Northcott, Ruth J. A spectroscopic binary of high eccentricity, HD 196133.

The star HD 196133, α (1900) $20^{\text{h}} 30^{\text{m}} 3$, δ (1900) $+44^{\circ} 50'$, visual magnitude 6.62, type (D.D.O.)A2, was announced as a star of varying radial velocity in *D.D.O. Pub.* 1, No. 13, 1942. In 1945 it was put on the spectroscopic binary program and sixty-two one-prism plates were taken in 1945 and 1946. The 69 observations were grouped according to phase into 32 normals and solved by least squares. The orbit was found to be highly eccentric, the preliminary eccentricity being 0.75. The final elements were found to be as follows: $P = 87.687$ days, $e = 0.7605$, $\omega = 230^{\circ} 99$, $T = \text{JD } 2431669.080$, $\gamma = -9.028$ km/sec., $K = 32.473$ km/sec., $a \sin i = 25.43 \times 10^6$ km., mass function = $0.0854 \odot$.

Three interesting points occur in this orbit. There are only five known orbits of greater eccentricity; systematic irregularities of residuals are found similar to those in some other very eccentric orbits; and there is some evidence of change in the spectrum, now being examined spectrophotometrically.

*David Dunlap Observatory,
Richmond Hill, Ontario*

Petrie, R. M. A study of absorption line intensities in the spectra of 30 stars of class O.

Equivalent widths of the prominent lines in the photographic region have been measured in the spectra of twenty O-type stars and supplemented by values already published. Atoms represented are: hydrogen, helium, ionized helium, ionized magnesium and triply-ionized silicon. The variation of line intensity with spectral type is described. The Balmer lines of hydrogen have been freed from the blending effects of those of ionized helium, and are found to persist in the hottest stars observed but would appear to vanish about O4. The lines of neutral helium are still present at O5; this result is at variance with previously accepted ideas but is in accordance with the prediction of ionization theory. The lines of ionized helium strengthen from O9 to O5; there is no maximum later than O5.

Measured line-ratios are studied for spectral classification and the three ratios $\text{He I}/\text{He II}$, $\text{He II}/\text{H}$ and $\text{Si IV}/\text{He II}$ are found to be suitable for defining spectral type on the revised system. The measured spectral types are given for thirty-one stars. An investigation of luminosity effects fails to produce any certain spectroscopic criteria of absolute magnitude.

The temperatures of the O stars are calculated from the measured intensity-ratio of the neutral and ionized helium lines. The derived temperatures range from $28,600^{\circ}\text{K}$ at B0 to $36,300^{\circ}\text{K}$ at O5, in general agreement with scales based on the maximum strengths of absorption lines.

*Dominion Astrophysical Observatory,
Victoria, B. C.*

Roman, Nancy Grace. The H-R diagram and space distribution of the members of the Ursa Major cluster.

Introduction. In two papers on the Ursa Major cluster, published in 1939, Smart examined the claim to cluster membership of 136 stars. He concluded that 42 of these stars are definitely members of the cluster while the status of 52 was doubtful. The purpose of this investigation has been to obtain spectroscopic parallaxes of these stars and, combining these with the remaining data in Smart's papers, to reexamine the question of the membership of the cluster and to give a revised H-R diagram.

A number of stars with small proper motions, for which the data are inconclusive, have been excluded by the limits on the position angle residual of 10° for definite members and 20° for probable members. The more accurate spectroscopic parallaxes have also excluded a few stars; the number has been reduced to 32 definite members and 12 probable members. There are probably also several members south of -30° which have not been considered in this investigation.

Space distribution. The cluster has a fairly compact nucleus containing 11 stars within nine parsecs. The remaining stars are scattered up to a distance of 135 parsecs from this nucleus.

The Coma and the Hyades clusters are included in the volume of space occupied by the Ursa Major cluster; Praesepe and the Pleiades are almost within it. In contrast to the Ursa Major cluster, the Coma cluster contains about 30 stars of similar absolute magnitude, Praesepe and the Hyades, about 75, and the Pleiades, several hundred members, each in a region less than eight parsecs across.

H-R Diagram. Nine of the nucleus stars give a smooth main sequence; the others include a metallic line star, a peculiar A star, and probably a G0 subdwarf. The latter was discovered in an attempt to find the fainter members of the cluster in the vicinity of the nucleus from their proper motion, and has no radial velocity.