

ASTRONOMY

120-Inch Telescope Works

The nucleus of the great Andromeda nebula has been shown by the newly completed 120-inch telescope at Lick Observatory to be rotating faster than its outer portion.

THE NEWLY completed 120-inch telescope at the University of California's Lick Observatory has reached into the heavens for the first time. It showed that the nucleus of the great Andromeda nebula is an astronomical "whirling dervish."

The nucleus of the dramatic pinwheel nebula, a mirror-image of our own Milky Way galaxy, is rotating faster than the outer portions, a fact not previously known. Stars at a distance of 25 light years from the center of Andromeda, known as M-31, make a complete trip around the galactic center every million years.

Stars farther from the center of this nebula, which is located some 2,000,000 light years away, make a complete revolution only once in every 100,000,000 years. By comparison, the portion of the Milky Way galaxy in which the sun and its planets, including earth, are situated is estimated to rotate around the center of the Milky Way only once in 200,000,000 years.

The rotational speed of the Andromeda nebula nucleus is astonishing, astronomically speaking, Dr. A. E. Whitford, director of Lick Observatory, Mt. Hamilton, Calif., said.

Reasons for the discontinuity of rotation in M-31 are as yet obscure, but the findings

provide important new information for astronomers, particularly those interested in the evolution of galaxies.

The observation with the world's second largest telescope was made by Dr. Merle Walker of the Lick staff, using an electronic camera designed by Prof. André Lallemand, of the Paris Observatory, and brought to Mt. Hamilton by Prof. Lallemand and Dr. Maurice Duchesne.

The new electronic camera will improve astronomical observations by a factor of between 30 and 50 times, Dr. Whitford said. The spectrograms of M-31 were obtained, for example, in exposures of 15 to 45 minutes, compared to exposures of five to 15 hours that would have been required with the best photographic plates.

Although the milestone of first observations with the new 120-inch telescope has passed, the giant instrument is still not completely operational. Mechanical "tune-up" operations will continue for some time, and several pieces of auxiliary equipment, in design or construction stage, will not be completed for more than a year.

Dr. Whitford said the telescope, now in regular use, gave a fine image on its first night of use, and performed completely up to expectations.

The huge telescope, which will complement the 200-inch telescope at Mt. Palomar in searching the distant heavens, was started in 1947 when the California State Legislature made the first appropriations for the instrument that have now amounted to some \$2,500,000. Grinding and polishing of the 120-inch mirror was started in 1953 and completed earlier this year.

(The 200-inch and 120-inch telescopes are the world's largest of their kind. The Russians are reported to be planning a telescope of comparable size, however.)

The final step in preparation of the huge mirror was performed some four months ago, when it was given an aluminum coating two-millionths of an inch thick.

The new instrument will be used for two general types of astronomical research, Dr. Whitford said.

One area of study will concern very faint and distant objects which could not be discerned with other instruments at Lick Observatory.

Some of the closer galaxies will be resolved into individual stars, and some of the brightest of them can be studied in detail. Also, the light of galaxies on the outer fringes of explored space will be available for analysis, and may yield insight into unresolved questions of cosmology and the geometry of space on the grand scale.

The second general area will concern stellar objects that are relatively close. The astronomers will make studies in this area of very young stars and stars that are in the pre-birth stage. This information may fill out the picture of the life cycle of matter in our galaxy that results in the creation of stars.

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GENERAL SCIENCE

Franklin's Library Is Reborn in Philadelphia

BENJAMIN FRANKLIN'S Library has been reborn in a monumental hall housing the collection of books and manuscripts of the American Philosophical Society, founded in 1743.

Located near Independence Hall at the famous address of Fifth and Liberty, the modernized restoration of the fine Georgian building of Library Company of Philadelphia was dedicated Nov. 11.

Costing more than \$2,000,000, the Library Hall has space for 300,000 volumes. It will provide a center for historical research, particularly relating to Franklin and his times, the American Revolution, the Lewis and Clark Expedition and memoirs of foreign academics.

The building is located in Independence National Historical Park upon land made available by Congress. A garden of the library is dedicated to Thomas Jefferson, third president of the society.

Dr. William E. Lingelbach, librarian emeritus, characterized the new research center as "a superb monument to Franklin and his confirmed faith in the force of ideas and their dissemination through books and libraries in promoting useful knowledge."

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ELECTRONIC CAMERA—Mounted at the focus of spectrographic equipment of the 120-inch telescope of Lick Observatory, University of California, is the electronic camera. From left to right are, Dr. Maurice Duchesne, Dr. Gerald Kron, Prof. André Lallemand and Dr. Merle Walker, all of whom were involved in the camera's development and installation.