

PART IV
HISTORICAL REVIEW OF NATIONAL INCOME
AND NATIONAL WEALTH ESTIMATES
IN CANADA
(EXCLUDING OFFICIAL SERIES PUBLISHED BY DOMINION BUREAU
OF STATISTICS)

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SECTION 13

DEVELOPMENT OF ESTIMATES

CANADIAN NATIONAL ACCOUNTS TODAY

THE Canadian National Accounts are prepared in the Research and Development Division, Dominion Bureau of Statistics. A comprehensive description of sources, methods, and concepts, as well as detailed data from 1926 on, are to be found in *National Accounts, Income and Expenditure, 1926-1950* (Dominion Bureau of Statistics, Ottawa, December 1951), and subsequent issues. Analysis of the principles underlying the National Accounts will be found in an article by Simon A. Goldberg, the Director of the Research and Development Division of the Dominion Bureau of Statistics, 'The Development of National Accounts in Canada', *Canadian Journal of Economics and Political Science*, February 1949, pp. 36-38.¹

The current official series first appeared in 1945. Since then it has been extended considerably in scope, detail of tabular material shown, and period covered. The publication of these new official estimates of national income and gross national product in convenient and meaningful form has led to their wide acceptance by businessmen, labour leaders, economists, Members of Parliament, the government, and others. The reader interested in greater detail is referred to the current National Accounts publications and to the Research and Development Division which is responsible for the high quality and the speedy preparation² of present-day estimates of national income and gross national product.

¹ This paper also includes a useful summary of some conceptual and estimating problems faced by Canadian national income statisticians in the further development and improvement of the National Accounts and their international comparability.

² For example, preliminary estimates of gross national product and gross national expenditure and its components for 1952 were released by the Dominion Bureau of Statistics on 7th February 1953.

PRESENT STATE OF NATIONAL WEALTH ESTIMATES

While estimates of national income, gross national product, gross national expenditure, and their components are complete and up to date, estimates of national wealth are still in their infancy. For about a decade no official estimates of national wealth have been published, the last having been prepared by the Dominion Bureau of Statistics for 1933 and published in 1936. The growing emphasis on national income data as a tool for economic analysis from the 'thirties onward, involving the most comprehensive measurement of economic flows yet undertaken, led to a concentration of available professional resources on the development of the National Accounts. This factor as well as the declining importance attached to national wealth estimates resulted in the discontinuation of the work on official national wealth estimates after 1936. Partial data on certain forms of national wealth have become available in recent years and these as well as earlier data are examined below. A considerable number of estimates of Canada's national wealth have been made but all these relate to the pre-war period.

ECONOMIC STATISTICS BEFORE THE PREPARATION OF NATIONAL INCOME AND NATIONAL WEALTH ESTIMATES

The development of economic statistics which eventually led to the preparation of national income, gross national product, gross national expenditure, and national wealth estimates was a gradual process involving much trial and error, and having its beginning in the early days of Canadian settlement.

Before Confederation: 1666-1867

Canadians can make the modest claim that it was in their country that the first systematic attempt in modern times to measure the resources of an area was made. This was the first census of population, occupations, farm land under cultivation, and livestock,¹ organized by Jean-Francois Talon for the colony of New France (now the Province of Quebec) in 1666.

Talon, who had only recently become the Intendant of the colony, was so enthusiastic about the census method as a means of making a comprehensive inventory of the regional resources and of providing the basis for policy recommendations to his

¹ A subsequent survey in 1668 also covered grain production.

superiors in France that he himself acted as one of the enumerators.¹ Had Talon wanted to, he could have produced a national wealth estimate for New France for 1666, for he had at his disposal more extensive basic data than Sir William Petty used for his estimate of national wealth for England at about the same time.²

Talon's first census set a pattern that was followed at regular intervals during the French regime in New France until 1763.³ The practice of census taking to determine the economic growth and potential of the country spread to other colonies which later were to become part of Canada. In fact, the censuses were so numerous and provided so much detail on the economic situation in the colonies⁴ that the Dominion Bureau of Statistics in its study on the history of economic statistics in Canada concluded that 'The colonies which now form Canada were well to the fore in respect of the collection of statistics of population, live stock, production, etc., between two and three centuries ago.'⁵

After New France and Acadia came under English rule, the census-type survey of people and resources became less frequent. The major sources of economic information during this period were more or less sporadic reports issued by colonial governors.⁶ But the situation changed substantially in the second decade of the nineteenth century. Economic statistics obtained by means of census surveys were put on a more regular basis and attempts were made to assure greater comparability of data obtained for the various colonies.⁷ While comprehensive population surveys were taken for the various colonies between 1814 and 1824, the

¹ The population census taken in 1666 included data on age, sex, occupation, conjugal, and family conditions of the 3,215 people who lived in New France. A subsequent survey was taken in 1667 covering areas under cultivation and numbers of livestock. The first census in the United States was taken in 1790 and in England and France at the beginning of the nineteenth century.

² Petty estimated the national wealth of England to be about £250 million around 1665.

³ Between 1666 and 1763, 36 complete censuses and 9 partial censuses were taken.

⁴ In this period a total of 10 complete and 9 partial censuses were taken for Acadia (now part of Nova Scotia), 10 complete and 6 partial censuses for Isle Royale (Cape Breton Island, now part of Nova Scotia), 21 complete and 4 partial censuses for Newfoundland, 4 of Saint John River (now New Brunswick) and 7 of Isle Saint Jean (Prince Edward Island).

⁵ *Dominion Bureau of Statistics, History, Function, Organization*, Ottawa, October 1952, p. 7.

⁶ Censuses of 'Canada' (the name under which the Province of Quebec was known at that time) were taken in 1765, 1784, and 1790.

⁷ More or less regular census taking began with the census of the Assiniboine and Red River District (Manitoba) in 1814, of Nova Scotia in 1817, Lower Canada (Quebec) and Prince Edward Island in 1822, and Upper Canada (Ontario) and New Brunswick in 1824.

collection of additional economic data by the census method became more important after 1824. It became the practice to collect information not only on population but also on 'agriculture'. The term 'agriculture' was used rather broadly and more information was collected on manufacturing operations and other economic pursuits as the latter became important in the course of the first half of the nineteenth century. Data reflecting economic activity and the resources of the country came to include not only statistics on livestock, farm land under cultivation or occupied, and agricultural production, but also information on lumbering and shipbuilding, two of the other major economic pursuits in that period. Information also began to be collected on the small scale operations of local manufacturing including flour and oatmeal mills, sawmills, asheries (to produce soap), tanneries, breweries, distilleries, carding and fulling mills (cloth production), foundries, agricultural implement works, and wagon carriage works. An interesting development of this early period was a first attempt to obtain economic data on an annual basis, leading to the establishment of an annual census of population and 'agriculture' for Upper Canada (Ontario) for 1824-42. The idea of continuing periodic collection of economic data found general acceptance during the 'forties¹ with the result that an Act of the Canadian legislature was passed in 1847 establishing a 'Board of Registration and Statistics', with instructions 'to collect statistics and adopt measures for disseminating or publishing the same', and also providing for a decennial census.

Under this Act the censuses of 1851-52 and 1861 were taken. Nova Scotia, New Brunswick, and Prince Edward Island also took censuses in 1851, and surveys were made for what is now Manitoba in 1849 and 1856. Thus, Canada has an uninterrupted series of decennial censuses providing comprehensive economic data covering a century.²

Besides the census type of economic data, a considerable amount of statistics was also assembled first by the colonies,

¹ Periodic census surveys in this period were taken in Lower Canada (Quebec) in 1825, 1827, 1829, 1831, 1832, 1842, and 1844. Censuses were taken for Nova Scotia in 1838, New Brunswick in 1840, and Prince Edward Island in 1841. Censuses for the Assiniboine and Red River District (Manitoba) were taken in 1822, annually from 1831 to 1835, and again in 1838, 1843, and 1846.

² A list of all the census surveys undertaken up to 1931, including those preceding Confederation, is given in Vol. 1, pp. 133 ff., of the *Census of Canada, 1931*, Ottawa, 1936.

mainly as a by-product of administrative functions. For example, import statistics were recorded on an annual basis by various colonial administrations in connection with the collection of custom duties. The organization necessary to register imports and collect duties was easily adaptable to maintaining a record of export trade also. Export statistics were, therefore, collected to provide an indication of the destination of Canadian produce abroad, and the effect that exports had on the economic growth and industrial diversification of the country. In this period trade statistics, both exports and imports, were considered the best indicators of economic activity. Other data collected periodically included shipping statistics, timber cut, production of certain minerals, railway mileage in operation, financial data,¹ and government expenditure and revenue and public debt data.

Since Confederation in 1867

The next major development affecting the collection of economic statistics came with the passing of the British North America Act in 1867 establishing Canada as an independent country with a federal constitution. This Act put the collection of statistics under the 'sole' control of the Federal Government. Export and import statistics on a comparable basis for all parts of Canada became available.² Data on prices were expanded³ and new statistical series were initiated on transportation,⁴ production,⁵ and employment.⁶

¹ For example, a series of monthly bank statements for the Province of Canada (Quebec and Ontario) dates back to 1856.

² K. W. Taylor, 'Statistics of Foreign Trade' (1869-1915), *Statistical Contributions to Canadian Economic History*, Toronto, 1931, Vol. 2.

³ H. Michell, 'Statistics of Prices' (1848-1913), *Statistical Contributions to Canadian Economic History*, Toronto, 1931, Vol. 2.

⁴ Railway statistics on 'Capital, Traffic and Working Expenditures' were prepared by the Dominion Public Works Department commencing in 1876, the first report being published in 1877.

⁵ An annual record of mining production was commenced by the Dominion Department of Mines in 1886 and one on forest products by the Forestry Branch in 1909. A new and more comprehensive series on agricultural production was commenced by the Dominion Department of Agriculture in 1908.

⁶ With the creation of the Department of Labour in 1900, several new series of labour statistics were published in *The Labour Gazette*, the first issue of which appeared in the same year. The most comprehensive summary of statistics relating to economic development between 1890 and 1913, including a large number of annual series, is contained in the *Report of the Board of Inquiry into Cost of Living in Canada*, Ottawa, 1915, two volumes. The second volume, a minority report by R. H. Coats, a member of the Board, includes the results of a number of inquiries and data collected from both primary and secondary sources by the Statistical Branch of the Department of Labour.

The first census taken for Canada as a whole, in 1871, included comprehensive data on manufacturing operations providing separately for the major industries such information as the number of establishments, capital invested, wages paid, number of persons employed, value of materials used, and value of commodities produced. These data, the collection of which continued in subsequent censuses, up to and including 1911, were in addition to information on population, agriculture, and other primary industries. Decennial censuses have been taken every decade since then, the latest being in 1951. These decennial censuses are supplemented by quinquennial censuses in the Prairie Provinces; the first of these was taken in Manitoba and the Northwest Territories (including the area now comprised in Saskatchewan and Alberta) in 1886, and it was followed by another census of Manitoba in 1896. Quinquennial censuses have been taken regularly since 1906 for Manitoba, Saskatchewan, and Alberta.¹

Thus, at the turn of the nineteenth century Canada had a fairly comprehensive system of economic statistics, but little had been done to fit the data into either national income or national wealth estimates. Statistics were collected to facilitate the administration of specific administrative functions rather than to provide the tools for interpreting economic behaviour, testing economic theory, or arriving at over-all economic policies concerning employment, income, and resources.

An estimate of national wealth was prepared as early as 1867 and some first attempts to estimate national income and national wealth appeared in 1896, but these were regarded as interesting exercises by academicians and of little import for the practical policy problems of business and governments. The lack of integrated economic data became particularly apparent during World War I. However, the need for a more systematic approach to the measurement and analysis of Canadian potentialities and capacity was brought out clearly in some investigations that the government had been conducting even before World War I. In 1912, the Minister of Trade and Commerce (under whose jurisdiction the Census and Statistics Office had been placed)

¹ The primary purpose of establishing these quinquennial censuses for the Prairie Provinces was to 'fix a basis for the per capita allowance payable to the provinces by the Dominion Government'. More frequent censuses in the Western Provinces were considered essential because of the more rapid economic growth that was taking place in these more recently settled regions.

reported to the Government that while information was being more or less effectively collected in several departments on external trade, crops, railways, canals, labour, wholesale prices of commodities, etc., overlapping effort and diverse results were apparent. In particular, 'No comprehensive system at present exists for the collection and publication of the statistics of production and distribution of Canadian commodities within the country itself'. The provinces were in some instances duplicating the work done by Dominion departments, whereas a system of co-operation and collaboration was highly desirable. A departmental commission on statistics was set up in 1912 and it recommended a comprehensive programme of improved collection and co-ordination of economic statistics and the setting up of a central agency. These recommendations led Parliament to pass the Statistics Act in 1918, establishing the Dominion Bureau of Statistics as Canada's central statistical collection agency.¹

PATTERN OF DEVELOPMENT OF NATIONAL INCOME AND
NATIONAL WEALTH ESTIMATES

The basis had now been laid for the integration and expansion of information on economic development and progress. A comprehensive programme was initiated by the Dominion Bureau of Statistics leading to the collection of new and more meaningful data and acceleration of the process of presenting the information so that it could be used for current economic analysis and policy formulation. The necessity of tying the widely dispersed information into an integrated framework was one reason for the development of official national income and national wealth estimates. In embarking on a comprehensive programme the Dominion Bureau of Statistics was aided by pioneering studies in other countries as well as by estimates by private investigators. The early exploratory work of the Dominion Bureau of Statistics, particularly in the national income field, was also greatly aided by new ideas and approaches developed by private research in the 'twenties and the 'thirties.

There are two general features which characterize the develop-

¹ For a summary of statistical progress between 1918 and 1952 and a detailed description of the economic statistics collected by the Bureau, see *Dominion Bureau of Statistics, History, Function and Organization*, Ottawa, 1st October 1952, pp. 10-11 and 15 ff.

ment of national income and national wealth estimation in Canada:

(1) All except one of the estimates which appeared before World War I were made by British statisticians attempting to measure the prosperity and economic influence of the British Empire.¹ The exception was an isolated national wealth estimate for around 1860 which appeared in the *Year Book and Almanac of British North America* for 1867. But for this estimate it might be said that estimates of Canada's national income and national wealth were appearing in British periodicals for about two decades before the first estimates appeared in Canadian publications. Active and continuing Canadian interest in the development of national income and national wealth estimates did not really materialize until World War I. A national wealth estimate was published in the *Canadian Bankers' Association Journal* in 1916 and a national income and a national wealth estimate by R. H. Coats in the *Monetary Times* in 1919.

(2) While national income and national wealth estimates for Canada are available for about a sixty-year period – and partial data on national wealth for a longer period – greater importance for analytical and policy purposes was attached to national wealth during the first three or four decades, when economic thought was influenced largely by classical and neo-classical doctrine. As a result of the upheaval occasioned by World War I considerable attention was being paid in the immediate post-war period to national wealth estimates of various countries. At that time the belligerents were concerned with two economic problems in particular: (a) post-war inflation and the huge indebtedness incurred during the war, a question that led to heated discussions on the subject of capital levies; (b) the war indemnities to be paid by Germany and her allies. The importance attached to national wealth estimates in the immediate post-World War I period was summed up by R. H. Coats as follows: 'The fundamental consideration is, of course, the wealth of the several countries – whether the point of approach be that of the peace negotiator seeking to know what indemnities can be

¹ See, for example, Michael G. Mulhall, *Industries and Wealth of Nations*, London, 1896; Sir Robert Giffen, 'The Wealth of the Empire and How It Should Be Used', *Journal of the Royal Statistical Society*, London, September 1903, Vol. LXVI, pp. 582-98; and J. C. Stamp, 'The Wealth and Income of the Chief Powers', *Journal of the Royal Statistical Society*, London, July 1919, Vol. LXXXII, pp. 441-507.

imposed, that of the Finance Minister anxious to learn what and how much taxes can be endured, that of the capitalist who must measure the changing yield of investments under the revolutions of war, or that of the sociologist concerned in the relative distribution of wealth on which hinges so much of the prevailing unrest.¹

In the meantime several pioneering studies in the field of national income had appeared in both Great Britain² and the United States³ and these greatly influenced Canadian thinking on the subject. During the 'twenties increasing efforts were devoted to national income estimation and during the 'thirties the preponderant importance was firmly established. Only in more recent years have estimates of assets and liabilities as a supplementary tool for economic analysis been achieving greater prominence, particularly in the United States.

