Strange Radiation of Sun Causes Weather and Earthquakes

Says New Theory

Astronomy

A HIGHLY penetrating radiation of electrons from the sun, guided along the magnetic lines of force of the earth, then entering into the surface of the earth and producing electric currents within, may be the cause of earthquakes, volcanoes and earthly weather conditions. This sensational hypothesis was presented at the recent meeting of the American Astronomical Society in Chicago by Dr. Benjamin Boss, director of the Dudley Observatory, Albany, N. Y.

It is but one manifestation of an electro-magnetic universe, he suggests. He believes the entire cosmos is a huge electromagnetic field. In this are local fields, the island universes, of which our whole milky way system of stars is one. These local fields, in turn, have within them sub-local fields, the stars, and even in the stars are still more localized fields, the atoms.

Einstein's gravitational universe, assumed in his theory of relativity, is therefore really an electromagnetic one, if the views of the Albany astronomer are correct.

Referring to studies made of the electric charge carried by the earth, Dr. Boss pointed out that the charge depends on the position of the sun relative to the magnetic poles. The maximum electric charge on the earth occurs when the sun is on the meridian of the north magnetic pole, which is the positive one, while the minimum charge occurs when the sun is directly above the meridian of the south magnetic pole, the negative one.

Loss In 10 Minutes

"It was this discovery," declared Dr. Boss, "that led me to trace the complete picture."

Then he pointed out that the charge of the earth would diminish to a tenth of its initial value in ten minutes if there were no source of replenishment. Because of the relation between charge and the position of the sun, it is reasonable to conclude that it comes from this body.

"Thus," he declared, "we are led to the hypothesis that the negative electric charge on the earth is maintained by a penetrating electronic bombardment from the sun, which, on its arrival at the earth, is guided along the magnetic lines of force, thus entering the earth in the magnetic polar regions from whence it is distributed to all the earth."

Some evidence in favor of this radiation, he stated, is given by the aurorae, or northern lights, which follow the lines of magnetic force of the earth, as shown by the Scandinavian physicist, Carl Stormer. This indicates that the radiation causing these lights travels along such a path, and it has also been shown that these rays probably come from the sun.

Wind and Potential

The best experimental evidence, however, stated Dr. Boss, is that of Dr. Harald U. Sverdrup, who made electrical and magnetic observations on Amundsen's ship, the "Maud," during its long drift in Arctic waters. This confirmed similar observations made in the Antarctic previously by a British expedition. It was that, as the wind increased, a higher electrical potential was observed, and the effect was attributed to drifting snow.

"It appears that the cart was put before the horse, and that it is a higher potential which causes the increased wind velocity," said Dr. Boss

"In this experiment," he continued, "we have direct evidence that the penetrating radiation causes the winds, for the electrometer jumped forward with every gust of wind. It is explained through the fact that an electron rushing through the atmosphere creates a vacuum along its path. The air rushing in to fill the vacuum tends to follow the direction of the speeding electron. As the radiation is entering the earth via the magnetic polar regions this would explain the high winds encountered near the magnetic poles; and the distribution of the atmospheric charge, taken by the air from the polar regions and distributed to the rest of the globe, would explain the flow of atmospheric currents from the poles towards the equator.

In this way, the winds of the earth are caused, he thinks, and from this, the weather, for it is the currents of air that carry temperature changes from one part of the earth to another.

Prof. E. W. Brown, of Yale, who presided over the meeting as president of the society, has demonstrated that the earth rotates irregularly, and this has been attributed to a pulsation of the earth. Dr. Boss believes that there is a daily pulsation as well and that this becomes manifest through the distribution of earthquakes. In support of this he has found that the frequency of earthquakes at various times of day, and the daily variation of electricity in the atmosphere show a striking relationship. Most earthquakes occur at the same time as the maximum electric charge.

Universe of Magnetism

To account for variation in the earth's electric charge, he offered the following speculations:

"Our universe may be represented as a huge electromagnetic field. Through this field cosmic particles are moving which bear electric charges. The distribution of cosmic dust is not uniform and, consequently, regions of different potential will be created. As the sun moves through these regions of different potential its atomic action will be stimulated or will subside. This might easily account for the great climatic changes to which the earth has been subject in past geological history.

According to the supposition advanced, the collection of cosmic particles into dense cosmic clouds, which we call dark nebulae, would bring a great electric charge to these clouds. A star passing through such a cloud would experience an excitation which would convert it into a star of class O or B. Stars of type O and B are bluish in color and very masssive. The stars definitely associated with the bright nebulae, which are merely dark nebulae rendered light by the presence of the star, are actually observed to be O and B type stars. It is extremely significant that these stars are confined to the narrow belt defined by the nebulous matter, or cosmic clouds."

In concluding his paper Dr. Boss suggested two direct proofs of his hypothesis. In the eclipse photographs taken to determine the shift of

star light as it passes the sun, predicted by Einstein, it should be found that the shift varies depending on the sun's magnetism. Then the shift of spectral lines in the red, also predicted by Einstein's theory, and found by Dr. Charles E. St. John at the Mt. Wilson Observatory, should also prove to be related to the sun's magnetic field.

