In Memoriam

Tillman Merritt Brown, 1913–73

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Merritt Brown, a delightful man, a dedicated scholar and teacher, and one of the pioneers of econometrics in this country, died in London, Ontario, on 23 August 1973, at the age of 59.

Born in Windsor, Ontario, Professor Brown obtained his BA in Mathematics and Physics from The University of Western Ontario in 1934. A year later he received his High School Teacher's Certificate from the Ontario College of Education. Although employed briefly as a substitute teacher, he was unable to find full-time work in the teaching profession because of the widespread unemployment among teachers at the time. This direct personal experience of the effects on the individual of widespread unemployment left an indelible impression on this deeply sensitive man, which greatly affected his professional attitudes in later years.

After serving in the RCAF from 1941 to 1945 as an instructor in navigation, Professor Brown attended the University of Toronto where he obtained his MA in economics in 1947. Upon graduation he was appointed Head of Economics and Development Research in the Economics Branch of the Department of Trade and Commerce, where he remained until 1959. During these years he attended the Australian National University, while on leave from the Department, to complete the requirements for a doctorate, which he received in 1958. From 1959–62 he was a Professor at the Royal Military College in Kingston. In 1962 he joined the Faculty at Queen's University and in 1967 he moved to Western, where he remained until his death. During 1962–4 he served part-time on the staff of the Royal Commission on Health Services.

The twenty-six years of Professor Brown's professional career, encompassing twelve years as a civil servant and fourteen as a professor, were all devoted to the application of mathematical and quantitative methods to the

development of economics as a useful tool for policy analysis. He became an economist at a later age than most students because of his personal experience of unemployment during the thirties and a deep-seated conviction that economics *is* important and can help in improving the lot of mankind. In his own words, 'It is the potential uses of the empirical models that make all of this research worthwhile.' (16) He embarked on economics as a trained mathematician already fully conversant with many of the mysteries of calculus, matrix algebra, statistics, and so forth, that baffled most of his teachers and fellow students at the time. And he remained one of the few people in this country up to the early sixties who was able not only to follow but also to contribute to the substantial econometric advances in economics during this period. International recognition of these contributions came in 1972, when he was elected a Fellow of the Econometric Society, the only resident Canadian economist ever to have been so honoured.

Professor Brown's scholarly publications and papers may conveniently be grouped into two broad categories. The first group (1 to 9) is concerned with the development of econometric theory. A common characteristic is the attempt to clarify the properties of various estimation procedures and to devise methods that increase their practical applicability. Three of these papers are especially notable. In (2) Professor Brown restated the full information maximum likelihood estimator, which has optimal large sample properties, so that it could be evaluated in an operational way. This was important because the original statement by T. Koopmans et al. had been so complex as to inhibit its application to large systems of equations. The paper on simultaneous least squares (3) provided an imaginative application of the principle of least squares, or minimum distance, to estimate jointly all the coefficients of a simultaneous equation model. This was only the second estimator to do this and pre-dated three-stage least squares by several years. The third paper (4) applied the principles developed in the simultaneous least squares paper to non-linear simultaneous systems. At the end of his life Professor Brown was deeply engaged, with nine collaborators, on a large study using Monte Carlo procedures to examine the small sample properties of various econometric estimators. This study will be completed under the co-ordination of Robin Carter, a former student and close associate at Western.

The second category of research (10–18) concerned mainly the application of econometric techniques for purposes of policy analysis. These include his pioneering and perhaps most widely known paper on 'Habit Persistence and Lags in Consumer Behaviour' and his major book on the *Specification and Uses of Econometric Models*. The former was the first formal exploration of what has since become widely known as the permanent-income hypothesis, elaborated by M. Friedman and others some five years later. As L.R. Klein stated and M. Friedman acknowledged, 'Brown's work on lags

in consumer behavior is truly a complete anticipation' of Friedman.[1] His book was a bold attempt to construct a general purpose macro-economic system in a general equilibrium framework, showing how it could be used to throw light on policy questions. It abstracted from questions of estimating techniques and data and focused on specifying one large model embracing five major sectors. Heroic in conception, the book came in for criticism on the ground that it did not consider sufficiently the merits of alternative specifications and that depth had necessarily been sacrificed in the interest of extensive coverage of the economy.

Part III of the book is of particular interest because of the account given of the development within the Department of Trade and Commerce of the first major econometric models of the Canadian economy. For many Canadians Professor Brown is likely to be remembered particularly for his pioneering work on these short-run forecasting models. Initiated by O.J. Firestone, this activity was briefly under the direction of L.R. Klein during the summer of 1947. With the help of a few clerks working with desk calculators, the doughty band of Klein, Grayson, Daly, and Brown specified and estimated Model I in the record time of three months! Shortly thereafter Professor Brown found himself working alone on the model, with the help of one clerk, until he was joined by S. May in 1949. Together they formed the team that developed the impressive series of models that followed during the next decade. More recently, of course, many new and more sophisticated models have appeared reflecting the growing number of econometricians, the improved quantity and quality of data, the increased availability of funds, and, most important perhaps, the development of the electronic computer. To have been some two decades ahead of one's time is a rare achievement which few can claim.