Three phases can be distinguished in the development of the national income estimates: (1) the first three decades when a number of estimates were made by private investigators; (2) the next two decades, beginning with the entry of the Federal Government into the field after the establishment of the Dominion Bureau of Statistics in 1918 and leading to the preparation of the early estimates prepared by the Bureau – during this period a number of private investigations helped to clarify concepts and suggest improved statistical techniques; (3) the last decade, starting in 1945, characterized by the regular publication of an integrated set of national accounts by the Dominion Bureau of Statistics and now forming the official series. In this more recent period private investigators have concentrated on analysis of official data and on developing comparable estimates for the years preceding 1926, the first year for which an official estimate is available.

Estimates of national income (and in more recent times of gross national product and gross national expenditure) by private investigators are summarized and classified according to

¹ R. H. Coats, 'The Wealth of Canada and Other Nations', *Journal of the Canadian Bankers' Association*, Toronto, October 1919, Vol. XXVII, Number 1, p. 80.

² A. L. Bowley, *The Nature and Purpose of the Measurement of Social Phenomena*, London, 1915, *The Economic Journal*, 1922, and A. L. Bowley and Sir J. Stamp, *The National Income*, Oxford, 1924.

³ W. C. Mitchell, W. I. King, F. R. Macauley and O. W. Knauth, *Income in the United States*, National Bureau of Economic Research, New York, 1921 and 1922.

the period in which they were made in Table 96. Estimates by public bodies covering the early work of the Dominion Bureau of Statistics and the estimates prepared for the Royal Commission on Dominion-Provincial Relations are shown in Table 97. These data are of purely historical interest since they have been replaced by the new official series. Private estimates of national income and gross national product are available for selected years from period 1870 to 1910 and annually from 1910 to 1947. The early Federal Government estimates are available for 1919-44. The development of national income and national wealth estimates in Canada are briefly highlighted below, and their sources and methods of estimation are discussed in Section 14.

PRIVATE ESTIMATES OF NATIONAL INCOME AND GROSS NATIONAL
PRODUCT IN THE PERIOD 1870-1947

The earliest available estimate of national income was by a British statistician for 1894 and published in 1896. The author was Michael G. Mulhall who placed the national income of Canada for 1894 at \$892 million.¹ In preparing his estimate Mulhall attempted to measure earnings in ten different sectors covering not only commodity-producing industries but also the service sector, and making allowance for 'house rent'. He carefully documented his estimates and appears to have been considerably in advance conceptually of later investigators who in several instances made no allowance for the service sector in their estimates of national income.

While the estimate by Mulhall is little known, those of Sir Robert Giffen for 1903 and 1913 are more familiar to national income statisticians. Sir Robert, who had been engaged for a considerable period of time in investigations of the national wealth and national income of the United Kingdom, expanded his work to an appraisal of the economic significance of the British Empire. This work led him to prepare a national income estimate (as well as a national wealth estimate - see p. 40) for Canada. He estimated Canada's national income for 1903 to be \$1,314 million, using a national income produced method.²

¹ Michael G. Mulhall, *Industries and Wealth of Nations*, London, 1896, p. 327.

² Sir Robert Giffen, 'The Wealth of the Empire, and How It Should Be Used', *Journal of the Royal Statistical Society*, London, September 1903, Vol. LXVI, p. 584.

TABLE 96

Private Estimates of National Income and Gross National Product in Canada, 1870-1947

(In millions of dollars)

Year	Before the Early Estimates of the D.B.S. ^a	During the Development of the Early Estimates of D.B.S. - Now Obsolete ^b								Since Introduction of the New Official Series of D.B.S. ^c					
	Early Investigators	G. Findlay Shirras	D. C. McGregor	Bank of Nova Scotia				Colin Clark		J. J. Deutsch	Penelope Hartland	Colin Clark			Kenneth Buckley
	National Income Produced ^d	National Income Produced	National Income Received	Preliminary Estimates		Revised Estimates		Preliminary Estimates of Available National Income		National Income Produced	Gross National Product in Constant Dollars ^e	Revised Estimates of National Income Produced ^g		Revised Estimate of National Income at Market Prices ⁱ	Gross National Product ^j
				National Income Produced	Available National Income	National Income Produced	Available National Income	Current Dollars	Constant Dollars ^f			Current Dollars	Constant Dollars ^h		
1870	—	—	—	—	—	—	—	—	—	—	346	—	—	—	—
1880	—	—	—	—	—	—	—	—	—	—	490	—	—	—	—
1890	—	—	—	—	—	—	—	—	—	—	686	—	—	—	—
1894	892	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	991	—	—	—	—
1901	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,130
1903	1,314	—	—	—	—	—	—	1,370	—	—	—	1,380	3,140	1,480	—
1906	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,696
1910	1,260	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1911	2,000	—	—	—	—	—	—	2,100	—	2,085	—	2,130	3,950	2,320	2,436
1912	—	—	—	—	—	—	—	—	—	2,209	—	—	—	—	—
1913	1,460	1,500	—	—	—	—	—	—	—	2,359	—	—	—	—	—
1914	—	—	—	—	—	—	—	—	—	2,253	—	—	—	—	—
1915	—	—	—	—	—	—	—	—	—	2,324	—	—	—	—	—
1916	—	—	—	—	—	—	—	—	—	2,677	—	—	—	—	4,185
1917	—	—	—	—	—	—	—	—	—	3,302	—	—	—	—	—
1918	2,400	—	—	—	—	—	—	—	—	3,714	—	—	—	—	—
1919	—	—	—	—	—	—	—	—	—	4,211	—	3,860	3,550	4,210	—
1920	—	—	—	—	—	—	—	5,610	4,575	4,408	—	4,580	3,640	4,990	—
1921	—	—	—	4,031	3,533	4,092	3,789	4,215	3,911	—	—	3,590	3,640	4,030	4,518
1922	—	2,500	—	4,027	3,540	4,100	3,809	4,250	4,289	—	—	3,740	4,270	4,190	—
1923	—	—	—	4,224	3,725	4,283	3,979	4,570	4,693	—	—	3,920	4,570	4,390	—
1924	—	—	—	4,155	3,636	4,274	3,975	4,520	4,568	—	—	3,930	4,520	4,400	—
1925	—	—	—	4,955	4,354	4,585	4,273	4,980	4,847	—	—	4,280	4,710	4,800	—
1926	—	—	—	5,069	4,441	4,935	4,564	5,450	5,197	—	—	4,540	5,080	5,090	5,586
1927	—	—	—	5,410	4,738	5,266	4,894	5,850	5,695	—	—	4,760	5,460	5,340	—
1928	—	—	6,218	5,835	5,117	5,705	5,308	6,175	5,974	—	—	5,260	5,970	5,790	—
1929	—	—	6,038	6,148	5,362	5,905	5,429	5,910	5,733	—	—	5,300	6,120	5,930	—
1930	—	—	5,313	5,337	4,620	5,173	4,771	5,000	5,000	—	—	4,560	5,570	5,100	—
1931	—	—	4,291	4,382	3,781	4,187	3,860	3,860	4,370	—	—	3,700	5,310	4,180	—
1932	—	—	3,520	3,608	3,090	3,385	3,109	3,150	3,989	—	—	2,950	4,730	3,400	—
1933	—	—	3,300	3,333	2,857	3,237	2,942	2,990	4,087	—	—	2,850	4,650	3,250	—
1934	—	—	—	3,989	3,422	—	3,585	3,278	3,570	—	—	3,250	5,000	3,640	—
1935	—	—	—	—	—	—	3,779	3,464	3,835	—	—	3,460	5,280	3,890	—
1936	—	—	—	—	—	—	4,118	3,759	4,230	—	—	3,920	5,840	4,490	—
1937	—	—	—	—	—	—	4,559	4,162	—	—	—	4,410	6,020	5,060	—
1938	—	—	—	—	—	—	4,531	4,132	—	—	—	4,360	6,260	4,980	—
1939	—	—	—	—	—	—	4,804	4,376	—	—	—	4,680	7,040	5,410	—
1940	—	—	—	—	—	—	—	5,200	—	—	—	5,650	7,600	6,500	—
1941	—	—	—	—	—	—	—	6,200	—	—	—	6,930	8,740	8,030	—
1942	—	—	—	—	—	—	—	—	—	—	—	8,650	9,690	9,960	—
1943	—	—	—	—	—	—	—	—	—	—	—	9,310	9,650	10,680	—
1944	—	—	—	—	—	—	—	—	—	—	—	9,980	9,710	11,320	—
1945	—	—	—	—	—	—	—	—	—	—	—	10,020	10,950	11,190	—
1946	—	—	—	—	—	—	—	—	—	—	—	10,050	11,010	11,270	—
1947	—	—	—	—	—	—	—	—	—	—	—	11,200	11,050	12,680	—

^a These estimates were prepared before 1923, the earliest estimate by Michael G. Mulhall being published in 1896.^b Estimates published between 1923 and 1945.^c Estimates available since 1945.^d Early estimates of national income were based on the national income produced method, except the estimates by Michael G. Mulhall and R. H. Coats, who attempted to use an income received method. The estimates in this Column are by the following authors: 1894, Michael G. Mulhall; 1903 and 1913, Sir Robert Giffen; 1910, Edgar Crammond; 1911 and 1918, R. H. Coats.^e In 1930 prices.^f In 1900 prices.^g After adjustment of net dividends and interest paid abroad.^h In terms of international units or I.U., defined as the quantity of commodities exchangeable for \$1 in the United States over the average of the period 1925-34.ⁱ Includes indirect taxes less subsidies.^j These estimates are annual averages for five-year periods. They are shown in the first year of each five-year period, i.e., the average for 1901-05 is shown in 1901.

Little detail as to methodology is given. A decade later Sir Robert estimated national income to be \$1,460 million for 1913, but this estimate is generally regarded as being less firmly based than the earlier one.

Interest in the economic importance of the British Empire and the manner in which the countries within the Empire were sharing the burden of defence led another British statistician, Edgar Crammond, to prepare a national income estimate for Canada. Using the national income produced method, Crammond placed Canada's national income at \$1,260 million in 1910, a figure lower than Giffen's estimate for 1903.¹ Crammond's estimate was lower because he made no allowance for national income originating in the service sector.

One of the first estimates by a Canadian statistician appeared in 1919. This was an estimate by R. H. Coats of national income for 1911 and 1918. Using the national income received method and basing his estimates mainly on the 1911 census, R. H. Coats derived an estimate of national income for 1911 of 'approaching' \$2 billion. While considerable detail is shown for the 1911 estimate, only a general allowance for a rise in wages and prices and expansion of the economy is made in deriving the estimate for 1918.² The latter was \$2.4 billion, a figure which subsequent investigation demonstrated as too low.

The next estimate of national income by a private investigator was that of G. Findlay Shirras, another British statistician. Shirras prepared the estimate in connection with his study of fiscal policies of British countries in the post-World War I period. He placed Canada's national income for 1913 at \$1.5 billion and for 1922 at \$2.5 billion.³ Few details of estimating techniques are given and the similarity of his estimate for 1913 to that of Sir Robert Giffen makes it appear likely that Shirras drew on Giffen's early work. Shirras does not seem to have been aware of Coats' work nor of the first Dominion Bureau of Statistics estimates appearing about the time he was making his national income estimates, for these materials would have suggested to Shirras that his estimates were on the low side.

¹ Edgar Crammond, 'Imperial Defence and Finance', *The Nineteenth Century and After*, London, August 1912, Vol. LXXII, pp. 228-9.

² R. H. Coats, 'National Wealth and Income of Canada', *The Monetary Times*, Toronto, 3rd January 1919, pp. 19-21.

³ G. Findlay Shirras, 'Taxable Capacity and the Burden of Taxation and Public Debt', *Journal of the Royal Statistical Society*, London, July 1925, Vol. LXXXVIII, p. 543.

According to Shirras, his estimates include an allowance for income originating in the service sector.

D. C. McGregor, who has made a significant contribution to the development of national income estimates in Canada, was the next to produce a private estimate of national income. In 1934 he published a series on national income for 1928-33.¹ Using the income received method, McGregor estimated national income to be \$6,218 million in 1928, and \$3,300 million in 1933.²

The world economic depression of the 'thirties did not spare Canada. Demands for a wide range of economic policies to deal with unemployment and low incomes made it desirable to obtain a greater insight into the working of the economy. Preliminary estimates of national income by the Dominion Bureau of Statistics were available from 1923 onward and so were the estimates by private investigators referred to above. But the available estimates were still considered unsatisfactory for current economic analysis and policy formulation, and the necessary detail was lacking. For example, a breakdown by provinces was necessary for negotiations between the Federal Government and (at that time) nine provincial governments. These intergovernmental discussions assumed great importance in the 'thirties when more positive public policies had to be formulated to cope with the depressed economic conditions. This led to the preparation of national income estimates by other bodies. One set of estimates was produced by the Bank of Nova Scotia and another by the research staff of the Royal Commission on Dominion-Provincial Relations.

The Bank of Nova Scotia estimates were published starting in the mid-'thirties, in the 'Monthly Letters' of the Bank. These estimates, released first in preliminary form and then in revised form for 1921-41, were of national income produced and available national income, the latter defined as income at the disposal of Canadian individuals and corporations.³

¹ D. C. McGregor, 'These Insignificant Budgets', *The Canadian Forum*, Toronto, July 1934, p. 386.

² McGregor had ample opportunity to continue his pioneering work in the field when he became associated with the preparation of a national income series by the Bank of Nova Scotia, and later was placed in charge of the preparation of national income studies for the Royal Commission on Dominion-Provincial Relations which submitted its report in 1939.

³ 'Monthly Letters', Bank of Nova Scotia, November 1935, December 1935, May 1937, July 1938, September 1940, June, November, and December 1941.

Colin Clark in his basic study, *The Conditions of Economic Progress*, included estimates of available national income in both current and constant dollars for 1903, 1911, and 1920-36.¹ These estimates were based mainly on earlier work by Sir Robert Giffen, R. H. Coats, and the Dominion Bureau of Statistics. Clark made some adjustments to assure greater international comparability.

One other private estimate appeared in the period of the development of the early series of the Dominion Bureau of Statistics. This was the estimate by J. J. Deutsch of national income for 1911-20. Deutsch was a member of the research staff of the Royal Commission on Dominion-Provincial Relations and had participated in the preparation of the Commission's national income volume. The outbreak of World War II aroused great interest in some of the economic problems that Canada had faced during World War I, and this led Deutsch to review the ways in which Canada had financed its military programme during the 1914-18 war. To facilitate this analysis, Deutsch prepared his set of national income estimates, drawing mainly on basic data available from the Dominion Bureau of Statistics.²

With the commencement of World War II there were three continuing series of national income estimates, a private series by the Bank of Nova Scotia and two government series, the Dominion Bureau of Statistics estimates and the data prepared by the Royal Commission on Dominion-Provincial Relations.

Preparation for an all-out war effort made it essential to obtain satisfactory knowledge on the role of the various factors of production in the Canadian economy. This aim, it was felt, could be furthered by assembling better information on the size, structure, and distribution of the national income, the relation of net national income to gross national product, the distribution of national expenditure between the different segments of the economy, private and public outlay, consumption and investment, war and non-war expenditures. But apart from the influence of the war, the objective of a high level of employment and income after the conclusion of hostilities made

¹ This series, described as preliminary, appeared in the first edition of Colin Clark, *The Conditions of Economic Progress*, London, 1940, pp. 110-2. A completely revised series appeared in his second edition in 1951.

² J. J. Deutsch, 'War Finance and the Canadian Economy, 1911-1920', *Canadian Journal of Economics and Political Science*, November 1940, pp. 538-9.

knowledge of this sort a prerequisite to the formulation of long-range economic policies.¹ Thus, during the war substantial efforts were concentrated on improving the conceptual framework and methods of measurement used by the Dominion Bureau of Statistics. The estimates prepared by the Bank of Nova Scotia and by the Royal Commission on Dominion-Provincial Relations were discontinued.

