attributed to the effects of the solid upon atomic and molecular nitrogen. In particular, it is suggested that the $^2D \rightarrow ^4S$ transition of N and the $^5\Sigma_g^+ \rightarrow A^3\Sigma_u^+$ transition of N_2 are observed. On the basis of the latter observation, a lower limit to the heat of dissociation of nitrogen of 9.632 e.v. can be given. Some observations of "explosions" and "burning" at low temperature also will be discussed. These results indicate a laboratory approach to problems concerning the growth and spectra of interstellar grains.

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Brownlee, Robert R. Photoelectric observations of SW Lacertae.

At the Goethe Link Observatory, Brooklyn, Indiana, photoelectric observations of SW Lacertae, a W Ursae Majoris type of eclipsing binary, were made in yellow, blue, and ultraviolet in 1953, and in yellow and blue in 1954, all on the U, B, V system. Comparison shows that while the system was well-behaved in 1953, it was quite erratic in 1954, varying from observation to observation as well as from cycle to cycle, and was about 0.1 mag. bluer in color. Further, although the depths of primary and secondary minima differed by approximately 0.1 mag. in 1953, they were practically equal in 1954. The light curves are asymmetric and have deformations which prevent normal rectification, giving a family of solutions. When the spectroscopic and the approximate photometric elements are combined they show the more massive star to be eclipsed at secondary minimum, an occultation. Times of minima show the period to be steadily increasing.

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Cameron, A. G. W. The evolution of the cosmic mixture of elements produced by capture of neutrons.

Thermonuclear reactions of helium with C^{13} , O^{17} , and Ne^{21} provide sources of neutrons in stars with helium cores at temperatures of 0.7 to 2×10^8 °K. The neutrons are thermalized to energies in the vicinity of 10 kev, and are captured by their surroundings.

The changes in nuclear abundances, brought about by capture of these neutrons as they are fed into an initial Suess cosmic mixture, have been followed by numerical integration. The

abundances of elements heavier than iron increase rapidly and approach saturation values. The factors of increase saturate at several hundred in the region of mass 80 and at several thousand in the rare-earth region. It is suggested that such a neutron capture process is responsible for producing the large increases in heavy-element abundances observed in the spectra of several classes of stars.

The nuclei remaining after hydrogen exhaustion in the core may at most provide enough neutrons to approach saturation in the mass-80 region, but not in the rare-earth region. The rate of production of these neutrons defines a slow time scale with many thousands of years between successive neutron captures by a given nucleus. However the observed relative abundances of the heavy nuclides cannot have originated in this way. If the heavy elements have originated in stars, then the slow time scale is of only minor importance for the production of nuclides of mass greater than 100. The majority of such nuclei appear to have been produced on a fast time scale for neutron capture—about one hour between successive captures to produce isolated neutron-rich nuclides; about 10 minutes to form heavy trans-lead nuclides. Such a fast time scale for neutron capture implies very high neutron fluxes.

A possible mechanism for the production of these high neutron fluxes may exist in massive stars with fast rotation. If the helium convection zone can extend temporarily to the boundary of the core, then some hydrogen may be transported rapidly toward the center of the star, where in succession C^{13} and neutrons would be produced. The same mechanism may mix neutron-evolved core material into the polar and surface regions of some stars.

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Dodson, Helen W. Development of an active solar region August 20–26, 1954.

It is possible to study the development of active solar regions under circumstances of unusual simplicity during the time when the sun is just emerging from minimum in the eleven-year cycle. The week of August 20–26, 1954 provided exactly this opportunity.

Between 15^h00^m and 15^h10^m UT on August 20, a small calcium plage formed very close to the central meridian at about 30° south latitude. By 18^h00^m a spot was visible. In the week follow-