Polytropes in General Relativity. WILLIAM J. KAUFMANN, III, *Indiana University*.—Assuming the usual metric and energy-momentum tensor for static spherical symmetry and a polytropic equation of state, the structure of the polytrope may be obtained from a single integro-differential equation in one unknown whose solution depends on the polytropic index n and the constant $B = p_c / (\rho_c c^2)$, where p_c and ρ_c are the central pressure and density, respectively. Numerical solutions were obtained for $n = \frac{3}{2}$ and $n = 3$ with $0 \leq B \leq \frac{1}{3}$. The gravitational redshift of light emitted at the polytrope's surface and the ratio of the mass to the radius of the polytrope were plotted against B ($z \rightarrow 0$ and $M/R \rightarrow 0$ as $B \rightarrow 0$). For $n = \frac{3}{2}$ both z and M/R increase monotonically over the range of B under consideration, reaching 0.3211 and $1.007 \times 10^5 M_\odot/R_\odot$, respectively, at $B = \frac{1}{3}$. For $n = 3$ both z and M/R reach a maximum at about $B = 0.18$, where $z = 0.08134$ and $M/R = 3.414 \times 10^4 M_\odot/R_\odot$; they decrease slowly with increasing B .

Li 6708 in the S-Type Mira Variable T Sgr. PHILIP C. KEENAN, *Perkins Observatory*.—It is well known that the Li 6707.8 line tends to be stronger in stars of type S than in M-type stars, though in none of them is its total absorption comparable to that attained in certain carbon stars, such as the "lithium star," WZ Cas, in which McKellar measured $w(\lambda 6708) = 8.4 \text{ \AA}$. M. C. Bretz (*IAU Symposium No. 26*, p. 304, 1966), has called attention to the S5.1 star HD 216672 and the S7.5, 6 semi-regular variable AA Cyg (HD 190629), in which the lithium line is stronger than normal, having $w = 0.4 \text{ \AA}$ in the former.

On a coudé spectrogram taken with the Hale telescope at the Palomar Observatory on 3 September 1966, the Mira variable T Sgr (S5, 8e) showed the strongest lithium line that I have yet seen in any S-type star. The equivalent width was about $1.2 \text{ \AA}$. The star was near maximum brightness, with an estimated visual magnitude of 7.5.

An independent measurement of the lithium line in T Tau at this same maximum has been made by Anne Merchant Boesgaard on a spectrogram by J. L. Greenstein on 23 August 1966. Her measured total absorption was $1.4 \text{ \AA}$, and in view of the difficulty of measuring such a deep line, this difference is not surprising. No observations of the line at other maxima appear to have been made.

Mass of Jupiter Derived from the Motion of 52 Europa. WILLIAM J. KLEPCZYNSKI, *Yale University* and *U. S. Naval Observatory*.—The minor planet 52 Europa is one of a group of asteroids having mean motions nearly double that of Jupiter, and as

a consequence has a sizable perturbation in longitude with a period of about 66 yr. Analysis of 297 observations, extending over a 100-yr period, indicates a mass of Jupiter in reciprocal solar mass units of $1047.381 \pm 0.020 \text{ m.e.}$

The coefficients of the correction to the mass of Jupiter, used in the equations of condition of a least-square analysis, were obtained in the following fashion. With the n -body numerical integration program of J. Schubart, two ephemerides of the minor planet were generated using two different values for the mass of Jupiter. The differences in the coordinates of the minor planet were then divided by the difference in the mass of Jupiter.

It was found by utilizing additional integrations that the differences in the coordinates divided by the difference in the masses were linear over the range of masses used for Jupiter in the numerical integrations. It was also noted that the differential perturbations of Jupiter on the earth could be neglected.

The generality of the method makes it suitable for use with any well-observed minor planet. The author will extend this investigation using minor planets 10, 24, and 31.

Model Stellar Atmospheres for Helium Stars. DANIEL A. KLINGLESMTIH, *Goddard Space Flight Center* and *Indiana University*.—A grid of model stellar atmospheres has been constructed using the currently accepted techniques (Mihalas, D., *Astrophys. J. Suppl.* **9**, 321, 1965; Avrett E. H., and Loeser, W. J., *Quant. Spectry. Radiative Transfer* **3**, 201, 1963; and Lucy, L. B., Ph.D. thesis, University of Manchester, 1962). The basic assumptions are plane-parallel semi-infinite geometry, perfect gas in local thermodynamic equilibrium, hydrostatic equilibrium, and radiative equilibrium. The sources of opacity are hydrogen and helium and their negative ions and electron scattering.

The grid contains 24 atmospheres. Two compositions are used: $Y = 1.0$, $X = 0.0$ and $Y = 0.999$, $X = 0.001$. The effective temperature range is $30\,000^\circ\text{K} \geq T_{\text{eff}} \geq 16\,000^\circ\text{K}$ and the logarithm of the surface gravity ranges from 4.0 to 2.5.

The models and their continuum properties are discussed.

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Moon Photographed at 2° Solar Elongation. M. J. KOOMEN, R. T. SEAL, JR., AND R. TOUSEY, *E. O. Hulburt Center for Space Research*.—From the earth's surface the moon has not been observed at elongations less than 7° from the sun (Danjon, A., *Ann. Obs. Strasbourg* **3**, 139, 1933). Here the crescent