PART III
THE NEW ESTIMATES
AND THEIR DERIVATION

THE NEW ESTIMATES
AND THEIR DERIVATION

SECTION 11

THE DATA AND THEIR LIMITATIONS

THE analysis in the preceding sections has been based, in large degree, on new estimates presented for the first time in this study. These estimates covering the period 1867 to 1920 (or 1925) are assembled in Tables 83 to 89 (at the end of this section) which also show, for purposes of comparison, data available from other sources for more recent years. The new series include:

(1) Annual estimates of population and net family formation for the period 1867 to 1925 (population and immigration data were available but estimates had to be made of births, deaths and marriages up to 1920, emigration and net family formation up to 1925 (Tables 83 and 84).

(2) Estimates of gross national expenditure by major components and constituent items – consumer expenditures (8 items), investments (3 items), government expenditures (2 items), exports and imports of goods and services (2 items) – for the years 1870, 1890, 1900, 1910, and 1920. Estimates of gross national expenditure alone were made for 1867 and 1880 on the basis of changes in the number of persons working, output per man-year, and the general price level. Estimates of gross national expenditure are given in current and constant (1935–39) dollars (Tables 85 and 86).

(3) Estimates of gross national product (expenditure) in constant (1935–39) dollars for 1867 and annually for the period 1870–1925 (Table 87).

(4) Estimates of annual averages for five-year periods of gross national expenditure in constant (1935–39) dollars, total and *per capita*, from 1870–74 to 1950–53 (Table 88).

(5) Estimates of gross national product for 1870, 1880, 1890, 1900, 1910, and 1920 on an industry basis using a value added technique and covering ten sectors. Gross national product in aggregate terms is shown in both current and constant dollars (Table 89).

235

The method of estimation is explained in detail later in this section. However, a brief description follows:

(1) All population estimates except emigration were obtained by examining the original records of births, deaths, marriages, etc., and making appropriate allowances for non-coverage and under-reporting. Emigration was estimated by deducting the sum of births and immigrants from the sum of annual population increase (itself an estimate by the Dominion Bureau of Statistics) and deaths. Thus, emigration estimates are subject to a much greater margin of error than any other component of population.

(2) Each major component of gross national expenditure was estimated independently for the years 1870, 1890, 1900, 1910, and 1920. Broadly speaking, the components were estimated in either of two ways. Direct estimates were made from basic data where satisfactory results could be obtained, e.g. Federal Government expenditures on goods and services. On the other hand, where the basic data were inadequate or where it would have been necessary to undertake a good deal of additional research to adjust them to our purpose a benchmark method was employed. For example, a number of components of consumer expenditures and expenditures for new machinery and equipment were estimated by projecting data from the official national accounts for 1926 on such trends as domestic disappearance and employment and earnings. In the case of consumer expenditures as many items as possible were estimated by a direct method for 1890, 1900 and 1910; in general, the data for 1926 were used as the basis of estimates for 1920 and those of 1900 for the estimates for 1870, 1890 and 1910. In some cases 1926 was the benchmark for the estimates for all years.

(3) Gross national product for each census year was estimated by totalling the values of production of the primary, secondary, and tertiary industries and then adding the value of rent not covered elsewhere, Federal indirect taxes less subsidies, and net interest and dividends received from abroad. The success of this method of estimating gross national product depends largely upon the accuracy with which duplication can be eliminated.

The value added by primary industries, i.e. agriculture, fishing and trapping, primary mining, and primary forest operations, is the gross value of production less certain costs of

production duplicated elsewhere. In the case of the secondary industries, manufacturing and construction, the costs of all materials used and of those services covered in the services sector were deducted from the gross value of production. The value added by service industries was estimated from samples of the value produced per man-year in a few selected service industries for 1870, 1890, 1900, 1910 and 1920.

To allow the reader to appraise the many limitations of these data, fairly detailed notes on the sources and methods of estimation are given at the end of this section. However, some general observations about the limitations and possible biases of the estimates may be appropriate here.

The limitations are of two types: biases introduced by long-term economic change and inadequacies of statistical techniques.

The former are those that result from the transformation of the economy from a pioneering community to a highly industrialized society, from a family economy to a market economy. In fact, the question may well be raised whether Canada of the 1860's has much in common with Canada of the 1950's. Such significant changes have taken place in the intervening period that an appraisal of long-term economic changes is really a comparison of different eras. The resulting biases have been ably set out in some detail by Kuznets[1] and others so that a brief summary of the more important factors may suffice here.

Many functions formerly carried out within the family and involving no monetary transactions have become commercial operations. The farmer now buys a larger proportion of his food supply and clothing than in the 1860's when he grew most of his own food and his womenfolk looked after a good deal of the clothing requirements of the family. The housewife buys bread and sends her washing to the laundry while in earlier days these functions were performed within the household. A businessman or a householder will frequently call on a tradesman to make repairs to his plant, store, or house, while in the old days it was customary for the owner of the property to look after most of its upkeep himself.

There is little doubt that the gross national product and gross national expenditure estimates for the years before 1920 do not cover all the 'income in kind' that was created, and the value

[1] 'Long-Term Changes in the National Income of the United States of America Since 1870', *Income and Wealth*, Series II, I.A.R.I.W., Bowes and Bowes, Cambridge, 1952, pp. 40-7.

of goods consumed that did not enter the market stream. Allowances for such items were made where evidence was available, but these may turn out to be inadequate. This may be particularly true for 1910 and 1900, where the gross national product estimates are 4.5 and 2.4 per cent, respectively, above the gross national expenditure estimates. In 1890 and 1920 gross national product was 1.5 and 0.3 per cent respectively, below gross national expenditure, and in 1870 it was 0.2 per cent above it.

Since transactions not entering the market economy, for which, therefore, no satisfactory record exists, were more important in the earlier years than in the recent period covered in the official National Accounts, this bias is in the direction of *understatement* of the estimates for the earlier period.

The deficiencies of the statistical techniques are due mainly to shortage of time and resources. Many short-cuts were employed in making estimates of some components where these short-cuts did not appear to jeopardize the meaningfulness of the final estimates. It would be possible to refine considerably the estimates presented here.

Gross national product estimates tend toward *overestimation* and may offset partly the downward bias resulting from the fundamental changes in the economy. Because of limitations of basic data all the duplications in value of production for different industries could not be eliminated. Each industry uses products of some other industries and unless intermediate products and services are fully netted out, the resulting estimate is likely to be too high.

The estimates of gross national expenditure, for which no specific bias seems to be indicated, may be subject to error for several reasons. In particular, it was necessary, in estimating some consumer expenditure items for the years up to and including 1920, to apply mark-ups covering distribution costs to data on domestic disappearance. Little information is available on mark-ups in this period. Another possible source of error arises from the use of series on domestic disappearance for extrapolation of some components. Apart from the question of representativeness, it is possible that wide differences in the ratio of inventories to production in the years covered might result in some differences between the trends of domestic disappearance and consumption.

Another group of problems arises out of the translation of a current dollar series into a volume or constant dollar series. The difficulties which the Dominion Bureau of Statistics encountered in deflating its estimates of gross national expenditure have been put in these terms:

> First, it may be noted that the deflation procedure adopted in the case of a number of components was to divide the current dollar values by an index of costs rather than by one of market prices. Lacking market prices for items such as new buildings and domestically-produced machinery and equipment, wage rates and raw material prices were combined in order to construct a deflator. This procedure assumes that market prices moved in the same manner as raw material prices and wage rates. Wage rate costs per unit of output will vary inversely with productivity; however, available statistics did not permit adjustments to be made for changing productivity, except in the case of residential construction since 1941. Further, in the absence of appropriate data, changing profit margins have not been taken into account in the construction of the cost index. The method of estimating constant dollar expenditures on government direct services (mainly wages and salaries) also assumes constant productivity.
>
> Other factors for which it has not been possible to allow in the price indexes are bargain sales, concealed discounts and premiums. Further, while the price of a commodity may nominally remain the same, the commodity itself may improve in quality and, in effect, this is equivalent to a reduction in its price or an increase in its quantity; attempts have been made to account for this factor in the price indexes but it is not possible to allow for it completely.[1]

For the earlier period these difficulties were multiplied, the available data were more limited and it was impossible to deflate individual items in each component separately as is done in preparing the official estimates. Moreover, the basic changes in the economy between 1867 and 1920 were more far-reaching than those in the recent period. In the first half century after Confederation many new commodities appeared on the market and many old ones passed out of use. Further, there were substantial changes in the quality and serviceability of many products. Replacement of the wood stove of the 1860's by the electric range of the 1950's, of the horse and buggy by the motor car, of the candle by the electric light, represent major shifts in the composition of the groups of consumer expenditures to which

[1] *National Accounts, Income and Expenditure, 1926–1950*, pp. 124–5.

TABLE 83 *Population, Families, Births, Deaths, Natural Increase, Immigration, Emigration, Net Migration, Annual Population Increase, Marriages and Net Family Formation, Canada,[a] 1867–1953*
(In thousands)

Year	Population	Families	Births	Deaths	Natural Increase	Immigration	Emigration	Net Migration	Annual Population Increase	Marriages	Net Family Formation
1867	3,499	761	123	62	61	15	24	− 9	52	20	4
1868	3,552	765	122	62	60	13	20	− 7	53	20	4
1869	3,610	771	123	63	60	19	21	− 2	58	21	6
1870	3,673	779	124	64	60	25	22	3	63	22	8
1871	3,737	790	125	65	60	28	24	4	64	25	11
1872	3,808	803	129	67	62	36	27	9	71	26	13
1873	3,878	816	131	65	66	50	46	4	70	27	13
1874	3,940	827	134	70	64	39	41	− 2	62	27	11
1875	3,995	834	137	72	65	27	37	−10	55	25	7
1876	4,050	843	138	71	67	26	38	−12	55	27	9
1877	4,106	851	138	75	63	27	34	− 7	56	26	8
1878	4,169	862	139	69	70	30	37	− 7	63	27	11
1879	4,237	873	138	67	71	40	43	− 3	68	27	11
1880	4,308	886	140	73	67	38	34	4	71	28	13
1881	4,362	897	134	80	54	48	48	—	54	29	11
1882	4,417	909	138	77	61	112	118	− 6	55	31	12
1883	4,472	922	138	74	64	134	143	− 9	55	32	13
1884	4,525	933	137	77	60	104	111	− 7	53	30	11
1885	4,569	942	135	82	53	79	88	− 9	44	30	9
1886	4,614	950	141	81	60	69	84	−15	45	30	8
1887	4,665	961	138	78	60	84	93	− 9	51	32	11
1888	4,717	973	139	80	59	89	96	− 7	52	32	12
1889	4,766	984	141	80	61	92	104	−12	49	32	11
1890	4,820	995	138	82	56	75	77	− 2	54	31	11
1891	4,870	1,006	138	77	61	82	93	−11	50	32	11
1892	4,919	1,017	133	79	54	31	36	− 5	49	32	11
1893	4,967	1,027	136	79	57	30	39	− 9	48	32	10
1894	5,015	1,037	135	77	58	21	31	−10	48	32	10
1895	5,062	1,046	137	77	60	19	32	−13	47	32	9
1896	5,110	1,053	148	80	68	17	37	−20	48	33	7
1897	5,162	1,061	149	88	61	22	31	− 9	52	34	8
1898	5,220	1,071	152	81	71	32	45	−13	58	36	10
1899	5,285	1,084	146	86	60	44	39	5	65	37	13
1900	5,356	1,098	146	87	59	42	30	12	71	37	14
1901	5,443	1,122	170	77	93	56	62	− 6	87	38	24
1902	5,586	1,143	175	75	100	89	46	43	143	38	21
1903	5,754	1,172	180	76	104	139	75	64	168	42	29
1904	5,929	1,203	186	80	106	131	62	69	175	43	31
1905	6,057	1,226	188	79	109	141	122	119	128	45	23
1906	6,280	1,268	188	83	105	212	94	118	223	47	42
1907	6,536	1,318	193	84	109	272	125	147	256	49	50
1908	6,727	1,352	204	85	119	143	71	72	191	49	34
1909	6,910	1,387	209	89	120	174	111	63	183	53	35

Year	Population	Families	Births	Deaths	Natural Increase	Immigration	Emigration	Net Migration	Annual Population Increase	Marriages	Net Family Formation
1910	7,116	1,431	216	93	123	287	204	83	206	58	44
1911	7,313	1,475	220	98	122	331	256	75	197	63	44
1912	7,531	1,529	236	98	138	376	296	80	218	71	54
1913	7,776	1,586	247	102	145	401	301	100	245	71	57
1914	7,939,	1,622	253	100	153	150	140	10	163	67	36
1915	7,992	1,632	255	100	155	37	139	−102	53	63	10
1916	8,036	1,641	247	105	142	56	154	− 98	44	64	9
1917	8,111	1,656	236	103	133	73	131	− 58	75	61	15
1918	8,243	1,673	237	131	106	42	16	26	132	56	17
1919	8,454	1,723	234	116	118	108	15	93	211	70	50
1920	8,691	1,784	254	116	138	139	40	99	237	80	61
1921	8,865	1,821	258	102	156	92	74	18	174	70	37
1922	8,972	1,841	253	102	151	64	108	−44	107	64	20
1923	9,087	1,866	241	105	136	134	155	−21	115	67	25
1924	9,232	1,895	246	99	147	124	126	− 2	145	65	29
1925	9,385	1,926	244	99	145	85	77	8	153	65	31
1926	9,560	1,964	233	107	126	136	87	49	175	67	38
1927	9,753	2,008	234	105	129	159	95	64	193	70	44
1928	9,948	2,055	237	109	128	167	100	67	195	74	47
1929	10,133	2,103	235	114	121	165	101	64	185	77	48
1930	10,306	2,142	243	109	134	105	66	39	173	72	39
1931	10,455	2,171	240	105	135	28	14	14	149	67	29
1932	10,581	2,190	236	104	132	21	27	− 6	126	63	19
1933	10,696	2,210	223	102	121	14	20	− 6	115	64	20
1934	10,802	2,238	221	102	119	12	25	−13	106	73	28
1935	10,906	2,268	221	106	115	11	22	−11	104	77	30
1936	11,006	2,300	220	107	113	12	25	−13	100	81	32
1937	11,107	2,339	220	114	106	15	20	− 5	101	88	39
1938	11,220	2,378	229	107	122	17	26	− 9	113	88	39
1939	11,333	2,432	229	109	120	17	24	− 7	113	104	54
1940	11,455	2,502	244	111	133	11	22	−11	122	123	70
1941	11,592	2,570	255	115	140	9	12	− 3	137	122	68
1942	11,737	2,642	272	113	159	8	22	−14	145	128	72
1943	11,883	2,697	284	119	165	9	28	−19	146	111	55
1944	12,019	2,745	284	116	168	13	45	−32	136	102	48
1945	12,200	2,795	289	114	175	23	17	6	181	108	50
1946	12,443	2,899	331	115	216	72	45	27	243	134	104
1947	12,710	2,971	360	118	242	64	39	25	267	127	72
1948	12,986	3,050	348	119	229	125	78	47	276	123	79
1949	13,602	3,197	366	124	242	95	70	25	267	124	74
1950	13,885	3,268	371	124	247	74	38	36	283	125	71
1951	14,256	3,363	380	125	255	194	78	116	371	128	95
1952	14,648	3,455	403	126	277	164	49	115	392	128	92
1953	15,035	3,547	417	127	290	169	72	97	387	133	92
TOTAL	—	—	18,035	8,110	9,925	7,404	6,090	1,314	11,239	5,234	2,717

a For 1867–1948 covers nine provinces and the Yukon and Northwest Territories. Commencing in 1949 Newfoundland is included. The entry of Newfoundland into Confederation added 349,000 to the population and 73,200 to the number of families.

