the corona. It is assumed that the same is true of other stars.

The first temperature plateau in the chromosphere is bordered both top and bottom by invariant conditions on the degree of ionization of hydrogen that are largely independent of the energy input. Predicted conditions at the base of the first temperature plateau lead naturally to the disappearance of Ca II emission features in early F stars.

The coronal pressure is fixed essentially by the chromospheric temperature plateaus whereas the coronal temperature is fixed by the magnitude of the energy input. It is suggested that coronal loss energy mainly by thermal conduction and/or heat convection inward, which, in turn, eventually appears as radiation and possibly as stellar wind.


Two time-dependent, model atmospheres of cool, grain-forming carbon rich stars were calculated. The grains were assumed to be graphite spheres with a surface-free energy of 1000 ergs/cm². The details of the nucleation and growth of the grains were included explicitly in the models. With the fixed stellar parameters M = 1.8 M☉, L = 1.94 x 10⁹ L☉, C/N = 1.22 x 10¹⁰ and C/O = 1.76, model 1 was calculated assuming a photospheric temperature Tₑ = 2500 K, and model 2, with Tₑ = 2400K. Radiation pressure on the grains generated mass flows in both models. The calculated mass loss rate for model 1 was 6.2 x 10⁻⁹ M☉/yr and its flow approached a steady state after an elapsed time of 2.73 x 10⁸ sec. In the case of model 2, the calculated mass loss rate was 7.4 x 10⁻⁹ M☉/yr, and after 2.7 x 10⁹ sec, the flow moved to a state in which a regular, small amplitude (Δν = 0.8 km/sec) pulsation was superimposed on the outward flow. The driving force for this pulsation appears to be an opacity controlled feedback mechanism which operates between the grain-forming region of the model and the H₂ dissociation zone. In model 1, the opacity of the grains was too small for the mechanism to produce pulsations. In both models, grain nucleation was negligible at supersaturation levels less than 5 and the low atmospheric densities in the grain forming regions severely limited the growth of the grains with the result that the grain radius remained very small (≈ 5.5 x 10⁻⁸ cm).

19.01 Future Directions in Ground-Based Optical Observations. R. B. DUNN, Sacramento Peak Observatory - Some of the recent trends in Ground-Based Solar Astronomy became clearer during the meeting, "Solar Instrumentation, What's Next?" at Sacramento Peak Observatory in October. There is continued wide interest in long-term observations of solar astrometry and oscillation. The detailed study of a large variety of stellar cycles appears to be a real aid in helping theoreticians model the solar cycle. Promising instrumental technology, including correcting for the deleterious effects of the earth's atmosphere on telescope resolution, may make a 2.5-meter Large European Solar Telescope (LEST) a very attractive possibility as the next ground-based solar telescope. Solar activity and polarization measurements were not emphasized at the meeting.

19.02 Solar Rotation. B. J. LaBONTE, Mount Wilson and Las Campanas Observatories, Carnegie Institution of Washington

The Sun is observed not to rotate as a rigid body. Angular momentum must be redistributed within the solar interior to maintain the observed angular rotation gradients. By measuring the solar rotation as a function of latitude, time, and depth, we hope to learn about the processes of momentum redistribution, and to identify the important physical forces operating in the solar interior.

19.03 Recent Global Scale Solar Oscillations and Magnetic Field Observations. P. H. Scherrer, Institute for Plasma Research, Stanford University, Stanford, Ca. 94305

In the past five years a new interest in whole-sun observations of velocity oscillations has developed. This interest has grown in part from the observations of 160-minute oscillations which have been observed with the same period for five years by at least three observers. These observations may be of very low order g-mode oscillations. Whole-sun oscillations with period near 5 minutes have also been observed at several observatories. The 5-minute oscillations are found to be consistent with model calculations for p-modes with high order n and low degree l. This report will discuss these observations.

There has also been increasing interest in the struc-