In the post-war period, following the publication of a new set of national accounts by the Dominion Bureau of Statistics, private researchers turned their attention mainly to estimates of gross national product comparable with the official data for periods not covered by the latter. Examples are Penelope Hartland's estimates of gross national product in constant dollars for 1870, 1880, 1890, and 1900,² and Kenneth Buckley's estimates of the average annual gross national product for five-year periods from 1901 to 1930.³ Colin Clark, in a second edition of *The Conditions of Economic Progress*, presented revised estimates of national income produced in current and constant dollars and of national income at market prices. His revised estimates are for 1903, 1911, and 1919-47.⁴

GOVERNMENT ESTIMATES OF NATIONAL INCOME AND GROSS NATIONAL PRODUCT IN CANADA, 1919-1944, PRECEDING THE NEW OFFICIAL SERIES OF THE DOMINION BUREAU OF STATISTICS

The early national income work of the Dominion Bureau of Statistics was greatly facilitated by the institution shortly after the establishment of the Bureau in 1918 of comprehensive annual surveys of the value of output and related data covering both primary and secondary industries.

These data were summarized in an annual publication entitled, *The Survey of Production in Canada*, first published in 1923 and providing data for 1920 and 1921. These surveys covered agriculture, forestry, fisheries, trapping, mining, electric power, construction, custom (goods made to order) and repair,

¹ *National Accounts, Income and Expenditure, 1938-1945*, Dominion Bureau of Statistics, Ottawa, April 1946, p. 5.

² 'Estimates of Gross National Product in Canada, 1870-1900', unpublished manuscript prepared for the National Bureau of Economic Research, New York, 1953.

³ Kenneth Buckley, *Capital Formation in Canada, 1896-1930*, Canadian Studies in Economics, No. 2, University of Toronto Press, 1955.

⁴ Colin Clark, *The Conditions of Economic Progress*, Second Edition, London 1951, pp. 53-5.

TABLE 97
Early Government Estimates of National Income in Canada,
 1919-1944

(In millions of dollars)

Year (1)	Dominion Bureau of Statistics					Royal Commission on Dominion- Provincial Relations National Income Paid Out ^f
	Early Estimates - Now Obsolete					
	Preliminary Data			Revised Data		
	National Income ^a	National Income ^b	National Income ^c	National Income ^d		
	Current Dollars (2)	Current Dollars (3)	Current Dollars (4)	Current Dollars (5)	Constant Dollars ^e (6)	
1919	—	—	—	4,087	3,834	—
1920	5,523	5,357	4,500	4,614	3,791	—
1921	4,215	4,028	—	3,735	3,527	—
1922	4,520	4,330	4,000	3,762	3,891	—
1923	4,696	4,482	4,200	3,945	4,067	—
1924	4,643	4,441	4,200	3,854	3,937	—
1925	5,178	4,967	4,800	4,161	4,194	—
1926	5,600	5,382	5,100	4,494	4,494	4,088
1927	6,101	5,890	5,600	4,682	4,622	4,254
1928	6,342	6,121	6,000	5,138	5,022	4,649
1929	6,072	5,812	5,500	5,149	4,913	4,727
1930	5,335	5,046	4,750	4,326	4,378	4,176
1931	4,100	3,820	— ^g	3,498	3,975	3,534
1932	3,370	3,108	—	2,893	3,608	2,870
1933	3,193	2,969	—	2,795	3,511	2,641
1934	3,808	3,596	—	3,171	3,890	2,888
1935	—	—	—	3,381	4,074	3,125
1936	—	—	—	3,829	4,547	3,427
1937	—	—	—	4,342	4,835	3,824
1938	—	—	—	4,288	4,672	3,837
1939	—	—	—	4,570	—	4,040
1940	—	—	—	5,391	—	4,594
1941	—	—	—	6,426	—	—
1942	—	—	—	8,044	—	—
1943	—	—	—	8,700	—	—
1944	—	—	—	9,200	—	—

^a Before allowance for depreciation and obsolescence and before deducting net interest and dividend payments abroad.

^b Before allowance for depreciation and obsolescence but after deducting net interest and dividend payments abroad. This series has been used most commonly for comparison with national income estimates by the Bank of Nova Scotia and for the Royal Commission on Dominion-Provincial Relations (see, for example, *National Income*, a study prepared for the Royal Commission on Dominion-Provincial Relations, 1939, p. 11).

^c After allowance for depreciation and obsolescence but before deducting net interest and dividend payments abroad.

^d After allowance for depreciation and obsolescence and after deducting net interest and dividend payments abroad.

^e The estimates cover total salaries and wages paid by employers, investment income paid to and received by individuals, and the net income of individual enterprises.

^f This series was discontinued after 1930. Its place was taken by preliminary estimates of national income after deducting net interest and dividend payments abroad but without an allowance for depreciation and obsolescence (see *Canada Year Book, 1934-1935*, p. 940).

^g In 1926 prices.

and manufacturing. Information was provided on the gross and net value of production (the latter derived by subtracting the value of materials consumed in the production from gross value of production).¹ This first survey suggested that a rough estimate of national income could be obtained by adding to the net value of production of the industries covered an approximation of income originating in the service sector. The latter, it was suggested, could be estimated by assuming that the output per worker in commodity-producing industries and in service industries were equal.

However, it was not until the publication of the *Canada Year Book* for 1922-23 that the first specific official estimate of national income - for 1920 - was published. Estimates, described as preliminary data of the 'early estimates', then appeared in annual issues of the *Survey of Production in Canada* and in *Canada Year Books* until 1934. The concept of national income was used rather loosely, and the term was applied to three different aggregates: a series before allowance for depreciation and obsolescence and before deducting net interest and dividend payments abroad (Table 96, Column 2), a series before allowance for depreciation and obsolescence but after deducting net interest and dividend payments abroad (Column 3), and a series after allowance for depreciation and obsolescence but before deducting net interest and dividend payments abroad (Column 4).

Some criticism both of the basic assumption of equating output per worker in service industries to output per worker in commodity-producing industries as well as of some of the techniques of measurement developed at this time. This led to a thorough investigation based largely on the data in the 1931 census, including wages and salaries in industry and in the service sector and the results of a merchandising census taken for 1930. Three tests were made, described on pp. 366-7, and they were assumed to corroborate the results achieved by the national income produced method.²

But progress abroad in developing concepts of national income accounting and the demand for improved data led to further exploratory work. As a consequence, the preliminary estimates of the old series were discontinued after the estimate

¹ Beginning in 1935, the value of fuel and purchased electricity were also deducted.

² *The National Income of Canada*, Dominion Bureau of Statistics, Ottawa, 1934, pp. 27-8.

for 1934, which was shown in the *Canada Year Book* for 1937. The results of further exploration and improvement were embodied in a comprehensive report on national income by the Dominion Bureau of Statistics in 1941.¹ This report included estimates of national income (after allowance for depreciation and obsolescence and after deducting net interest and dividend payments abroad) in both current and constant dollar terms, as well as a monthly series of national income for 1935-40, called the revised data of the 'early estimates' (Table 97, columns 5 and 6). They continued to be published in the *Canada Year Book* up to and including 1944, the latter estimate appearing in the *Year Book* for 1945.

But the problems of the war and the requirements of economic policy formulation in the post-war period pointed up the need for even more comprehensive and integrated national income statistics. Also, the need to assure greater international comparability became increasingly pressing.

British White Papers on national income and expenditure, the first of which appeared in April 1941, and the pioneering work of the National Bureau of Economic Research and the U.S. Department of Commerce influenced the adoption of a new pattern of national accounting in Canada. In September 1944 a series of meetings took place in Washington with a view to attaining greater comparability in the national income estimates in the United Kingdom, United States and Canada. Fairly wide agreement was reached on concept and techniques of measurement² and in its subsequent work the Dominion Bureau of Statistics was guided by the principles established at these meetings and developed further in subsequent international discussions. The result was the publication of a new set of national accounts for Canada by the Dominion Bureau of Statistics in 1945 to which reference has been made earlier.³

The estimates prepared for the Royal Commission on Dominion-Provincial Relations related to 'national income paid

¹ *National Income of Canada, 1919-1938*, Part I, Dominion Bureau of Statistics, Ottawa, 1941.

² For a summary of some conclusions reached, see Edward F. Denison, 'Report on Tripartite Discussions of National Income Measurement', *Studies in Income and Wealth*, Vol. X, 1946, pp. 3-23.

³ These estimates appeared in a reference book for the Dominion-Provincial Conference on Reconstruction in August 1945. They were first published, with some minor revisions, in *National Accounts, Income and Expenditure, 1938-1945*, in 1946.

out' and covered total salaries and wages paid by employers, investment income paid to and received by individuals, and the net income of individual enterprises. These estimates represented a somewhat different approach from that which the Bureau of Statistics followed and they had an important influence on the further development of national income estimates in Canada (see p. 370). Data for 1926-40 including later revisions are shown in Table 97, Column 7.

PRIVATE AND GOVERNMENT ESTIMATES OF NATIONAL WEALTH
IN CANADA, 1830-1939

The first complete estimate of Canada's national wealth was prepared by a Canadian and published in the *Year Book and Almanac of Canada* for 1867.¹ The year covered is not mentioned specifically but most of the basic data are from the 1861 census and mainly cover 1860. The author appears to have been the editor of the *Year Book*, Arthur Harvey of the Finance Department, Ottawa, a Fellow of the Statistical Society of London, England. Harvey gives a figure of \$1,136 million as the 'realized wealth' of British North America, that is, Upper and Lower Canada, New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland. Harvey's concept differed somewhat from definitions employed by later investigators, e.g. it excluded railways but included paid-up stock in banks. However, data were given for excluded items and separate figures were shown for all included items. It is therefore possible to adjust Harvey's estimate to make it roughly comparable with those prepared subsequently.

After this promising start there is no record of any further Canadian work on or interest in national wealth until 1916. The next estimate of Canada's national wealth, by Michael G. Mulhall, for 1895, was about \$4.9 billion.²

Mulhall examined estimates of national wealth preceding him. One set of data he was able to find was an estimate by Sir Henry Parnell of the value of occupied farm land including buildings and of urban real estate covering residential, industrial, and commercial properties in the settled parts of Canada around 1830. Mulhall provided a comparable estimate for real estate investment for 1895. On the basis of these partial data for 1830

¹ See *Year Book and Almanac of Canada, 1867*, p. 18.

² Michael G. Mulhall, *Industries and Wealth of Nations, op. cit.*, p. 237.

a rough approximation of national wealth in the settled parts of Canada in 1830 may be of the order of \$600 million at 1830 prices (see Table 98).

Mulhall's estimates relate to national wealth defined to include all tangible assets, including all occupied land but excluding undeveloped resources. Mulhall used an inventory method drawing mainly on data from the 1891 census and annual data from other sources (see p. 372). Some subsequent investigators first estimated national income and then derived national wealth by assuming that the latter would be five, six, or eight times national income. This was the technique used by Giffen, who placed Canada's national wealth at over \$6½ billion¹ in 1903 and by Crammond who placed it at over \$10 billion in 1910.²

The first estimate from a Canadian source in half a century appeared in the *Journal of the Canadian Bankers' Association* in 1916. The estimate which followed the definitions of earlier investigators put Canada's national wealth in 1912 and 1914 at \$11.1 and \$11.5 billion, respectively.³

Three years later, in 1919, Coats published two estimates of national wealth, one for 1915 based on partial probate returns and the other for 1918 using the inventory method, which provides a great deal of detail of national wealth by type. Coats estimated Canada's national wealth in 1915 to be over \$15 billion and in 1918, between \$16 and \$17 billion.⁴

Another private estimate, somewhat akin to the estimates by early investigators but more in line with modern theory, is Colin Clark's capital invested, included in the second edition of *The Conditions of Economic Progress* (London, 1951) p. 492. The concept used is 'reproducible' capital and the estimates, given in real terms, are for 1900, 1911, 1929, and 1939, and are based largely on data obtained from the Dominion Bureau of Statistics and the work done for the Dominion-Provincial Conference on Reconstruction in Ottawa, 1945.

¹ Sir Robert Giffen, 'The Wealth of the Empire, and How It Should Be Used', *J.R.S.S.*, *op. cit.*, p. 584.

² Edgar Crammond, 'Imperial Defence and Finance', *op. cit.*, p. 229.

³ 'National Wealth', *Journal of the Canadian Bankers' Association*, Toronto, January 1916, pp. 90-2.

⁴ R. H. Coats, 'National Wealth and Income of Canada', *The Monetary Times*, Toronto, 3rd January 1919, pp. 19-21, and 'The Wealth of Canada and Other Nations', *Journal of the Canadian Bankers' Association*, Toronto, October 1919, pp. 82-6.

TABLE 98

Private and Official Estimates of National Wealth^(a) in Canada, 1830-1939

(In millions of dollars)

Year	Private Estimates								Official Estimates
	Sir Henry Parnell	Arthur Harvey	Michael G. Mulhall	Sir Robert Giffen	Edgar Crammond	Canadian Bankers' Association	R. H. Coats	Colin Clark ^b	Dominion Bureau of Statistics
1830	600	—	—	—	—	—	—	—	—
1860	—	1,136	—	—	—	—	—	—	—
1895	—	—	4,881	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	5,500	—
1903	—	—	—	6,569	—	—	—	—	—
1910	—	—	—	—	10,082	—	—	—	—
1911	—	—	—	—	—	—	—	9,900	—
1912	—	—	—	—	—	—	—	—	—
1914	—	—	—	—	—	11,116	—	—	—
1915	—	—	—	—	—	11,500	—	—	—
1918	—	—	—	—	—	—	15,000	—	—
1920	—	—	—	—	—	—	16,000	—	—
1921	—	—	—	—	—	—	—	—	22,483
1925	—	—	—	—	—	—	—	—	22,195
1926	—	—	—	—	—	—	—	—	25,673
1927	—	—	—	—	—	—	—	—	26,691
1928	—	—	—	—	—	—	—	—	27,668
1929	—	—	—	—	—	—	—	—	29,630
1933	—	—	—	—	—	—	—	20,500	31,276
1939	—	—	—	—	—	—	—	23,000	25,768
									—

^a National wealth, except in the estimate by Colin Clark, covers the value in current dollars of all tangible assets including occupied farm and urban land, but excluding undeveloped natural resources.

^b The estimates relate to 'reproducible capital', i.e., they exclude the value of farm and urban land and undeveloped natural resources. They are intended to reflect the market value of capital and are expressed in terms of I.U., or international units, which are defined as the quantity of commodities exchangeable for \$1 in the U.S.A. over the period 1925-34.

Official estimates of national wealth became available at about the same time as the first national income estimates of the Dominion Bureau of Statistics. The first official estimate, for 1920, was published in 1923, providing data by sectors and by provinces. It was obtained by an 'inventory' method, drawing largely on annual and decennial census data.¹ Subsequently similar estimates of national wealth became available for 1921, 1925-29, and 1933. During this period the coverage was extended somewhat and the estimating techniques were improved, so that the estimates are not fully comparable over the years. The last estimate by the Dominion Bureau of Statistics appeared in 1936.

Estimates of the national wealth of Canada suffer in the first place from an inadequate theoretical framework. All estimates except those of Colin Clark's relate to tangible assets irrespective of whether they were the result of human efforts or the product of nature, or the result of a combination of both. Thus, the estimates include as a rule an allowance for the value of urban and farm land. Further, inadequacy of basic data led to the combination of constituent items of varying meaning into one national aggregate. This aggregate was therefore not really homogeneous, particularly where the so-called inventory method was used. When the basic data were obtained from decennial censuses or similar surveys, the judgments of thousands of individuals as to the value of their assets were combined to derive an aggregate. The resulting figure, ostensibly an estimate of the market value of assets held by individuals and corporations, was in fact a combination of varying valuations - actual market value, the owner's judgment of the market value, book value of assets, replacement value, etc.

