ties, and hence distances, to the stars in the three OB groups seems justified. The statistical application of this method to the Hamburg-Cleveland Luminous Star Surveys should provide further insight into galactic spiral-arm structure.

Formation of H II Regions. PETER O. VANDERVOORT, *Yerkes Observatory*.—This paper is devoted to a study of the formation of an H II region about a star of early spectral type which has formed in an infinite, homogeneous medium of atomic hydrogen. The radiation of the star in the Lyman continuum ionizes the gas at successively greater distances. The boundary of the H II region is an ionization front of the weak R type, which moves directly into the surrounding neutral gas. The neutral gas overrun by the front is ionized, and the ionized gas emerges from the front in a state of motion determined by the boundary conditions at the front. The main problem of this investigation is the determination of the subsequent motion of the gas.

The following approximations are made in the formulation of the problem: (1) The ionization front is treated as a surface of discontinuity. (2) It is assumed that the star forms instantaneously and radiates thereafter with a constant luminosity. (3) The motion of the ionized gas is assumed to be isothermal. (4) Absorption of the Lyman continuum in the H II region by atoms present as a result of recombinations is neglected. It appears that only the last approximation introduces a serious error; the model predicts dimensions for the H II region which are large compared with the dimensions of a Strömgren sphere. Nevertheless, the run of densities and velocities through the H II region given by the model should be qualitatively correct.

The equations governing the motion of the ionized gas have been solved in an approximation which has as its physical basis the circumstance that the interval of time required for the formation of the region is small. Results concerning the density and velocity as functions of position and time are presented.

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Discussion of the Composition of the Peculiar Star 3 Centauri. GEORGE WALLERSTEIN, *University of California, Berkeley*.—The most outstanding peculiarity in the spectrum of 3 Centauri is the deficiency of He^4 by a factor of 40. A deficiency of helium may be characteristic of many of the peculiar stars of types B8-A. It is suggested that the helium is destroyed by bombardment by protons that have been accelerated magnetically to energies greater than 20 MeV. The most likely reaction is

$He^4(p,d)He^3$, for which $Q = -18.4$ MeV. The deuterium is easily destroyed by proton bombardment and the He^3 will be subject to $He^3(p,2p)d$, for which $Q = -5.5$ MeV. For neither the He^4 reaction nor the He^3 reaction has the energy dependence of the total cross section been measured.

Proton bombardment could produce the observed excess of phosphorus and deficiency of sulfur through the reaction $S^{32}(p,d)S^{31}(\beta^+)P^{31}$, for which $Q = -12.9$ MeV, or the similar reaction, (p,np) , or $(p,2p)$, which yield the same final products. It is predicted that this reaction must have a substantially larger cross section than $Si^{28}(p,d)Si^{27}(\beta^+)Al^{27}$ because in 3 Cen neither a deficiency of Si nor an excess of Al is observed.

Finally, attention is called to the fact that a satellite exposed to the 3⁺ flare of Nov. 12, 1960 was recovered and found to have tritium and He^3 embedded in its casing. According to Schaeffer and Zähringer (*Phys. Rev. Letters* **8**, 389, 1962) the tritium and He^3 were produced by protons acting on He^4 in the solar flare. And so for the first time we have direct evidence that the physical processes in solar flares may be similar to the processes on the surfaces of the peculiar A stars.

Model of the Lunar Ionosphere. HERSCHEL WEIL AND MURRAY L. BARASCH, *Radio Astronomy Observatory, University of Michigan*.—An estimate of a possible lunar ionosphere was made by Herring and Licht [Herring, J. R., and Licht, A. L., *Space Research* (North-Holland Publishing Company, 1960), pp. 1132-1145], who assumed that protons of the solar wind are re-emitted as slow hydrogen atoms after striking the lunar surface and that charge exchange with the proton stream is a dominant mechanism which converts these atoms to slow protons which, together with electrons from the solar wind, form one component of a lunar ionosphere. The same mechanism is considered here but the simplifying assumptions made by these authors of complete spherical symmetry and an everywhere constant radial velocity for the re-emitted atoms are removed. Different procedures are then necessary and effects of an incident flux coming from only one direction are brought out. The flux continuity equation is solved for the slow proton density after introducing the local velocity and atomic hydrogen density obtained by integrating an appropriate distribution function. Perturbation of the original solar stream by the moon's shadowing is also considered using the above-mentioned distribution function. This perturbed stream forms a second ionospheric component. For typical quiet-sun solar-wind parameters, the resulting ionosphere has a single layer with a maximum