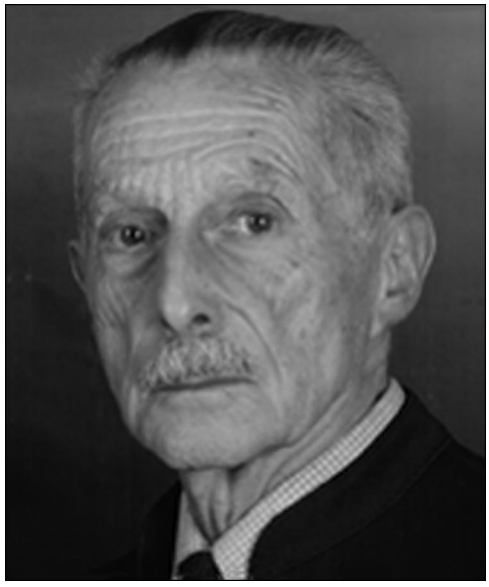
COMMENTARY

Remembering Walter Bitterlich

Harold E. Burkhart

Walter Bitterlich, who revolutionized forest inventory methods throughout the world with his path-breaking discovery of "Winkelzählprobe" ("angle-count sampling"), passed away on 9 February 2008 just 10 days shy of his 100th birthday. Born on 19 February 1908 in Reutte in the Tirol, Austria, he graduated Diplom Ingenieur at the Hochschule für Bodenkultur in Vienna, Austria, in 1930. Initial ideas about the angle count method are documented in his diary as early as 1931. However, the need for gainful employment and the interruption of professional and scientific work by service in the German army during World War II meant that he would not be able to finish development and publication of his theories until 1948.

In an autobiography called "Forester Gibrecht" (labeled "A true story using fictional names"), Dr. Bitterlich relates that, for a period of over 15 years—while walking, on train journeys, and at other times—his thought processes continued to return to the problem of angle count sampling. In mid-August 1947 he had his first opportunity after the war to attend a performance of an opera (Mozart's "Cosi fan tutte"). He credits the impeccable logic of Mozart's music for bringing his "subsidiary consciousness" into order, which led to the definite solution of his long-standing investigation into angle-count sampling. The results, published in January 1948, quickly spread around the globe. This new method of determining basal area per unit area without direct measurement of either plot areas or tree diameters turned out to be a highly efficient and economical inventory tool, and it soon became regarded by many foresters as the "invention of the century."



Walter Bitterlich

The method of including trees in a forest inventory when their boles at dbh (diameter at breast height) appear larger than a fixed angle is practiced the world over and is known by many different names including "angle-count sampling," "Bitterlich method," "plotless cruising," "prism cruising," "variable-plot sampling," and "point sampling." A 1952 *Journal of Forestry* article by L. R. Grosenbaugh was pivotal in introducing Bitterlich's method to American forestry practice. Since that time, hundreds of papers on various aspects of angle count sampling have been published as it became the standard method for efficiently obtaining estimates of basal area, volume, and numbers of trees in forested areas. In addition to sighting trees at dbh, which is sometimes called "horizontal point sampling," methods have been developed to project vertical angles and select sample trees based on their height ("vertical point sampling"). The angle count concept has been applied for a wide range of inventory situations, including recent extensions for assessing downed logs and coarse woody debris.

also: thumb trick

In addition to his pioneering contributions to methods of forest sampling, Dr. Bitterlich was a prolific inventor who received many patents. Starting in 1950, he worked closely with FOB, now Relaskop-Technik, in Salzburg, Austria, to develop the appropriate tree-measuring devices for his method of angle-count sampling, such as the Spiegel-Relaskop and the Tele-Relaskop. These instruments are still state-of-the-art and used worldwide for making forest inventory measurements.

In 1966, Dr. Bitterlich was appointed professor at the University of Agriculture (BOKU) in Vienna, Austria. After his retirement in 1978, he continued his scientific work, which was summarized in a book, "The Relascope Idea," published by the Commonwealth Agricultural Bureau in 1984. Over the years, he made presentations at numerous meetings and he received countless visitors in his home and office in Salzburg. He was a warm and gracious host; for many forest mensurationists (myself included), a pilgrimage to Salzburg to visit Dr. Bitterlich stands out as a high point in their careers. Dr. Bitterlich received myriad awards in Austria and Germany, and he was elected an Honorary member of the Society of American Foresters.

Dr. Bittterlich's extraordinary creative achievements earned the admiration of the forestry community worldwide. His work proved to be both intellectually interesting and highly practical. It is fitting that the SAF join foresters around the globe in remembering the long life and remarkable contributions of Walter Bitterlich.

Harold E. Burkhart, CF (burkhart@vt.edu) is University Distinguished Professor and Head, Department of Forestry, Virginia Polytechnic Institute and State University (Virginia Tech). *Biographical data and a photograph of Dr. Bitterlich were generously provided by Gerlinde Ruthner of Relaskop-Technik, Salzburg, Austria.*