TABLE 84 *Families, Births, Deaths, Natural Increase, Immigration, Emigration, Net Migration, Annual Population Increase, Marriages, and Net Family Formation per Thousand Population, Canada,*[a] *1867–1953*

Year	Families	Births	Deaths	Natural Increase	Immigration	Emigration	Net Migration	Annual Population Increase	Marriages	Net Family Formation
1867	217.5	35.1	17.7	17.4	4.3	6.9	− 2.6	14.9	5.7	1.1
1868	215.4	34.3	17.4	16.9	3.6	5.6	− 2.0	14.9	5.6	1.1
1869	213.6	34.1	17.5	16.6	5.2	5.8	− 0.6	16.1	5.8	1.7
1870	212.1	33.7	17.4	16.3	6.8	6.0	0.8	17.2	6.0	2.2
1871	211.4	33.4	17.3	16.1	7.5	6.4	1.1	17.1	6.7	2.9
1872	210.9	33.9	17.6	16.3	9.5	7.1	2.4	18.6	6.8	3.4
1873	210.4	33.8	16.8	17.0	12.9	11.9	1.0	18.0	7.0	3.4
1874	209.9	34.0	17.8	16.2	9.9	10.4	− 0.5	15.7	6.9	2.8
1875	208.8	34.3	18.0	16.3	6.8	9.3	− 2.5	13.8	6.3	1.8
1876	208.1	34.0	17.5	16.5	6.4	9.4	− 3.0	13.6	6.7	2.2
1877	207.3	33.6	18.3	15.3	6.6	8.3	− 1.7	13.6	6.3	1.9
1878	206.8	33.3	16.5	16.8	7.2	8.9	− 1.7	15.1	6.5	2.6
1879	206.0	32.6	15.8	16.8	9.4	10.1	− 0.7	16.0	6.4	2.6
1880	205.7	32.5	16.9	15.6	8.8	7.9	0.9	16.5	6.5	3.0
1881	205.6	30.7	18.3	12.4	11.0	11.0	—	12.4	6.6	2.5
1882	205.8	31.2	17.4	13.8	25.3	26.7	− 1.4	12.5	7.0	2.7
1883	206.2	30.8	16.5	14.3	30.0	32.0	− 2.0	12.3	7.2	2.9
1884	206.2	30.3	17.0	13.3	23.0	24.5	− 1.5	11.7	6.6	2.4
1885	206.2	29.5	17.9	11.6	17.3	19.3	− 2.0	9.6	6.6	2.0
1886	205.9	30.6	17.6	13.0	15.0	18.2	− 3.2	9.8	6.5	1.7
1887	206.0	29.6	16.7	12.9	18.0	19.9	− 1.9	10.9	6.9	2.4
1888	206.3	29.5	17.0	12.5	18.8	20.3	− 1.5	11.0	6.8	2.5
1889	206.5	29.6	16.8	12.8	19.3	21.8	− 2.5	10.3	6.7	2.3
1890	206.4	28.6	17.0	11.6	15.6	16.0	− 0.4	11.2	6.4	2.3
1891	206.6	28.3	15.8	12.5	16.8	19.1	− 2.3	10.3	6.6	2.3
1892	206.7	27.0	16.0	11.0	6.3	7.3	− 1.0	10.0	6.5	2.2
1893	206.8	27.4	15.9	11.5	6.0	7.8	− 1.8	9.7	6.4	2.0
1894	206.8	26.9	15.3	11.6	4.2	6.2	− 2.0	9.6	6.4	2.0
1895	206.6	27.1	15.2	11.9	3.7	6.3	− 2.6	9.3	6.3	1.8
1896	206.1	29.0	15.7	13.3	3.3	7.2	− 3.9	9.4	6.5	1.4
1897	205.5	28.8	17.0	11.8	4.3	6.0	− 1.7	10.1	6.6	1.5
1898	205.2	29.1	15.5	13.6	6.1	8.6	− 2.5	11.1	6.9	1.9
1899	205.1	27.6	16.2	11.4	8.3	7.4	0.9	12.3	7.0	2.5
1900	205.0	27.2	16.2	11.0	7.8	5.6	2.2	13.3	6.9	2.6
1901	206.1	31.2	14.1	17.1	10.3	11.4	− 1.1	16.0	7.0	4.4
1902	204.6	31.3	13.4	17.9	15.9	8.2	7.7	25.6	6.8	3.8
1903	203.7	31.3	13.2	18.1	24.1	13.0	11.1	29.2	7.3	5.0
1904	202.9	31.4	13.5	17.9	22.1	10.5	11.6	29.5	7.3	5.2
1905	202.4	31.0	13.0	18.0	23.2	20.1	3.1	21.1	7.4	3.8
1906	201.9	29.9	13.2	16.7	33.8	15.0	18.8	35.5	7.5	6.7
1907	201.7	29.5	12.8	16.7	41.6	19.1	22.5	39.2	7.5	7.6
1908	201.0	30.3	12.6	17.7	21.3	10.6	10.7	28.4	7.3	5.1
1909	200.7	30.2	12.8	17.4	25.2	16.1	9.1	26.5	7.7	5.1

Year	Families	Births	Deaths	Natural Increase	Immigration	Emigration	Net Migration	Annual Population Increase	Marriages	Net Family Formation
1910 .	201.1	30.4	13.1	17.3	40.3	28.6	11.7	28.9	8.2	6.2
1911 .	201.7	30.1	13.4	16.7	45.3	35.0	10.3	26.9	8.6	6.0
1912 .	203.0	31.3	13.0	18.3	49.9	39.3	10.6	28.9	9.4	7.2
1913 .	204.0	31.7	13.1	18.6	51.6	38.7	12.9	31.5	9.1	7.3
1914 .	204.3	31.9	12.6	19.3	19.9	18.6	1.3	20.5	8.4	4.5
1915 .	204.2	31.9	12.5	19.4	4.6	17.4	−12.8	6.6	7.9	1.3
1916 .	204.2	30.7	13.0	17.7	7.0	19.2	−12.2	5.5	8.0	1.1
1917 .	204.2	29.1	12.7	16.4	9.0	16.1	− 7.1	9.2	7.5	1.8
1918 .	203.0	28.8	15.9	12.9	5.1	1.9	3.2	16.0	6.8	2.1
1919 .	203.8	27.7	13.7	14.0	12.8	1.8	11.0	25.0	8.3	5.9
1920 .	205.3	29.2	13.3	15.9	16.0	4.6	11.4	27.3	9.2	7.0
1921 .	205.4	29.1	11.5	17.6	10.3	8.3	2.0	19.6	7.9	4.2
1922 .	205.2	28.2	11.4	16.8	7.1	12.0	− 4.9	11.9	7.1	2.2
1923 .	205.3	26.6	11.6	15.0	14.7	17.0	− 2.3	12.7	7.4	2.8
1924 .	205.3	26.6	10.7	15.9	13.4	13.6	− 0.2	15.7	7.0	3.1
1925 .	205.2	26.0	10.5	15.5	9.1	8.2	0.9	16.3	6.9	3.3
1926 .	205.4	24.4	11.2	13.2	14.2	9.1	5.1	18.3	7.0	4.0
1927 .	205.9	24.0	10.8	13.2	16.3	9.7	6.6	19.8	7.2	4.5
1928 .	206.6	23.8	10.9	12.9	16.7	10.0	6.7	19.6	7.4	4.7
1929 .	207.5	23.1	11.2	11.9	16.3	10.0	6.3	18.3	7.6	4.7
1930 .	207.8	23.6	10.6	13.0	10.2	6.4	3.8	16.8	7.0	3.8
1931 .	207.7	22.9	10.0	12.9	2.6	1.3	1.3	14.3	6.4	2.8
1932 .	207.0	22.3	9.8	12.5	2.0	2.6	− 0.6	11.9	6.0	1.8
1933 .	206.6	20.8	9.5	11.3	1.3	1.9	− 0.6	10.8	6.0	1.9
1934 .	207.2	20.4	9.4	11.0	1.1	2.3	− 1.2	9.8	6.8	2.6
1935 .	208.0	20.2	9.7	10.5	1.0	2.0	− 1.0	9.5	7.1	2.8
1936 .	209.0	20.0	9.7	10.3	1.1	2.3	− 1.2	9.1	7.4	2.9
1937 .	210.6	19.8	10.3	9.5	1.4	1.8	− 0.4	9.1	7.9	3.5
1938 .	211.9	20.4	9.5	10.9	1.5	2.3	− 0.8	10.1	7.8	3.5
1939 .	214.6	20.2	9.6	10.6	1.5	2.1	− 0.6	10.0	9.2	4.8
1940 .	218.4	21.3	9.7	11.6	0.9	1.9	− 1.0	10.7	10.7	6.1
1941 .	221.7	22.0	9.9	12.1	0.7	1.0	− 0.3	11.8	10.5	5.9
1942 .	225.1	23.1	9.6	13.5	0.7	1.9	− 1.2	12.4	10.9	6.1
1943 .	227.0 .	23.9	10.0	13.9	0.8	2.4	− 1.6	12.3	9.3	4.6
1944 .	228.4	23.6	9.6	14.0	1.0	3.7	− 2.7	11.3	8.5	4.0
1945 .	229.1	23.6	9.3	14.3	1.9	1.4	0.5	14.8	8.9	4.1
1946 .	233.0	26.6	9.2	17.4	5.8	3.6	2.2	19.5	10.8	8.4
1947 .	233.8	28.3	9.3	19.0	5.0	3.0	2.0	21.0	10.0	5.7
1948 .	234.9	26.8	9.2	17.6	9.6	6.0	3.6	21.3	9.5	6.1
1949 .	235.0	26.9	9.1	17.8	6.9	5.1	1.8	19.6	9.1	5.4
1950 .	235.4	26.7	8.9	17.8	5.3	2.7	2.6	20.4	9.0	5.1
1951 .	235.9	26.7	8.8	17.9	13.6	5.5	8.1	26.0	9.0	6.7
1952 .	235.9	27.5	8.6	18.9	11.2	3.3	7.9	26.8	8.7	6.3
1953 .	235.9	27.7	8.4	19.3	11.2	4.7	6.5	25.7	8.8	6.1

a   1867–1948 covers nine provinces and the Yukon and Northwest Territories. Commencing in 1949 Newfoundland is included.

these items belong. It was impossible to construct price indexes which would make full allowance for these changes. The more serious biases introduced in deflating the earlier estimates are likely to be in an *upward direction*. In other words, a more adequate account of new products, which are 'likely to show the greatest price decline or smallest price rise',[1] and of changes in quality and service, would probably result in a greater rise in real output and expenditures than appears from the estimates presented in this report.

To sum up: the transformation of a family economy into a market economy introduces a downward bias in the estimates for the earlier period. Inadequacies in netting and in the deflation process introduce upward biases, and the manner in which gross national expenditure was estimated may involve either upward or downward biases. All that can be said is that upward biases are offset to some extent by downward biases. Since the margin of discrepancy between gross national product and gross national expenditure varies between one-fifth of one per cent and about four and a half per cent, the errors are probably not serious enough to invalidate the general conclusions reached in this study.

NOTES TO TABLES

Tables 83 and 84

Some data in this table were obtained from published sources. Others are new estimates prepared by the Economic Research Department of the Central Mortgage and Housing Corporation.

The data for 1949–53 include Newfoundland; for 1867–1948 they exclude Newfoundland. The Yukon and Northwest Territories are covered throughout the whole period. Population and family data cover, therefore, the same area as gross national expenditure and gross national product shown in Tables 85 and 89.

Population. Data for census years from 1871 to 1951 are from decennial censuses. For intercensal years they are estimates by the Dominion Bureau of Statistics, published for 1867–1920 in the *Canada Year Book, 1936,* p. 141, and for 1921–53, in a memorandum dated 28th July 1954. These data, which up to

[1] 'Long-Term Changes in the National Income of the United States of America Since 1870', p. 47.

1900 relate to the beginning of April and since 1900 to 1st June, were converted to a year-end basis by linear interpolation.

Families. The number of families as of 1st June 1951 is from the *Census of Canada, 1951, Families Bulletin: 3–1, 13th November 1952,* Table 127–1. This figure, which includes Newfoundland and the Yukon and Northwest Territories, was adjusted to yield the number of families at the end of 1951 by adding an estimate of net family formation from 1st June to 31st December. The number of families for 1952 and 1953 was obtained by adding the net family formation to the 1951 year-end figure. The number of families for 1867–1950 were obtained by subtracting from the number of families at the end of each year the net family formation in that year.

Births. Data for 1867–1900 are based in part on records and in part on estimates. Actual records were available for Catholic births in the Province of Quebec from the registers of civil status kept by the Roman Catholic clergy for 1867–83, and from reports of the Quebec Bureau of Health for 1884 to 1900. Estimates of non-Roman Catholic births in the Province of Quebec for 1867–1900 are based on the birth rate per thousand for Ontario. The number of births for provinces other than Quebec for the year preceding each decennial census were estimated by adding to the number of persons aged one year or less, one-half the number of deaths in this age group, both sets of data being available from the censuses. The number of births for intercensal years was interpolated for Ontario and British Columbia on the basis of a series on registered births obtained from journals and sessional papers of the appropriate legislative assemblies and provincial annual reports of births registered. For the other provinces in the East the Ontario interpolation was used and for those in the West the British Columbia interpolation was used.

Births for 1901–20 are mainly from provincial annual reports of births registered or from journals and sessional papers of the provincial legislatures. In some cases the reports were incomplete and estimates of non-coverage were based on birth rates for comparable provinces. For this period, like the earlier, even where continuous records are available, all births are not covered because registration was not compulsory. Correction for this underestimation was made by using material on natural increase per decade as shown in Nathan Keyfitz 'The Growth

of Canadian Population', *Population Studies*, June, 1950, Vol. IV, No. 1, Cambridge University Press, London, p. 51.

The number of births for 1921–53 is from *Vital Statistics*, annual reports of the Dominion Bureau of Statistics, Ottawa.

Deaths. The number of deaths for 1867–1920 was obtained separately for each province and territory. For the Province of Quebec total deaths for 1867–84 are the sum of Roman Catholic deaths recorded in the registers of civil status kept by the Roman Catholic clergy and an estimate of non-Roman Catholic deaths based on the Ontario death rate. For 1885–1920 the data are from annual reports of registered deaths, issued by the Quebec Bureau of Health.

A series for deaths in Ontario for 1867–1900 was obtained from the sessional papers of the Ontario Legislative Assembly and from the annual reports of registered deaths in Ontario. It was then adjusted by means of the number of deaths recorded for the year preceding each census year given in the decennial censuses.

For British Columbia and the Northwest Territories deaths for 1867–1900 were calculated by using death rates for British Columbia for the year preceding each census, given in decennial censuses, and interpolating these rates for intercensal years.

Deaths in Manitoba and the Maritimes for 1867–1900 were calculated on the basis of death rates for the year preceding each census and intercensal interpolations. The death rates for the year preceding each census were the death rates in Ontario for the same years, adjusted to allow for differences in the age and sex composition of the population between Manitoba and Ontario and between Maritimes and Ontario. The data on age and sex composition were from the censuses for the respective areas.

For 1901–20 data were obtained from the provincial reports of deaths registered. Where data for particular provinces were lacking for some years, estimates were based on the death rate for neighbouring provinces.

Deaths for 1921–53 were obtained from *Vital Statistics*.

For the series on net family formation deaths of married persons were required. The ratios of deaths of married persons to total deaths were obtained for 1871 and subsequent census years to 1901 from decennial censuses. These ratios were interpolated for intercensal years from 1867 to 1900 and applied to

estimates of total deaths in each province to yield deaths of married persons. For 1901–20 deaths of married persons were assumed to be one-third of all deaths, the ratio that existed in the 'twenties. Data for 1921–53 are from *Vital Statistics*.

Immigration. Data on immigration for 1867–1953 are those assembled by the Department of Citizenship and Immigration and predecessor agencies and published by the Dominion Bureau of Statistics in the *Canada Year Book*.

Emigration. The number of emigrants was estimated by subtracting from the sum of births and immigrants the sum of deaths and the annual population increase. The data are thus residuals and are in effect, therefore, implicit in the estimates of total population. The series will differ from alternative direct estimates of emigration.

For the series of net family formation the number of married female migrants was required. These were assumed to be one-fifth of the total number of migrants. (For supporting evidence see *Residential Real Estate in Canada*, by O. J. Firestone, Toronto, 1951, pp. 436–7.)

Marriages. The number of marriages is in part based on actual registration, in part on estimates. For the Province of Quebec the number of Roman Catholic marriages for the period 1867–83 was obtained from the registers of civil status kept by the Roman Catholic clergy. Estimates for non-Roman Catholic marriages in the Province of Quebec for that period were based on the ratios of Roman Catholic and non-Roman Catholic population to total population in Quebec at the decennial censuses of 1871 and 1881. The total numbers of marriages in the Province of Quebec for 1884–1920 are from the *Statistical Year Book of Quebec, 1921*, p. 54.

Marriage registrations were available for the other provinces for almost the whole period or for scattered years, in the journals and sessional papers of the various legislative assemblies and in provincial annual reports. Estimates were made to complete the component series by using the marriage rates for comparable provinces.

Data on marriages for 1921–53 are from *Vital Statistics*.

Net Family Formation. Net family formation is the total number of families formed less the number of existing families dissolved during a year. The total number of families formed is the sum of marriages and married female immigrants, and the

s

TABLE 85

Gross National Expenditure, by Sectors, in Current Dollars, Canada, Selected Years, 1867–1953

(In millions of dollars)

Year	Expenditure on Consumer Goods and Services	Gross Investment			Government Expenditure on Goods and Services	Exports and Imports of Goods and Services			Residual Error	Gross National Expenditure
		New Residential and Non-Residential Construction and New Machinery and Equipment	Change in Inventories	Total		Exports	Imports	Net Foreign Balance		
1867	—	—	—	—	—	—	—	—	—	419
1870	404	54	14	68	21	79	114	— 35	—	458
1880	—	—	—	—	—	—	—	—	—	612
1890	691	113	13	126	54	110	—166	—56	—	815
1900	858	126	13	139	77	203	—245	—42	—	1,032
1910	1,677	389	176	565	173	349	—626	—277	—	2,138
1920	3,971	1,008	280	1,288	554	1,619	—1,889	—270	—	5,543
1929	4,393	1,330	61	1,391	682	1,632	—1,945	—313	+13	6,166
1930	4,204	1,054	—154	900	767	1,286	—1,625	—339	+14	5,546
1933	2,887	239	—82	157	526	826	—828	—2	—16	3,552
1939	3,904	605	331	936	735	1,451	—1,328	+123	+9	5,707
1945	6,811	986	—260	726	3,704	3,597	—2,910	+687	—78	11,850
1950	12,029	3,216	960	4,176	2,326	4,183	—4,513	—330	+2	18,203
1951	13,273	3,810	1,620	5,430	3,243	5,089	—5,613	—524	+52	21,474
1952	14,363	4,256	270	4,526	4,259	5,573	—5,400	+173	—119	23,202
1953	15,115	4,840	605	5,445	4,362	5,420	—5,860	—440	—66	24,416

number of families dissolved is the sum of the deaths of married persons, married female emigrants and divorces. The methods of estimating marriages, net married female migrants, and deaths of married persons have been mentioned above. Divorces for 1867–1920 were disregarded because there were less than a thousand each year and the estimates in this table are rounded to the nearest thousand. For 1921–53 divorces are from *Vital Statistics*.

Net family formation for 1921–51 is the series shown as adjusted net family formation in *Residential Real Estate in Canada*, p. 288. The series for 1941–51 includes some revisions not incorporated in the corresponding data shown there, with adjustments based on the 1951 census. In the main the adjustment in the estimate of net family formation in each decade ties with the increase in the number of families over the decade shown by the censuses. (For further explanation, see *Residential Real Estate in Canada*, p. 438.) Since the adjustments in the last three decades have been minor this adjustment has not been carried back beyond 1921. No adjustment was made to the 1952 and 1953 figures.

