Local acceleration of optical electrons by plasma processes in the jet remains a strong possibility. Fermi statistical acceleration, however, is not promising; it is augmented by turbulence but still requires random velocities $\gtrsim 3000$ km/sec and fields $\lesssim 3 \times 10^{-6}$ G. Adequate theories of plasma acceleration are lacking.

If x-ray electrons are produced as secondaries or accelerated locally over much of the lifetime of a radio galaxy, the diffuse x-ray background may be due to such sources. They should also produce optical synchrotron radiation.

A Search for Point Sources of Gamma Rays with a Digitized Spark Chamber. C. E. FICHEL, T. L. CLINE, C. H. EHLMANN, D. A. KNIFFEN, AND R. W. ROSS, *NASA/Goddard Space Flight Center*.—A series of high-altitude balloon flights have been made in the northern and southern hemispheres beginning in September 1966 to look for possible point sources of gamma radiation above 30 MeV. The heart of the detector system that was used in these investigations consisted of a 32-level magnetic-core digitized spark chamber with thin (1/50 radiation length) high-Z pair-producing plates between each spark module level. This spark chamber unit is surrounded by a bell-shaped plastic scintillator dome and is triggered by a coincidence between a central scintillator and a Čerenkov counter together with an anticoincidence of the dome. This device is flown in a balloon gondola that is oriented by means of a gas jet system that in turn is controlled by information from a magnetometer. Data related to Scorpius X-1, the galactic center, the Kepler supernovae, the Sagittarius x-ray sources, and Centaurus A in the southern hemisphere and Taurus A in the northern hemisphere are presented. At the present time, upper limits for γ rays above 30 MeV of 3×10^{-5} (cm² sec)⁻¹ have been established for Scorpius X-1, the galactic center, the Kepler supernovae, Oph XR-1, and Sgr XR-2. Other and more complete data on possible point sources are presented, and there is a general discussion of the energy spectrum of the secondary γ rays.

The Region of Formation of the Metallic Emission Lines of AG Pegasi. M. FRIEDJUNG, *Queen's University, Kingston*.—A photometric study of the intensities of the spectrum lines of the symbiotic star AG Pegasi is in progress. A study of the metallic emission lines by a curve of growth technique has given excitation temperature values dependent on excitation potential, and of the order of several thousand degrees. A lower limit to the size of the emitting region in 1946 can also be set from this investigation, and is around 10^{12} cm. This can be

combined with other data to deduce that if the star is binary, the metallic lines are formed far from the blue component, but on the same side of the system.

Multiple Periodicities of the Delta Scuti Stars. WAYNE FULLERTON, *University of Kansas*.—The light curves of all the well-observed δ Scuti stars and of several new δ Scuti type stars have been analyzed for multiple periodicities. δ Del, CC And, and δ Sct are remarkably similar to one another. These three stars exhibit a secondary frequency approximately 1 rad/day from the primary and they show close frequency pairs on the order of 0.2 rad/day apart. DQ Cephei and ρ Puppis do not show close frequency pairs or a secondary frequency near the primary, although it may be that such frequencies have an amplitude too small to be detected. The new δ Scuti stars (ϵ Cep, 4 CVn, HR 812, and β Cas) exhibit frequencies that correspond to those present in DQ Cep and ρ Pup. The frequencies present in terms of the primary, ω_1 , are $\omega_2 = 0.269 \omega_1$, $\omega_3 = 0.640 \omega_1$, $\omega_4 = 1.30 \omega_1$, $\omega_5 = 1.66 \omega_1$, $\omega_6 = 1.89 \omega_1$, and $\omega_7 = 1.99 \omega_1$. Thus approximate relationships among the secondary frequencies may be derived:

$$\begin{aligned} \omega_6 &= \omega_3 + \omega_4 = \omega_2 + \omega_5 = 3\omega_3, & \omega_6 &= \omega_1 + \omega_3, \\ \omega_4 &= \omega_1 + \omega_2 = 2\omega_3, & \omega_7 &= 2\omega_1. \end{aligned}$$

These frequencies are very nearly, if not exactly, those present in dwarf Cepheids.

The secondary frequencies close to the primary might be due to differing polar and equatorial radii just as may be the case for β CMa stars. The method of Böhm-Vitense can be used to derive an entirely reasonable rotational velocity of 75 km/sec, which compares favorably with 85 km/sec, the mean value for stars of similar spectral and luminosity classes. The close frequency pairs may be due to tidal effects from a binary companion. δ Del has been reported to be a double-lined spectroscopic binary of high eccentricity with a period on the order of 40 days. The beat frequencies caused by the two pairs of close frequencies are just one and four times a frequency corresponding to a period of 55 days. If this explanation of the close frequency pairs is correct, then we should expect that CC And and δ Sct and perhaps others are also binaries.

Some Characteristics of the Association III Cephei. R. F. GARRISON, *Mount Wilson and Palomar Observatories*.—III Cephei is one of the youngest of the associations within 1 kpc. It is only 2° from the plane of the Milky Way, has no central cluster, and contains a considerable amount of dust. This