In some cases constituent items were estimated by an income and yield method. But the judgment as to the yield varied greatly, and the assumptions made to derive national wealth estimates from income or yield data were rarely based on satisfactory premises.² The difficulties in preparing national wealth

¹ *Canada Year Book, 1922-23*, pp. 806-7.

² Early estimators of national wealth were in fact using five different techniques in preparing their estimates. These were summed up by Sir Josiah Stamp as follows: '(1) Based on data arising through taxation of income - notably the United Kingdom. (2) Based on data arising through the annual taxation of capital - notably United States. (3) Based on data arising through taxation of capital at irregular periods - death duties - notably Italy and France. (4) The inventory - an aggregation of various forms of wealth built up from various sources, insurance, etc. - notably France and Germany. (5) The census - notably Australia' (*Wealth and Taxable Capacity*, London, 1930, pp. 9-10).

estimates based on inadequate and frequently not comparable data were summed up by the Dominion Bureau of Statistics in its last publication of Canada's national wealth estimates as follows: 'It cannot be too strongly emphasized that by whatsoever means an estimate of the national wealth is compiled the resultant figures can be nothing more than rough approximations. Even with a census enumeration there are innumerable chances of misunderstanding, differences of opinion, etc., which vitiate the correctness of the totals. A complete inventory of all the nation's physical assets would be a gigantic undertaking so that it is necessary to resort to short-cut methods and to use much basic data collected for other purposes. Reliable information concerning certain items is not available and in certain fields obstacles to accurate measurement are almost insurmountable.'¹

Colin Clark attempted to estimate reproducible capital, i.e. a valuation of real capital in durable physical assets accumulated in the country, excluding land. The resulting estimate largely reflected market value, and no attempt was made to derive replacement value. Since Clark prepared his estimates for a large number of countries he relied mainly on secondary sources. All he could do was to summarize 'available information on the extent of aggregate capital accumulation. The components are shown where available and . . . are not intended to provide a full analysis of the total. . . . All the data are very imperfect.'²

In Canada the development of national wealth estimates which are comprehensive and mutually consistent awaits further theoretical development³ and the assembly of the necessary professional personnel.

PARTIAL DATA RELATING TO NATIONAL WEALTH

Partial wealth available for selected years from 1870 to 1953 are summarized in Tables 99 and 100. The series compiled in earlier years suffer from some of the shortcomings described above in connection with the national wealth estimates. On the other hand, some of the series that have become available in more recent years may serve as helpful background material in

¹ *Canada's National Wealth*, Dominion Bureau of Statistics, Ottawa, 1936, p. 2.

² Colin Clark, *The Conditions of Economic Progress*, Second Edition, London, 1951, p. 485.

³ See, for example, E. F. Beach, 'A Measurement of the Productive Capacity of Wealth', *Canadian Journal of Economics and Political Science*, November 1941, pp. 538-44.

TABLE 96
Private Estimates of National Income and Gross National Product in Canada, 1870-1947

(In millions of dollars)

Year	Before the Early Estimates of the D.B.S. ^a	During the Development of the Early Estimates of D.B.S. - Now Obsolete ^b								Since Introduction of the New Official Series of D.B.S. ^c					
	Early Investigators	G. Findlay Shirras	D. C. McGregor	Bank of Nova Scotia				Colin Clark		J. J. Deutsch	Penelope Hartland	Colin Clark			Kenneth Buckley
	National Income Produced ^d	National Income Produced	National Income Received	Preliminary Estimates		Revised Estimates		Preliminary Estimates of Available National Income		National Income Produced	Gross National Product in Constant Dollars ^f	Revised Estimates of National Income Produced ^g		Revised Estimate of National Income at Market Prices ⁱ	Gross National Product ^j
				National Income Produced	Available National Income	National Income Produced	Available National Income	Current Dollars	Constant Dollars ^e			Current Dollars	Constant Dollars ^h		
1870	—	—	—	—	—	—	—	—	—	—	346	—	—	—	—
1880	—	—	—	—	—	—	—	—	—	—	490	—	—	—	—
1890	—	—	—	—	—	—	—	—	—	—	686	—	—	—	—
1894	892	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	991	—	—	—	—
1901	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,130
1903	1,314	—	—	—	—	—	—	1,370	—	—	—	1,380	3,140	1,480	—
1906	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,696
1910	1,260	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1911	2,000	—	—	—	—	—	—	2,100	—	2,085	—	2,130	3,950	2,320	2,436
1912	—	—	—	—	—	—	—	—	—	2,209	—	—	—	—	—
1913	1,460	1,500	—	—	—	—	—	—	—	2,359	—	—	—	—	—
1914	—	—	—	—	—	—	—	—	—	2,253	—	—	—	—	—
1915	—	—	—	—	—	—	—	—	—	2,324	—	—	—	—	—
1916	—	—	—	—	—	—	—	—	—	2,677	—	—	—	—	4,185
1917	—	—	—	—	—	—	—	—	—	3,302	—	—	—	—	—
1918	2,400	—	—	—	—	—	—	—	—	3,714	—	—	—	—	—
1919	—	—	—	—	—	—	—	—	—	4,211	—	3,860	3,550	4,210	—
1920	—	—	—	—	—	—	—	5,610	4,575	4,408	—	4,580	3,640	4,990	—
1921	—	—	—	4,031	3,533	4,092	3,789	4,215	3,911	—	—	3,590	3,640	4,030	4,518
1922	—	2,500	—	4,027	3,540	4,100	3,809	4,250	4,289	—	—	3,740	4,270	4,190	—
1923	—	—	—	4,224	3,725	4,283	3,979	4,570	4,693	—	—	3,920	4,570	4,390	—
1924	—	—	—	4,155	3,636	4,274	3,975	4,520	4,568	—	—	3,930	4,520	4,400	—
1925	—	—	—	4,955	4,354	4,585	4,273	4,980	4,847	—	—	4,280	4,710	4,800	—
1926	—	—	—	5,069	4,441	4,935	4,564	5,450	5,197	—	—	4,540	5,080	5,090	5,586
1927	—	—	—	5,410	4,738	5,266	4,894	5,850	5,695	—	—	4,760	5,460	5,340	—
1928	—	—	6,218	5,835	5,117	5,705	5,308	6,175	5,974	—	—	5,260	5,970	5,790	—
1929	—	—	6,038	6,148	5,362	5,905	5,429	5,910	5,733	—	—	5,300	6,120	5,930	—
1930	—	—	5,313	5,337	4,620	5,173	4,771	5,000	5,000	—	—	4,560	5,570	5,100	—
1931	—	—	4,291	4,382	3,781	4,187	3,860	3,860	4,370	—	—	3,700	5,310	4,180	—
1932	—	—	3,520	3,608	3,090	3,385	3,109	3,150	3,989	—	—	2,950	4,730	3,400	—
1933	—	—	3,300	3,333	2,857	3,237	2,942	2,990	4,087	—	—	2,850	4,650	3,250	—
1934	—	—	—	3,989	3,422	3,585	3,278	3,570	4,685	—	—	3,250	5,000	3,640	—
1935	—	—	—	—	—	3,779	3,464	3,835	4,893	—	—	3,460	5,280	3,890	—
1936	—	—	—	—	—	4,118	3,759	4,230	5,220	—	—	3,920	5,840	4,490	—
1937	—	—	—	—	—	4,559	4,162	—	—	—	—	4,410	6,020	5,060	—
1938	—	—	—	—	—	4,531	4,132	—	—	—	—	4,360	6,260	4,980	—
1939	—	—	—	—	—	4,804	4,376	—	—	—	—	4,680	7,040	5,410	—
1940	—	—	—	—	—	—	5,200	—	—	—	—	5,650	7,600	6,500	—
1941	—	—	—	—	—	—	6,200	—	—	—	—	6,930	8,740	8,030	—
1942	—	—	—	—	—	—	—	—	—	—	—	8,650	9,690	9,960	—
1943	—	—	—	—	—	—	—	—	—	—	—	9,310	9,650	10,680	—
1944	—	—	—	—	—	—	—	—	—	—	—	9,980	9,710	11,320	—
1945	—	—	—	—	—	—	—	—	—	—	—	10,020	10,950	11,190	—
1946	—	—	—	—	—	—	—	—	—	—	—	10,050	11,010	11,270	—
1947	—	—	—	—	—	—	—	—	—	—	—	11,200	11,050	12,680	—

^a These estimates were prepared before 1923, the earliest estimate by Michael G. Mulhall being published in 1896.

^b Estimates published between 1923 and 1945.

^c Estimates available since 1945.

^d Early estimates of national income were based on the national income produced method, except the estimates by Michael G. Mulhall and R. H. Coats, who attempted to use an income received method. The estimates in this Column are by the following authors: 1894, Michael G. Mulhall; 1903 and 1913, Sir Robert Giffen; 1910, Edgar Crammond; 1911 and 1918, R. H. Coats.

^e In 1930 prices.

^f In 1900 prices.

^g After adjustment of net dividends and interest paid abroad.

^h In terms of international units or I.U., defined as the quantity of commodities exchangeable for \$1 in the United States over the average of the period 1925-34.

ⁱ Includes indirect taxes less subsidies.

^j These estimates are annual averages for five-year periods. They are shown in the first year of each five-year period, i.e., the average for 1901-05 is shown in 1901.

any future attempt to develop an integrated set of national wealth estimates. A shortcoming of most of the recent information bearing on national wealth is that the data are usually collected for other purposes.

A number of the partial series on capital invested go back almost to the time of Confederation. Foremost among these is capital invested in manufacturing industries, available from decennial censuses from 1871 to 1911 (see Table 99). For 1871 and 1881 the data include the value of working capital, but for 1891, 1901, and 1911 separate data are shown for fixed capital. In addition to the general decennial censuses, special censuses of manufacturing taken in 1906 and 1916 also include data on capital invested. The data are not fully comparable over the period since the 1871-91 censuses supposedly cover all manufacturing industry while those of 1901 to 1911 cover establishments with five workers or more and that of 1916 establishments with an annual output of \$2,500 and over. As indicated earlier, the method of valuation was left to the respondent and the value of fixed capital was based on a variety of methods. Collection of this information was discontinued after 1916.

Capital invested in manufacturing is available on an annual basis from 1917 to 1953. Totals given for all fixed capital including land, plant and equipment, usually represent book value of assets employed in manufacturing. In 1944 the collection of data on capital investment in the annual census was discontinued and replaced by the collection of annual data on expenditures on fixed capital by manufacturers. Using these and deducting effective allowances for depreciation, the Dominion Bureau of Statistics has extended the annual series on total fixed capital invested in manufacturing from 1943 to the present.¹

Data on capital invested in central electric stations were collected annually by the Dominion Bureau of Statistics 1917-43, and usually published in annual issues of *Central Electric Stations in Canada* or in the annual reports on the manufacturing industry. For 1917-35 these data form part of the annual census of manufacturing. This series was discontinued after 1943.

The value of capital invested in agriculture was first collected in the 1901 census, but as indicated earlier a series on the number of livestock, agricultural land under cultivation, etc., had

¹ *General Review of Manufacturing Industries of Canada*, 1952, Ottawa, p. 44.

been collected for about two and a half centuries preceding the 1901 census. This series is available from the decennial censuses up to the present, the last having been collected in 1951.

Annual data of capital invested in agriculture commence with 1917. A preliminary series based partly on surveys and partly on estimates for 1917-35, separately for farm land and for farm buildings, implements, equipment, and livestock, is shown in Table 99. For 1936-53 a revised series covers *total* capital invested in agriculture, based on data from the decennial censuses and other sources.

The value of fixed assets in the fishing industry was also collected in the decennial censuses and data are available for 1901 and 1911. The fishing industry included primary fishing and fish processing, so that there is some duplication between capital invested in manufacturing and in the fishing industry.

Information on capital invested in the fishing industry has been obtained annually since 1880. The data were collected in the earlier period by the Department of Marine and Fisheries and predecessor agencies, and in more recent years by the Dominion Bureau of Statistics in co-operation with the Federal and provincial Departments of Fisheries. Data for selected years 1880-1946 are shown in Table 99.

In the inter-war period, the Dominion Bureau of Statistics was the major source of official data relating to national wealth. In more recent years three other government agencies have been publishing data on capital invested in certain sectors: the Bank of Canada and the Department of National Revenue for major industries, and the *Central Mortgage and Housing Corporation* for housing (see Table 100).

The Bank of Canada has been collecting financial statistics for a number of incorporated companies covering manufacturing, mining, forestry operations, wholesale and retail trade, public utilities, and the service field. Comparable series on 'investment in plant, property and equipment' for 603 companies for 1935-51 and for 704 companies for 1947-53 are shown in Table 100. The data relate to the book value of fixed assets including the value of land. The statistics, according to the Bank of Canada, are 'subject to all the limitations and qualifications which apply to the basic accounting statements.'¹

¹ *Statistical Summary, 1950 Supplement*, Bank of Canada, Ottawa, 1950, p. 45.

TABLE 100

Capital Invested in Major Industries and in Housing, as collected by Bank of Canada, Department of National Revenue, and Central Mortgage and Housing Corporation, Canada, 1921-1953

(In millions of dollars)

Year	Investment in Plant, Property and Equipment by Canadian Corporations ^a					Capital Invested in Residential Real Estate ^c					
	Bank of Canada		Department of National Revenue ^b			Central Mortgage and Housing Corporation					
	Total Fixed Assets		Land	Buildings, Machinery and Equipment	Total Fixed Assets	Land	Structures ^d	Total Real Estate	Land	Structures ^d	Total Real Estate
	603 Companies	704 Companies				Current Dollars	Current Dollars	Current Dollars	Constant Dollars ^e	Constant Dollars ^e	Constant Dollars ^e
1921	—	—	—	—	—	468	4,831	5,299	391	4,035	4,426
1922	—	—	—	—	—	432	4,455	4,887	400	4,114	4,514
1923	—	—	—	—	—	455	4,66	5,123	410	4,193	4,603
1924	—	—	—	—	—	452	4,610	5,062	417	4,252	4,669
1925	—	—	—	—	—	452	4,594	5,046	426	4,336	4,762
1926	—	—	—	—	—	458	4,660	5,118	437	4,450	4,887
1927	—	—	—	—	—	470	4,777	5,247	449	4,563	5,012
1928	—	—	—	—	—	494	5,030	5,524	461	4,692	5,153
1929	—	—	—	—	—	530	5,397	5,927	473	4,817	5,290
1930	—	—	—	—	—	526	5,336	5,862	482	4,904	5,386
1931	—	—	—	—	—	497	5,025	5,522	490	4,969	5,459
1932	—	—	—	—	—	459	4,594	5,053	495	4,966	5,461
1933	—	—	—	—	—	445	4,399	4,844	499	4,943	5,442
1934	—	—	—	—	—	466	4,564	5,030	505	4,941	5,446
1935	2,232	—	—	—	—	469	4,550	5,019	511	4,956	5,467
1936	2,193	—	—	—	—	490	4,716	5,206	519	4,996	5,515
1937	2,204	—	—	—	—	536	5,134	5,670	528	5,057	5,585
1938	2,194	—	—	—	—	531	5,065	5,596	536	5,105	5,641
1939	2,173	—	—	—	—	546	5,177	5,723	546	5,177	5,723
1940	2,159	—	—	—	—	591	5,588	6,179	556	5,248	5,804
1941	2,152	—	—	—	—	673	6,333	7,006	567	5,337	5,904
1942	2,096	—	—	—	—	744	6,956	7,700	576	5,391	5,967
1943	2,006	—	—	—	—	818	7,572	8,390	584	5,412	5,996
1944	1,949	—	—	—	—	876	8,032	8,908	594	5,449	6,043
1945	1,966	—	—	—	4,990	916	8,335	9,251	605	5,512	6,117
1946	2,100	—	—	—	5,697	1,007	9,123	10,130	622	5,640	6,262
1947	2,335	2,316	1,499	4,688	6,187	1,160	10,483	11,643	642	5,812	6,454
1948	2,632	2,616	1,604	5,220	6,824	1,368	12,540 ^f	13,908 ^f	662	6,000 ^f	6,662 ^f
1949	2,878	2,864	1,699	5,586	7,285	1,470 ^f	13,470 ^f	14,940 ^f	685 ^f	6,214 ^f	6,899 ^f
1950	3,090	3,108	1,785	6,084	7,869	1,743	14,930	16,673	727	6,512	7,239
1951	3,465	3,451	1,870	7,056	8,926	2,230	17,496	19,726	750	6,674	7,424
1952	—	3,849	1,950	7,973	9,923	2,114	18,388	20,502	774	6,742	7,516
1953	—	4,179	2,132	9,129	11,261	2,252	19,148	21,400	789	6,988	7,777

^a Book value of fixed assets as reported by corporations.

