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60. Reported Soviet successes in education should be attributed, however, to their special educational practices and to special sociohistorical factors, rather than to a possession of special psychological or psychophysiological knowledge. Whatever Soviet special knowledge in the area is, it is certainly, by all tokens, as yet in a prodromal-basic and not in an applied-conclusive state. The same holds for Soviet successes with respect to propaganda and so-called "brainwashing."

C. F. Roos, Econometrician and Mathematician

A rare combination of talents in mathematics, economics, and statistics and a continuing activity in science, business, and public affairs, together with organizing and managerial ability and vast energy, made Charles Frederick Roos a unique and outstanding figure. His varied services over many years to the American Association for the Advancement of Science make his sudden death from coronary thrombosis, on 7 January 1958, a matter of concern to members of the organization.

Born in New Orleans on 18 May 1901, Dr. Roos studied at Rice Institute and received from it the A.B., A.M., and Ph.D. degrees in mathematics in 1921, 1924, and 1926, respectively. His main interests in his graduate work were the calculus of variations, integral equations, and the applications of these areas of mathematics to economics. His principal adviser was G. C. Evans. He spent the two years from 1926 to 1928 as a National Research fellow at the University of Chicago, Princeton University, and Cornell University, and became an assistant professor of mathematics at Cornell in 1928. He resigned this position to become permanent secretary of the American Association for the Advancement of Science, in 1931. This office, later abolished, he once described as "permanent like a permanent wave." While at Cornell he was also secretary of Section K (Social and Economic Sciences) of the AAAS and was active in arranging programs in economics at the annual meetings. With the onset of the severe depression of the 1930's, he arranged a symposium on unemployment at one of these meetings, and the papers presented were later published by the AAAS under the title *Stabilization of Employment.*

Dr. Roos resigned his position as permanent secretary in 1933, on receivng a Guggenheim fellowship to work in England on mathematical economics. But the fast-moving events of that year

led him to return after two months to become principal economist and director of research for the National Recovery Administration. Here he directed an important series of studies (many of which were later published) on dynamic economics, inspired by the desperate economic situation of the time. This work ended when the blue eagle of the NRA was overthrown in the Supreme Court by the sick chicken of a code infringer. Through the interest of Alfred Cowles III, Roos became, in 1934, both professor of econometrics at Colorado College and director of research of the Cowles Commission for Economic Research, then in Colorado Springs.

A symposium on econometrics organized by Roos was held at the AAAS Denver meeting in June 1935, and after the meeting some of the participants visited Colorado Springs. Soon, a group of mathematical economists who had found themselves together there began to meet regularly. Their lectures to each other quickly attracted a large audience, and the outcome was the series of important Cowles Commission conferences, which began the next summer and continued until the Cowles Commission moved to Chicago. The published proceedings of these conferences drew much international attention.

Dr. Roos' interest in varied large-scale applications of econometric methods led him to New York in 1937. After two years as research director of an investment management firm there, he organized the Institute for Applied Econometrics, whose name was later shortened to the Econometric Institute, Inc. The first clients were Armco Steel and Gulf Oil. One of the first was General Motors, which in 1939 published Roos' *The Dynamics of Automobile Demand.* This book contains much information, both about the automobile industry and about Roos' techniques, not previously available to the general public. Attracted by such studies and by Roos' success in forecasting, numerous large corporations commissioned studies related to their industries, such as long-term investigations of probable changes in technologies, raw material supplies, and demand for their products. This interest on the part of industry still continues, and the business has grown to substantial size. The principal techniques are freely available to the public, which however cannot easily use them because of the large amount of work involved and because their use involves a special background in mathematics. Among the basic variables used in the economic projections are size and composition of population; these in turn are predicted by means of several variables, among which are the same economic variables that are being predicted. Thus the work consists of simultaneous prediction of many interacting variables, a subject of great interest to mathematical economists and to theoretical statisticians as well as to businessmen.

Such quantitative studies help to throw light on the nature and causation of business cycles and inspire thoughts about how these might be controlled. Charles Roos was not silent on this subject. Among other things, he joined with Waddill Catchings in writing the book *Money, Men and Machines* (Econometric Institute, 1953 and 1958), which is severely critical of the Federal Reserve system and of Keynes.

Today it is hard to realize how nearly impermeable were the barriers separating scholarly subjects 30 years ago. Charles Roos liked to recount how he once sent a paper dealing, in turn, with higher mathematics, statistics, and economics to journals concerned with one or another of these three subjects, only to have it returned by each editor with a proposal to publish it if the two-thirds outside his own field were deleted. Finally a mathematical journal published it in expurgated form. Such experiences helped to make clear the need for better facilities for interdisciplinary research and publication. New societies had to be formed.

On a call from Charles Roos, Ragnar Frisch, and Irving Fisher, 22 mathematical economists and statisticians gathered at the Cleveland meeting of the American Association for the Advancement of Science in December 1930 and became the founding members of the Econometric Society. Explicitly international in character, and now having members in a large number of countries, it remains, as it was at the time of its founding, dedicated to the advancement of economic theory with the help of such mathematical, statistical, and accounting methods as may be appropriate. Charles Roos was its first secretary and treasurer and helped to guide it through many difficulties of infancy. He was president of the Econometric Society in 1948. A full-page photograph of him appears as the frontispiece of the July 1952 issue of *Econometrica,* the now-influential journal of the society.

Charles Roos never lost interest in the American Association for the Advancement of Science. At the time of his death he was a member of its Committee on Social Aspects of Science. He likewise kept up an interest in academic activities, and many friends, including professors and corporation executives alike, were welcomed at his home. All mourn his loss sincerely.

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