Table 84

Ratios based on data in Table 83.

Table 85

The notes below summarize the methods and sources used in estimating the components of gross national expenditure for 1920, 1910, 1900, 1890, and 1870. Three main considerations governed the choice of estimating techniques: (*a*) the desirability of making the estimates as comparable as possible with those prepared by the Dominion Bureau of Statistics for the years 1926 onward. This consideration counselled the use of concepts similar to those underlying the official estimates, and the projection of some components in the 1926 and 1930 estimates back to earlier years; (*b*) the need to make the maximum use of all available basic data. In some cases more data were available for 1900 than for the other years and it was, therefore, possible by using a different method in the earlier years to produce more reliable estimates; (*c*) the advisability of limiting the period of time spanned by extrapolation since the estimates were for single years rather than decennial averages. This was one of the main reasons for estimating expenditures on the major consumer goods in 1890, 1900, and 1910 by the

domestic disappearance[1] plus mark-up method. The notes on the estimation of consumer expenditures are set up to bring out these differences of technique.

1. CONSUMER EXPENDITURES

(i) (a) *Items Estimated Separately for* 1920

FOOD, DRINK, TOBACCO, CLOTHING, HOUSEHOLD
ARTICLES, AND VEHICLES

	Con-sumer Expendi-tures, 1930	Domestic Dis-appear-ance, 1930	Index of Domestic Disap-pearance of Con-sumer Goods, 1923 (1930= 100)	Index of Domestic Disap-pearance of Con-sumer Goods, 1920 (1923= 100)	Domestic Disap-pearance of Con-sumer Goods, 1920	Con-sumer Expendi-tures, 1920
	$ mill.	$ mill.			$ mill.	$ mill.
	(1)	(2)	(3)	(4)	(5)	(6)
Food	1,068	1,030	81.26	167.76	1,404.2	1,362.4
Tobacco and Alcoholic Beverages	277	267	59.30	124.75	197.1	191.2
Clothing and Personal Furnishings	570	550	92.20	132.88	673.7	653.7
Household Equipment and Supplies	244	236	69.73	150.53	248.4	241.0
Vehicles	246	237	58.00	168.53	230.9	224.0

(1) From *National Accounts, Income and Expenditure, 1926–1950*, Dominion Bureau of Statistics, p. 74.

(2) Column (1) plus increase in inventories of consumer goods. For method of breaking down inventories, see notes on net change in inventories.

(3) The change in domestic disappearance of each group of consumer goods from 1923 to 1930 was estimated from data in *A Decade of Retail Trade, 1923–1933*, Dominion Bureau of Statistics.

(4) The change in domestic disappearance from 1920 to 1923 was estimated by calculating domestic disappearance of a number of important items in each group.

(5) Column (2) projected to 1920 by indices in Columns (3) and (4).

[1] Domestic disappearance corresponds to 'available for consumption', that is production plus imports minus exports with no account being taken of changes in inventories.

(6) Column (4) minus increment in inventories of consumer goods during 1920. For method of estimation see notes on net change in inventories.

FUEL

Fuel Expenditures, 1930 $ million	Index of Fuel Expenditures, 1923 (1930=100)	Index of Fuel Expenditures, 1921 (1923=100)	Index of Fuel Expenditures, 1920 (1921=100)	Expenditures on Fuel, 1920 $ million
(1)	(2)	(3)	(4)	(5)
128	88.0	100.7	71.1	81.1

(1) From *National Accounts, Income and Expenditure, 1926-1950,* Dominion Bureau of Statistics, p. 74.

(2) Calculated from estimated value of sales of coal and wood yards for 1923 and 1930 in *A Decade of Retail Trade,* Dominion Bureau of Statistics, p. 24.

(3) Obtained from the change in retail sales of coal in the *Canada Year Book.* Change in the amount of coal distributed through retail dealers for 1921 and 1923 (from *Canada Year Book,* 1924), adjusted for change in price by the fuel component of the cost-of-living index.

(4) Arrived at by deducting from domestic disappearance of coal (production from *Canada Year Book, 1922-23;* imports and exports from *Trade of Canada*) consumption of coal by manufacturing industries (from unpublished material made available by the Bureau of Statistics) and consumption of coal by steam railways (*Report on the Steam Railways of Canada, 1921*).

(5) Column (1) adjusted by the indices in Columns (2), (3), and (4).

(i) *(b) Other Items Estimated Separately for* 1920

Item	Amount $ million
(1) Domestic Service	59.6
(2) Electricity	15.6
(3) Gas	12.2
(4) Hospital Care	33.5
(5) Private Duty Nurses . . .	7.8
(6) Telephones	14.6

(1) *Domestic Service.* The estimates for domestic service are projections of the official estimates for 1930 back to 1920 by the trend in earnings of domestic servants. One problem encountered was that in the 1921 census, earnings were tabulated only for cities with 30,000 population and over. It was, therefore,

necessary to assume that the relationship of average earnings in these cities to those in Canada as a whole was the same in 1921 as in 1931. Another problem was that no data were available on earnings of self-employed persons. It was assumed that the average income of self-employed persons was the same as that of wage earners in the same occupation. The source used for occupations in 1921 was the *Census of Canada, 1921,* Vol. IV, pp. 32–4; in 1931 the *Census of Canada, 1931,* Vol. I, pp. 1294–6. The source for earnings of wage earners in 1931 was the *Census of Canada, 1931,* Vol. V, pp. 126–8, and for earnings of wage earners in cities with population of 30,000 and over in 1921 was the *Census of Canada, 1921,* Vol. III, pp. 156–446, and in 1931 the *Census of Canada, 1931,* Vol. V, pp. 388–649. Except where otherwise noted, the same assumptions were made and data used in other cases where earnings were used to project expenditures on services in 1930 back to 1920.

(2) *Electricity.* A direct estimate was made from sales of electricity for lighting purposes. It was assumed that the ratio of sales to domestic consumers to total sales for lighting purposes was the same in 1920 as in 1929, the first year in which statistics of domestic consumption were prepared separately. Data are from the Dominion Bureau of Statistics, *Central Electric Stations.*

(3) *Gas.* Estimated directly from sales of manufactured gas and natural gas production in 1920. The 1942 ratios of domestic to total sales were used.

(4) *Hospital Care.* The average number of patient days in hospitals in 1930 (*Census of Canada, 1931,* Vol. IX, p. 96) was projected back to 1920 by the trend in total population. Average cost of maintenance per patient per day for 1930, obtained by dividing the Bureau of Statistics estimate of costs of hospital care (*National Accounts, Income and Expenditure, 1926–1950,* p. 74) was carried back to 1920 by the index of hospital costs prepared by the Bureau of Statistics (*Prices and Price Indexes, 1913–1930,* p. 196). The estimate of expenditures on hospital care is the product of the number of persons in hospitals and average cost of maintenance.

(5) *Private Duty Nurses.* The official estimate for 1930 was extrapolated by the trend of earnings. An estimate of the number of private duty nurses for 1930 was obtained by deducting graduate nurses employed as wage earners from total

graduate nurses. Nurses and nurses-in-training were included in one group in the data on wage earners in the 1921 census. It was assumed that the ratio of students to graduate nurses was the same in 1920 as in 1930. The ratio of private duty nurses to total graduate nurses was also the same. Average wages of nurses were estimated in 1920 by applying to the census figure for 1930 the percentage change in cost of maintenance of hospital patients from 1920 to 1930.

(6) *Telephones.* Receipts of telephone companies from residential and rural subscribers were estimated from data on the number of telephones used by each class of subscriber. It was assumed that revenue-wise one pay phone was equivalent to ten residential phones, and one business phone the equivalent to three residential phones.

(ii) *Items Estimated Separately for* 1890, 1900, *and* 1910

FOOD, TOBACCO AND ALCOHOLIC BEVERAGES, CLOTHING AND PERSONAL FURNISHINGS, AND HOUSEHOLD ARTICLES

(In millions of dollars)

Year and Item	Domestic Production (1)	Exports (2)	Imports and Duty (3)	Domestic Disappearance (4)	Flow to Consumers at Retail Prices (5)
1890:					
Food	175.7	26.3	20.0	169.4	203.4
Tobacco and Alcoholic Beverages . . .	20.0	0.1	4.7	24.6	39.7
Clothing and Personal Furnishings . .	73.0	0.1	10.9	83.8	120.4
Household Equipment and Supplies . .	26.7	0.9	7.1	32.9	49.7
1900:					
Food	250.1	57.6	23.7	216.2	265.8
Tobacco and Alcoholic Beverages . . .	30.0	0.5	7.1	36.6	51.4
Clothing and Personal Furnishings . .	88.5	1.0	12.5	100.0	142.7
Household Equipment and Supplies . .	25.9	0.9	8.7	33.7	50.3
1910:					
Food	413.8	69.8	48.9	392.9	486.7
Tobacco and Alcoholic Beverages . . .	66.1	1.2	15.2	80.1	177.1
Clothing and Personal Furnishings . .	161.1	0.4	31.2	191.9	290.8
Household Equipment and Supplies . .	52.1	0.9	19.6	70.8	107.1

(1) The basic data on domestic production are from the decennial censuses of 1891, 1901 and 1911. However, a number of adjustments were necessary before they could be used.

(*a*) The census of manufactures in both 1901 and 1911 covered only establishments employing five or more persons, with certain exceptions (see notes to 'value added by manufacturing' for Table 89, for further details). By comparing the value of products in manufacturing for all establishments and for those with five or more employees in 1890 and 1900 it was estimated that the value of manufacturing output shown in the 1900 census would have to be increased about 21 per cent, or by $103 million, to cover all establishments. This amount was distributed among the fifteen major manufacturing industries in accordance with the proportion of production in each industry accounted for by establishments employing five or more persons in 1890, and its growth during the following decade. The value of manufacturing output reported in the 1911 census was raised about eight and a half per cent to cover the output of establishments not covered in that census (see notes to value added by manufacturing for Table 89).

These estimates were used to prepare the sets of 'adjusters' shown below:

Item	Adjuster 1901	1911
Food and Products	1.410	1.144
Textiles	1.195	1.093
Iron and Steel Products	1.038	1.011
Timber and Lumber	1.145	1.100
Leather	1.355	1.188
Paper and Printing	1.045	1.019
Beverages	1.067	1.020
Chemicals and Allied Products	1.161	1.064
Clay, Glass and Stone Products	1.282	1.065
Other Metals and Products	1.284	1.073
Tobacco	1.017	1.008
Vehicles, Land	1.196	1.054
Vehicles, Water	1.101	1.030
Miscellaneous	1.182	1.067
Hand Trades	8.065	2.915
Total, excluding industries fully covered in censuses of 1901 and 1911	1.230	1.109
Grand Total	1.214	1.084

All manufactured items entering the flow of consumer goods and services were multiplied by the adjuster for the appropriate industry group for 1900 and 1910. Since the 1891 census covered all manufacturing establishments, no such adjustment was necessary for that year.

(*b*) It was also necessary to adjust data on production to include only finished items.

When the census did not provide a sufficiently detailed breakdown to separate finished from semi-manufactured goods, the 'omnibus' item was broken down in accordance with its composition in later years. When there was doubt as to the comparability of definitions in the 1901 census with those in later censuses, inquiries were addressed to the appropriate officers of the Dominion Bureau of Statistics. For example, the item 'woollen goods' (*Census of Canada, 1911*, Vol. III, p. 25) was assumed to be largely identical with 'woollen cloth' in subsequent censuses, and was broken down in accordance with the distribution of woollen cloth in 1925 (cf. Dominion Bureau of Statistics, *The Textile Industries of Canada in the Decade, 1917–1926*, p. 84).

In some cases it was difficult to distinguish between finished and unfinished goods because part of the output directly entered the flow of consumer goods and services while another part was used in the production of other consumer goods. For example, most of the butter produced went immediately into consumption, but a portion of it was used in the manufacture of bread, biscuits, and confectionery. Where it appeared that an item was manufactured largely from materials which were indistinguishable from finished consumer goods, the cost of materials was deducted from the total value of products. This course was followed for: bread, biscuits, confectionery, condensed milk, evaporated fruits and vegetables, fruit and vegetable canning, sugar refining, vinegar and pickles, aerated and mineral waters, all other breadstuffs (included in All Other Foods).

(*c*) Excise taxes, as shown in the *Public Accounts*, were added to the value of production of tobacco and alcoholic beverages.

(2) Exports are from *Trade and Navigation of the Dominion of Canada*, 1891, 1901, and 1911, and *Report of the Department of Trade and Commerce*, 1901 and 1911. The period covered is the fiscal year beginning 1st July 1890 and 1901 and April 1910. Production data cover the 'census' period, that is, the twelve months ended 1st April 1891 and 1901, and 31st December 1910. The resulting discrepancy was thought too small to warrant the task of putting exports and imports on the same time unit basis as production.

(3) From the same source as (2). Since imports are evaluated f.o.b. they had to be adjusted for the cost of carriage to the Canadian border. According to estimates of the Bureau of Statistics, this cost has been, in recent years, about nine per cent of the total value of imports. This percentage was applied to imports for the fiscal years beginning 1st July 1890 and 1900, and 1st April 1910.

(4) Column (1) minus Column (2) plus Column (3). In the absence of adequate information, no allowance has been made for change in inventories of finished items.

(5) A mark-up for transportation and distribution costs within Canada was applied to each item where appropriate. The amount of the mark-up was based upon information contained in the proceedings and evidence of the *Special Committee of the House of Commons on the Cost of Living, 4th June to 5th July 1919*. Reference was also made to the proceedings and evidence of the *House of Commons Special Committee on Price Spreads and Mass Buying, 1919*. The following mark-ups were used:

Food (other than fish):
Wholesale	12 per cent	
Retail	20 ,,	,,
Total	34 ,,	,,

Fish, Fresh . . . . . 100 ,, ,,

Fish, Preserved . . . . 50 ,, ,,

Clothing:
Wholesale .	17 ,,	,,
Retail	50 ,,	,,
Total	76 ,,	,,

Shoes:
Total . . . . . 40 ,, ,,

Home Furnishings:
Total . . . . . 60 ,, ,,

The total mark-up was used for those products that normally passed through both wholesale and retail channels and the retail mark-up for those items that usually involved one middleman. In a few instances special rates of mark-up, or no mark-up at all, were employed.

Thus, in the case of food, the total mark-up was applied to such products as baking powder, condensed milk, refined sugar, etc., and the retail mark-up to such items as flour, grist-mill products, fresh fruits, meats, etc. A special 10 per cent mark-up was used for eggs and potatoes, while no mark-up was applied to bread sales.

In the clothing group, the total mark-up was used for shirts, collars, blouses, other furnishings, gloves and mittens, hosiery, knitted wear, etc., the retail rate for men's and women's factory clothing, and no mark-up for men's and women's custom clothing.

In the case of home furnishings, the total mark-up was used for furniture, electrical apparatus and supplies, window blinds, etc. The total clothing mark-up, 76 per cent, was used for such products as sheets and towels, and the total manufactured foodstuffs mark-up, 34 per cent, for such items as matches, soap, and wax candles.

COAL

Year	Consumption of Anthracite 000 tons	Anthracite Retail Price per Ton $	Expenditures on Anthracite $ mill.	Consumption of Bituminous Coal 000 tons	Retail Price of Bituminous Coal $	Expenditures on Bituminous Coal $ mill.	Total Consumer Expenditures on Coal $ mill.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1890	1,378	5.81	8.0	119	6.72	0.8	8.9
1900	1,698	6.42	10.9	200	5.00	1.0	12.1
1910	2,547	7.66	19.5	304	7.24	2.2	22.7

(1) In view of the difficulty of estimating the amount of coal production and imports destined for household consumption, a special procedure was devised for estimating consumer expenditures on coal. A basic assumption was that no coal was consumed outside urban centres.

On the basis of coal consumption data for six major cities in Ontario, Quebec, and Manitoba given in *The Labour Gazette*, Vol. 3, pp. 334–51, it was estimated that urban consumption of anthracite *per capita* in these three provinces was approximately .987 tons per person per year. The cities and towns used to estimate urban consumption of anthracite *per capita* in Ontario, Quebec, and Manitoba appear to have been predominantly anthracite-burning centres. As a result total anthracite consumption may be overstated. It was assumed that this overstatement was approximately equivalent to the comparatively small quantity of bituminous coal consumed in Ontario, Quebec and Manitoba; and no attempt was made to estimate

consumption of bituminous coal in these provinces. By applying anthracite consumption *per capita* to the urban population of Ontario, Quebec and Manitoba, total anthracite consumption in these provinces was estimated.

Anthracite consumption *per capita* in the Maritimes was put at one-quarter the level for the Central Provinces in the light of information in the article in *The Labour Gazette* referred to above. An estimate of anthracite consumption in British Columbia was given in *The Labour Gazette*, Vol. 3, p. 350.

(2) Average prices of anthracite as of 1st October 1900 for each major region were calculated from data in *The Labour Gazette*, Vol. 3, pp. 358–63. For 1890, these prices were adjusted by the trend in import prices and for 1910, by the trend in retail prices of anthracite and bituminous coal in urban centres, given in the *Report of the Board of Inquiry into Cost of Living in Canada*, 1915, Vol. II, p. 65.

(3) Column (2) multiplied by Column (1).

(4) The estimate for soft coal consumption in Vancouver in 1900, given in *The Labour Gazette*, Vol. 3, p. 350, was used to estimate urban consumption of soft coal in British Columbia, on the assumption that urban consumption *per capita* in other British Columbia cities and towns was the same as in Vancouver.

