n^{th} order, defined by

$$K_n(\tau) = \int_1^\infty \frac{e^{-x\tau}}{x^n} dx, \quad (4)$$

and

$$\gamma = \frac{1}{1 + (\cos \beta) \ln \tan \frac{\beta}{2}}. \quad (5)$$

The coefficients, A_j , can be evaluated from a system of linear equations involving the C_{nj} 's tabulated in Paper I. We have calculated the emergent intensity corresponding to the solution of four simultaneous equations and compared our values with those obtained from the Chandrasekhar-Hopf formula:²

$$I(\mu, \mu_0) = \frac{1}{4} F \frac{\mu_0}{\mu_0 + \mu} H(\mu) H(\mu_0), \quad (6)$$

where $H(\mu)$ is the solution of Ambartsumian's functional equation:

$$H(\mu) = 1 + \frac{1}{2} \mu H(\mu) \int_0^1 \frac{H(\mu') d\mu'}{\mu + \mu'}, \quad (7)$$

and

$$\mu_0 = \cos \beta. \quad (8)$$

The two sets of values of the emergent intensity agree to within one part in a thousand, on the average, and somewhat less for $\beta = 0^\circ$, on account of a singularity in the solution, cf. (5).

Solution of more equations does not consistently improve the agreement. We believe that for higher accuracy we need improve the trial function (3).

1. *Ap. J.* **110**, 1, 1949.

2. *Ap. J.* **106**, 143, 1947.

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Oke, J. B. and R. E. Williamson. A theoretical Hertzsprung-Russell diagram for red dwarf stars.

The best model which has yet been suggested for stars of small masses is one first devised by Cowling in which a radiative envelope is fitted to a convective core. If the opacity in the star is represented by the law $\kappa = k\rho^{1-\alpha}T^{-3.5}$, where k is a function of the chemical composition, then it is found that α varies from 0.43 to 0.25 as the mass of the star goes from 0.2 to 1.0 of the mass of the sun. If the carbon cycle is assumed to be the source of energy in stars less massive than the sun, a Hertzsprung-Russell diagram can be constructed. It is found that the main sequence

should have a considerable width if reasonable variations in chemical composition are allowed. If several stars have a constant chemical composition, then they should fall on a single curved line in the diagram, their positions on the line being governed by their masses.

If the proton-proton reaction is assumed to be the only source of energy, then it is found that only two-thirds of the stars of known mass, luminosity, and radius conform to the proton-proton reaction models. This is so even when considerable errors are allowed for in the radius and luminosities of these stars. For the late-type main sequence stars, the Hertzsprung-Russell diagram based on the proton-proton reaction models does not appear to fit the observational diagram quite so well as that based on the carbon cycle.

Rather surprisingly, it is found that the sun may derive all of its energy from the proton-proton reaction if the hydrogen plus helium content is more than 90 per cent. If the hydrogen plus helium content is 98 per cent, the proton-proton reaction gives for the sun a central temperature of 16×10^8 °K, a central density of 124 grams per cc, a hydrogen content of 74 per cent, and a helium content of 24 per cent. The heavy material is assumed to be Russell mixture.

The authors wish to express their thanks to the National Research Council of Canada for its financial assistance in this project.

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O'Keefe, John A. A new determination of the lunar parallax.

The lunar parallax has been measured by determining by photoelectric measurements the times of occultation of the same star at several widely separated points in the United States. The essential tool not used in previous determinations of the lunar parallax is the geodetic triangulation of the United States, which appears to be accurate to 1 part in 200,000 on individual loops. It is a further consequence of the use of geodetic triangulation that what is determined is the moon's distance, rather than its parallax; consequently it is not necessary to make an assumption about the earth's radius in order to convert the results to kilometers.

The technique is to place the observers along the line covered by the shadow of a chosen lunar