^b Covers a varying number of Canadian corporations involving a total of 48,350 in 1953.

^c Replacement value of total housing stock including land used for residential purposes.

^d Including installed equipment.

^e In 1939 prices.

^f Revised.

The book value of fixed assets of most Canadian corporations – in 1953 about 48,000 companies representing most industries – has appeared in annual issues of *Taxation Statistics*, published by the Department of National Revenue, Taxation Division. The data are shown for 1944–53, with a breakdown between land and buildings and equipment since 1947.

A series on investment in residential real estate for 1921–49 was published in 1951 by the author of this paper.¹ The series covers a valuation of land used for residential purposes and the value of residential capital separately for non-farm and farm properties. These estimates are being kept up to date by the Central Mortgage and Housing Corporation. Data on residential gross capital formation, capital consumption, and net capital formation are published in quarterly issues of *Housing in Canada*.² Investment in residential real estate for 1921–53 in both current and constant dollars is shown in Table 100. The series on residential capital covering the value of the housing stock is the only one given in Tables 99 and 100 based on replacement value. *Residential Real Estate in Canada* includes, in addition to residential stock data, estimates of residential capital formation and residential capital consumption and thus represents a pilot study in a particular sector combining an appraisal of both assets and flow data.

The series on capital invested shown in Tables 99 and 100 cover the major part of the economy. They are not, however, a complete inventory, for data are also available for some other specific sectors, such as services (e.g. laundry, cleaning, and dyeing establishments), finance (particularly life insurance, loan and trust companies and chartered banks), certain public utilities (e.g. railways) and public assets held by governments. But the partial data assembled here may suggest two things: (1) that comprehensive information is available – and some of it quite current – on capital invested; (2) that the data differ a good deal in quality, definition, and coverage and there is therefore a major research and developmental job ahead for the investigators who take on the task of preparing a set of integrated and economically meaningful data on Canada's national wealth.

¹ O. J. Firestone, *Residential Real Estate in Canada*, Toronto, 1951, pp. 285 and 286.

² And its successor, *Canadian Housing Statistics*, beginning in 1955.

SECTION 14

SOURCES, COVERAGE AND ESTIMATING TECHNIQUES

THIS section gives the sources and describes in summary fashion the methods employed by various authorities to derive the estimates of national income, gross national product, and national wealth shown in Tables 96-100.

NATIONAL INCOME AND NATIONAL WEALTH ESTIMATES
BY ORDER OF APPEARANCE

National income and national wealth estimates cover a period of something like a century, most of the work, of course, having been done in the last half century. Obviously later investigators had the benefit of exploratory work done by early investigators. An understanding of the estimates is therefore facilitated if not only the dates to which the estimates apply are considered, but also the dates when they were prepared. The two summaries below set out separately for national income and gross national product, and national wealth estimates: the dates when the estimates were published or became otherwise available, the names of the authors, the type of estimate, and the date to which the estimates apply. The listing below is indicative of the large amount of pioneering work which for the most part has preceded the preparation of the official national income estimates.

National Income and Gross National Product Estimates

Date Estimate Became Available	Author	Type of Estimate	Date to which Estimate Applies
1896	Michael G. Mulhall	National Income Received	1894
1903	Sir Robert Giffen	National Income Produced	1903
1912	Edgar Crammond	National Income Produced	1910
—	Sir Robert Giffen	National Income Produced	1913
1919	R. H. Coats	National Income Received	1911, 1918
1923	Dominion Bureau of Statistics	First Estimate of National Income Produced - Preliminary Estimate (now obsolete)	1920 (continued annually to 1934)
1925	G. Findlay Shirras	National Income Produced	1913, 1922
1934	D. C. McGregor	National Income Received	1928-33
1935	Bank of Nova Scotia	National Income Produced and Available National Income (Preliminary Estimates)	1921-34

Date Estimate Became Available	Author	Type of Estimate	Date to which Estimate Applies
1939	Research Staff of Royal Commission on Dominion-Provincial Relations	National Income Paid Out	1926-37
1940	Bank of Nova Scotia	National Income Produced and Available National Income (Revised Estimates)	1921-39
1940	Colin Clark	Available National Income (Preliminary Series), Current and Constant Dollars	1903, 1911, 1920-36
1941	Research Staff of Royal Commission on Dominion-Provincial Relations	National Income Paid Out (Revised Series)	1926-40
1941	Dominion Bureau of Statistics	National Income Produced and National Income Received (Revised Estimates), Current and Constant Dollars (now obsolete)	1919-38
1941	J. J. Deutsch	National Income Produced	1911-20
1941	Bank of Nova Scotia	Available National Income (Revised Estimates)	1940, 1941
1945	Dominion Bureau of Statistics	National Income Produced and National Income Received (Revised Estimates - now obsolete)	1938-44
1951	Colin Clark	National Income Produced and National Income at Market Prices (Revised Estimates), Current and Constant Dollars	1903, 1911, 1919-47
1953	Penelope Hartland	Gross National Product, Constant Dollars	1870, 1880, 1890, and 1900
1955	Kenneth Buckley	Gross National Product	Annual Average for Five-Year Periods: 1901-30

National Wealth Estimates

Date Estimate Became Available	Author	Type of Estimate	Date to which Estimate Applies
—	Sir Henry Parnell	National Wealth (based on partial data)	1830
1867	Arthur Harvey	National Wealth	1860
1896	Michael G. Mulhall	National Wealth	1895
1903	Sir Robert Giffen	National Wealth	1903
1912	Edgar Crammond	National Wealth	1910
1916	Canadian Bankers' Association	National Wealth	1912, 1914

Date Estimate Became Available	Author	Type of Estimate	Date to which Estimate Applies
1919 1923	R. H. Coats Dominion Bureau of Statistics	National Wealth National Wealth (First Estimate)	1915, 1918 1920 (subsequent estimates for 1921, 1925- 29)
1936 1951	Dominion Bureau of Statistics Colin Clark	National Wealth (Last Estimate) 'Reproducible Capital', in Constant Dollars	1933 1900, 1911, 1929, 1939

The notes that follow are in the same order as the data shown in Tables 96-100, dealing, first, with private estimates in the period 1870 to 1947; second, with the early government estimates for 1919-44, now replaced by the new official series; third, with private and government estimates of national wealth in the period 1830 to 1939, and, fourth, with partial wealth data in the period 1870 to 1953.

PRIVATE ESTIMATES OF NATIONAL INCOME AND GROSS NATIONAL PRODUCT (Table 96)

1. *Michael G. Mulhall*

Michael G. Mulhall produced what appears to be the first estimate of national income for the area now comprising Canada (excluding Newfoundland). This estimate is given as £183 million for the year 1894 and appears in *Industries and Wealth of Nations*, London, 1896, p. 327.

Mulhall speaks of the earnings of the Canadian population. He prepared the estimates for ten different sectors including agriculture, manufacturing, forestry, fisheries, mining, trade, transport, house-rent, domestics, and professional people, etc. Detail is also shown on a provincial basis covering the Maritimes, Quebec, Ontario, and the western part of Canada described as 'North-West'.

To derive the estimate, Mulhall applied the following procedure: agriculture - 60 per cent of the value of the annual output; manufacturing - 50 per cent of output of 'mills and artisans'; minerals, forestry and fishing - total annual value produced; trade - 10 per cent of the total value of goods sold in the country; transport - 10½ per cent of the total value of goods

sold in the country; house-rent – 6 per cent of the value of houses; domestic wages – 2/3 of house-rent; public service – 50 per cent of national revenue; professions – 10 per cent of the sum of the preceding nine items.

As to sources, these include the census for 1891 and annual and other periodic reports in the field of agriculture, forestry and fisheries, mining, railway transportation and shipping, exports and imports, and Federal and provincial reports of government revenues and expenditures. On the basis of £1 = \$4,866 Mulhall's national income estimate for 1894 works out at \$892 million. The year to which the estimate applies is not specifically stated in the section on Canada (pp. 315 to 330), but in another connection the author makes it clear that the estimates are intended to apply to 1894 (see p. 50).

2. *Sir Robert Giffen*

In September 1903 Sir Robert Giffen read a paper before the Economics and Statistics Section of the Royal Statistical Society entitled, 'The Wealth of the Empire, and How It Should Be Used', which was published in the *Journal of the Royal Statistical Society*, London, September 1903, pp. 582 to 598.

This paper includes an estimate described as 'aggregate income' for Canada of £270 million (*ibid.*, p. 584). On the basis of £1 = \$4,866, this is equivalent to a 'national income' estimate of \$1,314 million. The year to which the estimate applies is not specifically stated but in connection with the discussions of the 'aggregate of the individual incomes of the people of the United Kingdom' Sir Robert emphasizes that his estimates relate to the current year (*ibid.*, p. 582). Scholars studying Sir Robert's estimates have assumed that they apply to 1903. (See, for example, J. C. Stamp, 'The Wealth and Income of the Chief Powers', *J.R.S.S.*, 1919, *op. cit.*, p. 487, and Colin Clark, *The Conditions of Economic Progress*, London, 1940, p. 110.)

As to the methods of estimation, Sir Robert states that they are based on 'known data as to production' and checked against 'data as to imports and exports, yield of revenue and the like' (*ibid.*, p. 583). Since the most comprehensive source of data of production available at the time was the census taken toward the end of March 1901 and covering the year ending 31st March 1901, it appears that the basic material which Sir Robert used for his estimates applied to the year 1900. Some allowance

for growth between 1900 and 1903 might have been made by Sir Robert, but there is no evidence that this was done.

An estimate of national income ascribed to Sir Robert Giffen and apparently applying to 1913 is included in J. C. Stamp's 'Wealth and Income of the Chief Powers' (*J.R.S.S.*, 1919, p. 491). The estimate is placed at £300 million, or \$1,460 million on the basis of £1=\$4.866. J. C. Stamp considers the estimate very rough and suggests that it is possibly 'inaccurate to a greater extent than 40 per cent' (*ibid.*, p. 491).

3. *Edgar Crammond*

Edgar Crammond includes an estimate of national income, apparently applicable to 1910, in 'Imperial Defence and Finance', *The Nineteenth Century and After*, 1912, *op. cit.*, pp. 228-9.

Crammond puts national income at £259 million, or \$1,260 million on the basis of £1=\$4.866. Separate data are shown for agriculture, fishing, mining, forestry, and manufacturing ('net', suggesting an attempt to eliminate duplications). The industrial breakdown implies that Crammond made no allowance for income originating in the service sector. Using the production method based mainly on census and related data, Crammond arrived at a gross figure of £289 million. From this he deducts £30 million for Canadian net dividend and interest paid abroad, arriving at what he describes as 'net' national income of £259 million.

4. *R. H. Coats*

R. H. Coats in his article 'National Wealth and Income of Canada', *The Monetary Times*, 1919, *op. cit.*, pp. 19-21, includes estimates of national income for 1911 and 1918.

Mr. Coats arrives at his estimate of national income by the income received method. He obtains from the 1911 census incomes of salary and wage earners and adjusts these for unsatisfactory returns or non-reporting. Notwithstanding the adjustment, Coats has some doubts about the quality of the data, which he expresses in these terms: 'A question of this kind (asking individuals to report salaries and wages received during the preceding year), requiring the exercise of memory, and in many cases involving calculation, does not always yield satisfactory information.' (*op. cit.*, p. 20.) After arriving at the ad-

justed income of wage and salary earners, Coats adds an allowance for incomes of 'persons operating on their own account, whose earnings take the form of profits, professional fees, etc.' Coats concludes: 'Altogether a national income approaching two billions would seem a not unfair estimate for 1911. The rise in wages and prices would probably bring this to \$2,400,000,000 in 1918.' (*Ibid.*, p. 20.)

While Coats describes his national income as relating to 1911, it is in fact based on wages and salary earnings for the year preceding the census-taking, that is, from mid-1910 to mid-1911. As to the figure for 1918, this is a suggestion rather than actual estimate by Coats. Estimates by others, particularly J. J. Deutsch, indicate that Coats' figure for that year may be on the low side.

5. G. Findlay Shirras

G. Findlay Shirras read a paper before the Royal Statistical Society in London on 'Taxable Capacity and the Burden of Taxation and Public Debt', on 16th June 1925. (*J.R.S.S.*, 1925, *op. cit.*) Shirras included in his paper estimates of Canada's national income of \$1,500 million in 1913 and \$2,500 million in 1922 (p. 543). The method of estimation is 'the production or inventory method, which is to add up the various parts of a country's "produce" in a 12 months (period) including services' (*ibid.*, p. 521-2). Colin Clark in *The Conditions of Economic Progress* (London, 1940) considered Shirras' estimate of national income for 1913 too low and therefore did not use it (see p. 109, n. 1).

6. D. C. McGregor

D. C. McGregor's estimates of national income for 1928-33 were first published in 'These Insignificant Budgets', *The Canadian Forum*, Toronto, July 1934, p. 386.

In his article in *The Canadian Forum*, D. C. McGregor speaks of national money income which he defines as 'the aggregate of all personal incomes and undispersed corporate income derived from work done or from property owned in Canada.' Separate data are shown on 'certain' wages and salaries received, income from bond interest, income from dividends, and farm income. The estimates appear to have been made largely by the income received method but no details are given. The techniques

McGregor used in his early work become apparent, however, from a study of the national income work which he did subsequently for the Bank of Nova Scotia and the Royal Commission on Dominion-Provincial Relations, where he had ample opportunities to develop further his early work in the field.

7. *Bank of Nova Scotia*

The Bank of Nova Scotia published a preliminary series for 1921-34 and revised series for 1921-41 of national income produced and available national income. These estimates were originally compiled by Professor McGregor for the Bank of Nova Scotia and were then kept up to date by the Bank. The preliminary series was published in the *Monthly Review* of the Bank of Nova Scotia, Toronto, November 1935 (see also correction in *Monthly Review* for December 1935, p. 4). The revised series for 1921-25, 1927 and 1928, 1930-32 is from the *Monthly Review* for May 1937, for 1926, 1929, 1933-39 from the *Monthly Review* for September 1940, and for 1940 and 1941 from the *Monthly Review* December 1941. There were intermittent revisions and these are discussed in *Monthly Review of the Bank of Nova Scotia*, December 1935, July 1938, June and November 1941.

'National Income Produced' is defined as 'the total net value of production of all industries, including those providing services as well as those producing goods'. 'Available National Income' is defined as 'the income which is at the disposal of Canadian individuals and corporations. It is obtained by the subtraction and addition of the following items from and to the National Income Produced: (i) *subtract* payments of interest and dividends to external investors; (ii) *subtract* an allowance for depreciation . . . ; (iii) *add* receipts of interest and dividends from Canadian investment abroad; (iv) *add* annual rental value of owned houses, less estimated mortgage interest (the reason for adding this item is that home-owners received an income in kind which is not covered elsewhere in the estimates).' (*Monthly Review of the Bank of Nova Scotia*, Toronto, September 1940, pp. 1 and 3.)

The Bank of Nova Scotia relied mainly on production data similar to those used by the Dominion Bureau of Statistics. The technique, however, differed from the Bureau's work in two

important respects. Instead of assuming that net value added in service industries per employee equalled the net value per employee in other sectors, the Bank made direct estimates of the net value added in service industries. The other innovation was an attempt to eliminate duplications which were believed to be included in the Bureau's estimates. The revised estimates of the Bank were somewhat higher than the Dominion Bureau of Statistics figures for 1921-35, and lower for the years after 1935.