(5) From the sources cited for Column (2).

(6) Column (4) multiplied by Column (5).

(7) Column (3) plus Column (6). Crude estimates of $100 thousand, $200 thousand, and $1 million based largely on population data have been added to the totals to cover the Northwest (unorganized) Territories for 1890 and 1900, and Saskatchewan, Alberta, and Northwest Territories for 1910.

FIREWOOD

Year	Firewood Consumption 000 Cords (1)	Percentage Consumed in Urban Areas (2)	Urban Price $ per Cord (3)	Rural Price $ per Cord (4)	Urban and Rural Expenditure on Firewood $ million (5)
1890	10,399	8.4	5.81	1.72	21.5
1900	8,802	9.7	5.97	1.65	18.2
1910	6,883	11.5	7.60	2.15	19.1

(1) Production of firewood by provinces is given in the decennial censuses. The comparatively small quantities exported were deducted from the production figures but no allowance was made for inter-provincial movements or for inventory changes.

(2) The arbitrary assumption was made that firewood consumption *per capita* in urban areas was one-quarter of that in rural regions in each province.

(3) For 1900 an urban price was calculated from data in *The Labour Gazette*, Vol. 1, pp. 98–9. For 1890 and 1910 urban prices were calculated by adjusting those for 1900 by the change in export prices.

(4) For 1900 and 1910 the rural price for each province was calculated from the volume and value of production given in the censuses. Since the census of 1891 reported only the volume of production, the 1900 price for each province was adjusted by the change in export prices between 1890 and 1900 to yield the 1890 price.

(5) Urban consumption multiplied by urban price, plus rural consumption multiplied by rural price.

HOSPITAL CARE

Year	Number of Patients, Census Date	Average Hospital Costs per Patient per Day $	Expenditures for Hospital Care $ million
	(1)	(2)	(3)
1890 . .	4,781	1.01	1.8
1900 . .	7,007	1.01	2.6
1910 . .	12,600	1.35	6.2

(1) The number of patients in hospital in each province in 1890 and 1900 are from the decennial censuses and apply to the census date. The 1910 figure is a special estimate based on population and other data.

(2) Average hospital costs per person for each region were calculated from data in the *Report of the Board of Inquiry into Cost of Living in Canada*, 1915, Vol. 2, pp. 360–6.

(3) The number of patients for each province multiplied by 365 yielded the number of patient-days, which was then multiplied by the average cost per day per person to give an estimate of total cost of hospital care for each province.

DOMESTIC SERVICE

Year	Number of Cooks, Housekeepers, General Domestic Servants 000	Average Wage plus Income in Kind $	Expenditure for Domestic Service $ million
	(1)	(2)	(3)
1890 . .	68.9	215	14.8
1900 . .	79.7	229	18.3
1910 . .	86.3	297	25.6

(1) Numbers of various types of domestic and personal servants in 1901 were obtained from unpublished census material made available by the Dominion Bureau of Statistics. These data were adjusted to exclude servants employed by business and institutions in the following manner:

(a) An estimate of the number of servants employed by hotels and restaurants was made on the basis of material in the *Census of Canada, 1931* (hotels, Vol. XI, p. 1238; restaurants, etc., Vol. X, p. 13; persons employed as waiters and waitresses, Vol. VII, p. 72).

In the light of the increase in the number of waiters and waitresses from 1900 to 1931, it was estimated that about 6,890 persons were employed by hotels and restaurants in 1901 as cooks, general servants, housekeepers, etc. Another 3,241 servants were estimated as being employed by taverns and saloons. These numbers were deducted from the appropriate classes of servants in 1901.

(b) An estimate of 6,026 was deducted for servants employed by hospitals and charitable institutions in 1901. This figure was arrived at by projecting the staff of these institutions back from 1931 to 1900 in accordance with the trend in the number of patients and inmates, with some allowance for an increase in the ratio of staff to patients from 1900 to 1931 (*Census of Canada, 1931*, hospital staffs, Vol. IX, p. 94; mental institutions, Vol. IX, p. 188; charitable and benevolent institutions, Vol. IX, p. 270; *Census of Canada, 1931*, inmates and institutions, Vol. IV, p. 357). The deduction was made proportionately for the various classes of servants.

(c) A deduction of 2,000 was made from cooks, male, to allow for those employed in lumber camps, ships, etc.

(d) The resultant 'netted' domestic servants amounted to 62.4 per cent of the total of persons in domestic and personal service and this proportion was applied to the totals reported in the censuses of 1911 and 1891 to obtain estimates of domestic servants for those years.

(2) The average annual wage was obtained from the 1901 census material and an addition was made to cover the value of income in kind received by servants 'living in'.

On the assumption that general non-resident domestic servants would receive approximately the same wage as laundry workers, it was estimated that the average wage of such servants as given in the census would have to be increased, in the case of males, about 45 per cent, and in the case of females, 60 per cent to include income in kind. These percentages were also applied to other types of servants who were likely to be resident, such as cooks, coachmen, housekeepers, etc. The average wage plus income in kind for domestic servants for 1910 was estimated by adjusting the 1900 average by the increase in the wages of domestic servants (29.7 per cent) shown in the *Report of the Board of Inquiry Into Cost of Living in Canada*, 1915, Vol. II, page 430. For 1890, the 1900 average wage including income in kind was adjusted by the trend shown in the average monthly earnings (including board) of domestics on farms in Ontario for 1890 and 1900, given in the *Ontario Bureau of Industry Reports* for 1890 and 1900.

(iii) *Items Estimated Separately for* 1870

FOOD, TOBACCO AND ALCOHOLIC BEVERAGES, CLOTHING AND PERSONAL FURNISHINGS, HOUSEHOLD ARTICLES, AND VEHICLES

(Value figures in millions of dollars)

Item	Expenditure 1900	Per Cent Increase 1870–1900	Expenditure 1870
Food	265.8	87.9	141.5
Tobacco and Alcoholic Beverages	51.4	117.4	22.1
Clothing and Personal Furnishings	142.7	133.0	65.6
Household Equipment and Supplies	50.3	136.7	21.1
Vehicles	12.8	65.6	7.7

Expenditures in 1870 on the items listed above were estimated by using the estimates for 1900 as benchmarks. Estimates were extrapolated by calculating domestic disappearance of a number of items in each group for 1870 and 1900 from production and trade data in the decennial censuses of Canada, 1871 and 1901, and *Tables of Trade and Navigation*, 1871 and 1901.

FUEL

(In millions of dollars)

Anthracite Coal	Bituminous Coal	Firewood	Total
(1)	(2)	(3)	(4)
1.0	1.2	23.1	25.3

(1) The estimate of anthracite consumption in 1900 was carried back to 1870 by the trend in imports of anthracite. In the trade statistics of 1870 no distinction is made between anthracite and other coal. However, starting in 1877 anthracite and bituminous coal were shown separately, and in the succeeding years the ratio of anthracite coal imports to bituminous coal imports was fairly constant. Imports of anthracite in 1870 were, therefore, estimated on the assumption that the ratio of anthracite to total coal was approximately the same as in 1877.

(2) In the latter part of the nineteenth century bituminous coal does not appear to have been consumed very much in households outside the coal-producing areas. It did not seem legitimate to assume that there would have been a shift from wood fuel to coal in these regions of the magnitude apparent in the case of Central Canada where consumption of imported anthracite coal increased markedly. Consumption of bituminous coal in 1870 was, therefore, estimated by using the trend in consumption of firewood back from 1900.

(3) Production of firewood in 1870 is from the *Census of Canada, 1871*, Vol. V, p. 145. The average price of firewood per cord in 1900 was extrapolated to 1870 by the trend in export prices of firewood. The resulting estimate of the domestic price of firewood was then applied to production data to yield a figure for expenditure on firewood.

OTHER ITEMS ESTIMATED SEPARATELY

(In millions of dollars)

Domestic Service (1)	Hospital Care (2)	Total Other Items (3)
6.2	0.9	7.1

(1) Average earnings per domestic servant in 1900 were carried back to 1870 by the trend in selected comparable consumer expenditures by employed persons. The number of domestic servants employed in households in 1870 was estimated on the assumption that the ratio of servants in households to total domestic servants was the same in 1870 as in 1900. Expenditures on domestic service is the product of the number of servants in households and average earnings.

(2) The cost of hospital care per patient per year in 1870 was estimated by adjusting the cost of hospital care per patient per year in 1900 by the trend in the general wholesale price index between 1870 and 1900. The resulting estimate was multiplied by the number of patients in hospitals on 31st March 1871 (*Census of Canada, 1871*).

(iv) *Items Estimated Similarly for All Years*

SHELTER

Year	Number of Occupied Dwellings at End of Year 000 (1)	Shelter Expenses as per National Accounts $ million (2)	Average Shelter Expenses per Occupied Dwelling (2:1) $ (3)	Shelter Index (4)	Newly-Estimated Average Shelter Expenses per Occupied Dwelling $ (5)	Newly-Estimated Total Shelter Expenses (1)×(5) $ million (6)
1870[a]	568	—	—	29.8	92.60	53
1880	738	—	—	32.5	100.99	75
1890	852	—	—	34.0	105.65	90
1900	1,008	—	—	37.4	116.21	117
1910	1,430	—	—	52.7	163.75	234
1913	1,566	—	—	60.6	188.30	295
1920	1,827	—	—	81.5	253.24	463
1930	2,227	692	310.73	100.0	—	—
1940	2,578	661	256.40	86.6	—	—
1949	3,059	1,190	389.02	100.0	—	—

[a] Estimate for four provinces only; the estimate for all Canada is $56 million.

T

(1) Occupied dwellings for 1930, 1940, and 1949 from *Residential Real Estate in Canada*, p. 271; for 1920, the 1921 figure from p. 271 minus the net increase during the year; for 1913, occupied dwellings for mid-1911 from p. 478 plus two-thirds of completions for 1911, completions for 1912, and completions for 1913 minus a 4 per cent allowance for demolitions; for 1910, 1900, 1890, and 1880, occupied dwellings for 1911, 1901, 1891, and 1881 from p. 478 minus one-third of completions for these years; for 1870 occupied dwellings for 1871 from *Census of Canada, 1871*, Vol. V, p. 6, adjusted to preceding year end. Completion estimates from 1900 to 1920 are from Table 90.

(2) From *National Accounts, Income and Expenditure, 1926–1950*, pp. 74–5.

(3) Column (2) divided by Column (1).

(4) Shelter index for 1913–49 is the new consumer price index (1949=100) provided by courtesy of The Prices Division, Dominion Bureau of Statistics. For 1913–40 the index is the rental index, and for 1949 it is the shelter index. These indices have been linked together. For 1900, 1910, and 1913 the data represent the unweighted rental index of a typical six-room dwelling in working-men's quarters, with sanitary conveniences, compiled by correspondents of *The Labour Gazette* and published in the *Report of the Board of Inquiry into Cost of Living in Canada*, 1915, Vol. II, p. 379. This index has been linked to the Bureau's shelter index. To carry the shelter index back to 1890, 1880, and 1870 when no data on rents were available it was necessary to adjust it for the improvement in the quality of housing and for changes in the cost of construction. The first adjustment was made by dividing the shelter index in 1900 by the ratio of persons per dwelling in each of the earlier years to persons per dwelling in 1900. Allowance was made for changes in costs by dividing the shelter index, adjusted for changes in quality, by an index of prices of selected building materials and construction labour.

(5) Newly-established average shelter expenses per occupied dwelling for 1870–1920 were estimated by extrapolating the average shelter expenses per occupied dwelling for 1930, Column (3), by the shelter index, Column (4).

(6) Newly-estimated total shelter expenses for 1870–1920 are the product of Column (1) and Column (5).

OTHER ITEMS

(In millions of dollars)

Item	1870	1890	1900	1910	1920
1. Medical and Dental Care	6.7	13.0	16.2	29.2	54.2
2. Death Expenses . .	3.0	5.4	6.0	8.9	21.7
3. Barber Shops and Beauty					
Parlours	0.4	2.0	3.0	6.7	17.1
4. Education (Private) . .	0.6	0.8	2.1	4.0	14.2
5. Hotels	0.3	1.0	1.7	5.2	10.3
6. Theatres, etc. . . .	1.9	4.4	5.7	7.2	28.4
7. Newspapers and Maga-					
zines	1.6	3.7	4.8	6.0	23.9
8. Postage	0.4	1.2	1.7	4.5	12.9
9. Life Insurance . . .	0.4	1.8	3.8	8.9	33.1
10. Religion and Welfare .	13.7	27.0	31.4	44.2	37.5
11. Passenger Fares . .	4.9	15.0	25.7	79.7	157.1
12. Residual	23.7	49.4	63.1	102.5	208.6

Most of these items were estimated by projecting the official estimates for 1930 back to the earlier years by the trend in earnings of appropriate occupational groups. The assumptions made in applying this technique to 1920 are described in the notes on the estimates of domestic service for that year which also give the sources of data on occupations and earnings for 1920. The data on the earnings of occupational groups in 1900 are from *Earnings by Occupations*, Bulletin 1, 1901 Census. Data on the number of persons in each occupation in 1900 are from unpublished material made available by the Dominion Bureau of Statistics. The number of persons in each occupation for other census years are from the decennial censuses. These do not show data on earnings, and indexes of the changes in average earnings in all occupations were, therefore, prepared for 1890, 1870 and 1910 based on 1900.

Earnings for 1870 were estimated largely by assuming that earnings per person followed the trend of consumer expenditures per employed person over the 1870 to 1900 period. Earnings for 1890 and 1910 were estimated by multiplying the number of persons by the estimated average earnings in each occupational group. Average earnings in each group were extrapolated from 1900 by the trend in earnings of farm labourers in Ontario, in *Reports of the Ontario Bureau of Industry*, 1890 and 1900, and for 1910 by the trends shown in the wage and salary indexes

given for 1900 and 1910 in the *Report of the Board of Inquiry into Cost of Living in Canada*, 1915, Vol. II.

1. *Medical and Dental Care*. The official estimate for 1930 was extrapolated to earlier years by the trend in the total earnings of doctors and dentists.

2. *Death Expenses*. Average death expenses were calculated for 1930 by dividing the death expenses for that year, given in the National Accounts, by the number of deaths in that year. The figure was carried back to 1890 by the trend in the price index implicit in personal expenditure on consumer goods and services for 1910, 1900, and 1890. In view of the far-reaching changes in living standards which occurred from 1870 to 1890, the trend in selected comparable consumer expenditures per employed person between 1870 and 1890 was used for 1870. The number of deaths in 1920, 1910, 1900, 1890 and 1870 were obtained from the decennial censuses. Total death expenses for each year are the product of average death expenses and the total number of deaths in each year.

3. *Barber Shops and Beauty Parlours*. The official estimate for 1930 was extrapolated by the trend in the earnings of barbers and hairdressers.

4. *Education (Private)*. The official estimate for 1930 was extrapolated by the trend in the total earnings of professors and lecturers.

5. *Hotels*. The official estimate for 1930 was carried back to 1923 by the trend in the receipts of hotels of Canadian National Railways and Canadian Pacific Railway (*Report of the Royal Commission to Inquire into Railways and Transportation in Canada*, Ottawa, 1921). The estimate for 1923 was projected to the earlier years by the trend in railway passenger receipts.

6. *Theatres, etc.* It was assumed that expenditures on theatres and other forms of recreation would follow the trend in the purchases of newspapers and magazines. The latter series was, therefore, used to extrapolate the official estimate for motion pictures, etc., for 1930 to the earlier years.

7. *Newspapers and Magazines*. Since newspapers and magazines were a major part of the output of the printing and publishing industry, the gross value of production of that industry was used to carry back the official estimate on expenditures on newspapers and magazines in 1930 to earlier years.

8. *Postage*. The official estimate for 1930 of expenditures of

persons on postage was extrapolated to all earlier years by the trend in the revenues of the Post Office Department, given in *Public Accounts* for the appropriate years.

9. *Life Insurance.* Direct estimates of the administrative expenses of life insurance companies connected with business in Canada were prepared for 1870–1920 from data in the *Reports of the Superintendent of Insurance of Canada.*

10. *Religion and Welfare.* The official estimate for 1930 was extrapolated to earlier years by the trend in the total earnings of clergymen and priests.

11. *Passenger Fares.* This item is mainly railway and urban transportation fares, and the official estimate for 1930 was, therefore, extrapolated to earlier years by the trend in the passenger receipts of steam and electric railways.

12. *Residual.* The estimating techniques described above produced sub-totals of expenditures on all the main categories of consumer goods and services shown in *National Accounts, Income and Expenditure, 1926–1950,* p. 74, except Personal and Medical Care and Death Expenses, and Miscellaneous. These two groups contain a number of items, mostly small, which it was not feasible or not worth while to estimate separately. Totals for these two groups were, therefore, prepared by projecting the official data for 1930 back to earlier years by the trend in the items in each for which separate estimates had been made. In the Miscellaneous group, however, the figure for 1930 used as a basis for extrapolation excluded net expenditures abroad, since this item was estimated separately for earlier years.

Net expenditures abroad for 1910 and 1920 were estimated from data on tourist expenditures and non-commercial remittances in 'An Excursus on Canadian Capital Movements and the Canadian Balance of International Payments, 1900–1934', by Frank A. Knox, in Herbert Marshall, F. A. Southard, and Kenneth Taylor, *Canadian-American Industry,* New Haven, 1936, pp. 296 ff. Net expenditures abroad in 1900 was calculated from data given in Jacob Viner, *Canada's Balance of International Indebtedness, 1900–1913,* Harvard, 1924. The estimates for 1870 and 1890 are based largely on data in *The Canadian Balance of Payments Since 1868,* by Penelope Hartland (manuscript, National Bureau of Economic Research).

