaching of dyes, effect on photographic paper, reddening effect on the skin and bacteriological effects. Most of these methods in actual use are of poor accuracy, time-consuming and inconvenient. Furthermore, no consideration is given to the difference in wave-length dependence of the effect used for recording and that for biological effect. The photoelectric method is free from these objections. The intensity is recorded directly, and the method is simple, speedy and convenient.

The photoelectric cell which Mr. Victoreen showed consisted of a glass bulb with a metallic cathode deposited on the inside surface and in the center a metal ring acting as anode. A definite electric potential is induced between the two electrodes, which potential is gradually neutralized by the electron emission from the cathode due to the ultra-violet light. The rate of neutralization is a measure of the intensity of the radiation.

The action of the photoelectric cell depends largely on the nature of the metal used as cathode and the absorption of the envelope. With different metals and different glasses of suitable thickness, Mr. Victoreen stated that a cell could be produced having its maximum sensitivity at any desired wave-length.

DOUBLE WEIGHT HYDROGEN

WORKING with hydrogen chloride, a substance from which physicists have already learned much about the constitution of matter, Professors E. F. Barker, D. M. Dennison and J. D. Hardy, of the University of Michigan, have confirmed the existence of hydrogen atoms practically twice as heavy as those of the ordinary variety, but otherwise identical with them.

The discovery of the hydrogen isotope of mass two was first reported last December by Professor Harold C. Urey and Dr. G. M. Murphy, of Columbia University, and Dr. F. G. Brickwedde, of the U. S. Bureau of Standards. They worked with liquid hydrogen in the laboratory of the Bureau of Standards where, not long before, helium had been liquefied for the first time in the United States.

The Michigan investigators reported that in hydrogen chloride the heavy atom occurs very rarely—only one to about 35,000 of the common weight. The double-weight atoms have been found to be comparatively plentiful, however, in water left over from the electrolysis process by which oxygen and hydrogen gases are produced commercially.

A paraffin-lined metal tube, eight inches in diameter and twenty-two feet long, 95 per cent. filled with the hydrogen chloride gas, was used at the University of Michigan laboratories. Light for the analysis was obtained through mica windows in the tube.

OBSERVATIONS ON MT. WASHINGTON

THE summit of Mount Washington, the highest of the White Mountains, will be occupied by a scientific party this fall for the first time since 1887. Weather, aurora, magnetic, radio and other observations will be made at a height of 6,288 feet, as a part of the second polar year program being participated in by many nations this year and next.

The observing program is being arranged under the direction of Joseph B. Dodge, manager of the Appalachian Mountain Club huts in the White Mountains, with the cooperation of leading scientific men, among them Dr. Charles F. Brooks, director of the Blue Hill Observatory of Harvard University, Professor J. W. Goldthwait, of Dartmouth College, and Dr. Norman E. Gilbert, also of Dartmouth, president of the New Hampshire Academy of Science.

Three observers will live on the summit from October 15 to June 15 of next year. Although geographically in the temperate zone, the summit of Mount Washington is climatologically in the Arctic. It is above the timber line and temperatures as low as 59 degrees below zero Fahrenheit and wind velocities up to 186 miles per hour were recorded there during the 17 years, 1871–1887, that government weather bureau observations were made there winter and summer.

At the Pinkham Notch headquarters camp of the Appalachian Mountain Club, weather and other observations will be made regularly during the winter to provide a basis of comparison for the observations made on the Mount Washington summit two and one half miles air line distance, but 4,281 feet higher in altitude. Mr. Dodge has spent eleven years, summer and winter, in the White Mountains, living with his family at Pinkham Notch. He will manage the expedition and serve as relief on the summit for the regular observers, as well as operate the comparison station at Pinkham Notch. In earlier winter observations near-by comparison stations were lacking.

A complete radio station with call letters WIOB will be installed on the summit to allow the observers to communicate with polar year expeditions in the far north and other points in the outside world. Constant communication will be maintained with Mr. Dodge's radio station, WIUN at Pinkham Notch. There will also be regular schedules with Boston and other cities for the transmission of daily weather and magnetic observations. The transmitters will use the amateur frequency bands of 3,500 to 4,000, 7,000 to 7,300 and 14,000 to 14,400 kilocycles. Considerable work is planned in ultra high frequency bands at 56 megacycles or above. A special power plant will feed the tubes with an output of 250 watts.

The observers on the summit will be: Robert Scott Monahan, of Pawtucket, Rhode Island; Salvatore Pagliuca, a native of Milan, now with the General Electric Company, Lynn, Massachusetts, and either Albert Sise, of Brookline, Massachusetts, or Alexander MacKenzie, of Albany, New York. All are experienced mountaineers well equipped for the work.

Although not as high as western mountain peaks, such as Pike's Peak, Mount Washington has temperatures and winds that are not equalled on higher mountains on the continent. The expedition during the coming winter will recall the hardships suffered during the winters of the 70's and the 80's by the observers that occupied the signal station of those days and made the first continuous weather records from any American mountain top.

ITEMS

RECENT exhaustive research on foreign chondrus, or Irish moss, which is used in industry as well as in foods and medicines, will most probably save an American industry from ruin, it appears from a report of Drs. Charles H. LaWall and Joseph W. E. Harrison, of the Philadelphia College of Pharmacy at the meeting in Toronto of the American and Canadian Pharmaceutical Associations. The gathering of this seaweed is quite an important industry on the New England coast. The American product is sun-bleached, a long and tedious process, which makes it impossible to sell it at the much lower price of the imported product. The foreign product is bleached with sulphur dioxide, Drs. LaWall and Harrison found. They first became interested in the matter when appreciable amounts of sulphites were found in a commercial product which used imported Irish moss. The manufacturers attempted to prove that sulphur dioxide is a natural constituent of Irish moss, just as benzoic acid is of cranberries. This contention was proved false. Drs. Harrison and LaWall recommend that manufacturers using the foreign product should be compelled to label their product properly, showing that sulphur dioxide was used in the bleaching. This would relieve the American industry of the handicap under which it has labored with its sun-bleached product.

Pithecanthropus erectus, the ape-man of Java, has had his existence as a true zoological genus confirmed through the recent discovery of three more thigh bones by Dr. Eugene Du Bois, of Holland, well known for his original find of the much-disputed fossils over forty years ago. This is the opinion of Professor G. Elliot Smith, English anthropologist. The three newly discovered thigh bones will be eagerly awaited by scientists, the more so because the original, or "type" specimen, is flawed with a bony outgrowth that probably made its owner lame. Except for this imperfection, the three new bones are declared to be identical with the *Pithecanthropus* type in every respect; and they were found at Trinil, the site of the original discovery. During recent months, Java has been the scene of several dramatic developments in the story of early man. First came the discovery by W. F. F. Oppenoorth and C. ter Haar, of remains of a race resembling Neanderthal Man, which has been named *Homo (Javanthropus) soloensis*. Then came Dr. Du Bois's statement, a little over a month ago, that two other skulls found in Java suggest the origin of the black natives of Australia from a race that migrated *via* the East Indies. Now *Pithecanthropus* comes back into the news with his three new-found thigh bones.