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On the Production of Low-Energy Cosmic-Ray Electrons. P. ABRAHAM, K. A. BRUNSTEIN, AND T. L. CLINE, *Goddard Space Flight Center*.—The subject of cosmic-ray electron production other than by the meson-decay mechanism is investigated. Constraints which are placed on both secondary and primary low-energy electron sources are considered.

(1) Calculations are made of the expected flux of low-energy knock-on and beta-decay electrons which are secondary to cosmic-ray interactions. Interstellar losses due to ionization, leakage from the galaxy, synchrotron, and inverse Compton effects are incorporated, as well as plasma excitation, redshift losses and synchrotron and inverse Compton effects in the intergalactic medium.

(2) Energy inputs to the injected secondary electrons by a possible galactic Fermi acceleration and by a possible solar electric field of low magnitude are investigated. It is shown that one such input is necessary if the observed low-energy interplanetary electron intensity is to be fitted to these secondary production mechanisms.

(3) The effect of a solar modulation on the observed spectrum is accounted for and the resulting velocity spectrum of galactic electrons in the gamma region of 7 to 25 is shown to closely approximate that of the cosmic-ray protons. This result of the near equality of the two spectra, in addition to the demonstrated constraints on the secondary hypothesis, suggests that the electrons may be of primary origin. Comparison is made with measurements of the spectrum and charge ratio of electrons at higher energies and constraints on a possible primary production mechanism are discussed.

Quasars and the Gravitational Image Intensifier. J. M. BARNOTHY, *Biomagnetic Research Foundation*.—A large number of theories were published to explain the extreme luminosity, small size, short-time brightness variation and spectral peculiarities of QSS and QSG's. The possibility that these objects are merely optical effects is discussed. During the last 40 yr 17 papers were published dealing with the gravitational lens. Its brightness amplification is inversely proportional to the distance in which the optical axis bypasses the object. Hence, on account of the proper motion of galaxies, the image brightness will be a function of time and reach its maximum value when the optical axis intercepts the area of the object. The nuclei of Seyfert galaxies with their broad and strong emission lines of high excitation (a characteristic of most quasars) are the most

suitable objects for this optical phenomenon, which lasts for a few million years. The optical axis scanning the nuclei crosses, in a few year's intervals, bright stars which, due to the extremely high amplification for such small objects, will simulate light flashes of a few weeks duration. In the following the integral number of such "Seyfert galaxy quasars" simulating an absolute magnitude less than -23 are listed for a limiting redshift of $z=1$ and $z=5$, for two steady-state and one evolutionary universe, assuming that the absolute magnitude of the QSS or QSG's was computed from the observed apparent magnitude with corrections as required for the cosmological model in question. In parentheses are given the numbers to be expected if corrections for the evolutionary universe alone were applied.

	Bondi-Gold	Fib	Evolutionary
k	0	+1	+1
Λ	...	H^2/c^2	0
$\dot{R}_0/R_0$	H	0	H_0
$\ddot{R}_0/R_0$	H^2	0	$-H_0^2$
$N(\mathfrak{M}, z)$			
$z=1$	23 (3)	3260	12 (12)
$z=5$	860 (3)	1600 (2×10^5)	256 (256)

Even if quasars are merely mirages, they remain powerful tools to decide between different cosmological models and to perform fundamental physical experiments (*Z. Physik* **176**, 435, 1963) on the photon, the sole signal carrier upon which astronomical observations rest.

ADS 9537—A Pair of Eclipsing Binaries. A. H. BATTEN, *Dominion Astrophysical Observatory*, AND R. H. HARDIE, *Dominion Observatory*.—Spectroscopic and photometric observations, carried out at the Dominion Astrophysical Observatory in Victoria and the Dyer Observatory in Nashville, respectively, show that the visual binary ADS 9537 is composed of two eclipsing systems. Component A has a period of 0.350376 day, and B a period of 0.292298 day. The light curves have virtually indistinguishable primary and secondary minima; the depths are 0.6 and 0.4 mag. (in B), respectively, for components A and B. Variation in color is very small throughout the cycle.

The blending of two nearly equal spectra and other unidentified systematic effects render the radial-velocity measures difficult and unreliable. Preliminary analysis indicates that each system is a con-