2. GROSS INVESTMENT

(i) *Construction*

NEW CONSTRUCTION

(In millions of dollars)

Year	Total New Construction	New Public Construction	New Private Construction
	(1)	(2)	(3)
1870 . .	36	3	33
1890 . .	82	8	74
1900 . .	91	12	79
1910 . .	273	32	241
1920 . .	632	64	568

(1) For source, see notes on values added by the construction industry.

(2) Public construction in 1920 was estimated by extrapolating the estimate for 1926 (from *Private and Public Investment in Canada*, p. 149) back to 1921 by the trend in major construction expenditures of Federal, provincial, and municipal governments (from the *Report of Royal Commissions on Dominion-Provincial Relations, 1939*, Book III) and the 1921 figure was extrapolated to 1920 by the trend in selected types of public works expenditures shown in budgetary accounts of the Federal and provincial governments.

Total construction outlays by the Federal Government in 1910, 1900, and 1890 were estimated directly from the appropriate *Public Accounts*. New construction was estimated by applying to total construction the ratio for 1926 (from *Public Investment and Capital Formation, 1926–1941*, p. 65). Data on total construction were also compiled for the provincial governments of Quebec, Ontario, and British Columbia and for the municipalities in these provinces. The new construction portion was estimated in each case by applying the appropriate 1926 ratio to the data on total construction. The resulting estimates of new construction were raised to cover the whole of Canada by applying the ratio of total expenditure on goods and services by provincial and municipal governments to expenditures on goods and services by provincial and local authorities in Quebec, Ontario and British Columbia.

New construction by the Federal Government in 1870 was estimated by a method similar to that used for 1910, 1900, and

1890. New construction by provincial and municipal governments was estimated by calculating the ratio of expenditures on new construction to expenditures on all goods and services by the provincial government and municipalities of Ontario for 1870 and 1900 and adjusting the 1900 ratio for all provincial and municipal governments in Canada by the trend in the ratio for Ontario.

(3) Column (1) minus Column (2).

(ii) *Machinery and Equipment*

Expenditures on machinery and equipment in 1926, given in *National Accounts, Income and Expenditure, 1926–1950*, p. 26, were projected back to earlier years by the trend in an index of domestic disappearance of selected items of machinery and equipment. This index was prepared from data in the censuses of manufactures and trade statistics for the respective years. Owing to the deficiencies in the data for the earlier years, it was not possible to cover all items of machinery and equipment, and those reflected in the index are principally those in the iron and steel group and several important types of machinery in other groups, such as new vessels and railway cars and locomotives. Since in the years before 1920, manufacturing production was not shown in sufficient detail to permit a rigid breakdown of the iron and steel group into capital equipment, intermediate products, and consumer goods, all items that obviously did not fall into the category of machinery and equipment were excluded from the iron and steel products. It was assumed that the trend in the balance would reflect quite closely the output of machinery and equipment. Imports and exports of iron and steel products were shown for all years in considerably more detail than production.

(iii) *Net Change in Inventories*

(In millions of dollars)

Year	Livestock	Grain	Manufactures	Trade	Other	Total
	(1)	(2)	(3)	(4)	(5)	(6)
1870	1.9	−6.2	−0.4	+19.0	—	14.3
1890	5.2	0.5	13.1	−5.9	—	12.9
1900	3.0	−0.6	16.6	−6.3	—	12.7
1910	60.8	−8.0	57.5	66.0	—	176.3
1920	−68.5	124.1	137.5	75.6	10.8	279.5

(1) It was assumed that the change in numbers of livestock in 1920 was approximately the same as the change from mid-1919 to mid-1920. Numbers of livestock on farms in June 1919 and 1920, and average prices in 1920, were obtained from the *Canada Year Book, 1922–23*. The numbers of livestock on farms were reported in each census year, 1871, 1891, 1901, and 1911. The number on farms in 1870 was estimated on the assumption of a straight-line trend between the censuses of 1861 and 1871 and export prices were used to calculate the value of the change in the number of livestock. The number of each class of livestock for 1891 and 1901 as reported in the censuses was projected back one year by the trend in livestock on farms in Ontario, given in the *Statistical Year Book of Canada*, 1894 and 1904. The resulting estimates of the changes in the number of livestock were then multiplied by the value of livestock per head shown for Ontario in 1891 and 1901. Complete data on the number and value of livestock as of June are available from the *Canada Year Book, 1911* and *1912*, for all Canada and the values of the changes in number were calculated from those data.

(2) Stocks of grain at 31st March 1920 and 31st March 1921 were obtained from *Canada Year Book, 1922–23*, p. 297. These were adjusted roughly to a 31st December basis by adding on exports of grain in the first three months of 1920 and subtracting exports in the first three months of 1921 and allowing similarly for domestic consumption during the same periods. The value of physical change was calculated by applying year-end prices appropriate to the grade of each crop (from *Canada Year Book, 1922–23*). The physical changes in inventories of grains during 1890, 1900, and 1910 were estimated by means of a stock to production method. The average ratio of carry-over at the end of the crop year to production was calculated for each type of grain for 1921/22–1928/29 and these ratios were applied to production in 1890/91, 1900/01, and 1910/11. Export prices were used to estimate the values of these physical changes.

The physical change in inventories of grain during 1870 was estimated by a similar method. However, it was necessary to estimate production of grains in 1870. This was done by projecting production in 1871 (from the *Census of 1871*) back to 1870 by the trend in exports of each type of grain. The value of the physical change was calculated by applying the prices for each type of grain that are used by the Dominion Bureau of

Statistics in preparing etimates of the value of grain production (*Canada Year Book, 1950*, p. xviii).

(3) The change in manufacturing inventories from the end of 1919 to the end of 1920 was computed from data on materials on hand, stocks in process, and miscellaneous supplies, collected in the census of manufactures and made available by the Industry and Merchandising Division, Dominion Bureau of Statistics. The inventories of manufacturing establishments at census dates for 1890, 1900, and 1910 were estimated by assuming that materials in stock, etc., constituted the same proportion of total working capital as in 1915, the first census in which physical working capital was shown separately from cash, receivables, etc. Inventories in the lumber and log products industries were projected back one year from these census dates by the trend in lumber production. Other manufacturing inventories were projected back by the trend in imports of bituminous coal, raw cotton, raw sugar, and primary iron and steel, exports of wheat flour, and rail shipments of manufactures.

Inventories of flour mills, lumber mills, and all other manufacturing establishments on 31st March 1871 were estimated by extrapolating inventories in 1901 by the trend in value of manufacturing production plus value of materials used. Inventories of flour mills were projected back to 1870 by the trend in exports of flour and inventories of lumber mills by the trend in exports of lumber. Inventories of all other manufacturing establishments were carried back to 1870 by the trend in imports of important raw materials used in manufacturing, such as coal, raw cotton, primary iron, and steel.

(4) Estimates of the book value of wholesale and retail inventories in 1926 were supplied by the National Income Unit of the Dominion Bureau of Statistics. The wholesale book value was carried back to 1920 by the trend in the domestic disappearance of consumer goods and machinery and equipment. The resulting estimate of book value in 1920 was broken down into finished and unfinished goods, and the finished goods were, in turn, broken down into capital and consumer items by the 1931 proportions (cf. *Census of Canada, 1931*, Vol. XI). Inventories of finished goods were projected to 1919 by the trend in retail sales, and finished capital inventories by the trend in the domestic disappearance of iron and steel products. Inventories of unfinished goods were extrapolated by the trend in the cost

of materials used by the manufacturing industries. As a check, this method was also followed for 1926 and 1927 for which official estimates, based largely on a sample of corporation income tax returns, were available. In both years, the estimates were within 5 per cent of the official estimates.

The book value of retail inventories was projected back to 1920 by the trend in the domestic disappearance of consumer goods and thence to 1919 by the trend in retail sales. The increase in retail trade from 1919 to 1920 was estimated from a study of sales data of four department store chains, in *Proceedings and Evidence of the Special Committee on Price Spreads and Mass Buying, 1934.*

The book value of wholesale and retail trade inventories was projected back from 1920 to 1911 by the trend in personal expenditures on consumer goods and services, from 1911 to 1910 by the change in imports of certain consumer goods. This method was also employed to estimate the change in the book value of wholesale and retail inventories for 1900, 1890, and 1870.

(5) An estimate of the change in 'other' inventories was made only for 1920 and is based on the relationship of 'other' inventories to those estimated separately in 1926–29.

(6) The sum of Columns (1) to (5).

3. GOVERNMENT EXPENDITURES ON GOODS AND SERVICES

Federal Government expenditures on goods and services were obtained directly from the *Public Accounts* for 1921, 1911, 1901, 1891, and 1871 by adjusting budgetary expenditures to conform with national accounting concepts (for further details, see *National Accounts, Income and Expenditure, 1921–1950*). The data relate to fiscal years.

Provincial and municipal expenditures for 1920 were estimated by projecting the official estimates for each for 1926 back to 1921 by the trend in the cash expenditures of all provincial and municipal governments in *Dominion of Canada, Provincial Governments, Comparative Statistics of Public Finance, 1913, 1921, 1925 and 1939* (published by the Royal Commission on Dominion-Provincial Relations, 1939) and *Report of the Royal Commission on Dominion-Provincial Relations, Book III, Documentation*. The resulting estimate for 1921 was carried back to 1920 by the trend in ordinary budgetary expenditures of the

provinces and expenditures of Quebec municipalities.

For 1910 and 1900, expenditures on goods and services by the governments of Ontario, Quebec, and British Columbia were obtained directly from the respective public accounts. Expenditures on goods and services by the other provinces were estimated by applying to their budgetary expenditures appropriate ratios derived from the estimates for Ontario, Quebec, and British Columbia. Expenditures of municipalities on goods and services for the Provinces of Ontario, Quebec, and British Columbia for 1910 and 1900 were calculated directly from data given in the appropriate issues of *Annual Report of the Ontario Bureau of Industry, Quebec Municipal Expenditures*, and *British Columbia Year Book*. For 1890 data for Ontario were available in the 1892 issue of the publication referred to and partial data for Quebec were available in *Quebec Municipal Statistics, 1891*. The Quebec figure was adjusted for full coverage by the relationship of the per capita expenditures of the municipalities covered in 1890 to those of all municipalities in 1900.

Estimates were made for the Maritime Provinces for 1910, 1900, and 1890 by applying per capita municipal expenditures on goods and services in Ontario and Quebec to the population of the Maritimes. Per capita expenditures of municipalities in the rest of Canada for 1910 and 1900 were estimated by multiplying per capita expenditures in Ontario for these years by the ratios of per capita revenues of selected municipalities in Ontario (data from the *Report of the Board of Inquiry into Cost of Living in Canada*, 1915, Vol. II). The resulting per capita estimates were then applied to the population of the remainder of Canada. No data on the expenditures of municipalities on goods and services were available for British Columbia for 1890 so they were estimated by assuming that the trend in per capita municipal expenditures in British Columbia between 1890 and 1900 was similar to that for Ontario.

Expenditures of the four provinces on goods and services in 1870 were estimated by extrapolating the estimate for 1900 by the trend in the budgetary expenditures of these provinces. Municipal expenditures in 1870 were estimated by extrapolating the estimate for 1900 by the trend in expenditures of municipalities in Ontario from 1868 (the year nearest to 1870 for which statistics were available) to 1900. The data for 1868 appear in *Miscellaneous Statistics of Canada for the Year 1868*, p. 39.

4. EXPORTS AND IMPORTS OF GOODS AND SERVICES

Data for 1870 and 1890 are special estimates compiled on the general pattern used by Jacob Viner in *Canada's Balance of International Indebtedness, 1900–1913*. Commodity exports and imports pertain to the fiscal years 1871 and 1891 and were adjusted by deducting 'settlers' effects' from the totals. Shipments of gold coin and bullion were also deducted since they are considered 'monetary gold': Canada did not refine gold and all exports of bullion were of a monetary nature. Payments and receipts of interest and dividends, tourists' expenditures, and private remittances for these years are from *The Canadian Balance of Payments Since 1868*, by Penelope Hartland. Freight payments and receipts are special estimates made in line with the estimates by Jacob Viner and F. A. Knox for later years.

The estimates for 1900 and 1910 are based on data in Jacob Viner, *op. cit.*, and those for 1920 are derived from F. A. Knox, *Dominion Monetary Policy, 1929–1934*. Total current receipts and payments given in these sources were adjusted to conform with national accounting concepts by deducting emigrants' and immigrants' capital. Also, in this study, both the payments and receipts of private remittances are shown, rather than '*net* remittances' included in the Viner's totals for 1900 and 1910. A further necessary adjustment, the exclusion of net exports of non-monetary gold from current receipts, was not attempted since it was impossible to break down bullion shipments into monetary and 'non-monetary' gold for these years.

In 1920, the residual error, which was quite large, was divided between current and capital account instead of being entirely allocated to capital account.

Table 86

Data for all years up to and including 1920 are based on the current dollar figures shown in Table 85, adjusted by the price indices in Table 63. The major components of consumer expenditures on goods and services were adjusted individually for price changes. The main basis for 1870 was information on prices in *Report of the Minister of Agriculture for 1870*, Sessional Papers on Dominion Parliament, 1871, No. 64, and for other years data on wholesale and retail prices and price changes in the *Report of the Board of Inquiry into Cost of Living in Canada*,

TABLE 86

Gross National Expenditure, by Sectors, in Constant (1935–1939) *Dollars, Canada, Selected Years,*
1867–1953

(In millions of dollars)

Year	Expenditure on Consumer Goods and Services	Gross Investment			Government Expenditure on Goods and Services	Exports and Imports of Goods and Services			Residual Error	Gross National Expenditure
		New Residential and Non-Residential Construction and New Machinery and Equipment	Change in Inventories	Total		Exports	Imports	Net Foreign Balance		
1867	—	—	—	—	—	—	—	—	—	695
1870	600	100	18	118	32	98	86	+ 12	—	762
1880	—	—	—	—	—	—	—	—	—	1,034
1890	1,112	210	19	229	89	122	− 166	− 44	—	1,386
1900	1,476	227	21	248	134	228	− 253	− 25	—	1,833
1910	2,276	610	224	834	241	325	− 589	−264	—	3,087
1920	2,768	651	138	789	380	695	− 788	− 93	—	3,844
1929	3,685	1,228	48	1,276	629	1,314	−1,578	−264	+ 11	5,337
1930	3,557	1,009	126	1,135	713	1,157	−1,448	−291	+ 13	5,127
1933	3,055	259	−125	134	529	982	− 911	+ 71	− 17	3,772
1939	3,820	591	338	929	742	1,494	−1,330	+164	+ 9	5,664
1945	5,471	750	−203	547	2,814	2,548	−2,004	+544	− 61	9,315
1950	7,022	1,678	303	1,981	1,375	2,027	−2,095	− 68	+ 20[a]	10,330
1951	6,978	1,786	453	2,239	1,713	2,215	−2,342	−127	+132[a]	10,935
1952	7,381	1,952	187	2,139	2,162	2,443	−2,426	+ 17	− 57[a]	11,642
1953	7,771	2,148	460	2,608	2,140	2,445	−2,644	−199	−222[a]	12,098

[a] Including the adjustment arising from converting from a 1949 to a 1935–39 base.

1915, Vol. II and various issues of *The Labour Gazette*, and on components in the cost of living index available from 1913 on, in Dominion Bureau of Statistics bulletins on *Prices and Price Indexes*.

TABLE 87

Estimates[a] of Gross National Product (Expenditure) in Constant (1935–1939) Dollars, Canada, 1867, and Annually, 1870–1953

(In millions of dollars)

Year	G.N.P.	Year	G.N.P.	Year	G.N.P.
1867	695				
1870	747	1900	1,849	1930	5,127
1871	769	1901	2,031	1931	4,475
1872	645	1902	2,179	1932	4,096
1873	710	1903	2,244	1933	3,772
1874	855	1904	2,284	1934	4,208
1875	827	1905	2,457	1935	4,530
1876	833	1906	2,599	1936	4,738
1877	855	1907	2,612	1937	5,201
1878	843	1908	2,723	1938	5,246
1879	985	1909	3,031	1939	5,664
1880	1,096	1910	3,087	1940	6,487
1881	1,247	1911	3,355	1941	7,481
1882	1,238	1912	3,419	1942	8,941
1883	1,216	1913	3,708	1943	9,374
1884	1,337	1914	3,483	1944	9,721
1885	1,482	1915	3,591	1945	9,315
1886	1,337	1916	3,749	1946	9,045
1887	1,340	1917	3,831	1947	9,165
1888	1,408	1918	3,864	1948	9,438
1889	1,374	1919	4,046	1949	9,722
1890	1,408	1920	3,844	1950	10,330
1891	1,642	1921	3,495	1951	10,935
1892	1,605	1922	3,780	1952	11,642
1893	1,562	1923	4,015	1953	12,098
1894	1,553	1924	4,010		
1895	1,636	1925	4,182		
1896	1,794	1926	4,548		
1897	1,559	1927	4,926		
1898	1,846	1928	5,330		
1899	1,769	1929	5,337		

[a] For 1867–1925, inclusive, figures are special estimates made for this study, while those from 1926 on are official National Accounts estimates.

Table 87

Years 1870–1909

The figure for 1867 is from Table 10.

Gross national expenditure in constant (1935–39) dollars for 1870–1909 was estimated by extending the 1910 constant dollar figure backward to 1870 by a total weighted index of expenditures. The index for consumer expenditures on goods and services comprises the volume of apparent consumption (production plus imports minus exports) of wheat, fish products, and coal, the volume of imports of tea, coffee, sugar, raw wool, and raw tobacco, and the number of passengers carried by steam railways.

Gross domestic investment was estimated by using a volume index of the apparent consumption of selected construction materials.

Government expenditures on goods and services were estimated by using an index based on total expenditure of Federal, provincial, and municipal governments in constant dollars.

