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ABSTRACTS OF PAPERS PRESENTED

Radio Measurements of the Total Solar Eclipse of October 2, 1959 at AFCRC, Hamilton, Massachusetts. JULES AARONS, JOHN CASTELLI, WILLIAM KIDD, AND RONALD STRAKA, *Air Force Cambridge Research Center, Bedford Massachusetts.*—During the recent eclipse of October 2, 1959, measurements of solar radiation were made simultaneously at 1300 and 224 Mc using the 84-ft antenna at Sagamore Hill, Hamilton, Massachusetts, and at 3000 Mc using an 8-ft antenna at the same location. Although the altitude of the sun was low at totality (1°), the center of the sun's disk was tracked quite accurately since refraction corrections based on average refraction values acquired from sunrise measurements of the previous week to 10 days were applied to the antenna pointing. Comparison solar temperatures on the eclipse day and throughout the eclipse, with days both before and after the eclipse were likewise made. At totality, at 1300 Mc, 19% of the average solar energy normal for this elevation was recorded. This figure was about 35% at 224 Mc, and between 14 and 15% at 3000 Mc. These levels appear to be considerably greater than those for low-sunspot-year eclipse measurements reported by other investigators. The higher percentages are probably due to the existence of regions of high intensity at the limbs as evidenced by interferometric maps of the sun at 3000 Mc. After totality at 3000 Mc, the solar records did not increase smoothly, but rather the trace evidenced some roughness as would be expected from the uncovering of a nonuniform sun. Scintillations produced by sources on the sun were observed at 1300 and 3000 Mc. Some measure of the source brightness to disk temperature ratio can be arrived at by observing the scintillations occurring during the first 5° of elevation. At 224 Mc the sun does not scintillate. At 1300 and 3000 Mc, large to violent scintillations were seen when most of the disk was covered. Smaller scintillations were observed even at totality when all but limb source activity was eclipsed.

Faraday Dispersion in the Solar Atmosphere. K. AKABANE AND M. H. COHEN, *Cornell University.*—The degree of linear polarization in solar bursts was measured simultaneously at two bandwidths, 10 and 22 Kc, each having the same center frequency, 201.6 Mc. A number of partially linearly polarized type III bursts were seen, and in every case the burst was more polarized in the narrow band than in the wide band. According to the theory of Faraday dispersion, the ratio between the degrees of polarization observed at two bandwidths gives the degree of polarization at the source ρ_0 , the Faraday rotation angle ϕ , and the dispersion angle θ . A typical example is as follows: $\rho_0 \approx 0.2$; $\phi \approx 5 \times 10^8$ rad, corresponding to $\int nH dz \approx 8.5 \times 10^{15}$ (cm, gauss); $\theta \approx 1$ rad for 10-Kc bandwidth. From 37 linearly polarized bursts the following interpretations are tentatively suggested: (1) The intensity of the general magnetic field of the sun can be estimated to be less than 1 gauss at the pole, assuming that the

source of the general magnetic field produces a bipolar field in the equatorial region, as well as in the polar region. (2) In some cases there is a weak magnetic field (~ 1 gauss) near the source of a burst (for the assumed electron density); if a strong magnetic field exists there, it might be disordered so as to diminish the total amount of Faraday rotation. (3) The number of observed bursts increases steeply with decreasing ρ_0 . In the discussion of Faraday dispersion the band shape of the receiver is approximated by a Gaussian function. This results in single-valued determinations of ρ_0 , ϕ , and θ .

Primordial Chemical Composition of the Solar System. LAWRENCE H. ALLER, *The Observatory, University of Michigan.*—The point of view is adopted that the atmosphere of the sun represents closely the original composition of the solar system except for constituents such as deuterium, lithium, boron, and beryllium that are destroyed by thermonuclear reactions deep in the convection zone. The difficulty in obtaining a definitive table of abundances lies in the circumstance that the lines of many elements, particularly the heavy ones, are either masked by lines of more abundant elements or fall in the inaccessible ultraviolet. For some atoms and ions the term analyses are incomplete so partition functions cannot be computed or the f -values are unreliable. Hence a table based on solar abundances only would contain many gaps. The chondritic meteorites probably supply the most reliable abundance data for many elements, although certain metals such as lead and indium appear to be deficient. Accordingly, the best meteoritic data are combined with solar data (Goldberg, Müller, and Aller) and stellar data (from various authors) to obtain a tabulation of abundances. The procedure is very similar to that employed by Suess and Urey except that more stress is laid on the astronomical data. The abundance of iron with respect to other metals of the ferrous group is reduced. The general run of the abundances is very similar to that proposed by Suess and Urey, but certain marked discordances with the tabulation by Cameron are found. Some proposals for further improvements in the data are mentioned.

Interstellar Polarization in the Local Spiral Arm. ALFRED BEHR (introduced by D. Nelson Limber), *Verkes Observatory and Universitäts-Sternwarte Göttingen.*—By using a differential method, the polarization of 550 stars most of them nearer than 250 pc has been measured with the 34-cm astrograph of the Hainberg Observatory in Göttingen. The mean error of a given polarization is $\pm 0^m.00005$. A discussion of the results on the basis of the theory of Davis and Greenstein leads to the following results: In distances of up to 25 pc the amount of polarization is found to be smaller than or of the order of the mean error of observation. A statistical discussion however, shows the existence of interstellar polarization even in those distances.