

## **Hotelling, Addyson Harold** <sup>[1]</sup>

### **Hotelling, Addyson Harold**

by Harold Hotelling, Jr., 1988

**29 Sept. 1895–26 Dec. 1973**

Addyson Harold Hotelling, mathematical statistician and economist, was born in Fulda, Minn., the son of Clair and Lucy Rawson Hotelling. (In later life he dropped his first name.) He moved to Seattle, Wash., with his family in 1905, and attended the University of Washington by earning his own way. During World War I <sup>[2]</sup> he joined the army, serving at Camp Lewis, Wash. After the war he returned to the university and was graduated in 1919 with a major in journalism.

Hotelling worked briefly for the Puyallup, Wash., *Herald*, and in 1920 married Floy Tracy. His mathematical talent was observed by Eric Temple Bell, whose encouragement induced him to return once more to the University of Washington for an M.A. degree in mathematics (1921) and to go to Princeton for a Ph.D. degree (1924). Hotelling was then appointed a junior research associate at the Food Research Institute of Stanford University, where he remained until 1931 except for a six-month stay in Rothamstead, England, to study with Ronald Fisher, whose work was fundamental to modern statistical theory. While at Stanford, Hotelling conducted his early research in statistical analysis and in 1931 published "The Generalization of Student's Ratio" (*Annals of Mathematical Statistics* 2), introducing a statistic known as "Hotelling's Generalized T<sup>2</sup>."

The importance of econometrics, the application of statistical techniques to economics, was receiving increasing recognition and in 1931, largely at the instance of Wesley Mitchell, the Department of Economics at Columbia University appointed Hotelling professor of economics. Hotelling held the post for fifteen years, during which his principal economic work appeared. He was influential in the development of many statisticians and economists, including Nobel laureates Kenneth Arrow and Milton Friedman.

His wife died in 1932, and on 14 June 1934 he married Susanna Porter Edmondson. In 1939 they left New York for an extended visit to India, where Hotelling lectured at Calcutta. After their return in 1940, he engaged in statistical research with certain military applications and was head of Columbia's Statistical Research Group, whose work was devoted to the war effort.

In 1946 Hotelling left Columbia to accept an appointment at The University of North Carolina <sup>[3]</sup>, which was establishing an Institute of Mathematical Statistics. As head of the institute, he brought to Chapel Hill a number of distinguished statisticians and built one of the nation's leading university departments in the subject; he also taught courses in mathematical economics. In 1965 Hotelling was a visiting professor at the University of Buenos Aires, Argentina. After his retirement in 1966, he remained active in his profession and continued to travel widely for some years. He died in his sleep and was buried in Chapel Hill near the university. He was survived by his wife and seven children.

Hotelling is remembered among economists for his work on the early stages of econometrics. His best known works are "The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates" (*Econometrica* 6 [1938]), "Stability in Competition" (*Economic Journal* 39 [1929]), and "Economics of Exhaustible Resources" (*Journal of Political Economics* 39 [1931]). The first of these deals with the question of what price to charge where the marginal cost is very low but the total investment may be great, as in bridge tolls and railway rates. The second is a theoretical discussion of how two competitors may divide a market, and the third anticipates some of the conservationist controversies of the 1970s.

His best known statistical work was the introduction of Hotelling's Generalized  $T^2$ , and his work in canonical correlations and principal components. These studies have had substantial influence in the development of mathematical statistics.

In 1930 Hotelling participated in a meeting in Cleveland, Ohio, that founded the Econometric Society, of which he was president in 1937. He was one of the first Distinguished Fellows of the American Economic Association (elected in 1965) and received honorary degrees from the University of Chicago (1955) and the University of Rochester (1963). He became a member of the National Academy of Sciences in 1970, was given the North Carolina Award <sup>[4]</sup> in 1972, and was elected to the Italian Accademia Nazionale de Lincei in 1973.

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