Exports and imports of goods and services were estimated by using indices of the value of commodity exports and imports converted to constant dollars by means of indices from sources described in the notes to Table 63.

These indices for consumer expenditures, gross domestic investment,. government expenditures on goods and services, and the exports and imports of goods and services were weighted and combined into a total index which was applied to the 1910 estimate of gross national expenditure in constant (1935–39) dollars and extended back to 1870. The actual 1910 weights were used for years back to 1906, the 1900 weights for 1905 to 1896, the 1890 weights for 1895 to 1886, the 1880 weights (derived by straight-line interpolation between those for 1870 and 1890) for 1885 to 1876 and the 1870 weights for the remainder of the period.

The resulting estimates of gross national product (actually gross national expenditure) check fairly closely with the estimates for the individual years, 1900, 1890, and 1870 which were estimated independently – the differences being less than one per cent for 1900 and about 2 per cent for 1890 and 1870.

It bears emphasis that the annual estimates in Table 87 are less reliable than those for selected years at ten-year intervals

in Table 85 and described in the notes to Tables 85 and 86. But because they are so close the former can be used to obtain some general indication of the overall economic fluctuations in the earlier part of Canada's economic history. The annual estimates can also be used to derive quinquennial averages as test data for the long-term or medium-term comparisons of economic change which have been based on the more detailed and reliable estimates for selected years. In fact, as indicated in Section 3, the tests yield fairly satisfactory results.

Years 1911–1919 and 1921–1925

Real gross national product for 1911–19 and 1921–25, inclusive, was estimated by adjusting two available series of national income estimates in current dollars to conform to national accounting concepts and then converting them to constant (1935–39) dollars.

The series for the earlier period, that of J. J. Deutsch (in 'War Finance and the Canadian Economy', *Canadian Journal of Economics and Political Science*, 1940, pp. 539–9), covers national income produced in 1911–20, inclusive. These annual estimates were adjusted by adding the value added by construction, adjusting the value added by the service sector to the MacGregor concept (see below), and adding 'indirect taxes less subsidies'. The total for 1920 by this method was 94.6 per cent of the independent estimate for that year, and the estimates for 1911–19 were accordingly inflated by this proportion.

For 1921–25 the unadjusted national income series of D. C. MacGregor (in *Monthly Review of the Bank of Nova Scotia*, May 1937, p. 4) was adjusted by replacing the estimates of value added by the construction industry with new estimates, by adding indirect taxes less subsidies, and interest and dividend payments and receipts. The 1926 total by this procedure was 94 per cent of the official National Accounts estimate for that year and the whole series was therefore divided by this proportion.

The new estimates of value added by construction were derived by using the methods described in the notes to Table 89. The production of construction materials for 1911–21 and 1921–25 was estimated by the trend in an index of the value of production of important construction materials. Estimates of imports and exports of construction materials were compiled from the trade statistics and the available supply calculated for each year.

Costs of freight and sales and other taxes, and allowances for mark-ups were then added, in proportions established by Kenneth Buckley in *Capital Formation in Canada, 1896–1930*, pp. 126–7. The total value of all construction, the value of new construction, and the value added by construction were then calculated from these figures by the methods described in the notes to Table 89.

Indirect taxes less subsidies were compiled from data in *Public Accounts* and adjusted to a calendar year basis.

Interest and dividend payments and receipts are from F. A. Knox, *Dominion Monetary Policy, 1929–1934*, p. 90.

Gross national product in constant (1935–39) dollars for these years were estimated by first dividing these gross national expenditure (or product) estimates in current dollars into their major components, i.e. consumer expenditures on goods and services, capital expenditures (inventories were estimated separately from outlays on durable physical assets), government expenditures on goods and services, exports of goods and services, and imports of goods and services. The proportions for 1911–19 and for 1921–25 were obtained by straight-line interpolation between the proportions in 1910 and 1920, and 1920 and 1926, respectively.

Price indices of consumer goods and services for 1911 and 1912 were estimated by applying the trend in general wholesale price indices from 1910 to 1912 to the consumer price index for 1910. For 1913–19 and 1921–25, a consumer price index was compiled by adjusting the cost-of-living index (1935–39 base) by the average difference between it and the implicit consumer price index in the National Accounts for 1926–35 (consumer price index equalled 98.9 per cent of cost-of-living index over this period). The price indices derived in this manner were used to convert the estimates of personal expenditures on consumer goods and services to constant 1935–39 dollars.

The estimates of expenditures on gross domestic investment (new construction, machinery, equipment and inventories) were converted to constant dollars by applying a weighted index of new investment to the durable physical assets (construction and machinery) and the general wholesale price index to inventories. The capital goods price index was compiled by the methods described in the notes to Table 92 (the capital goods index for single years). The price indices for construction and

U

for machinery and equipment derived in this manner were weighted 60–40 (the 1910 ratio) for 1911–19, and 56–44 for 1921–25 (the 1920 and 1926 ratios) and combined into a total index. The general wholesale price index applied to inventories is published on a 1935–39 base in the March 1952 issue of *Prices and Price Indices.*

The price index for government expenditures on goods and services was compiled by the methods described in the notes to Table 63, i.e. by combining the consumer price index with a weight of four with the capital goods index with a weight of one.

Exports and imports of goods and services estimates in current dollars were converted into 1935–39 dollars by the appropriate price indices for commodity exports and imports (which comprised the overwhelming portion of these totals in these years). The sources of the indices are described in the notes to Table 63.

TABLE 88

Gross National Product in Constant (1935–1939) *Dollars, Population and Gross National Product in Constant* (1935–1939) *Dollars Per Capita, Canada, Annual Averages for Five Year Periods,* 1870–1953

Period	Gross National Product in Constant Dollars $ million	Population Thousands	Gross National Product in Constant Dollars per Capita $
1870–74 . .	745	3,807	196
1875–79 . .	869	4,111	211
1880–84 . .	1,227	4,417	278
1885–89 . .	1,388	4,666	297
1890–94 . .	1,554	4,918	316
1895–99 . .	1,721	5,168	333
1900–04 . .	2,117	5,614	377
1905–09 . .	2,684	6,502	413
1910–14 . .	3,410	7,535	453
1915–19 . .	3,816	8,167	467
1920–24 . .	3,829	8,969	427
1926–30ᵃ . .	5,054	9,940	508
1930–34 . .	4,336	10,568	410
1935–39 . .	5,076	11,114	457
1940–44 . .	8,401	11,737	716
1945–49 . .	9,337	12,788	730
1950–53ᵇ . .	11,251	14,456	778

[a] Special period used in study; the figures for the 1925–29 period are $4,865 million, 9,756 thousand persons and $499 respectively.
[b] Four-year period.

TABLE 89

Gross National Product, by Industry, in Current and Constant (1935–1939) *Dollars, Canada,*
Selected Years, 1870–1920

(In millions of dollars)

Year	Commodity Producing Industries Current Dollars							Service Industries Current Dollars	Other				Total	
	Agriculture	Fishing and Trapping	Mining	Forest Operations	Manufacturing	Construction	Total		Rent	Net Interest and Dividends Received and Paid Abroad	Indirect Taxes Less Subsidies	Total	Current Dollars	Constant Dollars
1870	153	5	4	44	87	14	307	96	43	— 4	17	56	459	764
1880	186	11	6	50	110	22	385	130	58	— 16	24	66	581	982
1890	217	13	11	53	189	37	520	214	69	— 30	30	69	803	1,366
1900	282	17	35	52	223	41	650	311	90	— 32	38	96	1,057	1,877
1910	509	21	59	86	508	113	1,296	752	182	— 82	87	187	2,235	3,225
1920	1,073	47	140	212	1,335	306	3,113	1,953	361	—166	268	463	5,529	3,834

Table 88

The quinquennial averages of real gross national product are based on the annual estimates in Table 87, the population figures on those in Table 83 and the real gross national product per capita, averages are derived by division.

Table 89

The notes are organized separately for each industry or sector and each covers all the years in the table.

1. *Agriculture*

Data on agricultural production in the first three decennial censuses covered only the quantities produced.

In the 1901 and later censuses value figures were also reported. Thus agricultural data for 1870, 1880, and 1890 cover only the volume yield of field crops and fruits, the number of livestock slaughtered on the farms or sold for slaughter or export, and the poundages of butter, cheese, wool, honey, and maple sugar produced. The census year was the twelve months preceding the census date, which up to and including 1901 was around 1st April. The 1901 census not only reported value as well as quantities of farm products covered in the previous three censuses, but also collected information on agricultural products not covered previously, e.g. eggs and nursery stock sales. The pattern established by the 1901 census was followed in 1911 and 1921 except that the census year was made to conform with the calendar year, i.e. the June 1911 and 1921 censuses cover agricultural production during the calendar years 1910 and 1920. Forest products cut on farms are shown in primary forest production and are excluded from the value of agricultural production.

In order to make the census totals consistent it was necessary to estimate the value of certain farm products for which not even quantitative data were collected in 1871, 1881, and 1891.

Field Crops. The Agriculture Division of the Dominion Bureau of Statistics made a full set of estimates in 1921 for the value of field crops produced in 1870, 1880, 1890, and 1900 on the basis of the 1910 (and 1920) census. These estimates were published in the *Monthly Bulletin of Agricultural Production*, May, 1921, p. 200. The value figures for field crops in 1910 and 1920 are from the *Census of Canada, 1921*, Vol. V, p. xi.

Fruits, Vegetables, and Nursery Stock. This classification comprises fruits, vegetables not covered in field crops (tomatoes, lettuce, cucumbers, etc.) and sales of nursery stock. The more common vegetables such as potatoes, peas, beans, turnips, etc., which are grown on a large scale, are classed as field crops. Before 1901, the decennial censuses had reported only fruit production but the 1901 census added vegetable production and sales of nursery stock. Estimates of the value of fruit and vegetable production and of nursery stock sold in 1870, 1880, and 1890 are based on the quantities produced and on the quantities and values of the 1900 production. These estimates of values at prices prevailing in 1900 were adjusted for the change in prices, by the vegetable products price index for 1870, 1880, and 1890 (base 1900=100) in Taylor and Michell, *Statistical Contributions to Canadian Economic History*, Vol. II, p. 56. All other data are from the decennial censuses.

Livestock Slaughtered or Sold for Slaughter or Export. The numbers of cattle, hogs, and sheep slaughtered on farms or sold for slaughter or export are reported in all the censuses but the first value estimates appear in the 1901 census. Values for the previous census years were estimated by the method described for fruits, vegetables, and nursery stock. The price indices are those for animals and meats in Taylor and Michell, *Statistical Contributions to Canadian Economic History*, Vol. II, p. 56.

Dairying. All the earlier decennial censuses reported the quantities of butter and cheese made at home (i.e. dairy) except that of 1901 when statistics on home-made cheese for some reason are omitted. The statistics on manufactures give the value of output and the cost of materials used by butter and cheese factories for all the census years. While the value of home-made butter (and cheese) is not available from the 1901 census, estimates for this and for 'other dairy' products are given in the historical series of dairying statistics in the *Canada Year Book, 1952–1953*, p. xxviii. The value of home-made cheese produced in 1900 was estimated by deriving the quantity by straight-line interpolation between the quantities produced in 1890 and 1910, and multiplying it by the average value per pound in 1910, adjusted for price differences between 1900 and 1910 by the export prices prevailing in these years. The census data and these estimates were used to build up an estimate of the value of dairying in 1900. This 1900 total comprises the esti-

mated value of home-made butter, the value of materials (almost all milk or cream) used by butter and cheese factories, and the estimated value of other dairy products. Only the value of materials used by butter and cheese factories is taken since the value added by manufacture is included in the manufacturing item.

The values of home-made butter for 1870, 1880, and 1890 were estimated by projecting back the 1900 price per pound by the export price trend for each of these years, and multiplying these prices per pound by the quantities reported in the census returns. The costs of materials used by butter and cheese factories are available from the manufacturing statistics and the values of other dairy products were estimated on the basis of their proportion to the total value of dairying in 1900.

In the 1911 census the value of milk produced in 1910 was reported and this figure was used. The 1920 value of milk produced was computed by adding up the values received by the farmers for the different forms – value of milk and cream sold or sent to the creamery or factory, value of butter and cheese made on the farm, etc., so that no adjustment to the total was necessary. The basic data are as reported in the decennial censuses.

Miscellaneous Products. This group comprises wool, honey and wax, maple products, and eggs. Quantities of all these items, except eggs, are available in the earlier decennial censuses and, from 1901 on, value figures are also reported. The values of wool, honey and wax, and maple products for 1870, 1880 and 1890 were estimated individually by determining the price per pound in 1900, then adjusting this by the trends in export prices and multiplying by the quantities reported in the census years 1870 to 1900. The data for these items relate to census years as given in the decennial censuses. Value figures for 1900, 1910, and 1920 are given on pp. cx and cxi of Vol. V of the *Census of Canada, 1921.* Production figures for maple products refer to the spring in which the census was taken. The 1900 quantity and value figures for maple products are from the *Census of Canada, 1901,* Vol. IV, pp. 318 and 369. The value of maple products for 1910 is given in Vol. IV, p. 369 of the census of that year, and for 1921 in *Census of Canada, 1921,* Vol. V, p. 38. Data on egg production were not collected until the census of 1901 which reported both the quantity and value. The

value of egg production in 1890 was estimated by calculating the number of eggs the hens and chickens reported on farms and lots at census time would lay at the 1900 rate, and adjusting for change in price by the trend in export prices per dozen. However, no data on the number of poultry on farms and lots are available for 1870 and 1880, and the value for these two years was estimated by obtaining volume figures using the proportion that hens and chickens formed of total livestock (excluding horses) on farms and lots in 1891, and the 1900 laying rate. These quantities were expressed in value terms by using the 1900 value per dozen adjusted for the differences in export prices prevailing in 1870, 1880, and 1900. The numbers of hens and chickens at census time in 1891 and 1901 are from p. xxiv of Vol. II of the 1901 census. Egg production in 1900, 1910, and 1920 is shown in *Census of Canada, 1921*, Vol. V, p. 6.

Duplications and Deductions. To ensure the success of the method used, duplication must be eliminated by deducting the value of materials consumed in production from the value of output. An attempt has been made to remove the obvious duplications that arise when individual items of agricultural production are added together. The most serious duplication occurs in the 'field crop' and 'livestock slaughtered or sold for slaughter or export' totals. In assessing the value of field crop production allowance must be made for the seed required to produce such crops. In addition, a large part of the field crop production is used as feed and fodder for farm livestock. Part of this livestock is slaughtered or sold for slaughter or export during the year while the remainder is retained to produce milk, wool or eggs, for fattening·for the market, or to work the farm land in the case of horses, etc. Seed and feed consumed in the course of agricultural production must be deducted. On the other hand, feed given to livestock being prepared for the market or to young stock represents investment, and the change in the total value of livestock on farms during the census year must be taken into account also. Data published in the annual issues of the D.B.S. report, *Survey of Production*, for 1920 and 1939 show that for this period an average of 29.3 per cent has been deducted each year from the gross value of agricultural production (unrevised series) to cover the value of the seed used and of the feed grains, fodder, and milk fed to livestock. This percentage has been deducted from the gross value of agricultural

production for all census years except 1920. In 1920 the difference between the gross and net values of agricultural production figures as published in *Survey of Production, 1921 and 1922*, p. 5, is 27.6 per cent and this was used. The estimated change in the value of the livestock on farms during each census year is taken into account in the livestock inventory adjustment item. Other farm expenditures that have been allowed for as direct costs of production are outlays for blacksmithing work, and for the purchase of manufactured fertilizer and binder twine. One-half the total value of the products of the blacksmithing industry as reported in the statistics of manufactures in the decennial censuses up to 1920, has been allocated to farmers. Estimates of the amounts expended for fertilizers (from 1890 on) and binder twine (from 1900 on) are based on the available supply in the census years – that is, production plus imports minus exports. The value of binder twine used in 1901 is the reported imports and in 1910 and 1920 is production plus imports less exports. The 1910 production figure was estimated from the number of pounds of Manila fibre for the manufacture of binder twine, on which the Federal Government paid a bounty, and the average import price per pound of binder twine. The quantity on which bounty was paid is given in the *Canada Year Book, 1914*, p. 465. The value of binder twine manufactured in 1920 was obtained from unpublished material of the Dominion Bureau of Statistics. All import and export data are from the annual trade reports and refer to the fiscal year most nearly corresponding to the calendar year, except in 1920 when they are for the calendar year.

2. *Fishing and Trapping*

The values of primary fishing products for the census years 1870 to 1910 have been estimated from historical statistics using the 'total value of fisheries' figures in *Fisheries Statistics of Canada, 1927*, p. 43. These figures cover the total value of fish marketed, whether in a fresh, dried, cured, canned, or other prepared state, and, hence, have to be adjusted to exclude the value added by processing which appears in the 'manufactures' item. The data are for fiscal years until 1917 and calendar years thereafter, and are for the fisheries year most nearly corresponding to the census period, i.e. fisheries totals for the years ending 30th June 1871, 1881, 1891, and 1901, 31st March 1911 and 31st December 1920.

The value of fish caught and landed, primary production, is given for each year from 1917 on, in *Fisheries Statistics of Canada*. For the decade between 1917 and 1926 the value of fish caught and landed averaged 63.7 per cent of the total 'value of fisheries' figures, and this proportion has been used to estimate the value of the fish catch for all years up to and including 1910. The 1920 figure is from *Fisheries Statistics of Canada, 1920*, p. xi.