The Bank of Nova Scotia estimates included an industrial classification but no geographical breakdown. The latter was achieved by the Royal Commission on Dominion-Provincial Relations (Rowell-Sirois Commission), in a series on national income using the income paid out method. This technique involved estimating income payments to individuals by provinces, with the final total coming close in concept to what is known in current national accounting literature as 'personal income'. The Rowell-Sirois Commission estimates of income paid out were consistently lower than the estimates of available national income by the Bank of Nova Scotia. As to reasons for the differences, the Bank of Nova Scotia had the following observations to make:

One reason for this difference is that the available income estimates use the total net income of corporations, whether disbursed or not, while income paid out includes only what is disbursed. This difference in definition would tend to make the available income figures higher than those of income paid out in years of rising activity though it would probably have the opposite effect in years of declining business. Another factor which accounts for appreciable differences in the two sets of income figures is that available national income is based on the net value of all production whether it is turned into cash income or is carried over into the next year in the form of stocks. In agriculture, for example, the figures of income produced and income paid out differ materially from year to year for this very reason, though when placed on a comparable basis the averages over a period of years differ little.

But one cannot explain the considerable variations between the figures of available national income and income paid out solely in terms of differences in definition. This Bank's estimates are in all probability somewhat too high and the Rowell-Sirois data are perhaps a little on the low side. The volume on national income in

the Rowell-Sirois Report admits that their estimates, particularly in regard to investment income, are not all-inclusive and suggests the total of omitted items may be in the neighbourhood of \$75 millions. Our figures of income probably over-estimate the total by a larger amount than the Rowell-Sirois figures underestimate it. It is quite possible that too small a deduction has been made for manufacturers' expenses. It is also probable that the treatment of taxation and Government service involves some double counting, though how much it cannot be said. A further place where the figures may be somewhat too high is in the professional services and retail trade. (*Monthly Review of the Bank of Nova Scotia*, September 1940, p. 4.)

8. Colin Clark

Drawing largely on published material, Colin Clark included two sets of national income estimates in *The Conditions of Economic Progress*, First Edition, London, 1940, pp. 110-2, and Second Edition, 1951, pp. 53-5. The first set covered preliminary estimates of available national income for 1903 and 1911 in current dollars, and for 1920-36, inclusive, in both current and constant (1930) dollars, and were included in the First Edition of his book. In his Second Edition, Colin Clark included, for 1903, 1911, 1919-47, a series of national income produced and national income at market prices in current dollars and of national income produced in constant dollars.

In his First Edition Colin Clark starts out with a concept of national income produced, adapting the data to arrive at available national income in real terms. His estimate for 1903 is based on Giffen's. Sir Robert's estimate of national income is £270 million, or \$1,314 million on the basis of £1=\$4.866. Colin Clark adjusts the estimate upward to \$1,370 million by adding an allowance for 'customs revenue and other small items of indirect taxation'. The 1911 figure is R. H. Coats' estimate of \$2 billion which Colin Clark found in Harvey Fisk, *Dominion of Canada*, New York, 1927. Mr. Clark adjusts this figure upward to \$2.1 billion to allow for indirect taxes.

The estimates of national income produced in current dollars for 1920-36 are based in part on Dr. S. A. Cudmore's *The National Income of Canada*, Dominion Bureau of Statistics, Ottawa, 1934 (see particularly p. 27). This study puts the national income for 1930 as follows: by the production method, \$5,016 million; by the consumption method, \$5,000 million; by the

income received method, \$4,952 million. Colin Clark uses the \$5,000 million figure for 1930 as the bench mark for his national income estimates. He then applies a series of index numbers for 1920-36 taken from 'Economic Fluctuations in Canada', Supplement to the *Monthly Review of Business Statistics*, Dominion Bureau of Statistics, January 1938, pp. xiv and xv. The difference between national income produced and available national income in current dollars shown in Table 1 is, according to Colin Clark, some \$200 million per annum which represents net interest and dividends paid to persons outside Canada.

Colin Clark comments on the index numbers he uses for interpolation as follows: 'It appears that these have been constructed on the assumption that the value of the output of services moves proportionately to the value of output of material production, which makes the data of little value for detailed analysis.'

He then adjusts the series for 1920-36 to derive available national income in 1930 prices as follows: He estimates consumption and investment by subtracting the balance of payments from national income. Then he adjusts the remainder for price changes by the cost-of-living index, 1930=100. To the adjusted series he adds the volume of exports at 1930 prices and subtracts the volume of imports and net invisible imports, both obtained from the Dominion Bureau of Statistics. Exports and imports are each adjusted for price changes separately by using export and import price indices.

In his Second Edition, Clark uses different sources and somewhat different techniques in deriving his estimates of national income. The following is a summary of the methods he used.

National Income Produced. From 1938 on, recent official figures from *National Accounts Income and Expenditure, 1938-1947*, with the addition of interest and dividends payable abroad, and \$100-\$130 millions for the difference between wholesale and retail prices of income in kind consumed on farms. Before 1938 he uses the series given in the *Canada Year Book, 1943-1944*, p. 800, less 8 per cent (the difference between the two series for 1938). The figure for 1911 is Coats (quoted by Harvey Fisk, *Dominion of Canada*, New York, 1927), and for 1903 by Giffen's (*J.R.S.S.*, 1903, p. 584). Additions for imputed retail value of income in kind consumed on farms are those given by Hope, *Canadian Journal of Economics and Political*

Science, 1943 (ranging from \$201 millions in 1928 to \$112 millions in 1937). Mr. Hope's figures begin in 1926 and Clark makes rough estimates for earlier years.

National Income at Market Prices. Since 1938 as above, taking the mean of estimates based on income and on expenditure. For earlier years figures of indirect taxation given in the Rowell-Sirois Report for 1913, 1921, 1926, 1930, 1937. Other years are interpolated.

National Income Produced in Constant Dollars. Clark first revalues exports and imports by applying an index number of prices of imports and exports available back to 1914 and carried back to 1911 by means of a wholesale-price index. He then revalues national income less exports and gold by a weighted index consisting of the cost-of-living index, two-thirds, and the wholesale-price index of producers' goods, one-third, for 1919-38 and 1945-47. Revaluations for 1911 and 1903 were made with an old index number of the cost of living linked to the new index over the period 1922-28. (The wholesale-price index gives a similar trend.) Since import and export prices were not available before 1911, the whole national income for 1903 was revalued by the cost-of-living index. For 1939-44 the residual national income was adjusted for price changes separately for munitions production and consumption and 'other' net expenditures by means of data in *The Impact of the War on Civilian Consumption in the United Kingdom, the United States and Canada*, Washington, U.S.A., September 1945.

9. J. J. Deutsch

J. J. Deutsch, another contributor to the study on national income prepared for the Royal Commission on Dominion-Provincial Relations, made some estimates of national income for 1911-20. They were published in an article entitled, 'War Finance and the Canadian Economy, 1914-20', *The Canadian Journal of Economics and Political Science*, November 1940, p. 538.

The estimates are for national income produced, with net interest and dividends paid abroad deducted. The author comments on the quality of his estimates and method of estimation as follows:

Owing to the paucity of statistics for this period, the estimates shown here of net values of income produced in the various

branches of the economy are necessarily rough. While the absolute figures may be very approximate, it is believed that the relative year-to-year changes are represented with a useful degree of accuracy. The net values shown here are after deductions for estimated values of materials and supplies used, for taxes and other expenses but not for depreciation. Net incomes from housing are not included. The estimates were prepared mainly from Dominion Bureau of Statistics sources and from information in the *Canada Year Books*. (*The Canadian Journal of Economics and Political Science*, Toronto, November 1940, p. 539.)

10 *Penelope Hartland*

Penelope Hartland's estimates were prepared for the National Bureau of Economic Research and were made available through the courtesy of the author.

Gross national product at 1900 prices is estimated by the production method. To the estimated value of output of primary industries is added the value produced in secondary industries (manufacturing) and in tertiary industries (service industries). Estimates of the value of production in primary and secondary industries are based mainly on data in the decennial censuses, with adjustments to assure comparability over the period. Estimates of net value added in the service industries are based on the assumption that persons employed in service industries produce as much on the average as persons employed in the other two sectors.

Miss Hartland tested the estimates and made the following comments on their quality:

In view of the many subjective adjustments that had to be made in the process of estimating the volume of goods and services produced, some check on the adequacy of the process is desirable. Official estimates of GNP in current prices start with the year 1926. For that year also data on the value of agricultural production, forestry and fisheries operations, mineral output and the net value of manufactures are available in the same form as those used above. Repeating the same process, but deducting 30 per cent rather than 15 per cent from the value of field crops to account for duplication (30 per cent being the average difference between the gross and net output of agriculture, 1918-1938 . . .), the value of total physical output in 1926 amounts to \$3.2 billion. Inflating this by 62 per cent, the ratio of the number employed in the production of physical goods to the total of gainfully occupied people in 1926,

the estimate of GNP is \$5,161 million. The official estimate for that year is \$5,196 million. If, however, only 15 per cent is deducted from the value of field crops for duplication, the estimate of GNP becomes \$5.5 billion as compared with the \$5.2 billion official estimate.

It seems likely that the close agreement between the estimate according to the methods used here and the official figure is to be explained in some part to improvement in the quality of the data in the primary sources between 1900 and 1926. The agreement does indicate that errors involved in the method do tend to cancel one another.

11. *Kenneth Buckley*

Kenneth Buckley included in *Capital Formation in Canada, 1896-1930* (Canadian Studies in Economics - No. 2 University of Toronto Press, 1955), estimates of the gross national product in current prices for five-year periods from 1901 to 1930.

Buckley used as the trend of gross national product for 1911-20 the national income estimates prepared by J. J. Deutsch, and for 1921-30 those prepared by D. C. McGregor for the Bank of Nova Scotia.

The two series called 'national income produced' include depreciation. The following adjustments were carried out to make the series conceptually comparable with gross national product: (1) deduct investment income paid abroad; (2) add investment income from abroad; (3) add indirect taxes less subsidies; (4) add imputed rent on owner-occupied dwellings. The net value added by the construction industry which Deutsch and McGregor had based on Maclean's Contracts Awarded was replaced by a series estimated by Kenneth Buckley, based primarily on domestic disappearance of building materials. A special estimate of national income produced was made by Kenneth Buckley for 1901 using the Deutsch method, and then the above adjustments were made to derive gross national product.

The adjusted series for 1901 and 1911-30 was used as an index to extrapolate the official series of gross national product to 1911 and 1901. Gross national product for 1902-10 was derived by interpolation on the basis of the relationship in 1911-20 between the estimated gross national product and the volume of money supply. Then annual averages were computed for each five-year period from 1901 to 1930.

EARLY GOVERNMENT ESTIMATES OF NATIONAL INCOME –
NOW OBSOLETE (Table 97)

12. *Dominion Bureau of Statistics*

The following are the sources of the data shown in Columns 2 to 6 in Table 97.

Column 2: for 1920–29 from *The National Income of Canada*, Dominion Bureau of Statistics, Ottawa, 1934, p. 7; for the years 1930–34 from the *Canada Year Book, 1937*, p. 865 (which includes latest revisions).

Column 3: for 1920–34 from *National Income*, a study prepared for the Royal Commission on Dominion-Provincial Relations, 1939, p. 11.

Column 4: these data are rough approximations and were published in annual issues of the *Canada Year Book* commencing with the issue for 1922–23 (p. 807). The last such estimate was published in the *Canada Year Book, 1933* (p. 874).

Column 5: for 1919–37 from *National Income of Canada, 1919–1938*, Part 1, Dominion Bureau of Statistics, Ottawa, 1941, p. 24; for the years 1938–44 from the *Canada Year Book, 1945*, p. 905, including the latest revisions.

Column 6: for 1919–38 from *National Income of Canada 1919–1938*, *op. cit.*, p. 24.

The first official statistical reference to Canada's national income appeared in a brief mimeographed bulletin of the Dominion Bureau of Statistics, entitled *Survey of Production in Canada, 1920 and Later*, Ottawa, 1923. This bulletin, which summarizes the results of a number of censuses of industrial production conducted for 1920 and 1921, covered for 1920 the following industries: agriculture, forestry, fisheries, trapping, mining, electric power, construction, custom and repair, and manufacturing. Both the gross value and net value of production are shown, the latter representing an attempt to eliminate the value of materials consumed in production.

The bulletin shows a net value of production in the industries covered of \$3,682 million. To derive an estimate of national income from this figure, the Dominion Bureau of Statistics suggests: 'We might add . . . one-half to the present total as a rough estimate of the total productive activity of the Canadian people according to the economist's definition of production,

which approximates to the concept of national income. (pp. 1-2). Thus, the suggested national income for 1922 is \$5,023 million. As additional data became available, this estimate was raised to \$5,523 million (see the *National Income of Canada*, Dominion Bureau of Statistics, 1934, p. 7). National income estimates for 1921 and 1922 were suggested although not specifically shown in the *Survey of Production in Canada, 1921-1922* (Dominion Bureau of Statistics, 1924). A specific estimate for 1922 was first published in the *Canada Year Book* for 1924, p. 782. In the next issue, *Survey of Production in Canada, 1923* (Dominion Bureau of Statistics, 1925), an estimate of the national income for 1923 was published, and comparable data were shown for 1922 and 1921. Such estimates were continued annually in subsequent surveys of production and were also published in the periodic issues of the *Canada Year Book*.

These early preliminary estimates were of national income produced before allowance for depreciation and obsolescence and before deducting net interest and dividend payments abroad. When the estimate was first published in the *Canada Year Book, 1924*, an attempt was made to eliminate some of the duplications which the Dominion Bureau of Statistics felt were included in their series derived by the production method. A rough approximation was made of allowances for depreciation, obsolescence, and replacement and subtracted from the gross figures on 'national income'. This netted series was published for 1922-30 in the *Canada Year Books, 1924-1933* (see Column 4 of Table 97), but was discontinued after 1930, mainly because allowances for depreciation, obsolescence, and replacement were unsatisfactory. Its place was taken by a preliminary series of national income after deducting net interest and dividend payments abroad but without allowance for depreciation and obsolescence published in the *Canada Year Book* commencing with the issue for 1934-35. This series with some improvements was reproduced in the study on *National Income* prepared for the Royal Commission on Dominion-Provincial Relations, 1939, p. 11, and is shown in Column 3 of Table 97.

To check these estimates a thorough investigation was made which resulted in estimates of national income for 1930, by three different techniques. The first was national income produced, employing the net value added method for commodity-producing industries, but making special estimates of income

originating in the service sector by using data from the census of distribution of 1930 and from the record of earnings of those engaged in professional and business service, available for the great majority of such persons from the population census of 1931. The resulting estimate was adjusted for net interest and dividends paid abroad, yielding a figure of \$5,016 million for 1930. The Dominion Bureau of Statistics described this estimate as 'national income spendable'.

The second estimate was based on retail sales from the merchandising census of 1930, outlay on construction, insurance, education and other services, and commodities consumed by producers or sold to consumers direct and not entering into retail trade. The total, after adjustment, was \$5 billion. The Bureau describes this figure as the 'disposition' of the national income (*The National Income of Canada*, Ottawa, 1934, p. 22).

The third estimate was based on earnings taken largely from the population census of 1931, to which was added an estimate of property income. Since the basic data used related to 1st June 1930–31st May 1931 they were adjusted to the calendar year 1930. This national income received method yielded a total of \$4,952 million.

