Alfvén speeds. If turbulence occurs, it can cause sufficient Ohmic dissipation of the magnetic fields to explain the rate of optical emission (Wentzel, *Astron. J.* **68**, 299(A), 1963).

The dissipation and emission are localized in thin surfaces at eddy boundaries. The total depth of the emitting surfaces crossed by a line of sight through the flare is of the order of 10 km, in agreement with inferences from observations (Suemoto, Hiei, and Hirayama, *J. Phys. Soc. Japan* **17**, Suppl. A-2, 231). If the same kind of collapse which causes an optical flare in the chromosphere occurs at greater heights, the density is insufficient to radiate away the thermal energy derived from Ohmic dissipation. The result is heating, with attendant favorable conditions for the generation of radio, x-ray, and particle events, instead of an optical flare. Depending on the extent of the collapsing region, optical and heating events may occur alone or together.

The conditions under which turbulence may occur and the corresponding gas densities have been investigated numerically. Some of the consequences of the theory relate to flare heights and light curves, increases in density before optical flaring starts, rates of expansion of flare areas, homologous flares, and apparently simultaneous flares.

Galactic 21-cm Line Observations at Green Bank. GART WESTERHOUT, *University of Maryland*.—The DTM multichannel hydrogen-line receiver was used with the 300-ft transit telescope at the NRAO, Green Bank, West Virginia, to make observations of the 21-cm line in a strip along the galactic plane, and in a number of cross sections perpendicular to the plane. The aim is to study how much detail is visible with a bandwidth of 10 kc/sec (2.1 km/sec) and a beamwidth of 10 min of arc. Later, specific regions will be studied in greater detail. The spacing of the profiles is one beamwidth in general, and many features of this order of size show up. Clearly, a program of this size, with a transit instrument, will take several years to complete. In cooperation with the NRAO, the author will reduce all 21-cm line data obtained with the Green Bank 300-ft in a standard reduction program so that a consistent set of line profiles can eventually be obtained, irrespective of the purpose for which they have been observed or the further use the person whose program they belong to is making of them.

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Brightness Changes in Periodic Comets. FRED L. WHIPPLE, *Smithsonian Astrophysical and Harvard*

College Observatories.—Secular changes in the absolute magnitudes of periodic comets, averaged over each perihelion passage, have been derived from data by Vsekhsviatky. The intrinsic brightness, at 1 a.u. from earth and sun on an r^{-4} law, is assumed to vary as $\mu(1-\lambda t)^2$, where μ and λ are constants characteristic of each comet and t is the time; $t \gg \text{period}$. The relation is based upon the concept of an icy cometary nucleus that shrinks linearly with the time, where the brightness varies as surface area times rate of mass loss per unit area. By least squares the relation fits the observations within their accuracy; approximately ± 1 mag. The quantity $\mu\lambda^2$ measures a physical characteristic of each cometary nucleus not yet correlated with other observed characteristics.

Applied literally, the theory predicts that cometary nuclei disintegrate to nothing. Predicted death dates for selected periodic comets are as follows: Pons-Winnecke, 1958–1962; Tuttle, 1959; Wolf 1, 1964–1971; Kopff, 1966; Brooks 2, 1967; Faye, 1967; Whipple, 1967; Encke, 1993; and Halley, 2458. Note that Pons-Winnecke was not found in its 1957 passage, nor Tuttle in 1953.

The precision with which comets actually follow this forecast will be a partial test of the degree to which cometary nuclei truly disappear. On the other hand, a few may become erratically inactive before total disintegration.

The author finds no correlation between cometary magnitudes by Vsekhsviatky and Bobrovnikoff and sunspot numbers or phase in the solar cycle.

Extrapolation into the past indicates that Encke's comet should have reached second to third absolute magnitude in the first three centuries B.C. when its orbit intersected that of the earth at a small inclination ($\sim 5^\circ$). Thus there is strong hope of finding it in Chinese or Babylonian records; the associated Taurid meteor streams indicate an age of some 4000 years or more. Phenomenal meteor showers should have occurred near the time of orbital intersection.

Observed Resonance Lines of Coronal Ions and Ionization Temperatures. K. G. WIDING, W. E. AUSTIN, J. D. PURCELL, AND R. TOUSEY, *E. O. Hulburt Center for Space Research, U. S. Naval Research Laboratory*.—Relative intensities were derived from a calibrated tracing for lines reliably identified in the solar spectrogram obtained on 10 May 1963. Between 250 Å and 350 Å approximately thirty lines were identified with resonance transitions of the following abundant coronal and chromospheric ions: Si VII through XI, Mg VIII and IX, Al X and possibly S X, as well as Fe XV and XVI.