The trapping figures cover the value of furs of wild animals only, as the value of furs taken on fur farms is included in agricultural production. Each decennial census from 1881 to 1911 reported the value of wild fur production, and the data are given on p. xiii of Vol. V of the 1911 census. The estimate for 1870 was based on the value of fur exports and the proportion of the value of exports to production in 1880. The 1920 figure is the average of the value of wild furs reported for the years ending 30th June 1920 and 1921, as shown in the annual reports on fur production for those years. An average was used because of the very high fur prices prevailing in the first part of 1920 and the sharp decline that occurred in the 1921 fur year.

3. *Mining*

The values of primary mining production for all census years are based largely on data in the D.B.S. publication, *Chronological Record of Canadian Mining Events from 1604 to 1947 and Historical Tables of the Mineral Production of Canada, 1947*, which contain a complete annual record of mineral production from 1886 on, and provides information on the production of a few minerals for earlier years. The data shown for 1870 and 1880 were supplemented by quantitative information from the 1871 and 1881 censuses given on p. xxx, Vol. II, *Census of Canada, 1901*, and by trade data on exports of minerals for these two years. The quantities reported in the two earlier censuses were expressed in current dollars by first calculating their values in 1900 prices, using the 1901 census quantities and values, and then adjusting for price changes. The price indices are those given for iron and its products, non-ferrous metals and their products, and non-metallic minerals and their products, for 1870, 1880, and 1900, in Taylor and Michell, *Statistical Contributions to Canadian Economic History*, Vol. II, p. 56.

The basic data in the historical series on the total values of mineral production from 1886 on, had to be adjusted to conform to the primary mining production concept. This series gives the total value of mineral production and covers: (1) the value of metallic minerals when refined and; (2) the gross value of production of certain fully manufactured mineral products also included in manufacturing. In addition, some of these mineral production totals include the values accrued in the smelting and refining of metals outside of Canada.

The values of the ores used to produce the refined metals were estimated by assuming that the value of the ores is one-half the value of the refined metals produced from them, the average proportion of the cost of materials to the value of the output of the smelting industry in 1910 and 1915 as given in the *Census of Canada, 1911*, Vol. III, p. 7, and the *Postal Census of Manufacturers, 1916*, p. 9.

The values of the mineral constituents of fully manufactured mineral products were also included in primary mining production. These were estimated by using the proportions of the cost of materials in the value of the output for the appropriate items, as shown in statistics of manufactures for each census year. In line with current practice, no value was assigned to the domestic minerals used for clay products and cement.

Finally, the basic data were adjusted to take account of the materials consumed in the primary mining production process and of other costs of production duplicated elsewhere. Expenditures by the primary mining industries on explosives, fuel, and purchased electricity, and on freight charges and insurance in 1934 and 1935 were 6 per cent of the total value of mineral production. An allowance of 6 per cent of the 'total value of mineral production' figures has therefore been deducted for each census year to cover such costs. Details of the purchases of the mining industry are given in the two issues of *Special Report on the Consumption of Supplies by the Canadian Mining Industry*, for 1934 and 1935, published by D.B.S.

4. *Primary Forest Production*

Estimates of the values of primary forest production for the census years 1870 to 1900 are based upon data collected for these censuses. The 1871, 1881, and 1891 censuses reported only the quantities produced and the latter census also provided informa-

tion on certain products, i.e. railway ties, fence posts, and electric light and telegraph poles, not covered previously. The 1901 census followed the 1891 one in this regard and collected value figures as well. The 1911 census reported only the production of farm wood-lots and these data have been supplemented by information from other sources. All 1920 figures are those published in the *Canada Year Book, 1922–1923*, p. 339, and are D.B.S. estimates which combine the information collected annually and the data on the production of farm wood-lots reported in the 1921 census.

The census data on the volume of sawlogs and square timber reportedly produced in 1870, 1880, and 1890 proved so unreliable and inconsistent that they could not be used to estimate the values of the production of these two items. Instead, the values of the sawlogs produced were estimated from the cost of the materials used by the log products industry – that is, sawmills, shingle mills, lath mills, and stave mills, and the values of square timber exports reported in the fiscal years 1871, 1881, and 1891 were taken as the values of production for the census years. The same procedure was used to obtain value estimates for the 1910 production of these two items. The quantities of all other forest products reported in these censuses were used to derive value estimates first at 1900 prices and then in current dollars on the basis of the changes in the export prices per unit in the fiscal years 1871, 1881, 1891, and 1901. The volume of production of forest products for census years up to and including 1900 are given in *Census of Canada, 1901*, Vol. II, pp. lx–lxiii. Both the volume and value figures for 1900 were used as given, except that the value of square timber exported in the fiscal year 1901 was substituted for the value of production shown.

Sawlogs. In order to obtain a relationship between the value of sawlogs produced in 1900 and the cost of the materials used by the log products industry, it was first necessary to raise the latter to take account of establishments with less than five employees. This was done by using the proportion (86.3 per cent) between the value of production of log products establishments with five hands or more and of all such establishments in 1890, as given in the *Census of Canada, 1901*, Vol. III, pp. xxvii and lxvii. Imports of logs were deducted from this figure of the cost of material in 1900 and it was found that the value of sawlogs produced amounted to 95.07 per cent of the cost of domes-

tic materials used by the log products industry. Values of saw-logs produced in all other census years except 1920 were esti-mated by taking this percentage of the costs of domestic materials used by the log products industry in these years and adding the values of logs exported in the nearest fiscal years. The costs of materials used by the log products industry are given in the section on manufactures in the decennial censuses, 1871 to 1901.

Square Timber. The values of square timber production for all census years are the values exported in the fiscal year most nearly corresponding to the census period. These export figures for the fiscal years 1871 to 1911 are given in the *Report of the Department of Trade and Commerce, for the Fiscal Year Ending 31st March 1911, Part I,* p. 526.

Firewood. The quantities of firewood produced in all census years up to and including 1910 were reported in the decennial censuses with value figures also shown for 1900 and 1910. Values of the firewood produced in 1870, 1880, and 1890 were estimated by first calculating values at the 1900 price and then adjusting for domestic price differences on the basis of export prices prevailing in the fiscal years 1871, 1881, 1891 and in 1901. Data on the production of firewood are in the 1901 census, Vol. II, p. lxii, and the *Census of Canada, 1911,* Vol. V, p. vii.

Pulpwood. The production of pulpwood was first reported in the *Census of Canada, 1891,* in volume terms only, and in both volume and value in the *Census of Canada, 1901.* The value of the 1890 cut was obtained by using the 1900 price per cord for values in 1900 dollars and then expressing these in 1890 dollars on the basis of export prices prevailing in 1900 and 1890. Statistics on pulpwood production were collected on an annual basis from 1908 on and the 1910 and 1920 values are from *The Pulp and Paper Industry in Canada, 1951,* D.B.S., p. H22.

Other Forest Products. The values of the remaining items of primary forest production, i.e. tan bark, railway ties, electric light poles, etc., were estimated by using two different methods. Wherever the quantity produced was reported in the census, the value was calculated at the 1900 price and adjusted to current dollars by using the export price index for 1900 and the year concerned. For the few other products for which neither quantity nor value figures were given in the census reports, over-all estimates were made by the trend of the proportions they accounted for in 1890 and 1900. Values of certain items

in 1910, e.g. electric light and telegraph poles, railway ties and sleepers, mining timbers, etc., are based on estimates of their production values in 1911 in the *Canada Year Book, 1912,* pp. 64–7. The value of fence posts produced in 1910 was estimated by using the relationship between the values of wire fencing and fence posts in 1900 and the value of fencing in 1910.

5. *Value Added by Manufacture*

The value added by manufacture is the gross value of production less the costs of materials and supplies consumed in the production process and less expenditures for services included under the services category.

The basic sources of the data on 'value added' for 1870 to 1910 are the appropriate decennial censuses. The estimate for 1920 is based upon information, published and unpublished, collected for the annual D.B.S. Census of Manufactures for that year. All the decennial censuses up to and including that of 1911 report the gross value of the products and the costs of materials as well as other data. The costs of materials cover the raw or semi-manufactured products used directly in manufacturing and do not include the costs of fuel and electricity, or packaging and shipping containers, etc. In addition, the data for 1900 and 1910 pertain, with certain exceptions, only to manufacturing establishments with five or more employees, and due allowance had to be made for this incomplete coverage. In the 1901 census *all* butter and cheese factories and *all* brick and tile yards were covered and in the 1911 census this list was extended to cover the following as well: flour mills, saw and shingle mills, lime kilns, fish curing plants, and electric light and power plants.

The value of output and the cost of materials for all manufacturing establishments in 1900 are based largely on data in Vol. III of the 1901 census, p. lxv, covering the output and employment of establishments with five or more employees in 1890 as well as in 1900. Other data used are the gainfully occupied in manufacturing reported for these two years in Vol. IV of the 1921 census, p. xv. Gross value of production in 1900 on a full-coverage basis was estimated by multiplying the 1890 output per man-year by the increase in productivity in 1900 and adjusting for the change in value. The increase in productivity is the percentage difference between real output per man-year of establishments with five or more employees in 1900

and in 1890. The price index is the D.B.S. general wholesale price index. On this basis establishments with five or more employees in 1900 accounted for 82.37 per cent of total output of manufacturing. This adjustment factor was used to raise the reported costs of materials, fuel, electricity, etc., to full-coverage.

The 1910 value of production was estimated by using straight-line interpolation between the proportions of the totals that establishments with five or more employees accounted for in 1900 and in 1915. This coverage factor is estimated at 92.22 per cent in 1910. The 1915 data are from the *Postal Census of Manufacturers, 1916,* p. vi, adjusted to include the output of manufacturing establishments with an annual output of less than $2,500, excluded from the reported total. This estimate was obtained from the first annual D.B.S. Census of Manufactures, for the calendar year 1917, which covered all manufacturing establishments regardless of the number of employees or the size of the annual output. As a result, $15 million was added to the total reported for 1915. The proportion of total output in that year accounted for by establishments with five or more employees was 97.15 per cent.

The source of data on gross value and costs of materials for all other years from 1870 to 1920, inclusive, is *The Manufacturing Industries in Canada, 1950, Section III,* p. 2.

The 1901 census, Vol. III, p. xvi, gives the costs of fuel and light and rent of power and heat by the manufacturing industry in 1900. In total these amounted to 1.47 per cent of gross value of production and this proportion was used to estimate expenditures for fuel and electricity for the previous census years. The 1911 census, Vol. III, p. 85, reports the cost of fuel used in 1910 but gives no information on electric power. An allowance of one-half the total value of all purchased electricity was made. The totals for 1900 and 1910 were adjusted by the factors described above to obtain estimates on a full-coverage basis. Expenditures on fuel and electricity for 1920 were obtained from unpublished material of D.B.S.

The census definition of manufacturing was almost un-changed over the entire period 1870 to 1910, inclusive. The 1920 definition corresponds very closely to that for all subsequent years up to the present. The chief differences are that the D.B.S. series exclude and the decennial Censuses of Manufactures

include electric light and power plants and the construction and hand trades. The decennial census data on manufactures include plumbing and tinsmithing, painting and glazing, interior decoration (defined as carpentering in the 1871 and 1881 censuses), painting and glazing for all years except 1910, and housebuilding in 1910 only. The hand trades are blacksmithing, dyeing and cleaning, lock and gunsmithing, etc. Certain custom and repair work was also included in the census data, e.g. tailoring, bicycle repairing, etc. The 1920 census did not collect statistics on the non-ferrous metals smelting industry and for the sake of comparability, estimates were made and added to the official D.B.S. figures. These 1920 estimates are based on information for 1920 and 1925 on the value of production in refined form of the non-ferrous metals, given in *Chronological Record of Canadian Mining Events from 1604 to 1947 and Historical Tables of the Mineral Production of Canada, 1947*, pp. 35 and 36, and on data given for this industry in the 1925 D.B.S. Census of Manufactures. The gross value of output of the non-ferrous smelting industry in 1920 was estimated by applying the 1925 relationship between the values of non-ferrous metals production given in the mining and in the manufacturing series, to the 1920 'mining series' value of production. The costs of materials and fuel for 1920 were estimated on the assumption that they were the same proportions of the value of output in 1925. The source of the data on non-ferrous metals smelting and refining is *Manufacturing Industries of Canada, 1925*, p. 28.

The only other adjustment made in gross value of production to derive estimates of the value added by manufacture was deduction of an allowance in all years for manufacturers' expenditures on other materials and services included also in the 'value added by commodity production' or in the 'services' sectors, e.g. packages, cartons and shipping containers, office supplies, and materials for plant and equipment maintenance, and also advertising, professional fees, travelling expenses, freight and express charges, etc. For all census years from 1870 to 1900, inclusive, 5 per cent of gross value of production was deducted and in 1910 and 1920 6 per cent. These percentages were estimated from unpublished material of the D.B.S. covering miscellaneous expenses of manufacturers in 1917 and 1920 and manufacturers' operating expenses in 1929, 1933, and 1936.

The latter data provided the relative proportions needed to estimate certain required manufacturers' expenditures not shown in sufficient detail in the 1917 and 1920 data.

6. *Value Added by Construction*

The decennial censuses up to and including that of 1921 did not report the value of construction work during the census periods. The statistics of manufactures for all these censuses except 1921 contain detailed information on certain hand construction trades like painting and glazing, plumbing and tin-smithing, interior decoration, etc. These data, however, are too scanty and inconsistent to be used to estimate either the total value of construction work performed or the value added to the nation's output by construction. Instead, the required estimates were derived by assessing the values of construction materials available during the census years and raising them to cover the total cost of construction work. The available supply of construction materials is the value of domestic production plus imports, including the duty, minus exports. On-site values were estimated by adding transportation charges, sales taxes, and mark-up to these totals of construction supplies. It was assumed that the costs of materials were 51.6 per cent of the total value of the work performed since this was the percentage between 1934 and 1951 of the value of the work performed, according to the data given in the annual D.B.S. construction reports. See *Report of the Construction Industry, 1941*, p. 5, *Report of the Construction Industry, 1943*, p. 3, *The Construction Industry in Canada, 1950*, pp. 12–13 and *Construction in Canada, 1951*, p. 1.

The values of construction materials produced in the census years 1870 to 1910, inclusive, are based largely on data in the appropriate decennial censuses. These were supplemented by information on the values of structural minerals and mineral products in *Chronological Record of Canadian Mining Events, 1604 to 1947 and Historical Tables of the Mineral Production of Canada, 1947* for all census years up to and including 1920. The 1920 estimates of the values of other manufactured construction materials are from the *Iron and Steel Industry in Canada, 1920* and from published and unpublished material of the D.B.S. collected for the 1920 report on the manufacturing industries. The values of such primary forest construction products as railway ties, fence posts, and telegraph, telephone, and electric

light and telegraph poles, were taken from the sources described in the notes on primary forest operations. The values of such secondary forest construction products as lumber, lath, shingles, sashes and doors, etc., were estimated by adjusting the values of the production of the log products and lumber products industries reported in the manufactures section of these censuses. The gross values of production figures for the log products industries for all years prior to 1910 were reduced by the relationship between the value of lumber, lath and shingles produced, as reported by the Department of Interior, and the census output of log product mills in 1910 (72.1 per cent). This independent estimate of the Department of the Interior is part of a series of forest statistics collected by its Forest Service Branch from 1908 to 1916, and continued by the D.B.S. in co-operation with the Forest Service Branch (see *Canada Year Book, 1930,* pp. 289–90. To avoid duplication, only the value added by manufacture of the lumber products industry was included. The statistics of manufactures included in all the decennial censuses up to and including that of 1911 vary considerably in detail shown for manufactured building materials, especially before 1900, and for the iron and steel products category. The values of iron and steel construction items included in the general classifications 'foundry and machine-shop' products and 'iron and steel products' are based on the proportion of these products in the total output of the iron and steel and their products industry in 1929 and 1930, 15 per cent. This proportion was used for the census years 1890 to 1920, inclusive, and 5 and 10 per cent were used for 1870 and 1880, respectively. Similarly, values of the construction items included in 'electrical apparatus and supplies' as reported in each decennial census from 1890 to 1910 and in the 1920 Census of Manufactures were obtained by using 42.8 per cent, the proportion in 1928 according to *Manufactures of Non-Ferrous Metals in Canada, 1928–1929,* pp. 57 and 58.

Exports and imports of construction materials for all the census years were taken from the appropriate annual trade reports and the latter include the duty. In each case data are for the fiscal year most nearly corresponding to the census year concerned, e.g. the fiscal years ending 30th June 1871 to 1901 are used for the census years ending around 31st March for each of these years and the fiscal year ended 31st March 1911 for the

v

census (calendar) year 1910. The figures for 1920 are for the calendar year.

Costs of transportation charges are based on the freight rate index for construction materials compiled by Kenneth Buckley.[1] This index is available only as far back as 1890 and the 1890 figure was used for 1870 and 1880 as well.

The values of new construction were estimated by assuming that 70.6 per cent of the total value of construction was new in all years except 1920. This ratio was the average for the twenty-seven-year period, 1926-52, according to date in *Private and Public Investment, 1926-1951*, p. 151, for 1926-49, *Private and Public Investment in Canada, Outlook, 1952*, p. 5, for 1950 and 1951, and the *Supplement to Private and Public Investment in Canada, Outlook 1953*, p. 2, and 1952. The year 1920 was a year of very high activity and the 1929 proportion of 74.2 per cent was used to estimate the value of new construction.

The values added by construction were estimated by first deducting from the estimated total value of construction for all years up to and including 1910, the value of output of construction trades included in manufacturing (see notes on value added by manufacture). The value of new construction for each census year was then estimated by using the proportions described above. The value added by new construction was then derived on the basis of the ratio of the costs of construction materials to the total value of construction, also described above.

