An Observational Search for Integrated Cosmic Light. F. E. ROACH AND L. L. SMITH, *National Bureau of Standards, Boulder*.—The measurement of the integrated light from extragalactic sources (cosmic light) involves its detection with respect to the other components of the light of the night sky: the zodiacal light, the night airglow, the integrated starlight, and the diffuse galactic light. Measurements at the earth's surface are further complicated by the necessity of allowing for the extinction and scattering of the atmosphere.

We have attempted to evaluate the upper limit of the cosmic light by photometric observations of the night zenith sky over a calendar year at each of three stations: Fritz Peak (latitude $39.9^\circ N$), Kitt Peak (latitude $31.9^\circ N$) and Haleakala (latitude $20.7^\circ N$). During the course of the year the zenith sky includes galactic latitudes from zero for the Milky Way traversals to the region near the north galactic pole. The residual, after subtracting out the zodiacal light, the night airglow and the integrated starlight when plotted against galactic latitude increases toward the galactic plane and is interpreted as due primarily to diffuse galactic light. If there were a measurable cosmic light component, it should show up as an increase toward the galactic pole. No such increase is observed by us and we place the upper limit of the brightness of the cosmic light at about five stars of visual magnitude 10 per square degree.

The Radial Velocity Field and Neutral Hydrogen Distribution in M31. MORTON S. ROBERTS, *National Radio Astronomy Observatory*.—Loci of constant radial velocity have been mapped for the central regions ($\pm 50'$ about the center) of the Andromeda Galaxy. Two diagonally opposite quadrants of this map show features which are in accord with a pure rotational, thin disk model having the inclination, 77° , of M31; the other two quadrants are in violent disagreement with such a model. Additional disagreement from model calculations occurs along the minor axis of M31. In the position angle of the minor axis the radial velocity locus should be a straight line and should correspond to the systematic velocity of the galaxy; no such locus exists. The observed distribution of loci in this region can be explained qualitatively by adding an expansion (or contraction) term to the model calculations. Expansion plus rotation will also result in paired quadrants in just the sense observed. However, no reasonable expansion representation can account for the extent and amount of the "irregularities" observed and some other mechanism must be considered as the prime cause. The sense of these irregularities, i.e., the crowding together of the radial velocity loci, can be explained if we relax the condition of an over-all

thin disk hydrogen distribution and invoke a warp similar to that found on each side of our galaxy. The direction of the required bending is such that the effective inclination is increased.

Mayall's (*Publ. Obs. Univ. Mich.* 10, 19, 1951) radial velocity measures of H II regions in M31 refer to objects lying in the complex quadrants described above. These optically derived measures show reasonably good agreement with the 21-cm measures of the same quadrants.

The maximum ridge lines of the integrated hydrogen contours follow the general run of H II regions mapped by Baade and Arp (*Astrophys. J.* 139, 1027, 1964) but lie $1'$ to $2'$ west; this difference is larger than the estimated absolute error in the pointing correction of the 300-ft telescope. A high concentration of H II regions exists in the north following quadrant, this quadrant also displays the highest integrated hydrogen brightness temperatures.

These data were obtained with the 300-ft radio telescope of the National Radio Astronomy Observatory; at 1420 Mc/sec the half-power beamwidth of this telescope is $10'$ which corresponds to 2 kpc at the distance of M31.

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Solar Evolution and Cosmology. R. C. ROEDER AND P. R. DEMARQUE, *David Dunlap Observatory*.—Investigations of solar evolution in the flat space model universe of Brans and Dicke [where the gravitational constant is a function of epoch given by $G = G_0(t_0/t)^n$, $n = 2/(4 + 3\omega)$] have been carried out for $\omega = 4, 6, 8$, and a Hubble constant of 75 and 100 km/sec/Mpc. Evolutionary tracks covering an interval of 4.5×10^9 yr have been calculated using Larson and Demarque's version (*Astrophys. J.* 140, 524, 1964) of the Henyey method for various solar compositions having $Z = 0.03$. The results show that the effect of increasing ω is to change the shape of the evolutionary track in the H-R diagram from a steep downward line—similar to that found by Pochoda and Schwarzschild (*Astrophys. J.* 139, 587, 1964) for $\omega = 2$ —to a U-shaped curve and ultimately (as $\omega \rightarrow \infty$) to the conventional upward curve. It also appears that increasing the Hubble constant from 75 to 100 km/sec/Mpc makes relatively little difference in the composition needed to fit the present sun, but has a drastic effect on the shape of the evolutionary track.

The Brightness Distribution and Mass-to-Light Ratio of the Compact Galaxy NGC 4486-B: A Preliminary Study. HERBERT J. ROOD, *Univer-*