

RADIO-ASTRONOMY

Moonlight as Well as Sunlight Spoils Radio Reception

Dr. Stetson Finds Signal About a Hundred Per Cent. Better When the Moon Is Below the Horizon

MOO NLIGHT, like sunlight, interferes with the successful reception of radio. Dr. Harlan T. Stetson of the Perkins Observatory at Ohio Wesleyan University made this announcement last week before a joint meeting of the American Institute of Electrical Engineers and of the New York Electrical Society.

The strengths of signals between Chicago and Boston for the last few years have been analyzed by Dr. Stetson and found to be received about one hundred per cent. better when the moon was below the horizon. This is believed to be due to a negative electrical charge on the moon.

The unfavorable influence of the moon on the reception of radio waves of 4000 kilocycles has also been independently established by Lieut. H. F. Breckel of the U. S. Navy Department in Cincinnati. Lieut. Breckel worked without knowing of the Perkins Observatory experiments.

Radio waves travel long distances only because they are reflected from a layer of electrified particles lying in the upper atmosphere about seventy miles from the earth. This radio mirror, called the Kennelly-Heaviside layer, after its discoverers, is pushed down towards the ground when the moon is passing overhead.

This produces somewhat the same sort of disturbance in radio transmission as that produced by sunlight. "The sun constantly bombards the earth's atmosphere with electrons or bundles of energy of high frequency," said Dr. Stetson. "These in turn tear apart the positive and negative charges of the atmospheric molecules. . . ."

"If the sun is more active on occasion, as when large spots appear on its surface, the degree of ionization increases, producing substantially the effect of lowering the Kennelly-Heaviside layer and upsetting the radio reception. . . ."

"Recent investigations in the field of correlation of radio reception with astro-

nomical phenomena point now to the radio receiver as a valuable instrument of research in cosmic physics."

The decreased strength of reception at present over that experienced in the early days of broadcasting and the vastly poorer reception in daytime compared with night-time are both due to the changing effect of the sun's rays on the earth's atmosphere.

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METEOROLOGY

Carbonic Acid in Air Keeps Earth Warm

IF THE AMOUNT of carbonic acid in the air decreased to a half of its present amount the temperature would fall enough to cause another great ice age on the earth. Calculations showing this were disclosed to the National Academy of Sciences meeting in Washington, this week, by Dr. E. O. Hulbert of the U. S. Naval Research Laboratory.

The small amount of carbon dioxide

GEOPHYSICS

Yellowstone Geyser Water Would Make Only Small River

GEYSERS and hot springs make their impressive display in Yellowstone National Park on a surprisingly economical expenditure of water. The total run-off amounts to only 107 cubic feet per second, or enough to form a creek 50 feet wide and one foot in average depth, flowing at a rate of one and one-half miles per hour. This is only about three per cent. of the water in the rivers that flow out of the park.

This is one of the conclusions reached by Dr. E. T. Allen, who has been conducting the first comprehensive study of the geysers and hot springs in the first and greatest of the world's national

in the air absorbs much of the heat of the sunlight radiated from the earth's surface. A change in the amount of this gas changes markedly the amount of heat retained by the air and therefore the average temperature over the earth's surface. That changes in the carbon dioxide of the atmosphere might be adequate to cause the ice ages was suggested by the English physicist Tyndall in 1861. His suggestion fell into disrepute for many years, but the present work, and also that of Dr. H. B. Maris, of the Naval Research Laboratory, indicates that Tyndall's suggestion is still valid.

Dr. Hulbert's work was concerned in the first place with calculating the air temperature to be expected from a knowledge of the kinds and amounts of different gases present in the atmosphere at different heights and from a knowledge of how the various constituents of sunlight are absorbed by these substances. The sea level temperature calculated from Dr. Hulbert's formula comes within one degree of the known average earth temperature. This is taken to mean that emission and absorption of radiation are the main processes concerned in the control of the earth's atmospheric heat on the surface. At higher levels mixing by winds is included with the radiation processes.

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The greatest number of automobile deaths are in October, and the fewest in February, statistics for seven years show.

parks. This survey is being carried on by the Carnegie Institution of Washington, with the cooperation of the U. S. National Park Service. Dr. Allen's report was presented in Washington this week at the meeting of the National Academy of Sciences.

Dr. Allen has also made an estimate of the amount of heat dissipated by the geysers and hot springs. Leaving out of account the vents that discharge only steam, he found that the geysers and hot springs give off every second about 200,000 kilogram calories, or enough to melt 2.9 tons of ice.

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