



Galaxy seen through 61-inch telescope

Navy

ASTRONOMY

Stars: Near and Dark

by Ann Ewing

A quiet man who speaks in a soft voice with only a trace of accent—the astronomer who discovered the first unseen companion of planetary size to a star beyond the solar system—heads the largest observatory in the U.S.

The U.S. Naval Observatory, where Danish-born Dr. Kaj Aa. Strand is scientific director, has 80 scientists on its professional staff, more than any other U.S. observatory even though it does not have the largest telescope.

Its job is not that of seeing out to the limits of the known universe, as is that of its more powerfully instrumented sisters. But for fundamental observations on which navigation and astronomy depend, the Naval Observatory in Washington is a prime source of data on which both government agencies and other astronomers depend.

Dr. Strand believes that it is “extremely important that the Observatory have the most advanced equipment both for its operational effort in direct support of the mission of the Navy and of the Department of Defense, as well as for its programs in fundamental astronomical research.” The Naval Observatory, Dr. Strand stresses, is “the national observatory of the United States, with certain definite obligations to all citizens, like the accurate determination of time.” He noted that the “time signals you hear over your radio are based on measurements made with Observatory instruments.”

Besides supervising the Naval Observatory's many and varied programs

in fundamental astronomy and celestial mechanics, Dr. Strand also finds time to continue his research on double stars in the search for planetary bodies. Occasionally he even takes a few minutes to look through a telescope, especially when he is visiting Flagstaff, where the new 61-inch reflector is located.

This instrument, one of the new ones whose importance Dr. Strand stresses, is the “only telescope that can be used to measure the distances to very faint stars in the sun's neighborhood.” Knowing accurately the distances to such nearby faint objects is essential to determining accurately such fundamental properties as stellar mass and luminosity.

Dr. Strand has been keeping track of nearby stars since the early 1930's when he was studying for his doctorate at the University of Leiden Observatory in Holland under Prof. E. Hertzsprung, a world-famed “grand old man” of astronomy. Dr. Strand maintained this interest when he came to the United States in 1938 to spend five years at Sproul Observatory, Swarthmore, Pa., before enlisting in the Air Force.

After serving as director of navigation at the Air Force Proving Ground, Eglin Field, Fla., in World War II, during which time he was awarded a field commission and became a naturalized citizen, Dr. Strand taught astronomy for a year at the University of Chicago. For the next 11 years he was chairman of Northwestern University's astronomy department and director of Dearborn Observatory. In

1958 Dr. Strand was appointed director of the Naval Observatory's astrometry and astrophysics division, and was promoted to scientific director in 1962.

Unseen objects circling a visible star, his long-standing interest, are detected by measuring the amount of wobble they produce in the motion of the main star, and this is how Dr. Strand in 1943 discovered the dark companion to the star known as 61 Cygni. Since then three other stars have also been found to have invisible companions of planetary size. The plates being taken with the 61-inch reflector at Flagstaff “could well add to that total” within the next year, Dr. Strand said.

His Own Design

Although he is, as always, modest about any achievement, one new piece of equipment that Dr. Strand has particular reason to be pleased with is a machine for measuring stellar positions automatically. The device, based on Dr. Strand's design, is 30 percent more accurate than previously used hand methods. It was the first with the ability to pinpoint positions and record the stellar coordinates on punched cards for later computer processing.

Among the other new instruments acquired in the last year are the Observatory's two 214-pound “atomic clocks.” They are the only two portable time pieces, accurate to one-millionth of a second, available in the western world. They are delicately hand-carried by air around the world to reset the already-accurate clocks used afield by other agencies.

Congress authorized the establishment of the Naval Observatory in 1842 to help ships navigate, as well as to provide accurate time and to contribute to the “general advancement of navigation and astronomy.” It has since then performed the assigned functions with distinction. Today's navigation problems are not only at sea but in air and space as well, and the Naval Observatory's measurements and calculations are involved in all such travel.

Fundamental not only to navigation but to timekeeping are accurate positions of the stars, as well as the sun, moon and planets. These positions are determined from observations taken with two telescopes known as “transit circles,” one six inches in diameter on the Naval Observatory grounds in Northwest Washington, and the other, seven inches in diameter, now en route for installation at El Leoncito in western Argentina. The seven-inch instrument is being moved because there is a “great need for better stellar positions for stars visible only from the Southern Hemisphere,” Dr. Strand said.