Because the three estimates were close, the Bureau continued with its methods of estimation for three more years. Notwithstanding these tests, some inadequacies remained. The method and some of its shortcomings were pointed out in *National Income*, prepared for the Royal Commission on Dominion-Provincial Relations in the following terms (pp. 10–11):

The net values of production of manufacturing, mining and electric power were obtained from the Bureau's annual census of these industries. For agriculture, forestry, fisheries, trapping and custom and repair work, estimates of the value of production were prepared by the Bureau on the basis of the decennial census, marketing information and sample returns. The net value of production in the construction industry was estimated from the Maclean's record of construction contracts awarded. The aggregate of the net values of production in these industries (mining, manufacturing, electric power, agriculture, forestry, fisheries, trapping, custom and repair, and construction) is the net value of all 'goods' produced in Canada. According to the census of population, approximately five-eighths of the gainfully occupied are engaged in the 'goods' producing industries. It was assumed in the Dominion Bureau of Statistics' estimate that the remaining three-

eighths engaged in the service industries were on the average equally as productive as the persons occupied in the production of 'goods'. Thus the total income of all the gainfully occupied, i.e., the national income, was obtained by multiplying the net value of 'goods' production by approximately eight-fifths. There are two qualifications necessary in connection with this estimate of the national income: (1) there are no adequate grounds for the assumption respecting the equal productivity of persons engaged in the service and 'goods' producing industries at any given point of time; and (2) the Bureau's estimate of the total net value of 'goods' production includes a large amount of duplication and consequently the estimate of the national income is too high. The duplication arises chiefly out of the inadequate allowances for expenses. In the Bureau's estimate of the net value of production of agriculture the only deductions are for seed and feed. No allowances are made for such production costs as expenditures on implements, repairs, building materials, blacksmithing, gasoline, fertilizers, etc. The Bureau's estimates of the net values of production of manufacturing, forestry, mining and fisheries are arrived at by deducting from the gross values, the cost of materials purchased for further processing. No deductions are made for depreciation, repairs, fuel and power purchased,¹ transportation expenses, selling expenses, royalties paid, cost of professional services, etc.

The series of preliminary estimates of national income of the Dominion Bureau of Statistics was discontinued after 1934, the data having been shown last in the *Canada Year Book, 1937*. A new investigation followed, and its results were published in a report entitled *National Income of Canada, 1919-1938*, Part 1, in 1941. This was the most comprehensive report of national income yet produced by the Dominion Bureau of Statistics. It included for the period 1919-38 a revised series of national income, both in current and constant dollars, and the first attempt to make national income estimates on a monthly basis, covering the years 1935-40. In this study the Bureau made two separate estimates, one of income originating in different industries and the other an estimate of aggregate incomes received by individuals, with an adjustment for business gains or losses. The method of making estimates on the basis of the income originating in industry method was described as follows:

¹ Prior to 1933. Since 1933 the cost of fuel and power purchased has been deducted.

Statistical data on an annual basis are collected by the Bureau of Statistics for most of the groups engaged in commodity production, trade and leading branches of transportation. The gross revenue received by each of these groups is taken as the starting point. The cost of raw materials, process supplies, fuel and purchased electricity is the first deduction. It is necessary also to subtract the miscellaneous expenses including rent, insurance, taxes, etc. The collection of miscellaneous expenses by the census of industry was discontinued after 1921, but the relationships established in the first three years of the post-war period are proving valuable as a basis of estimate. A special questionnaire has also been distributed to obtain a sample of miscellaneous expenses for the years 1929, 1933, and 1936.

Having deducted the miscellaneous expenses, the residue may be called the 'gross national product'. The next step is to estimate depreciation and depletion as percentage of the fixed capital employed by the several groups. The gross national product less depreciation and depletion is regarded as the national income. It is not feasible to apply this treatment to all industrial groups of the Bureau's classification, but a growing proportion of the field is amenable to the method. Under the heading of real estate in the finance group, an estimate of the imputed rent of owned houses is included. The international balance of dividend and long-term interest payments is also deducted as a final adjustment.

The second method, income paid out or income received, was described as follows:

The census of industry furnishes data of the amount of salaries and wages paid, and wage data for decennial census years are available through the population census for each of the main industrial groups. The indexes of wage rates published by the Department of Labour and the monthly survey of employment conducted by the Bureau, are useful in estimating earnings for the intercensal years where specific information is not otherwise available (see p. 767). The number of persons working on own account and employers as reported by the decennial census is valuable for estimating the withdrawals of entrepreneurs. Volumes X and XI of the Census Reports present pertinent data regarding wholesale and retail trade and a portion of the service field.

A sample of dividend and bond interest payments may be compiled from an examination of company accounts. The net amount of dividends paid by privately-owned companies as well as by corporations with public investment interest is also available. It is possible to estimate from census data the total amount of net rentals paid on dwellings. The contribution of government to the

national income consists of the net interest paid on the funded debt and the salaries and wages, service and social pensions, compensation payments, and relief.

The aggregate paid to individuals is adjusted for business gains or losses. The latter signify the additions to or deductions from surplus by business concerns. (*The Canada Year Book, 1938*, pp. 890-91.)

The revised estimates of the old series were kept up to date until 1944, the last being shown in the *Canada Year Book* for 1945 (p. 905). This last estimate closed an important chapter in the early development work of the Dominion Bureau of Statistics in the national income field. Among the many that participated in this work, two men particularly contributed unremitting labour and made a lasting contribution, S. A. Cudmore and S. B. Smith, under whose direction most of the early national income work of the Dominion Bureau of Statistics was done.

13. *Research Staff of Royal Commission on Dominion-Provincial Relations*

Estimates of national income paid out, shown in Column 7 of Table 97, for 1926-37 were first published in *National Income*, a study prepared for the Royal Commission on Dominion-Provincial Relations, by D. C. MacGregor, J. B. Rutherford, G. E. Britnell, and J. J. Deutsch, Ottawa, 1939. The data for 1926-37 were published with minor revisions in *National Income, 1937-1940*, Dominion-Provincial Conference, Ottawa, January 1941, p. 1. The data for 1938-40 are from the same source.

These estimates of national income, based largely on the 'income paid out' method and in some cases on the 'income received' method, were prepared on a provincial basis and covered: (1) total salaries and wages paid, (2) investment income (bond and mortgage interest, dividends, investment income from life insurance, and income from housing) received by individuals, and (3) net income of individual enterprises in each province. The latter are entrepreneurs in unincorporated business enterprises and cover farmers, fishermen, proprietors of independent merchandising establishments, independent professional workers, lodging-house keepers, unincorporated construction contractors, and miscellaneous workers on their

own account. For this group of individuals it was not feasible to distinguish between investment income and salaries and wages. Only their total net income was estimated after making allowances for all expenses of production.

The estimates of national income are based largely on data obtained from the Dominion Bureau of Statistics and other sources, particularly the comprehensive studies of government expenditures undertaken by the research staff in assembling the necessary background material for the Royal Commission on Dominion-Provincial Relations. The research staff also made 'the first thorough-going attempt to measure net income from agriculture and bond interest and dividends received by Canadian individuals.'

The report, *National Income*, prepared for the Royal Commission on Dominion-Provincial Relations (Ottawa, 1939, p. 12), includes the following comments on quality:

The estimates of the research staff of the Commission are probably on the low side, although by a much smaller and relatively unimportant *net* amount, on account of omissions. The omissions are chiefly in the estimates of investment income, income from odd jobs and the income of miscellaneous workers on their own account. The following items are omitted in the estimates of investment income: interest on deposits with banks, loan and trust companies, rents received by individuals from rented business property, bond coupons and foreign dividend or interest cheques cashed abroad by Canadian residents and various sources of investment income from abroad other than bond interest and dividends. The total of these omitted items of investment income is probably of the order of magnitude of \$75 million.

ESTIMATES OF NATIONAL WEALTH (Table 98)

14. *Sir Henry Parnell*

Sir Henry Parnell estimated Canada's national wealth for 1830 in farm land including buildings, and in urban real estate, covering residential, industrial and commercial properties in the then settled parts of Canada, to be £60 million (quoted by Michael G. Mulhall, *Industries and Wealth of Nations*, *op. cit.*, p. 431). The official rate prevailing in 1830 was £1 = \$4.615. On this basis the value of investment in real estate was \$277 million.

According to Mulhall, a comparable figure for 1895 for investment in real estate was £375 million. A rough approximation

of total national wealth for 1830 comparable to the Mulhall estimate (see below) can be obtained by applying the ratio of the value of all real estate in Canada to total national wealth (excluding investment in railways – developed after 1830). On this basis national wealth in 1830 may have been about £130 million, or approximately \$600 million.

15. *Arthur Harvey*

The *Year Book and Almanac of Canada, 1867*, edited by Arthur Harvey of the Finance Department, Ottawa, gave \$1,136 million as the 'realized wealth' of British North America, i.e. Upper and Lower Canada, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland. While no year is referred to specifically, most of the basic data are from the decennial census for 1860. Regarding the concepts and the method of estimation the author has the following to say:

Calculations respecting realized assets must necessarily be somewhat wild in any country exempt from Government taxation upon its property. The municipal assessments in the various counties of even a single Province are not equalized – the statements given to the Census Commissioners are seldom accurate. Leaving out of view the value of the Canals, Harbors, Light Houses and Public Buildings constructed by the Governments at a cost of from \$35,000,000 to \$40,000,000; also of the Railways of the Provinces, \$150,000,000; also of the Gold and Bank Notes in circulation; also such doubtful matters as the speculative value of mining locations, etc.,—we may however put down an approximate estimate of the honestly realized property of British America.

He then gives an estimate of 'realized wealth' for each of the following sectors: farms, agricultural implements, real estate in cities, towns and villages, horses, cattle, etc., paid up stock in banks, miscellaneous stocks, goods on hand in stores above debts due, other personal property, and shipping.

16. *Michael G. Mulhall*

Michael G. Mulhall estimated Canada's national wealth in 1895 to be £1,003 million (*Industries and Wealth of Nations*, p. 327). Data are provided separately for the Maritimes, Quebec, Ontario and the western part of Canada, and for ten different items of wealth.

National wealth was defined to cover all tangible assets

including occupied land of all types, both farm and urban. The ten items for which separate estimates were prepared include: land, cattle, farm implements, railways, shipping, factories, houses, furniture, merchandise and sundries. These were derived mainly from 1891 census data and other information for agriculture, forestry and fisheries, mining, railway transportation and shipping, exports and imports, as well as financial data.

On the basis of £1=\$4.866, national wealth in 1895 was \$4,881 million. In the chapter on Canada (pp. 315-30) the year to which the estimate applies is not specifically stated, but a subsequent reference makes it clear that the author meant it to apply to 1895 (see p. 392).

17. *Sir Robert Giffen*

In 'The Wealth of the Empire, and How It Should Be Used' (*J.R.S.S.*, 1903), September 1903, Sir Robert Giffen includes an estimate of 'capital' or 'wealth' of Canada. His estimate places Canada's wealth at that time - again no specific year is stated but it is presumed to be 1903 - at £1,350 million. On the basis of £1=\$4.866, this is \$6,569 million.

Sir Robert stated that he assumed the capital or wealth of each dominion 'to be about five or six times the income which is a smaller proportion than that for the United Kingdom' (*ibid.*, p. 584). 'It will be understood, of course, that these figures as to capital are not figures built up from a multitude of data, but calculations for want of better based on a few data so as to give an approximate basis for the discussion' (*ibid.*, p. 584). J. C. Stamp described Sir Robert's wealth estimate as a 'guess' ('The Wealth and Income of the Chief Powers', *J.R.S.S.*, 1919, *op. cit.*, p. 487).

18. *Edgar Crammond*

An estimate of Canada's national wealth was made by Edgar Crammond, 'Imperial Defence and Finance', *The Nineteenth Century and After*, 1912, p. 229. The year is not specifically stated but, since it is largely based on the most recent census information and related data, it would appear to apply to either 1910 or 1911. The estimate is ascribed to 1910 by J. C. Stamp in 'The Wealth and Income of the Chief Powers' (*J.R.S.S.*, 1919, *op. cit.*, p. 487).

The estimate is £2,072 million and on the basis of £1 equal to \$4.866, is \$10,082 million.

Crammond derived his estimate by making the following assumption: 'It will perhaps be regarded as a conservative estimate to assume that the national wealth of the Dominion is eight times the amount of her net income, say, £2,072 million or £288 per head. It must be clearly understood that in this estimate no provision has been made for the ultimate development of the vast natural resources of the Dominion . . .' (*ibid.*, p. 229).

19. *Canadian Bankers' Association*

The Canadian Bankers' Association provided one of the earliest detailed estimates of national wealth, for 1914. The estimate appeared in 'National Wealth', *Journal of the Canadian Bankers' Association*, Toronto, January 1916, pp. 90-2.

The estimate of national wealth included farm values (lands and buildings), 1911 census; mines and forests (based on value of products) 1911; steam and electric railways (fifteen times net earnings); urban real property, 1914; manufacturing machinery, livestock and implements, 1911; stocks of raw materials and manufactured goods, 1911; household furnishings, clothing, carriages, motors, etc., specie, 1914; investments abroad, railways, public utilities, etc.

Methods of estimation are described as follows: 'The value of farm lands and buildings is given by the Dominion Census. The value of mines and forests is assumed to be three times the gross value of the annual output; in the case of farms, the ratio in the census year was four and a half to one. The capital invested in steam and electric railways, private and state, amounted to approximately \$2,280 million in 1914, but much of this is sunk irretrievably; on the other hand, the estimate given above doubtless errs in the other direction, as much of our recent railroad construction has hardly yet had a chance to show its earning power. The *Canada Year Book* for 1914 gives the assessment of all taxable and exempt property in the towns and cities of 4,000 and over at approximately \$3,700 million. Making deductions for the inclusion of other than real property or property included under other headings, and making a slight addition to cover the other smaller urban centres, we may estimate urban real property values at \$3,000 million. Our

census reports do not give an estimate of the value of manufacturing machinery, but United States experience shows this runs at about one-fourth annual gross product, or \$300 million. Livestock and implements statistics are given by the census. Stocks of goods, from farm, forest, mine, sea, and manufactured goods are taken at a little more than one-third of the annual output, as given in the census year. No data are available for furnishings, clothing, etc., so these are taken at two-thirds the United States per capita rate.

'Possibly half a million should be added for miscellaneous assets, and for net increases in the value in the schedules taken as of 1911. On the other hand we must deduct \$3,500 million as the mortgage outside investors hold against us.' (*Ibid.*, pp. 91-2.)

No author was mentioned but the Dominion Bureau of Statistics, in *Canada's National Wealth* (Ottawa, 1936, p. 2), suggests that the author might have been J. C. Stamp.

The detailed estimating technique yields a national wealth estimate of \$11,116 million. Again the year is not specifically stated but most of the data are from the 1911 census. The Bureau of Statistics, in *Canada's National Wealth* (p. 2), suggests that the estimate applies to 1912. Some support for the suggestion of that year (or possibly 1911) is found in the fact that another estimate (only an aggregate) puts national wealth in 1914 at \$11,500 million (*Journal of the Canadian Bankers' Association*, p. 91).

20. R. H. Coats

R. H. Coats gave two estimates of national wealth in his article, 'National Wealth and Income of Canada' (*The Monetary Times*, 1919, *op. cit.*, pp. 19-21): one based on partial probate returns for 1915 and the other, by the inventory method for 1918.

National wealth for 1915 estimated from probate returns for the Province of Ontario is over \$15 billion. The total is derived by assuming that the data for Ontario apply to Canada as a whole, and a blow-up is apparently on a population basis.

For 1918, the estimate is worked out in detail. The following items are covered: agriculture - improved lands, buildings, implements, livestock; fishing - total capital invested; mines - value of buildings and plant; manufactures - plant and working capital; railways; street railways; canals; shipping; telegraphs;

telephones; real estate and buildings in cities and towns (based on assessments of 140 localities); clothing, furniture, and personal effects; coin and bullion - held by Receiver General, specie in banks, value of token currency; imported merchandise in store; current production - agriculture, fishing, forestry, mining, manufacturing. (This national wealth estimate includes an estimate of the current production of 1917 - *op. cit.*, p. 19.)

Coats describes his method as follows: 'The figures are from various sources, but are based in large part on the census and other materials in the Dominion Bureau of Statistics. Several of them contain a considerable element of estimate, but they are perhaps as near as they can be brought with the data now in hand.' (*Ibid.*, p. 19.) Using the inventory method of estimating national wealth, Coats arrives at a figure of \$19 billion for 1918 but he adjusts the estimate downward to allow for double counting. Coats concludes: 'There is, however, some overlapping among the items which would reduce this considerably. For instance, the item "Real Estate and Buildings in Cities" reproduces a part of the item "Plant" under the heading "Manufactures". The statistics given to current manufacturing production in the final item of the table also fail to take into account the repetition of the value of raw materials in the addition of such items as wheat, flour, bakery products, etc., and of such items as iron ore, pig iron, steel ingots, bars, wire, etc. It is thought that between sixteen and seventeen billions would be an outside figure to set down as the total capital invested in Canada.' (*Ibid.*, p. 20.)