This pioneering spirit was again reflected in Professor Brown's work for the Health Commission during 1962–4 when he estimated, once more with a bare minimum of assistance and facilities, a long-term model of the Canadian economy focusing on the determinants and prospects of long-run economic growth. While this work too has now been superseded by CANDIDE and possibly other models, it again showed Professor Brown at work on the frontier, well ahead of most of his colleagues.

Less well known but equally impressive was Professor Brown's attempt during his stay in Ghana in 1969–70 and after his return to Canada to develop an econometric model of the Ghanaian economy. It was 1947 all over again: inadequate statistics, little research assistance, desk calculators. Plunging in single-handedly, with all the optimistic enthusiasm that characterizes pioneers, he developed a comprehensive set of macro-economic data for the period 1956 to 1969, which is unique and represents a considerable

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1 L.R. Klein, 'The Friedman-Becker Illusion,' and M. Friedman, 'Supplementary Comment,' *Journal of Political Economy* 66 (Dec., 1958) 541, 549

achievement. Initially he himself intended to estimate a model based on these data. Waning health and a growing concentration on his Monte Carlo study led him to transfer his work on Ghana to younger colleagues at Legon and at Western.

Apart from his dedication, his pioneering contributions to scholarship, and his care and patience as a teacher, Professor Brown lives on in the memory of all who knew him as a charming, courteous man, of elegant bearing and gallant manner. Modest, gentle, witty, humane and understanding, uncomplaining whatever the task – all this and more. Whether recounting the amusing tale of his highly unsuccessful attempts to grow tomatoes in Ghana or patiently explaining some fine point of econometrics or assisting boys from disadvantaged homes (on whom he spent considerable time), he inspired in all he met a warm affection and the deepest respect.

No more fitting words can be found perhaps to suggest Professor Brown's attitudes and approach than those found in the Preface to his book:

> It is probably no exaggeration to suggest that ... the future of the world hinges on the combined international and domestic solution of welfare problems. While some of them are social, psychological and political, many of the problems are basically economic. Also economic wealth is needed to help solve the non-economic problems ... In this sense a sane and humane economics is fundamental to the creation of a sane and humane society ...
> This book is optimistic that such a world can be reached.

As an expression of the esteem in which he was held, an award has been established at Western by his colleagues to honour the memory of this beloved man and one of Canada's outstanding economists.

SCHOLARLY PUBLICATIONS AND PAPERS

1 'Standard Errors of Forecast of a Complete Econometric Model.' *Econometrica* 22 (April, 1954) 178–92
2 'Simplified Full Maximum Likelihood and Comparative Structural Estimates.' *Econometrica* 27 (October, 1959) 638–53
3 'Simultaneous Least Squares: A Distribution Free Method of Equation System Structure Estimation.' *International Economic Review* 1 (September, 1960) 173–91
4 'Structure Estimation for Nonlinear Systems of Simultaneous Equations.' *International Economic Review* 4 (May, 1963) 117–33
5 'Approximate Small Sample Covariance Formulas for Parameters Estimated by Various Econometric Methods.' Read before the First World Congress of the Econometric Society, Rome, 1965, and The University of Western Ontario Econometrics Workshop, May, 1969.
6 'Simultaneous Least Squares and Invariance under Changes of Units of Measurement.' *International Economic Review* 8 (February, 1967) 97–101
7 'Estimation of Structure for Single Nonlinear Equations.' Read before Econometric Society meetings in Toronto, August, 1967, and the

Mathematics Colloquium, The University of Western Ontario, February, 1968.

8 'A General Quasi-Asymptotic Formula for The Sampling Error Covariance Matrix of Econometric Estimators.' Read before the Econometrics Workshop, Carleton University, November, 1972, and the Econometrics Workshop, The University of Western Ontario, April, 1973.

9 'Conversion of Simultaneous Least Squares to a Malinvaud Minimum Distance Estimator.' Read before the Econometrics Workshop, The University of Western Ontario, January, 1973.

10 'Habit Persistence and Lags in Consumer Behavior.' *Econometrica* 20 (July, 1952) 355–71

11 'Some Recent Econometric Developments.' *The Canadian Journal of Economics and Political Science* 25 (February, 1959) 23–33

12 'Unemployment or inflation – Economic Dilemma of the West.' *Queen's Quarterly* 68 (Summer, 1961) 226–36

13 'A Forecast Determination of National Product, Employment, and Price Level in Canada from an Econometric Model.' *Models of Income Determination* National Bureau of Economic Research, Studies in Income and Wealth (Princeton, 1964) 59–86

14 *Canadian Economic Growth* Royal Commission on Health Services (Ottawa, 1965)

15 'The Use of Econometric Models for Estimating Optimal Growth Paths.' Read before a University of Western Ontario – University of Toronto seminar, April 1969, and the Economics Workshop, University of Ghana, October, 1969.

16 *Specification and Uses of Econometric Models* (London, 1970)

17 'Macroeconomic Data of Ghana.' Parts I and II. *The Economic Bulletin of Ghana* 2 (1972) No. 1, 25–53 and No. 2, 61–79

18 'Economic Models and Their Uses.' In John F. Chant (ed.) *Canadian Perspectives in Economics* (Don Mills, Ontario, 1973)