Wilson, Raymond H., Jr. Psychological brightness reduction of simulated flashes from a polyhedral satellite.

Variations, with flash rate, of the apparent brightness of intermittent, compared to steady, light sources are explicitly described under existing theories (Bartley 1956) only for relatively long flash durations with light-dark ratios around one-to-one. It has been shown (Wilson 1958) that the expected mean duration of each solar reflection from a face of a polyhedral satellite rotating once per second would be about 0.001 with a light-dark ratio less than 1 to 100 for polyhedra yielding less than ten flashes per second. Hence, a special investigation of the visual effectiveness of such a proposed device seemed to be in order.

Simulation of such flashing from a polyhedral satellite was produced by viewing different planets and stars through the interception of a metal disc having a sector open about 1/200 of its area. For measured rotation rates of around five per second, corresponding to flash durations of less than 0.001, the apparent brightness, by direct comparison with non-intercepted stars, appeared to be reduced by about two stellar magnitudes. However, even with this dimming effect, the net gain of the polyhedral over a spherical satellite of the same diameter could still be more than five stellar magnitudes.

Bartley, S. H. 1956, "Vision," *Encyclopedia Britannica* **23**, 207.

Wilson, R. H., Jr. 1958, *A. N.* **284**, 79.

*Naval Research Laboratory,
Washington, D. C.*

Woltjer, L.* Hydromagnetic equilibrium configurations.

In the case of infinite conductivity and zero viscosity the hydromagnetic equations have six integrals besides the energy integral. The configuration of most-stable equilibrium is obtained by minimizing the energy for given values of the six integrals. The equilibrium configurations are characterized by six constants, which are the Lagrangian multipliers in the variational problem. These six constants are determined by the initial state of the medium. The nature of the equilibrium configurations shows that force-free and related magnetic fields may be of great importance.

*Yerkes Observatory,
Williams Bay, Wis.*

* On leave from Leiden Observatory.

Wright, Frances W. An observation concerning mean radiant paths of photographic meteor showers.

From a survey of twelve meteor showers photographed at Harvard, we have observed that the sun is never more than a few degrees from the extended great circle through the mean daily path of radiant motion for the corresponding shower. When the earth takes some time in passing through the stream, the daily radiant seems to advance along a great circle path towards the position of the sun at the time of maximum activity of the meteor shower.

This observation can be explained if we assume that, when the earth encounters individual members of a meteor stream, the heliocentric velocity vectors of these individual members are approximately parallel. The observation can prove to be a convenient tool in the future whenever the data for a meteor shower are few or inaccurate.

*Harvard College Observatory,
Cambridge, Mass.*

Wright, K. O. Victoria spectrographic observations obtained at the 1955-57 eclipse of ϵ Aurigae.

High-dispersion grating spectra of ϵ Aurigae have been obtained at Victoria since 1946 on 125 nights, 40 in the red region of the spectrum. The normal, background lines vary in shape and in radial velocity in a semi-regular manner but no period has yet been found. As measured from high-excitation lines of $MgII$, $CrII$ and $SiIII$ and from differential measurements of intensity tracings, the radial velocity has varied between +10 km/sec and -20 km/sec since 1955.

Additional absorption lines, first observed at the 1930 eclipse by Adams and Sanford (1930), are sharp and readily observed with high dispersion near first and third contacts. Ionized titanium lines can be detected for a year or more outside of eclipse. Lines of neutral metals are strong during the partial phases. They can be detected for some months before first contact and after fourth contact. As noted by Struve and Pillans (1957), these same lines sometimes appear complex during total eclipse. Victoria plates taken between October 1956 and January 1957 show a complex spectrum with at least two fairly broad components, one of which may merge into the sharper "chromospheric" component. The radial velocities of the "chromospheric" lines vary in a regular manner from +10 to +25 km/sec before eclipse and from -20 to -40 km/sec after eclipse.