Significant differences were found between the band profiles obtained in the laboratory and in the stellar spectra. Some of these differences could be attributed to differences in resolution. However, the fact that the bands in the stellar spectra decreased in strength, with increasing distance from the band head, much more rapidly than in the laboratory spectra could only mean that the rotational temperature was lower than in the laboratory, i.e., lower than 1900°C . A rotational analysis of this band has recently been completed at the Yerkes Observatory. It was therefore possible to compute the band profile for various temperatures. When this was done, it was found that the stellar profiles most closely approximated a profile computed for 1000°A .

This rotational temperature of about 1000°A is considerably lower than temperatures derived for M-type stars by other methods (2500° to 2850°A). It is possible that effects other than a lower temperature are responsible for the observed band profile. A study of the relative intensities of the bands of the TiO molecule would provide a vibrational temperature which may be compared with the present result. This will be done when the current study of the relative transition probabilities of this molecule is completed.

*Yerkes Observatory,
Williams Bay, Wis.*

Pierce, A. Keith and Lawrence H. Aller. Structure of the solar atmosphere from limb darkening measures.

The darkening to the limb of the sun depends not only on the temperature gradient but also on the absorptivity of the solar gases. From measures of the intensity distribution, $I_{\lambda}(0)$, at the center of the solar disk and from limb darkening measures it is possible to derive both the temperature gradient and the wave-length dependence of the absorption coefficient of the solar atmosphere. For this purpose we have utilized Mulders's determination of $I_{\lambda}(0)$, together with limb darkening measures made with the lead sulfide cell at the McMath-Hulbert Observatory. The limb darkening curves were made at 10 different wave lengths in the region 0.5μ to 2.3μ and cover 98.5 per cent of the solar radius.

The results confirm previous studies which show that the negative hydrogen ion is the principal source of continuous absorption. The extra-

polation of the limb darkening curves to the boundary is small and thus a reliable boundary temperature can be found. The observed parts fit a Planck distribution corresponding to a boundary temperature of 4500°K with an uncertainty of less than 100°K .

From these studies we hope to obtain improved knowledge of the variation of temperature, gas pressure, electron pressure, etc. with depth and thus finally an improved model of the solar atmosphere.

*McMath-Hulbert Observatory,
University of Michigan,
Lake Angelus, Pontiac, Mich.*

Rabe, Eugene. The precessional constant from Eros.

The more precise values for the masses of the inner planets derived recently by me from Eros¹ lead to an improved value of the constant of precession P . To the value $P = 5493''.849$, recently obtained by G. M. Clemence² for 1950.0, a probable error of about $\pm 0''.156$ ought to be assigned. The probable error $\pm 0''.175$ as given by de Sitter³ is reduced by the introduction of Oort's more accurate result for the general precession in longitude. The greater part of this probable error is due to the planetary precession, i.e., mainly to the uncertainty of the masses of Mercury and Venus. With the reciprocals for the planetary masses

Mercury	6120000 ± 43000
Venus	408645 ± 208
Mars	3110000 ± 7700

as obtained from Eros, new values for the coefficients of the power series for the secular motion of the ecliptic and for the fundamental precessional quantities have been computed. Oort's⁴ result, $p = 5026''.65 \pm 0''.07$ for the general precession in longitude and Newcomb's value for the obliquity of the ecliptic with an assigned uncertainty of $\pm 0''.10$ at 1900.0 were linked with the secular motion of the ecliptic as given by the expressions

$$\begin{aligned} \pi \sin \Pi &= \\ &+ 5''.3181 T_1 + 0''.19338 T_1^2 - 0''.000219 T_1^3 \\ &\pm \quad 47 \quad \pm \quad 7 \quad \pm \quad 1 \\ \pi \cos \Pi &= \\ &- 46''.7841 T_1 + 0''.05617 T_1^2 + 0''.000317 T_1^3, \\ &\pm \quad 148 \quad \pm \quad 2 \quad \pm \quad 0 \end{aligned}$$

T_1 being reckoned in tropical centuries from 1850.0. These expressions differ from those