"Should the observational data fit my speculation," he concluded, "it would support the idea that the Einstein field is an electromagnetic field."

Long Range Weather Forecasting

Discovery by Dr. C. G. Abbot, secretary of the Smithsonian Institution, that there is a close correspondence between changes in the sun's radiation and in temperature at Washington, D. C., "seems to offer promise for weather forecasting nearly a week in advance." At the meeting of the Astronomical Society Dr. Abbot made the first announcement of these new results which are based on studies extending over a period of more than 30 years.

Regular observations of the sun's radiation are made from a station at Mount Montezuma, Chile, a mountain 9,000 feet high in the Atacama desert, and these show that the sun does not always radiate the same amount of heat. Instead, it varies from day to day, even after allowances are made for the effect of the earth's atmosphere. In a study of these variations since January, 1924, Dr. Abbot has found 98 cases of rapid increase of the radiation of heat and 91 of decrease, in each case the change taking about four or five days.

Dr. Abbot has studied the temperature variations at Washington at the times of each of these increases and decreases. Taking the temperature just before the beginning of the solar change as normal, he finds that as the solar radiation varies, the temperature also changes, and that the change in temperature continues until at least four days after the maximum or minimum of radiation. A change in the radiation of eight-tenths of a per cent. is accompanied by a temperature change of about five degrees. At times when increase of radiation is accompanied by an increase in temperature, a decrease of radiation is generally accompanied by a decrease in temperature. This is taken by Dr. Abbot as rather conclusive proof that the changes are not mere coincidences.

A curious feature of the results is that an increase of radiation is not always accompanied by an increase in temperature, or vice versa. From mid-November to March, and also in May, increase in temperature and radiation ordinarily go together, while in April and from June to mid-November, the temperature goes down when the radiation goes up. This leads Dr. Abbot to believe that the effect of the sun's heat is not a direct one on the earth, but that there is some intermediate atmospheric effect not yet understood. Even in March and other months when temperature and radiation follow each other most closely, there are isolated occasions when the reverse happens. These, Dr. Abbot thinks, are the chief difficulties in the way of weather prediction from solar radiation. But he explains them as being "doubtless caused frequently by one solar change treading too quickly on the heels of another. Again, they may sometimes be caused by delayed receipt from distant centers of action of waves of temperature effect arising from former solar changes."

Difference of Location

The changes in temperature are not the same for different places. Though his most detailed studies are for Washington temperatures, Dr. Abbot has also studied the effects in Yuma, Arizona, and Williston, N. D. He finds that there the magnitudes and tendencies of the effects are much the same as at Washington, though the months during which there is a direct change and those during which it is reversed are different.

"My results thus far are tentative," he concluded his paper. "I propose to study barometric pressures as well as temperatures, and to extend the investigation to other parts of the United States and of the world. I have made preliminary studies, too, of 10-day mean values of solar radiation and temperature, and hope that in this way if reliable weather forecasting data are really secured they may be extended to months and seasons in advance."

"Other Side of Nowhere"

Why do some stars seem "the other side of nowhere?" Or, as the astronomers express it, why do stars have negative parallaxes? At the meeting of the American Astronomical Society in Chicago at the Adler Planetarium and Astronomical Musuem, Dr. Oliver J. Lee, of the Dearborn Observatory at Northwestern University, discussed some reasons for this paradoxical effect.

Astronomers measure the distance of nearer stars by determining their parallax. This is the amount that a star seems to shift in the sky as observed at times six months apart. During this time the earth makes half of a revolution in its orbit, and in June, for instance, is about 186 million miles away from its position in December. By making photographs through large telescopes at these times, and measuring the position of a star as compared with other stars on the same plate but at such great distances that they show no appreciable displacement, the parallax can be measured, and the star's distance determined.

The Causes

The farther away a star is, the smaller the parallax, so that a star at infinite distance should have a parallax of zero. However, despite the most careful work of astronomers, some stars do actually come out with negative parallaxes, that is, less than zero. It has been facetiously suggested that they are "the other side of nowhere."

Dr. Lee called attention to three reasons why they should occur. In the first place, he said, it may be a matter of chance. Parallaxes are always very small quantities, and like any measurement are subject to a certain possible error, which may be in one direction or the other. If the possible error is larger than the quantity measured, it may throw the value determined under zero. Another reason is that double stars, consisting of two separate bodies, might act differently at different times in building up the image. Under certain atmospheric conditions the image might be principally of one, while other plates might show mainly the other star, thus introducing a shift not due to the earth's revolution.

The third cause suggested by Dr. Lee is that the comparison stars, presumed to be much farther than the star under measurement, are really nearer, and that under such circumstances, the measure would be a positive parallax of the comparison stars. He urged a study of negative parallaxes with a view to learning more about the distance of the stars with which they were compared.

Science News-Letter, September 13, 1930

A mining company in Idaho is giving its miners brief violet-ray treatments daily to make up for their lack of sunshine.