

SCIENCE NEWS

*Science Service, Washington, D. C.*INFRARED AURORAL DISPLAY IN
THE NIGHT SKY

AN infrared aural display has been detected in the night sky. This radiation of waves, invisible to the human eye and far more intense than the ordinary persistent aurora, is probably due to a large number of nitrogen atoms in the high atmosphere, according to Professor Joel Stebbins, Professor A. E. Whitford, of the Washburn Observatory of the University of Wisconsin, and Dr. P. Swings, of the Mount Wilson Observatory of the Carnegie Institution of Washington.

This strong infrared radiation was first detected in 1940 on a photograph of the great Andromeda nebula made with an infrared filter, they report in the *Astrophysical Journal*. In 1944 the infrared sky was found unexpectedly to be of nearly twice its ordinary brightness and to be fluctuating by 10 per cent. to 15 per cent. within 10 minutes.

"The infrared radiation is obviously much brighter than any other part of the spectrum, including the persistent aural line at 5577 Angstroms, for which we have never found any effect," the astronomers state. "With allowances for the continuous sky spectrum, the infrared radiation is probably scores of times—perhaps even a hundred times—as strong as the line in the green."

The main source of the radiation is probably near 10,000 Angstroms, where it would be between two strong water-vapor absorption bands.

The infrared radiation is believed to be atmospheric because it varies with the distance from the zenith, decreases through the night, and varies irregularly from night to night and from season to season. It is brightest immediately after twilight.

In order to estimate the height above the earth's surface at which the rays are emitted, it is suggested that measurements be made at widely different zenith distances every minute or less, and that they be carried to near the horizon. The radiation should also be studied soon after sunset and before sunrise to find the effect of solar radiation.

ITEMS

PARTS of the radio spectrum, until recently used only for experimental work, are now being employed by the Navy Department in radio for aircraft. Radio-altimeters and direction finders are only a few of many new devices that employ these hitherto little-used radio frequencies. They enable naval aviators to search out and attack the enemy when he is at a disadvantage due to adverse flying conditions. To help the pilot and crew make use of these new devices, a simplified semi-automatic aircraft instrument control has been put into operation. Of first importance are automatic engine controls that relieve the pilot of the necessity of observing and setting countless dials and gages. Navy pilots now have improved electrical gyro instruments that operate reliably under the extremely low temperature conditions experienced at high altitudes and

throughout violent acrobatics often necessary in outmaneuvering the enemy in combat. New and better compasses of both gyro-stabilized and remote indicating types, as well as air position indicators, help to simplify navigational problems.

THE standard frequency broadcast service of the National Bureau of Standards now includes 24-hour service on 15 megacycles which was previously confined to the 12-hour period from 7:00 A.M. to 7:00 P.M. Other frequency services remain unchanged. The bureau's standard frequency broadcast, that makes the national standard of frequency widely available, includes standard radio frequencies, standard time intervals accurately synchronized with basic time signals, standard audio frequencies and standard musical pitch. Four radio carrier frequencies are used by the bureau; three are on the air at all times, to insure reliable coverage of the United States and other parts of the world. The frequencies are: 2.5 megacycles, which is 2,500 kilocycles (2,500,000 cycles) per second, broadcast from 7:00 P.M. to 9:00 A.M., Eastern War Time; 5,000 kilocycles, 10,000 kilocycles and 15,000 kilocycles, these three continuously day and night. Two standard audio frequencies, 440 cycles per second and 4,000 cycles per second, are broadcast on the radio carrier frequencies. Both are broadcast continuously on 10 and 15 megacycles. Both are on the five-megacycle band in the daytime, but only the 440 is on five megacycles from 7:00 P.M. to 7:00 A.M. Only the 440 is on 2.5 megacycles. The 440 cycles per second is the standard musical pitch, A above middle C; the 4,000 cycles per second is a useful standard audio frequency for laboratory measurements. All broadcasts are from the bureau's station WWV, near Washington.

THE electronic vulcanization of rubber may become common in the near future, replacing the familiar heating method, with the securement here of the basic patents covering the new process granted on discoveries made by R. A. Dufour and H. A. Ledue, of France, and by E. E. W. Kassner, of Switzerland. The purchasers of the patents are the B. F. Goodrich Company and the Firestone Tire and Rubber Company, who plan to make them available to other companies in the rubber and plastics industries on a reasonable basis. Electronic vulcanization will speed production, but, more important, will give more uniform and higher quality products. Vulcanization is the joining of rubber molecules and sulfur. For more than a century, rubber has been vulcanized by applying heat to the outside surface. Since rubber insulates against rather than conducts heat, heating to the core by this method is slow and lacks uniformity. In electronic vulcanization, high-frequency oscillations shake the molecules of rubber and sulfur millions of times a second, creating uniform heat throughout the product being vulcanized in a fraction of the time required when steam heating is used.