No. 136, 1958); it is about 0.42^m in total photographic brightness and 0.04^m in color. The redirection of photons should be most prominent in the dusty regions of the face-on galaxy, creating an anomalous relative brightness and blueness of the spiral arms.

Nucleosynthesis during the Early History of the Solar System. WILLIAM A. FOWLER, JESSE L. GREENSTEIN, and FRED HOYLE, *California Institute of Technology, Pasadena, California.*—Abundances in terrestrial and meteoritic matter indicate that the synthesis of D^2, Li^6, Li^7, Be^9, B^{10}, and B^{11}, and probably C^{13} and N^{15} occurred during an intermediate stage in the early history of the solar system. In this intermediate stage, the planetary material had become largely separated from the hydrogen which was the main constituent of primitive solar material. Appropriate physical conditions were satisfied by solid planetesimals with dimensions from 1 to 50 m consisting of silicates and oxides of the metals embedded in an icy matrix. The synthesis occurred through spallation and neutron reactions simultaneously induced in the outer layers of the planetesimals by the bombardment of high-energy charged particles accelerated in magnetic flares at the surface of the condensing sun. Recent studies of the abundance of lithium in young, T Tauri stars serve as the primary astronomical evidence for this point of view. The observed abundances of lithium and beryllium in the surface of the sun are discussed. The isotope ratios $D^2/H^1=1.5\times10^{-4}$, $Li^6/Li^7=0.08$, and $B^{10}/B^{11}=0.23$ are the basic data leading to the requirement that 10% of terrestrial-meteoritic material was irradiated with a thermal neutron flux of 10^7 n/cm^2-sec for an interval of 10^{14} sec. The importance of the (n,α) reactions on Li^6 and B^{10} is indicated by the relatively low abundances of these two nuclei. It is shown that the neutron flux was sufficient to produce the radioactive Pd^{107} and I^{129} necessary to account for the radiogenic Ag^{107} and Xe^{129} anomalies recently observed in meteorites. It is not necessary to postulate a short time interval between the last event of galactic nucleosynthesis and the formation of large, solid bodies in the solar nebula.

An Eclipsing "Astronaut." SERGEI GAPOSCHKIN, *Harvard College Observatory.*—The star of position, $12^h7^m5^s$, $+37°28'$ (1855) ($12^m.7$) or $12^h12^m16^s$, $+36°56'$ (1950) was discovered by Humason and Zwicky as an interesting blue star. It was found a no less interesting object with variable radial velocities by Greenstein, and it is now established as a spectroscopic binary and an eclipsing system of exceptional character.

On the basis of 24 spectrograms taken with the Hale telescope (200 inch), offered to me by Greenstein and measured by myself, I found the following spectroscopic elements: $P=3^d.5281$, $e=0.00?$, $K_1=140$ km/sec, $K_2=180?$ km/sec, $\gamma=-20$ km/sec, $SP_1=B_2$, $SP_2=B_1?$, $(a_1+a_2)\sin i=15.75\times10^6$ km, $(m_1+m_2)\sin^3 i=12.10\odot$.

On the basis of 327 photographic estimations made on the plates of the Harvard Patrol collection the photometric light curve and the elements of this star were found: max.$=12^m.92$, $m_1=13^m.17$, $A_1=0^m.25$, $m_2=13^m.07$, $A_2=0^m.15$, period$=3.5821$ (assumed), no ellipticity (assumed), $D_1=0^p.18$, $D_2=0^p.18$ (assumed), $r_1=0.270$ A, $k=0.72$, $i=82°.4$, $L_1=0.55$.

Combining the photometric and the spectroscopic elements, and assuming that there is no interstellar absorption, I find the following basic data on both stars (solar units for R and $\mathfrak{M}$):

$$R_1=6.18,\quad \mathfrak{M}_1=7.04,\quad Mv_1=-2^m.39,\quad T=17\,900°.$$
$$R_2=4.44,\quad \mathfrak{M}_2=5.48,\quad Mv_2=-2.31,\quad T=?.$$

Another well-established method leads to the similar results: $\mathfrak{M}_1=8.1$, $R_1=7.0$.

The apparent visual magnitude is assumed to be $12^m.92$. The modulus is then 15.97. The distance of the star 15 630 parsecs.

How could the star hurtle itself that distance up? It would not have had time for this, for it should have left the center of the galaxy some billions of years ago, while the star's life itself could not have been longer than one hundredth part of this span of time.

Atomic Transition Probability Calculations. R. H. GARSTANG, *National Bureau of Standards, Washington, D. C.* (on leave from *University of London Observatory*).—As part of a program to fill some of the gaps in our knowledge of forbidden-line transition probabilities, calculations have been performed on [*Fe*II]. Theoretical formulas, including spin-orbit interaction and configuration interaction, have been fitted to the observed spectroscopic energy levels, and estimates of the relevant quantum-mechanical parameters obtained. These have been used to compute magnetic dipole transition probabilities, and similar calculations for electric quadrupole probabilities are approaching completion. The agreement between theoretical relative intensities and rough estimated intensities in η Carinae is excellent.

Some results have also been obtained for electric dipole transitions of the type p^2-ps in carbon, silicon, germanium, tin, and lead. The main point of interest is the calculation of the transition probabilities for certain intercombination lines and, where possible, comparison with experimental determinations. For carbon and silicon excellent agreement is obtained.