threefold or fourfold collision must have a negligible probability.

An Investigation of Possible Variations in the Brightness Temperature of the Moon at 21 cm.

JOHN A. WAAK (introduced by E. F. McCLAIN), *Radio Astronomy Branch, U. S. Naval Research Laboratory*.—Radiometric observations of the moon at a frequency of 1440 Mc ($\lambda 20.8$ cm) were made on 47 days over a period of slightly more than three lunations during the early part of 1960. For this purpose a conventional total-power radiometer installed in the 84-ft antenna at NRL's Maryland Point Observatory was used. A bandwidth of 5 Mc was used with a 30 Mc i.f.; the noise figure of the receiver was 7.5 db, and the integration time was 3.5 sec. The measured half-power beamwidth was $36'$ and the antenna efficiency at 21 cm was found to be 46%. Calibration was with reference to an argon noise tube. Polarization was in the north-south direction.

For each day of observations, a minimum of three drift curves was averaged, and an effective equivalent blackbody temperature assuming a uniform disk was determined. When plotted against phase angle, these blackbody temperatures appeared to show a sinusoidal variation with time. A sine curve having the period of the synodic month (29.53 days) was therefore fitted to the data by the method of least squares, and gave a mean temperature of about 205°K with a variable component of about $\pm 2.5\%$. Preliminary analysis of similar data taken at 2930 Mc ($\lambda 10.2$ cm) taken by the author during the winter of 1958–59 also indicated a sinusoidal variation of approximately the same magnitude.

The Computed Solar Continuum in the Ultra-

violet. KENNETH G. WIDING, *U. S. Naval Research Laboratory, Washington 25, D. C.*—An attempt was made to compute the solar energy curve between Lyman-alpha and 2700 Å to compare with the observations of Detwiler, Purcell, and Tousey.

The intensity in the broad wings of Lyman-alpha was used to derive a partial model of the low chromosphere. It was assumed that the wings are formed in completely noncoherent scattering, the corresponding source function being $B_\nu(T_e) \times b_2/b_1$, where b_2/b_1 measures the departure from local thermal equilibrium. In the region where the wings are formed $b_2/b_1 = 1$ (Pottasch and Thomas, *Astrophys. J.* **132**, 195). The resulting distribution of electron temperature vs log neutral hydrogen density resembles the model given by van de Hulst [*The Sun*, edited by G. Kuiper (University of Chicago Press, Chicago, 1953)].

For a model of the transition region the data from the Lyman-alpha wing was joined to Minnaert's

empirical model of the deeper layers with a minimum temperature at the limb of 4700°K . The continuous absorption coefficient was estimated from the graphs of Böhm-Vitense (*Z. Astrophys.* **34**, 209). For conditions at the solar limb the main contribution comes from the ionization of the metals. To this was added the opacity due to Lyman-alpha which is natural damping in the chromosphere and Stark broadening in the deeper layers (Menzel and Doherty, *Liège Symp.*, 1960). The metal opacity is more important than Lyman-alpha except within approximately 100 Å of the line center where natural damping dominates.

The resulting computed energy curve is in approximate agreement with the observed. The position of the observed energy curve longward of 2000 Å is uncertain due to suppression of the continuum by Fraunhofer lines.

The Gray Planetary Atmosphere. RUPERT WILDT,

Yale University Observatory.—The problem of strict radiative equilibrium in a gray planetary atmosphere of infinite depth was formulated by Milne (1922) as an inhomogeneous integral equation. Its solution (Hopf 1934) can be expressed in terms of Chandrasekhar's H function and an integral over Hopf's q function. The temperature distribution, as function of the optical depth below the surface, has been evaluated numerically for several values of the angle of incidence of the insulating flux. Hopf's analytical solution also holds, after application of certain scale factors, for the temperature distribution in an atmosphere whose gray absorption coefficient for the incident solar radiation differs from that for the (infrared) planetary radiation, the ratio of the two coefficients being constant throughout the atmosphere. Even this generalization affords but a poor model of the familiar planetary atmospheres in their present state. Nevertheless, it deserves to be known more widely; for it is, to date, the only problem in planetary radiative equilibrium that has been solved rigorously.

A Search for Micrometeorites in the Earth's Atmosphere. F. W. WRIGHT, P. W. HODGE, and

E. L. FIREMAN, *Smithsonian Astrophysical Observatory*.—The atmosphere of the earth is continually being penetrated by particulate matter of the interplanetary medium, as well as by large meteoroids. Theoretical studies by Whipple have shown that particles with sizes of the order of a few microns have small enough cross sections, but large enough masses to enter the atmosphere and lose their cosmic velocity without a great loss of material. Satellite micrometeorite detectors have shown that a high concentration of dust is present near the earth. In order to collect and analyze these