between the estimated intensities of the interstellar lines and the distance of the star, thus providing a new method of obtaining the individual parallaxes of these distant stars. A single-prism spectrograph giving moderate dispersion was employed in the above mentioned investigations as, with few exceptions, these distant stars are quite invisible to the unaided eye.

A few years later, Dr. C. S. Beals, now Dominion Astronomer, using a three-prism spectrograph found that the interstellar calcium and sodium lines in some stars had multiple structure. The results were extremely interesting and important as they showed that the interstellar matter, instead of being uniformly distributed was actually organized into a number of discrete clouds with individual motions in the line-of-sight. His work has been recently confirmed by Dr. W. S. Adams at the Mount Wilson Observatory, California, U.S.A., using the most powerful astronomical spectrograph in existence.

Whereas formerly, the strengths of the interstellar lines were estimated in a relative scale of intensities, quantitative measurements of the intensities of the interstellar lines have recently been made by Dr. Beals using a registering microphotometer, designed by him and constructed by the instrument maker of the Observatory. These have been used in studies correlating the intensities of interstellar lines and the distances of the stars in whose spectra they appear.

An important contribution to our knowledge of interstellar matter was recently made by Dr. McKellar who showed that certain unidentified interstellar lines were due to the molecular compounds CN and CH, thereby establishing the existence of diatomic molecules in space. This discovery followed from an exhaustive analysis of the band spectra of 30 diatomic molecules. The data permitted the computation of the effective temperature of interstellar space as 1° absolute, and established the interesting fact that because of the extremely low temperature and pressure in space all the electrons in the molecules were concentrated in the lowest energy states. Thus, the spectrum of an interstellar molecule consists solely of a single resonance line, in striking contrast to the complex banded spectrum observed under laboratory conditions.

Studies of the Physical Characteristics of the Stars, Nebulae and Comets.—In the earlier years of the Observatory's history nearly all the researches undertaken were in the field of dynamical astronomy, but in recent years problems relating to the physical conditions in stellar atmospheres, the nebulae and comets have received steadily increasing attention. At the present time at least one-half of the total research deals with subjects in this general field. In this short article it is not possible, nor desirable, to outline the theories behind the interpretation of stellar spectra. It is sufficient to state that the positions, intensities and characteristics of the emission features and absorption lines appearing in the stellar spectra, when analysed by a microphotometer give definite information on the physical conditions in the heavenly bodies.

A new method of determining stellar temperatures was developed by H. H. Plaskett with interesting applications. Using carefully controlled lamps and carbon arcs as standard sources and a neutral-tint wedge before the spectrograph to vary the amount of light transmitted, he was able to determine the distribution of energy in different parts of the spectra of various astronomical sources including the sun, several stars and nebulae. This research is regarded as one of the pioneer investigations of stellar spectrophotometry, a field which has recently become increasingly important.