with the radiative heat transfer equation. The stability of the layer in a stellar atmosphere where the gradient is superadiabatic is found to depend on a dimensionless parameter analogous to the Rayleigh number. The scale of the most unstable perturbation is of the order of the layer thickness, and its exact value is given as the solution of a transcendental equation involving the parameters of the medium.

In the study of turbulent fluctuations it is assumed that the amplitude of the fluctuations is small and that their behavior does not appreciably affect the velocity field. The amplitude of velocity fluctuations need not be small. The development follows Corrsin (1950, 1951) for the non-radiative case. It is possible to obtain a number of results about the temperature fluctuations, particularly a universal spectrum for the scales in which there is local isotropy.

The effects of conductivity and radiative transfer on sound propagation are a space-damping and a reduction of propagation speed. The former effect is the more important and the space-damping of sound waves by radiative transfer has been found in the general case where the mean free path of photons may be comparable with the acoustic wave length.

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Sterne, Theodore E. and Dieter, Nannielou. The constancy of the solar "constant."

The correlation was studied of ten-day mean values, x , of the solar constant inferred from measurements at Montezuma, Chile, with the ten-day mean values, y , inferred from measurements at Table Mountain, California. The covariance, $\bar{xy} - \bar{x} \cdot \bar{y}$, of x and y was found to be 10.59×10^{-6} (cal cm⁻² min⁻¹)², corresponding to the standard deviation 3.25×10^{-3} cal cm⁻² min⁻¹. This is an upper limit to the standard deviation of any real changes in the solar constant itself (about 1.946 cal/cm² minute) over the interval of simultaneous observation January 1926 through June 1955. The standard deviation of the real changes may have been smaller than this, because the value 3.25×10^{-3} included possible changes in atmospheric absorption, common to the two stations and imperfectly corrected for, and the effects of some adjustments of the Table Mountain values to conform

to Montezuma values. It is concluded that the simultaneous Smithsonian measurements of the solar constant in Chile and California indicate that if the solar constant really changed at all between 1926 and 1955, it changed by amounts having a smaller root-mean-square value than 0.17 per cent of the solar constant itself.

Serial correlations for each of the two stations separately were also calculated. No periodicities appeared that were common to the two stations.

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Swihart, Thomas L. The blanketing effect in the sun.

Previous work has indicated a discrepancy between the continuous radiation field predicted from so-called standard models of the solar atmosphere and that observed in the sun. The blanketing effect is investigated as a possible source of this discrepancy.

A solar atmosphere with a blanketing coefficient which varies with depth is constructed. Values of the blanketing coefficient are taken from the calculations of J. C. Pecker. Comparing the resulting model with one in which the blanketing coefficient does not vary with depth, one finds that, although the changes in the internal structure are small but significant, the changes in the emitted continuous radiation are entirely too small to explain the above-mentioned discrepancy.

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Thomas, Richard N. On T_{rad} for the early Balmer lines.

An earlier-reported inquiry into the relation between T_{ex} and T_e for the early Balmer lines is continued. Two observational results must be interpreted: (1) the fact that limb-darkening measures of individual lines and combined results from line-profiles at the center of the disk give a monotonic T_{rad} vs. N_2 relation with scatter small relative to total change in T_{rad} (de Jager 1952; Böhm-Vitense 1954); (2) the indication of small but systematic differences between various lines in the relation of (1) (Athay and Thomas 1957). The framework for the interpretation is: (a) T_{rad} may be taken to equal T_{ex} over at least the central regions of the lines;