is identical to the metric of the Einstein static solution. The luminosity distance is a periodic function; the redshift-magnitude relation is, below $z=1$, linear (*Z. Physik* **176**, 435, 1963). At two previous meetings we have discussed how this theory explains the origin, intensity, spectral index, and count of discrete radio sources (*Astron. J.* **72**, 291, 1967) and the isotropic microwave background radiation (*Astron. J.* **71**, 845, 1966).

Physically the Fib universe is a perpetuum mobile of the second order; the free energy degraded in natural processes becomes, during its metamorphosis to messengers, upgraded and newly available to natural processes: The entropy of the closed universe remains constant. Geometrically the Fib universe is a static universe, performing slight oscillations around its Einstein equilibrium radius. These oscillations regulate the transfer of radiant energy to matter in a way that prevents further expansion and contraction. The integral spectrum of photons and neutrinos is (E in erg)

$$N_{\text{ph}}(E) = 5 \times 10^{-5} E^{-1}, \quad N_{\nu}(E) \sim 4 \times 10^{-6} E^{-1}, \quad (1)$$

per cm^2 , sec, and sr. This spectrum has no other energy limit except through absorption. K. Greisen has discussed possible interactions of high-energy photons and from the experiments made at CERN and Brookhaven we know that the cross section of high-energy neutrinos is not so very small and increases with the first or possibly higher power of the neutrino energy.

From Eq. (1) it follows that every few billion years the nucleus of each galaxy will be hit by a neutrino of a relativistic energy corresponding to more than 3000 sun masses, which through its gravitational interaction alone will cause an implosion and partial gravitational collapse. Theoretically a jet of atomized matter should appear on the opposite side of the impact, which jet, as H. Arp has suggested (*Astron. J.* **72**, 290, 1967), may be wound up as a new spiral arm. Every thousand years one star in our galaxy will be hit by a neutrino of more than 10^{42} erg energy. This could increase the central temperature of the star to a degree where an instability and subsequent supernova outburst could occur. Every 200 yr the earth should be hit by a neutrino having the energy of the meteorite which produced the Arizona meteor crater. The Sudbury basin in Canada, which represents an accumulation of shocked and melted basement rocks, lithified and metamorphosed to the chlorite grade, may be the result of such an event.

Possible Continuum Emission from Jupiter at 18 Mc/sec. C. H. BARROW AND J. WILLIAMS, *Florida State University Radio Observatory*.—Observations of Jupiter have been made with an inter-

ferometer consisting of two identical broadside arrays, each of four whole-wave dipoles, on an east-west baseline of 16 wavelengths. The beam of each array was centered on the zenith and had half-power points at about $\pm 13^\circ$ in the north-south direction and $\pm 25^\circ$ in the east-west direction. The receiver was phase switched with variable time constant and bandwidth.

Some typical records are presented. In some of these the conventional Jupiter bursts appear superimposed on a fringe envelope while in others the pen returns to the zero-centered baseline between bursts of activity. The over-all time characteristics of the instrument were such that the pen should readily have returned to the center zero between bursts had the incident radiation from Jupiter gone to zero for periods of more than a few seconds. It is suggested that the former type of record indicates the presence of some weak background continuum radiation of intensity less than about $10^{-21} \text{ W m}^{-2}(\text{cps})^{-1}$.

This effect was not observed on many occasions and presumably indicates either that continuum emission is not a frequent occurrence or that it is usually of too low an intensity to be recorded by the interferometer.

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Homogeneous Stellar Models and the Zero-Age Time Lines. A. BENNICK, *Hunter College*, AND L. MOTZ AND R. LINSKER, *Rutherford Observatory*.—Following the integration procedure developed by A. Bennick and E. Motz (*Astrophys. J.* **141**, 195, 1965) we have constructed a large series of homogeneous main sequence models with central convective cores and differing chemical compositions. Since our primary purpose in this investigation was to determine the dependence of the zero-age main sequence on chemical composition, we allowed the hydrogen content of our models to range from 0.99 to 0.5 and Z to range from 0.001 to 0.3. For a given chemical composition we obtain a series of models that lie on a zero-age line by varying the size of the convective core. The larger the convective core, the larger the mass of the model, and the higher up it lies on the main sequence. For a given chemical composition and core size, the ratio of the energy generated by the carbon cycle to that generated by the p - p chain in the core can still be adjusted to give models with outer convective envelopes of different depths. However, as one moves up the main sequence, the choice of this ratio becomes more and more restricted, since the convective envelopes become shallower and the models become radiative all the way out. The zero-age main sequence lines