A few months later, in October 1919, Mr. Coats produced another estimate for 1918, using a different technique. This estimate appeared in 'The Wealth of Canada and Other Nations', published in the *Journal of the Canadian Bankers' Association*, Toronto, October 1919, pp. 82-6. Coats revised the estimate published in the *Journal of the Canadian Bankers' Association* in January 1916 by adding items which in his opinion were not covered and making allowance for additions to the national wealth in the intervening period. The national wealth estimate for 1918 is built up on the basis of the following components: farm values (lands, buildings, implements, and livestock), mines and forests, fisheries (capital invested), steam and electric railways, canals, shipping, telegraphs and telephones, urban real property (based on assessments of 140 localities), manu-

facturing machinery, stocks of raw materials and manufactured goods, stored products of the farm, fisheries, and the mine, household furnishings, clothing, carriages, motors, etc., specie, imported merchandise in store. These components yield a total of \$14,658 million. According to Coats, however, this estimate understates the actual national wealth because of the necessity to make 'more generous provision for current production'. Allowing for this factor, Mr. Coats concludes that the national wealth of Canada in 1918 probably was about \$16 billion, the lower range of the estimate that he had published in 3rd January 1919 issue of the *Monetary Times*. Mr. Coats emphasizes that the estimates are very rough: 'The above calculations are of the most rapid description and should be regarded as indicative rather than accurate.' (*Journal of the Canadian Bankers' Association*, p. 84.)

21. Colin Clark

Colin Clark gives an estimate of capital invested, in constant dollars, for 1900, 1911, 1929, and 1939 in *The Conditions of Economic Progress*, Second Edition, London, 1951, p. 492. The concept of capital invested is akin to that of the earlier estimates of national wealth. The main difference is the exclusion in the former of the value of land, both farm and urban.

Clark describes his estimate as 'reproducible capital'. This would cover dwellings, other buildings, capital invested in railways, shipping, public utilities, machinery, and plant; also business inventories, livestock, other agricultural capital, furniture and personal goods, and specie. Public buildings and other public capital and urban and rural land are excluded. According to Clark, the estimates reflect the market value of capital, and no attempt has been made to estimate replacement value.

Clark worked backward from 1929 by subtracting from – and forward by adding to an estimate of capital invested in 1929 – obtained from the Dominion Bureau of Statistics estimates of national wealth – an allowance for net investment. Estimates of net investment are largely based on two studies: *Public Investment and Capital Formation, A Study of Public and Private Investment Outlay, Canada, 1926–1941*, Dominion-Provincial Conference on Reconstruction, Ottawa, 1945, and *National Accounts, Income and Expenditure, 1936–1946*, Dominion

Bureau of Statistics, Ottawa, 1947, and subsequent national income publications.

Clark considers the estimates very rough and comments that they are based on data that 'are very imperfect'. (*Conditions of Economic Progress*, p. 485.)

22. Dominion Bureau of Statistics

The estimate of national wealth for 1920 is from *Canada Year Book, 1922-1923* (pp. 806-7); the estimate for 1921 is from *Report on the National Wealth of Canada and Its Provinces as in 1921*, Dominion Bureau of Statistics, Ottawa, 1924. Data for 1925-28 are from annual reports on the national wealth of Canada and its provinces for those years, including later revisions. Data for 1929 and 1933 are from *Canada's National Wealth*, Dominion Bureau of Statistics, 1936.

The Dominion Bureau of Statistics' estimates, shown by sectors and by provinces, were derived by an 'inventory' method. National wealth was defined as the value (in current dollars) of all tangible wealth, including farm and urban land but excluding undeveloped natural resources. Specifically, the following items were included for 1920: farms (land, buildings, implements, and machinery, and livestock, census 1921); mines (capital employed, 1921); forests (estimated value of accessible raw materials, pulpwood, and capital invested in woods operations); fisheries (capital invested in boats, gear, etc., in primary operations; capital in secondary operations included under 'manufacturing machinery'); central electric stations (capital invested, 1920); steam and electric railways (investment in road and equipment); canals (amount expended on construction to 31st March 1921); shipping (estimated from 1918 census); telegraph and telephone systems (cost of plant); urban real property (assessed valuations and exempted property, and estimate for undervaluation by assessors, and for roads, sewers, etc.); manufacturing machinery (Census of Industry, 1920); stocks of raw materials and manufactured goods (Census of Industry, 1920, for amount in manufacturers' hands; estimate for amount in dealers' hands); stored products of farm, fisheries, etc. (estimated from grain trade statistics, cold storage, etc.); household furnishings, clothing, carriages, motors, etc. (estimated according to procedure in U.S.A. and Australian Census Bureaus); specie (data on holdings of government and chartered

banks, and estimate of public holdings); imported merchandise in store (estimate based on imports during year).

These items were estimated in terms of net contributions to wealth, that is, attempts were made to exclude 'all duplication'. The technique is described as follows: 'In any consideration of the individual items, it should be remembered that each item covers only the portion of wealth which is mentioned in the description of the item. For example, the item of *Fisheries* includes only capital invested in primary operations, but capital invested in fish canning and curing establishments are included under *Manufactures*, though they might also be considered as part of the wealth connected with *Fisheries*. In the same way, the items for *Manufactures* do not include land and buildings in urban centres, which are shown under the heading of *Urban Real Property*.' (*Report for 1925*, p. 2.)

The estimate was prepared on a provincial basis separately for each item enumerated above. The method of estimation was described as an 'inventory' method, consisting of 'totalling the amounts known from various sources to be invested in agriculture, manufactures, dwellings, etc.' The Bureau of Statistics emphasized the approximate character of the estimates in these terms: 'It must be understood that statistics of this character are suggestive and indicative rather than strictly accurate. The concept of wealth is distinctly intangible, and there are numerous elements of uncertainty in a calculation of this nature.' (*Report for 1925*, p. 1.)

The estimates for 1921-33 are not quite comparable. The Bureau of Statistics continuously improved its technique and in making revisions usually carried them back for only one year. The revisions were the result partly of improved data becoming available and statistical techniques being refined, partly of changes in coverage. For example, in the first estimate for 1929 an allowance was added for national wealth in harbours, aircraft, and highways, which had hitherto not been covered. Only the 1928 estimate was revised to allow for this increase in coverage. While the changes made are not major, strictly speaking only the estimates for 1926 and 1927, and 1929 and 1933 are comparable with each other, that is, 1926 with 1927 and 1929 with 1933.

The last estimate of national wealth in Canada, for 1933, appeared in 1936. There were two main reasons for discon-

tinuing this series: (1) The inadequacy of available basic data raised questions as to the quality of the estimates, particularly the comparability of the items aggregated into 'national wealth', (2) the growing preference for national income data for economic analysis and policy formulation.

PARTIAL DATA RELATING TO NATIONAL WEALTH
(Tables 99 and 100)

The data on capital invested in manufacturing for 1871 and 1881 are derived from data in the *Census of Canada, 1871*, Vol. III, p. 463, and the *Census of Canada, 1881*, Vol. III, p. 505, which include working capital. The figures shown in Table 99 are for total fixed capital excluding working capital. The estimates of the fixed capital and its components for 1871 and 1881 are based on the proportions shown in the 1891 census. Data on capital invested in manufacturing in 1891 separately for land and buildings, machinery and equipment are from the *Census of Canada, 1891*, Vol. III, p. 382. The data for 1871-91 cover all manufacturing establishments irrespective of the number of persons employed. However, of manufacturing in the censuses of 1901 and 1911 covers establishments with five or more employees only, though it is stated that all establishments were included in a few industries, e.g. butter and cheese factories and brickyards.

Data on capital invested in manufacturing for 1901 and 1911 are from the *Census of Canada, 1901*, Vol. III, p. xi, and from the 1911 census, Vol. III, p. 27. The split between land on the one hand and buildings, machinery, and equipment on the other for 1911 is based on proportions in the 1901 census. The data on capital invested in manufacturing shown in the 1906 and 1911 censuses relate to the end of the preceding calendar year and are shown in Table 99 under 1905 and 1910. The data for 1905 are from Bulletin II, *Manufactures of Canada*, Census and Statistics Office, Ottawa, 1907, p. 1. Data for 1915 are from the *Postal Census of Manufactures, 1916*, Ottawa, 1917, pp. 12 and 209. The technique used for 1911 was also used to split capital invested into the value of land and the value of buildings, machinery, and equipment in 1905 and 1915. The coverage of the 1916 manufacturing census goes beyond that of establishments with five employees or more. This census includes all firms with output of \$2,500 or more even when they employ

less than five persons. The figures in Table 99 have been adjusted to eliminate working capital to assure a measure of comparability with the data for 1901-10.

The term 'manufacturing' in the censuses of 1871 to 1916 was used rather broadly. It covers, in addition to manufacturing proper (column 14 of Table 99), capital invested in electric light and power stations and hand trades such as custom clothing, blacksmithing, painting and glazing, and other construction trades.

The data on capital invested in land, buildings, implements, equipment, and livestock in agriculture for the census years 1901-41 are from the census of 1941, Vol. VIII, pp. 4 and 5. The total for 1951 is from the *Census of Canada, 1951*, Vol. VI, p. 1.

Data on capital invested in the fishing industry are available for 1901 and 1911 in the *Census of Canada, 1911*, Vol. V, p. viii. The data on capital invested cover such items as fishing vessels and boats, fishing gear, curing and canning stations, and docks and wharves used for fishing vessels. The figures shown in the 1901 census are for 31st March 1901, and the figures in the 1911 census are for the calendar year 1910. The latter figure is identical with the one shown in the annual series of capital invested in the fishing industry (Column 10 of Table 99).

Data on capital invested in mining industries for 1901 and 1911 are from the *Census of Canada, 1911*, Vol. V, p. xix. All mining industries are covered, metallic and non-metallic minerals, fuel, and the production of structural materials made of stone and clay products, as well as some miscellaneous minerals. Thus, both primary and secondary mining operations are included. There is, therefore, some duplication as far as the processing operation is concerned, with data shown as capital invested in manufacturing. Capital invested covers the 'value of real estate and plant', defined as the 'visible capital employed', i.e. excluding a valuation for proven mineral resources.

The longest annual series of capital invested is that of total fixed capital invested in the fishing industry. These were collected by the Department of Marine and Fisheries and its predecessors between 1880 and 1916 and continued by the Dominion Bureau of Statistics in co-operation with Federal and provincial Departments of Fisheries. Annual data for every fifth year only are shown in Table 99 for 1880-1915. They are from *Fisheries Statistics of Canada, 1946*, Dominion Bureau of

Statistics, 1949, p. 51. Data for 1917-45 are from the same publication, which provides separate information on the value of capital employed in primary fishing operations and in secondary operations, mainly processing and canning. Commencing in 1946, the collection of data on capital invested in secondary fishing operations was discontinued but data covering the value of vessels, boats, and fishing gear continues to be available annually.

The annual series of capital invested in agriculture begins in 1917. The data for 1917, 1918, and 1920 are from the *Canada Year Book*, 1918, 1919, and 1920, pp. 219, 225, and 267, respectively. The data for 1921-40 are from the March issues of the *Monthly Bulletin of Agricultural Statistics*, published by the Dominion Bureau of Statistics. The data for 1941-51 are from the April/June, 1952 issue of the *Quarterly Bulletin of Agricultural Statistics*, p. 109. The estimates for 1952 and 1953 were provided by the Agriculture Division of the Dominion Bureau of Statistics. This series is available in considerable detail including separate data on land, buildings, implements and equipment, and livestock up to 1935. The annual series is revised frequently as more comprehensive data from the decennial censuses and from other sources become available. The revised figures are not given in the same detail, however. The data in Table 99 for 1917-35 are the preliminary series, while those for subsequent years are revised.

Beginning in 1917, annual data on the value of total fixed assets of manufacturing industries were collected by the Dominion Bureau of Statistics. Separate totals are shown for land, buildings and fixtures, and for machinery and tools, but the value of the land is not available separately. The data published in earlier years included capital invested in central electric stations, custom hand trades, and the construction industry. The revised series for 1924, 1927, 1929, and 1943 are from two publications: *The Manufacturing Industries of Canada, 1936*, Summary Report, Ottawa, 1939, p. 52, and *The Manufacturing Industries of Canada, 1945*, Summary Report, Ottawa, 1948, p. 43. The estimates for 1944-52 are from *General Review of the Manufacturing Industries of Canada, 1952*, p. 44, and the estimate for 1953 was obtained by the method described in the latter source. Data for other years are from worksheets of the Dominion Bureau of Statistics.

The data on capital invested in central electric stations for 1919–22 are from the annual reports of *Central Electric Stations in Canada*, for the respective years: for 1925–35 from the respective annual issues of *The Manufacturing Industries of Canada*; and for 1917, 1918, 1923, and 1924 from worksheets of the Dominion Bureau of Statistics. The data relate to total fixed assets (excluding working capital) but no separate information is available on the value of land used by central electric stations. For 1936–43 annual data on capital invested including working capital were available from annual issues of *Central Electric Stations in Canada*. The figures for this period in the last column of Table 99 have been adjusted to exclude working capital on the basis of the 1935 proportion.

In addition to the data on capital invested in manufacturing, agriculture, fishing, mining, and central electric stations, new data on capital invested in the corporate sector of industry and in housing have become available in recent years. Three government agencies are responsible for the publication of these data: the Bank of Canada, Department of National Revenue, and Central Mortgage and Housing Corporation. The notes that follow describe briefly the sources and the meaning of the data for 1921–53 summarized in Table 100.

Bank of Canada

Data on investment in plant, property, and equipment by 603 corporations for 1941–51 are from the *Statistical Summary, Bank of Canada*, November 1952, p. 184, and for the 704 companies for 1947–53 from the November 1954 issue, p. 225. Data for 1935–40 are by courtesy of the Economic Research Department, Bank of Canada. The series represents the book value of fixed assets owned by the companies surveyed. Investment in plant, property, and equipment is described as ‘net’, i.e. after deduction of reserves for depreciation and depletion. The series covers land and structures, installations, machinery, and equipment. The 603 companies are firms with assets of over \$200,000 in 1941 for which consistent reports were available from 1935 to 1951, and the 704 are those with assets of over \$200,000 in 1952. Since many companies report on a consolidated basis the number of individual firms included in the sample is a good deal larger than the figures suggest, a cross-section of primary, secondary, and service industries.

Department of National Revenue

The data on investment in plant, property, and equipment by a varying number of companies, shown in Columns 4-6 of Table 100 are from annual issues of *Taxation Statistics*, published by the Department of National Revenue, Taxation Division. They are based on taxation returns of corporations and usually appear two years after the taxation year to which they apply. Information is shown separately for profit and loss companies. The industries covered include (with the number of companies tabulated in each industry in 1953 shown in parentheses): agriculture, fishing and forestry (1,021), mining (1,588), manufacturing (12,403), construction (3,459), public utilities (2,638), wholesale trade (7,706), retail trade (8,993), service (4,748), finance (5,786), unclassified (8), total industries covered (48,350). Investment in plant, property and equipment covers the book value reported to the Department of National Revenue. The 'land' item also includes other non-depreciable natural resources. The value of mineral and oil resources and timber limits is treated as 'land'. Plant and equipment covers all kinds of depreciable property. The figures are net, i.e. they exclude depreciation allowances.

Central Mortgage and Housing Corporation

Data on capital invested in residential real estate are from *Residential Real Estate in Canada*. The data on capital invested in land, structures (including installed equipment), and total real estate for 1921-47 in both current and constant dollars as shown in Columns 7-13 of Table 100 are from the above-mentioned publication, pp. 285-6. Revised data for 1948 and 1949 and new data for 1950 to 1953 are by courtesy of the Economic Research Department, Central Mortgage and Housing Corporation. The data reflect replacement value of investment in residential real estate. The methods are described in detail in the above publication on pp. 431-3.