Classification of the O- and B-type Stars.—By a careful analysis of the spectra of three high temperature O-type stars, H. H. Plaskett demonstrated that the atomic constants in these very hot stars were identical with those determined in terrestrial laboratories. This observation and identification of faint spectral lines of ionized helium, two angstroms to the violet of the hydrogen lines, predicted from theory but not previously identified in the stars was a splendid verification of Bohr's theory of the atom.

The O-type stars were shown to have temperatures ranging from 22,000°K for 05 to 15,000°K for 09 stars and new spectral criteria for the classification of the O-type stars were proposed and adopted by the International Astronomical Union.

A careful reclassification of over 1,000 O- and B-type stars was subsequently carried out by J. S. Plaskett and J. A. Pearce who estimated the relative intensities of the spectral lines by means of a standard scale. This revision arranged these stars whose temperatures vary from 30,000°K to 10,000°K in a better linear sequence than the previously published Harvard Classification. Recently, Dr. R. M. Petrie has measured the intensities of many spectral lines in a number of these stars, with the microphotometer, thus providing quantitative impersonal measures in place of the visual estimates previously adopted. From theoretical considerations he finds excitation temperatures of 36,300°K to 28,600°K for the 05 and BO stars.

Investigations of the Emission Line Stars: The Wolf-Rayet Stars.—Dr. C. S. Beals joined the Observatory staff in 1927 and undertook as a special research the investigation of the Wolf-Rayet stars, north of declination −24, all that could be observed from Victoria. These stars are extremely hot, and their spectra showing strange broad emission bands of unknown origin were, at that time, quite unexplained. A satisfactory classification of the Wolf-Rayet stars into two main sequences, (a) the Nitrogen and (b) the Carbon sequence, was proposed and adopted by the International Astronomical Union. Stars of the nitrogen sequence are characterized by emission bands due to nitrogen to the exclusion of carbon while the carbon sequence shows bands due to carbon and oxygen to the exclusion of nitrogen.

Spectrophotometric studies of the contours of the emission bands, in both the visual and photographic regions led Dr. Beals to advance the hypothesis that these wide bands were produced by atoms being constantly ejected with velocities as high as 3,000 kilometres per second from the stellar surfaces. This theory satisfactorily explains the observed features and has been universally accepted. Thus, the major mysteries of these strange stars have been solved. Accurate information on the absolute magnitudes, masses, diameters, and parallaxes of these stars is much to be desired.

The P-Cygni Stars.—In the 17th century a new star appeared in the constellation of Cygnus which, unlike other novæ is still visible to the unaided eye as a star of the fourth magnitude, and which has been designated P-Cygni. This star is the prototype of a small group of early type stars whose spectra are characterized by complex features consisting of emission lines bordered on their violet edges by absorption components. Following a detailed spectrographic study of P-Cygni, Dr. Beals secured observations of all P-Cygni-like objects that could be observed at Victoria and has made extensive studies of the profiles of the strange spectral features. This work has led to important conclusions concerning the motions and stratification within the atmospheres of these stars. A comprehensive catalogue describing in detail the classification, spectra, light variations and physical characteristics of these stars is almost ready for the press.