

In 1930 Jessie Donalda Dunlap offered to build and donate to the University an observatory to be named in memory of her deceased husband, David Alexander Dunlap, who himself had been interested in Dr. Chant's proposal. The site chosen was to the immediate south of Richmond Hill, Ont., about ten miles north of Toronto. Work was begun in 1932 and the Observatory was completed and opened in 1935.

The David Dunlap Observatory was designed primarily for astrophysical research. The principal telescope, housed in a 61 foot dome, is a reflector of 74 inch aperture equipped with both Newtonian secondary for direct photography and Cassegrain secondary for use with a one-prism spectrograph. Separate from the dome for the 74 inch telescope is the Administration Building which contains library, offices, laboratories and workshops and which supports three domes. One of these houses a 19 inch reflecting telescope designed and built by Dr. R. K. Young. This telescope is used for direct photography and more recently for photoelectric photometry. A second dome on the Administration Building houses a six inch refracting telescope for student use; the third is vacant. Measuring instruments of various types for studying the astronomical photographs complete the scientific equipment of the Observatory.

*Stellar Radial Velocities.*—As regards the real motions of the stars, which reveal the over-all dynamics of the stellar system, classical astronomy had had to be content with that part of the motion which is directed across the line of sight and which is manifested by slight changes of position of the stars relative to one another. About eighty years ago it began to be possible by means of astronomical spectroscopy to measure also the radial or line-of-sight component of stellar motion. These stellar radial velocities as they became available for statistically large numbers of stars in the early part of this century revealed much new information concerning the structure of the galaxy. It was this field of radial velocity determination which was chosen for the major effort of the 74 inch telescope during the Observatory's early years. In twenty years about 2,500 stars have been measured for radial velocity out of a total of about 15,000 for which radial velocities are now known.

*Stellar Photometry.*—Another measurable attribute of stars which has always been of the greatest importance to the study of stars and star systems has been their apparent brightness. In particular this is true for stars of variable brightness. Some classes of these variable stars hold the clue for the determination of distances in the outer parts of the galaxy, particularly of the globular clusters. A twenty year program of photographic photometry of faint variable stars in many of the globular clusters has occupied about 5 p.c. of the observing time of the 74 inch telescope and has added appreciably to knowledge of these clusters. More recently photoelectric photometry, using electronic equipment fitted to the 19 inch telescope, has been added to the Observatory's observing program.

*Stellar Luminosities.*—Ranking in importance with measurement of apparent brightness of stars is the measurement of the luminosity or intrinsic brightness for, if both can be measured for the same star, then the star's distance may be calculated. Methods are available for gauging stellar luminosities from spectra of the stars and in recent years have been adapted to the collection of stellar spectra available at the Observatory from the radial velocity work. About 1,500 stars have now been measured for luminosity and new equipment and new methods are being developed to increase the precision of luminosity determination.

The foregoing brief outline of the work of the Observatory is intended to indicate only the major fields of observational activity. To this must be added detailed research problems of staff and students, which may be related to the observational data referred to, may be along purely theoretical lines, or may involve particular observational techniques designed to fit the problems. An effort is made to strike a balance between the production of routine astronomical measurements and the encouragement of individual enterprise and new methods of research.