Part 4.

Long-term Polar Motion

The session on long-term polar motion of IAU Colloquium 178 was dedicated to William Markowitz. He made important contributions to the study of polar motion through his analyses of International Latitude Service data. It is fitting that his name is associated with polar motion at decadal time scales and that he be remembered at this session of the colloquium.

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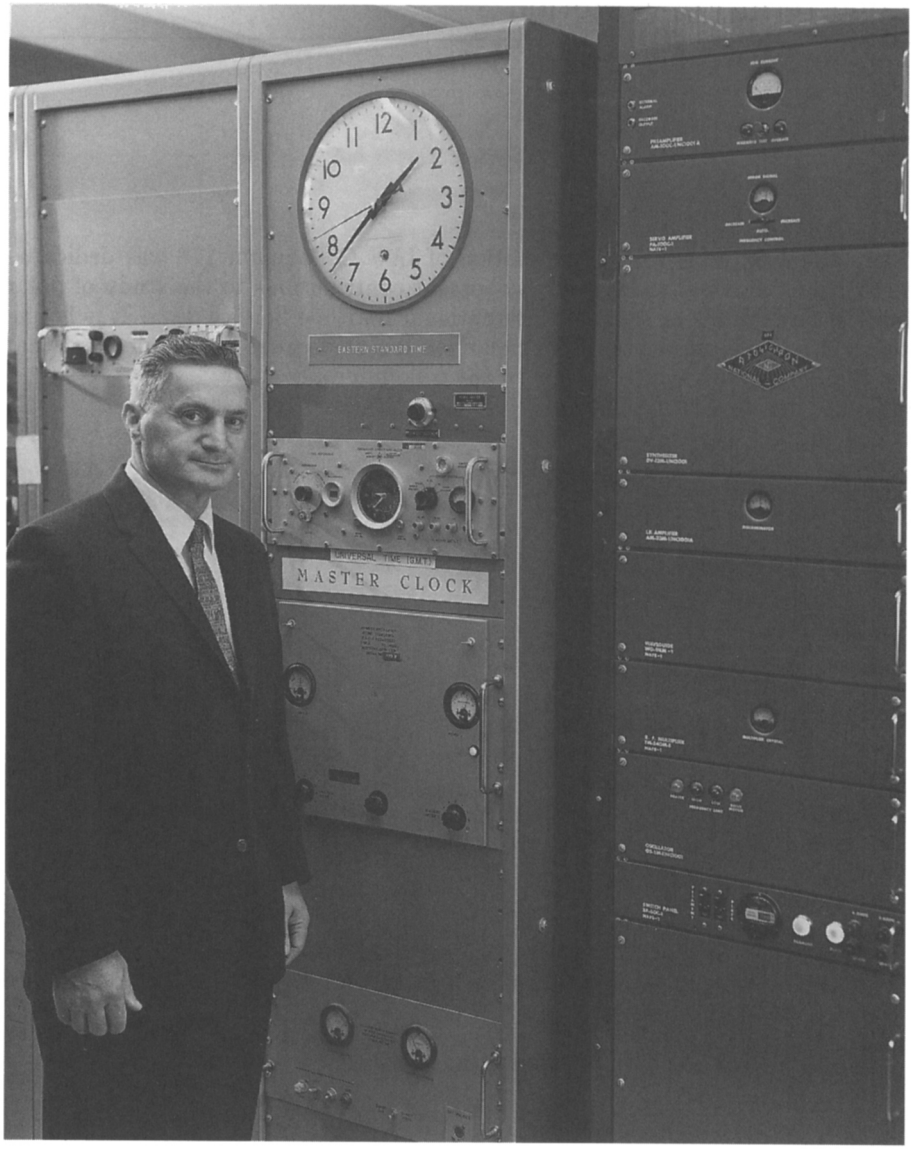

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William Markowitz (1907-1998)

William Markowitz, a U. S. Naval Observatory astronomer from 1936 through 1966, died in Pompano Beach, Florida on October 10, 1998. He was the Director of the Observatory's Time Service Department from 1953 until his retirement in 1966. His principal research interests concerned the rotation of the Earth and the motion of its pole; the polar motion occurring at decadal time scales known as the "Markowitz wobble" is named after him.

Markowitz was born February 8, 1907 in Mlec, Austria, where his mother was visiting from her native Poland. In 1910 he immigrated with his family to Chicago, obtaining his Ph.D. in astronomy from the University of Chicago in 1931. After teaching at Pennsylvania State College, he joined the U. S. Naval Observatory in 1936, working under Paul Sollenberger and with Gerald Clemence.

One of Markowitz's early duties was operating the Photographic Zenith Tube (PZT). In 1949, he and Sollenberger designed an improved version for the Observatory's new station near Miami. The variation of latitude, determined with the PZT, was one of the chief interests of Markowitz throughout his career. The analysis of these data led to his contributions to the study of polar motion.

Markowitz directed the Time Service Department during a period with increasing demands for more uniform and accurate time. "Ephemeris Time," based on the orbital motion of the Earth, was proposed in the early 1950s to provide a more uniform time scale than that based on the Earth's rotation. Markowitz devised a practical means for its determination by inventing the dual-rate Moon camera bearing his name. The first Markowitz Moon Camera was placed in operation at the Naval Observatory in June 1952, and twenty were used around the world during the International Geophysical Year (1957–1958). With data from these cameras, Markowitz worked with Louis Essen at the National Physical Laboratory in England to calibrate newly developed atomic clocks in terms of the Ephemeris second. The fundamental frequency of cesium atomic clocks, 9,192,631,770 Hz, which they determined, has defined the second internationally since 1967. At the International Astronomical Union (IAU) meeting in Dublin in 1955 he proposed the system of UT0, UT1 and UT2 which went into effect within months and remains today.

As Director of the Time Service, Markowitz was heavily engaged in international cooperation in time. He participated in experiments synchronizing time using artificial satellites and atomic clocks transported by airplanes. He served as President of the IAU Commission on Time from 1955 to 1961, and was active in the International Union of Geodesy and Geophysics, the American Geophysical Union, and the International Consultative Committee for the Definition of the Second.

After retiring from the Naval Observatory, Markowitz served as Professor of Physics at Marquette University (1966–1972), and Adjunct Professor at Nova University in Florida. He married Rosalyn Shulemson in 1943 and is survived by a sister, Mary, son, Toby, daughter-in-law, Dorothy, and granddaughter, Alison.

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