$$P_1 \quad \nu = 14524.246 - 2.87740J \\ - .06430J^2 - .263J^4/10^6$$

$$R_1 \quad \nu = 14524.248 + 2.87725J \\ - .065023J^2 - .948J^4/10^6 \\ (J = 0.5, (1.5), 2.5, \dots)$$

$$P_2 \quad \nu = 14526.203 - 2.90465J \\ - .063870J^2 - .409J^4/10^6$$

$$R_2 \quad \nu = 14526.203 + 2.90102J \\ - .065961J^2 - .465J^4/10^6 \\ (J = 0.4524, (1.4524), 2.4524, \dots)$$

The lines involving odd numbers of J are absent from these bands which are associated with homologous diatomic molecules.

The simplest method of using wave numbers to check relative accuracy makes use of the fact that for a given J the wave number of each line of any band of $O^{16}O^{16}$ differs by a constant from that of the homologous line in any other band. For example, choosing $J = 6.5$

	$B - A$	$\alpha - A$	$\alpha' - A$
P_1	1403.989 ν	2779.983 ν	4127.862 ν
P_2	.985	.985	.856
R_1	.990	.980	.864
R_2	.987	.979	.879

These differences for all J -values may be represented by the same type of formula as that which connects the lines of a branch of a band. Having set up a system of wave numbers by this means, it is seen that the relative accuracy of lines measured by interference is one part in seven million.

The wave numbers in a band may be represented as differences in level. Several such arrangements were tried but no system appeared to be superior to all others. It is evident that there is no transition from a state associated with an even J to a state involving an odd J . And no pair of P and R branches can be represented by use of the same coefficient of J^2 and the same interval for both P and R.

*Allegheny Observatory,
Pittsburgh, Pa.*

Edmondson, Frank K. Radial velocities of A and K stars fainter than tenth magnitude.

This paper is a report of work in progress under the existing plan of co-operation between the Universities of Chicago, Indiana, and Texas. A previous report is to be found in *Publications of the American Astronomical Society*, 10, 307.

It is planned to measure the radial velocities of 1000 faint stars, 500 of type A and 500 of type K. These stars are selected, with the co-operation of Dr. A. N. Vyssotsky, from the faint stars whose proper motions have been measured at the McCormick Observatory. The present report is based on all the radial velocities measured thus far: 74 A-type, each based on two spectrograms; and 135 K-type, most of them being based on one spectrogram. The McDonald material has been supplemented by Mount Wilson spectrograms which were taken by Dr. S. A. Mitchell during the summers of 1941 and 1943.

The McDonald dispersion at $H\gamma$ is 342 A/mm for the A stars and 152 A/mm for the K stars. The Mount Wilson dispersion is 120 A/mm for both types. Each spectrogram is measured direct and reversed on two different days, and the measures are independently reduced. The difference between the two values is used to estimate the measuring error. The sum of the measuring and plate errors is estimated from standard stars, and 144 spectrograms have been measured for this purpose so far. The total probable error for the A stars is ± 10 km/sec (McD) and ± 8 km/sec (Mt. W). For the K stars it is ± 5 km/sec (McD) and ± 4 km/sec (Mt. W). Over 74,000 measurements have been recorded to date, each measurement being the mental average of two settings of the measuring machine.

The largest velocity measured so far is +244 km/sec for McCormick 119-4 (Ko, 10.8). No A star has a velocity greater than 60 km/sec, but 10 K stars are going faster than this limit.

The corrected standard deviation of the peculiar velocities of the A stars is ± 15.8 km/sec, which is in good agreement with bright star data.

The corrected standard deviation of the peculiar velocities of the K stars, omitting McCormick 119-4, is ± 27.7 km/sec. Taking the values for giant and dwarf K stars as ± 17 and ± 30 , the present figure derived from 134 K stars between magnitudes 10 and 11 leads to a figure of 82 per cent dwarfs. Previous estimates have ranged from 4 to 30 per cent. Confirmation of the high percentage is found in a preliminary examination of some of the spectra for luminosity effects. Out of the first 45 stars measured, only 15 are giants. This high percentage of dwarfs, if confirmed by the later observations, will have important bearing on theories of galactic structure.

*Kirkwood Observatory,
Bloomington, Ind.*