Secular Motion of the Pole and Rotation of the Earth. W. MARKOWITZ, *Marquette University*.—A study of the International Latitude Service (ILS) results for 1900 to 1966 indicates that the secular motion of the mean pole is real and that within the errors of observation the five stations located near parallel $+39^{\circ}8'$ are not undergoing crustal displacements in latitude. An empirical, 24-yr librational motion found in 1960 was continued from 1960 to 1966. The progressive motion of the mean pole is about $0''.0034/\text{yr}$ towards longitude 65° west. Homogeneous data for studying changes in relative longitudes do not exist because similar observations for time have not been made. However, programs of observations of the same stars with instruments on nearly the same parallel and which determine both time and latitude, such as the photographic zenith tube and astrolabe, have recently been organized. These observations will help to determine whether continental drift is occurring.

The irregular variation in speed of rotation of the earth has been determined with high accuracy since 1955.5 by a comparison of Universal Time with Atomic Time. Sudden changes in acceleration occur, but not sudden changes in speed of rotation. The difference, Universal Time minus Atomic Time, can be well represented by arcs of parabolas. The changes from one parabola to another do not coincide with changes in the motion of the mean pole. However, a much longer period of observation than is now available will be required to see if there is any correlation.

Effect of Ultraviolet Continuum of the Photospheric Radiation Field. SATOSHI MATSUSHIMA, *University of Iowa* (present address: the Pennsylvania State University).—Comparisons with observations are made for theoretical limb-darkening curves as well as for the intensity distributions as a function of wavelength obtained from various solar models with different choices of opacities. Particular attention is directed to the opacity due to the metal absorption, using the newly computed absorption coefficient on the basis of the quantum defect method of Burgess and Seaton (see Travis and Matsushima, presented at the same meeting). It is found that satisfactory agreement can be obtained between theory and observations if one assumes an additional opacity, amounting to about a factor of 10 to 50 larger than metal absorption in the wavelength region between 2500 and 3500 Å. Recent observations of the intensity and the limb-darkening in the ultraviolet region are found to be useful for determining the wavelength and depth dependency of the assumed unknown source of opacity. In addition, the emergent flux computed for the model without additional opacity predicts a large

(factor of 3) drop at λ 2515 due to the photoionization from the 3P state of magnesium. The fact that such a discontinuity has not been detected also seems to suggest the necessity of additional opacity.

Due to the condition of radiative equilibrium, insufficient opacity assumed in the ultraviolet produces a considerable change in the temperature-depth relation throughout the atmosphere, and, in effect, decreases the visual and infrared radiation as well as increases the ultraviolet flux. As a consequence, any comparison of the theoretical flux or the limb darkening with observations is meaningful only when such a comparison is made on the basis of the over-all wavelength rather than on an isolated region of the spectrum. The principal cause of the existing disagreement in the visual regions of the solar continuum therefore does not necessarily indicate the invalidity of the basic theory, but rather the inaccuracy of the opacity sources assumed in the region beyond the Balmer discontinuity.

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Polarized Brightness Distribution over Cassiopeia A, the Crab Nebula, and Cygnus A at 1.55-cm Wavelength. CORNELL H. MAYER AND JAMES P. HOLLINGER, *E. O. Hulburt Center for Space Research*.—Observations with 1'.7 resolution were made of Cassiopeia A, the Crab Nebula, and Cygnus A using the 140-ft reflector of the National Radio Astronomy Observatory and a polarimeter at 1.55-cm wavelength which measured directly the intensity with linear polarization oriented $N-S$, and the Stokes parameters Q and U on three separate scans. These data were combined to determine the distribution of total intensity, polarized intensity, and degree and position angle of linear polarization for scans across the sources spaced at $0'.8$ intervals of declination.

Cassiopeia A at 1.55-cm wavelength is a nearly circular source with enhanced regions of emission around the rim, and remarkably symmetrical linear polarization of about 4.5% around the rim and zero at the center of the source. The electric field is oriented circumferentially defining a radial magnetic field associated with the polarized radiation. The total intensity contours of the Crab Nebula source are roughly elliptical, but the intensity of polarized radiation is concentrated in a smaller region centered about $0'.5$ south and $0'.25$ east of the center of the nebula with a maximum degree of polarization of about 16% at position angle 154° . Both the total intensity and polarized intensity of Cygnus A are consistent with two point sources separated by $1'.9$ along position angle 109° . The