Ground vs. Grid

American Theodolite
A failed attempt

Biggert-Waters 2012
Impact on surveyors

Velocipedes
Early-day mechanization
Velocipedes, or handcars, as they came to be known, were a transportation mainstay for Coast and Geodetic Surveyors in the late years of the Nineteenth Century and early Twentieth Century. As they evolved, they became motorized by the 1920’s and 1930’s. Primarily used by level crews following railroad tracks through remote areas, they were also used occasionally by triangulation crews. In particular, handcars were used by the triangulation party of William Scaife on the Alaska Railroad for transportation to jumping-off points for packing into the wilderness. Constant vigilance was required by the crews as trestles, tunnels, and attention to survey work (with inattention to oncoming traffic) were all hazards to contend with. Beginning in 1916, level crews developed modifications that allowed mounting of the instrument, mounting of adding machines, and seating for a recorder. These innovations were forerunners of the motorized truck leveling systems that began in the 1950s.

Albert “Skip” Theberge served as a NOAA Corps officer for 27 years prior to retirement in 1995. During that period he was primarily engaged in nautical charting and seafloor mapping but also served a stint in geodesy working on the Transcontinental Traverse project during the 1970s. For the past 15 years he has worked as a research librarian at the NOAA Central Library and has produced a number of historical works related to the Coast and Geodetic Survey (C&GS) and seafloor mapping. He also produced the NOAA History website (www.history.noaa.gov) and the NOAA Photo Library (www.photolib.noaa.gov) which includes thousands of historic photos related to the work of the C&GS.

By Albert “Skip” Theberge
First order leveling. Mechanized leveling with velocipede. Party of M. E. Lutz

Image ID: cgs01212, NOAA's Historic Coast & Geodetic Survey (C&GS) Collection
Location: South Carolina
Photo Date: 1917
Credit: NOAA John Hayford Album

Leveling crew moving velocipede off tracks for approaching train. Level party of Herman Odyssey.

Image ID: theb0746, NOAA's Historic Coast & Geodetic Survey (C&GS) Collection
Location: Alaska Central
Photo Date: 1923
Credit: C&GS Season's Report Odyssey 1923

Observer riding ahead. Level crew of W. H. Burger

Image ID: cgs01213, NOAA's Historic Coast & Geodetic Survey (C&GS) Collection
Location: Texas, Pittsburg area
Photo Date: 1902
Credit: NOAA, John Hayford Album

Crew with motor velocipedes and inclined level. Party of J. D. Crichton

Image ID: theb1765, NOAA's Historic Coast & Geodetic Survey (C&GS) Collection
Location: Oregon
Photo Date: 1920
Credit: C&GS Season's Report Crichton 1920

Early level crew—taking the back sight. Umbrella shading instrument, recorder writing down observations and computing. Level party of W.H. Burger.

Image ID: theb0742, NOAA's Historic Coast & Geodetic Survey (C&GS) Collection
Location: Oklahoma, Indian Territory
Photo Date: 1902
Credit: NOAA John Hayford Album