7. *Value Added by Service Industries*

Service industries comprise transportation, storage, communication, public utilities, wholesale and retail trade, finance, insurance, and real estate operations as well as personal, professional, and business services. The values added for all years are based on samples for 1870, 1890, 1900, 1910, and 1920. The 'sample' covered the value added per person working in personal and domestic service and in transportation, and the services of doctors, dentists, clergymen, and professors. This group represented between one-quarter and one-third of the total persons working in the service industries. The values added by the 'other' service industries were estimated by assuming that the output per person working in them was half-way between the value added by persons working in the 'sample' service group

[1] *Real Investment in Canada, 1900-1930*, p. 30.

and that of persons working in the commodity-producing industries. The value added in 1880 was estimated by interpolating the ratios between the output per person working in the service and the commodity-producing industries in 1870 and 1890.

The decennial censuses provided most of the data on which the estimates of values added by services are based. Data on the transportation sector covering railways and express and delivery services are from *The Year Book and Almanac, 1873,* p. 117, *The Statistical Record of Canada, 1887,* p. 291, *Canada Year Book, 1905,* p. 287, and *Railway Statistics, 1919–1912.* The value added by transportation in 1870 was estimated by assuming that the railway operating expenses and value added were the same proportions of the gross revenue as in 1875 (the first year for which such details are available). The number of employees was obtained by dividing estimated total wages and salaries paid by estimated annual earnings of persons working in railways. The annual earnings per person working were derived by assuming that earnings in railways bore the same relationship to earnings in manufacturing in 1870 as in 1880, and the wages and salaries total is based on the 'value added' referred to above. The estimates of persons working and values added by personal and domestic services and the professions, included in the sample, are from data compiled for the consumer expenditure estimates, and the methods are described in the notes to Table 85.

8. *Rent*

Income from rent covers that portion of rent not included elsewhere. Since industrial and commercial rents are included implicitly in the respective sectors, this item is residential rent less certain deductions described below. The estimates are based on gross expenditures on residential rent, described above in the notes on the rent component of gross national expenditure.

These gross residential rent figures were adjusted to exclude rent paid by farm tenants, implicitly included in the 'value added' by agriculture. The latter was based on the average rent paid by farm tenants, assumed to be one-half the national average for all occupied dwellings, and the number of farm tenants reported in each decennial census, as given in Vol. VIII, Part 1 and Part 2, of the 1941 census.

Income from rent not covered elsewhere was estimated as

four-fifths of gross residential rent after deducting rent of farm tenants. The one-fifth deducted covers such duplicated items as the costs of materials used in the repair and maintenance of dwellings, expenditures for fuel and light, etc., when these are part of the rental agreement, and interest on mortgages paid to life insurance companies, etc. The 80 per cent portion covers expenditures for taxes (30 per cent), depreciation (15–20 per cent), repair and maintenance labour (10 per cent), and net rental income (20–25 per cent).

9. *Net Interest and Dividends Paid Abroad*

Data for 1900, 1910 and 1920 are from F. A. Knox, *Dominion Monetary Policy, 1929 to 1934, A Study Prepared for the Royal Commission on Dominion-Provincial Relations*, p. 80. For the earlier years the figures are from Penelope Hartland, *The Canadian Balance of Payments Since 1868*.

10. *Indirect Taxes Less Subsidies*

This category comprises indirect taxes and production subsidies by the Federal Government only. It is believed that these constituted a very high proportion of the totals in all the census years. However, since no allowance has been made for such provincial indirect taxes as stumpage fees, and the business portion of automobile licences in 1910 and 1920, etc., they are a slight understatement.

The Federal indirect taxes consist of custom duties and excise taxes and the additional indirect war revenue taxes in force in 1920, such as special excise taxes, sales taxes, etc. Data for the earlier years are for the fiscal year most nearly corresponding to the census period under review. In 1920 they are for the calendar year.

The subsidies are payments by the Federal Government on the production of certain iron and steel products, non-ferrous metals, crude petroleum, Manila fibre, and linen yarns and the bounty paid to fishermen under an Act of 1882. Production subsidies, in addition to the fisheries bounty, were paid in all the census years from 1890 on, although their total value in any one census period was small. They were paid on pig iron in 1890, on pig iron, puddled iron bars, steel, and lead-silver ore smelting in 1900, and on all these products except puddled iron bars, and on Manila fibre and crude petroleum also in 1910. In

1920 bounties were paid only on crude petroleum, linen yarns, zinc, and to fishermen.

All data on indirect taxes and production subsidies are from the following sources: *Canada Year Book, 1921,* pp. 515, 661, 662 and 669, *Canada Year Book, 1915,* pp. 460 and 461, *Canada Year Book, 1910,* p. 404, and *The Statistical Year Book of Canada, 1898,* p. 139.

11. Adjustment of Gross National Product for Price Changes

The gross national product for 1870, 1890, 1900, 1910 and 1920 was adjusted by the implicit price index in gross national expenditure, derived from Table 10.

TABLE 90

Dwellings Completed and Net Family Formation, Canada, Averages for Decades, 1867–1901, and Annually, 1900–1953

(In thousands)

Year	Dwellings Completed	Net Family Formation	Excess of Dwellings Completed over Net Family Formation
Annual Average, 1867–81 . .	24	9	15
Annual Average, 1881–91 . .	15	11	4
Annual Average, 1891–1901 . .	21	10	11
1900 . . .	29	14	15
1901 . . .	31	24	7
1902 . . .	34	21	13
1903 . . .	38	29	9
1904 . . .	43	31	12
1905 . . .	43	23	20
1906 . . .	49	42	7
1907 . . .	50	50	—
1908 . . .	45	· 34	11
1909 . . .	51	35	16
Sub-total . .	413	303	110
1910 . . .	60	44	16
1911 . . .	48	44	4
1912 . . .	49	54	—5
1913 . . .	52	57	—5
1914 . . .	45	36	9
1915 . . .	41	10	31
1916 . . .	40	9	31
1917 . . .	55	15	40
1918 . . .	41	17	24
1919 . . .	40	50	—10
Sub-total . .	471	336	135

TABLE 90 (*continued*)

Dwellings Completed and Net Family Formation, Canada, Averages for Decades, 1867–1901, and Annually, 1900–1953

(In thousands)

Year	Dwellings Completed	Net Family Formation	Excess of Dwellings Completed over Net Family Formation
1920 . . .	45	61	−16
1921 . . .	34	37	−3
1922 . . .	42	20	22
1923 . . .	43	25	18
1924 . . .	39	29	10
1925 . . .	45	31	14
1926 . . .	55	38	17
1927 . . .	57	44	13
1928 . . .	63	47	16
1929 . . .	65	48	17
Sub-total . .	488	380	108
1930 . . .	53	39	14
1931 . . .	48	29	19
1932 . . .	28	19	9
1933 . . .	22	20	2
1934 . . .	28	28	—
1935 . . .	33	30	3
1936 . . .	39	32	7
1937 . . .	49	39	10
1938 . . .	44	39	5
1939 . . .	52	54	−2
Sub-total . .	396	329	67
1940 . . .	53	70	−17
1941 . . .	57	68	−11
1942 . . .	47	72	−25
1943 . . .	37	55	−18
1944 . . .	43	48	−5
1945 . . .	48	50	−2
1946 . . .	67	104	−37
1947 . . .	79	72	7
1948 . . .	81	79	2
1949 . . .	92	74	18
Sub-total . .	604	692	−88
1950 . . .	92	71	21
1951 . . .	85	95	−10
1952 . . .	76	92	−16
1953 . . .	101	92	9
TOTAL, 1900–53	2,726	2,390	336

Table 90

Dwellings completed, annual average from 1867 to 1901, and annual data 1921–49 are from *Residential Real Estate in Canada, op. cit*. Data for 1950–53 are from *Housing in Canada*, quarterly issues, Central Mortgage and Housing Corporation. Dwellings completed annually between 1900 and 1920 are new estimates, based on an interpolation of gross additions to housing stock, derived from census data for 1901, 1911, and 1921. The 1941 census, Vol. V, p. 2, contains data on occupied dwellings for the earlier period, which were adjusted upward for vacancies and for under-enumeration of dwellings in the censuses of 1901, 1911, and 1921. In these censuses the data refer to buildings, so that in cases of multiple units the number of buildings is shown rather than the number of dwellings. By subtracting revised housing stock data from successive census dates, estimates of the net increase in dwellings between 1901 and 1911 and 1911 and 1921 were obtained. To these net additions was added an allowance of 4 per cent of the housing stock at the beginning of the decade for demolitions, destruction, and abandonment. The resulting figures were the gross additions to the housing stock for 1901–11 and 1911–21. These ten-year aggregates were distributed annually on the basis of an index approximating building materials predominantly used in the building industry. The items covered include imports of window glass (lagged one year to take account of the time lag between imports and use on the site), domestic sales of brick, gypsum, lime and wire nails; and production of lumber minus exports. Sources of the production, sales, export, and import data are numerous. Those for trade statistics include monthly reports of *Trade of Canada*, issued by the Department of Trade and Commerce, for mineral and wire nails data, annual reports of the Department of Mines, for lumber production since 1908 annual reports of the Department of Interior. Data for earlier years are based on lumber cut on Crown lands, as reported by the provincial governments concerned.

The distribution of dwellings completed yielded data for each year ending June (to correspond with the date the census is generally taken). The data were then adjusted to a calendar year basis by means of a seasonal pattern that assumes that dwelling completions in the second half of the year are double those of the first half. The figure for 1900 was obtained by applying the

building material index mentioned above to the dwellings completed figure for 1901.

The estimates for 1900–20 are preliminary, since the method yields only a rough approximation of the trend of housing completions. While the trend appears reasonable, even though it does not seem to be too sensitive to short-term economic fluctuations, there are some questions as to the absolute dimensions of the volume of house building in the first decade compared to the second. The census data, even after adjustment, suggests greater activity between 1900 and 1910 than between 1911 and 1920. This higher volume of activity in the earlier decade is also supported by the fact that substantial population increases took place between 1900 and 1910 and new settlement, particularly of the West, proceeded at a rapid rate. On the other hand, the volume of building materials consumed was notably higher in 1911–20 than in 1900–10. The domestic disappearance of building materials, therefore, suggests that the housing volume in the first decade should have been less than in the second. However, a great deal of the expanded consumption of building materials in the second decade was a result of the increased demands of World War I, and probably a considerably smaller proportion of these materials went into house building. Furthermore, house building in the first decade included a great number of temporary huts, shacks, and other short-term housing accommodation built by settlers in the West. This kind of accommodation might last several years and would then be replaced by more permanent living quarters. It is, therefore, possible that the volume of house building solely in terms of numbers was somewhat greater in the first decade than in the second. But if the data for the first decade could be adjusted for temporary accommodation, then the number of permanent dwellings built in this period would probably be smaller than the number reported for 1911–20. Most of the temporary housing accommodation would have been built from local materials, and building materials sold through commercial channels; the data used for interpolation of the estimates would not allow to any significant extent for the consumption of materials obtained locally or through the labour of the owner. Data on net family formation are from Table 83.

TABLE 91

Passenger Cars and Other Types of Motor Vehicles Registered,
Total and Per Thousand Population, Canada, 1904–1953

Year	Number of Motor Vehicles Registered			
	Passenger Cars 000	All Other Motor Vehicles 000	Total Motor Vehicles 000	Registration per 1,000 Population
1904 . .	—	—	1	0.1
1905 . .	—	—	1	0.1
1906 . .	—	—	1	0.2
1907 . .	—	—	2	0.3
1908 . .	—	—	3	0.4
1909 . .	—	—	5	0.7
1910 . .	—	—	9	1.3
1911 . .	—	—	22	3.0
1912 . .	—	—	36	4.8
1913 . .	—	—	54	6.9
1914 . .	—	—	74	9.3
1915 . .	—	—	95	11.9
1916 . .	—	—	128	15.9
1917 . .	—	—	204	25.2
1918 . .	—	—	277	33.6
1919 . .	—	—	342	40.5
1920 . .	—	—	409	47.1
1921 . .	—	—	465	52.5
1922 . .	—	—	509	56.7
1923 . .	513	63	576	63.4
1924 . .	573	72	645	69.9
1925 . .	641	83	724	77.1
1926 . .	737	95	832	87.0
1927 . .	830	110	940	96.4
1928 . .	931	138	1,069	107.5
1929 . .	1,023	164	1,187	117.1
1930 . .	1,056	176	1,232	119.5
1931 . .	1,024	177	1,201	114.9
1932 . .	945	169	1,114	105.3
1933 . .	917	166	1,083	101.3
1934 . .	952	178	1,130	104.6
1935 . .	990	186	1,176	107.8
1936 . .	1,042	198	1,240	112.7
1937 . .	1,103	217	1,320	118.8
1938 . .	1,160	235	1,395	124.3
1939 . .	1,190	249	1,439	127.0
1940 . .	1,235	266	1,501	131.0
1941 . .	1,280	293	1,573	135.7
1942 . .	1,217	307	1,524	129.8
1943 . .	1,194	318	1,512	127.2
1944 . .	1,178	325	1,503	125.1
1945 . .	1,160	337	1,497	122.7
1946 . .	1,234	388	1,622	130.4
1947 . .	1,370	466	1,836	144.5
1948 . .	1,497	538	2,035	156.7
1949 . .	1,672	619	2,291	168.4
1950 . .	1,907	694	2,601	187.3
1951 . .	2,098	774	2,872	201.5
1952 . .	2,296	860	3,156	215.5
1953 . .	2,514	917	3,431	228.2

Table 91

The number of motor vehicles registered is from various issues of *Canada Year Books*. Population data are from Table 83.

TABLE 92

Price Indices of Capital Goods, Canada,
Selected Years, 1867–1953

(1935–1939 = 100)

Year	Indices of Wholesale Prices of General Building Materials	Indices of Wage Rates in the Construction Industry	Weighted Indices	Indices of Prices of Machinery and Equipment	Total Investment Weighted Indices
1867	56.7	20.6	41.6	111.1	55.2
1870	55.5	20.8	41.0	106.5	54.0
1880	57.1	21.4	42.2	107.8	54.9
1890	55.9	31.4	45.7	81.6	53.8
1900	57.1	33.3	47.2	78.7	55.6
1910	70.5	52.6	63.0	65.3	63.8
1920	163.8	109.5	141.2	176.5	154.8

Implicit Indices in National Accounts

Year	Residential Construction	Non-Residential Construction	All Construction	Machinery and Equipment	Total Investment Indices
1929	115.4	110.7	112.2	103.8	108.3
1930	112.4	106.7	108.7	99.6	104.5
1933	90.2	91.9	91.2	94.4	92.3
1939	102.8	101.2	102.0	102.8	102.4
1945	154.1	126.6	139.4	123.5	132.8
1950	235.8	185.2	204.4	177.1	191.7
1951	268.9	207.9	227.8	198.8	213.3
1952	276.9	222.4	238.0	197.8	218.0
1953	285.2	231.2	249.3	199.8	225.3

Table 92

The wholesale price index of general building materials, 1890–1953, is from *Annual Report of Wholesale Price Indexes, 1943, Wholesale Price Index Numbers, 1913–1942, Prices and Price Indexes,* January, 1952, January, 1953 and 1954, published by the Dominion Bureau of Statistics. Estimates for 1867–80 were based on prices of selected building material items

exported or produced, given in *Trade and Navigation* reports and from Taylor and Michell, *Statistical Contributions to Canadian Economic History*. Indices of wage rates in the construction industry, 1900–20, are from *Wage Rates and Hours of Labour in Canada, 1949*. Indices of wage rates for 1867–90 are based on data given in the decennial censuses on the annual wages paid in the plumbing and tinsmithing and in the painting and glazing trades for the census years 1871 to 1901 and hours worked per week in 1901. Allowance for a decrease in the number of hours worked per week between 1870 and 1900 was made on the basis of the trend indicated for manufacturing. The resultant hourly wage rates of the construction trades mentioned above were translated into an index which was then linked to the 1900–20 index.

The weighted indices for the period 1867–1920 were derived by use of constant weights, 58.3 per cent for building materials and 41.7 per cent for wage rates. These weights are those used in the index in *Housing in Canada*, quarterly issues. The weighted indices for 1929–53 are those used in the official National Accounts.

The price index of machinery and equipment for 1929–53 is the index used in the official National Accounts. For 1890–1920 it is the wholesale price index of iron and its products obtained from *Prices and Price Indexes* publications of the Dominion Bureau of Statistics. For 1870 and 1880 the wholesale price index of iron and its products given in Taylor and Michell *Statistical Contributions to Canadian Economic History*, was linked to the price index for 1890. Since the Taylor-Michell data go back only to 1868, the index for 1867 was projected back by the trend for 1868–70.

'Total investment weighted indices' for the period 1929–53 are from data in the official National Accounts. The index for 1867–1920 is the index implicit in new construction plus machinery and equipment.

Tables 93 and 94

Data from various issues of *Canada Year Book*, except for hydro-electric power and telephones in 1953. The former are from *Water-Power Resources of Canada*, March 1953, Department of Northern Affairs and National Resources and the latter is a preliminary estimate by the Dominion Bureau of Statistics.

TABLE 93

Railway Mileage in Operation, Canada, 1835–1953

Year[a]	Number of Miles	Year[a]	Number of Miles	Year[a]	Number of Miles
1835	0	1875	4,804	1915	34,882
1836	16	1876	5,218	1916	36,985
1837	16	1877	5,782	1917	38,369
1838	16	1878	6,226	1918	38,252
1839	16	1879	6,858	1919	38,329
1840	16	1880	7,194	1920	38,805
1841	16	1881	7,331	1921	39,191
1842	16	1882	8,697	1922	39,358
1843	16	1883	9,577	1923	39,654
1844	16	1884	10,273	1924	40,059
1845	16	1885	10,773	1925	40,350
1846	16	1886	11,793	1926	40,350
1847	54	1887	12,184	1927	40,570
1848	54	1888	12,163	1928	41,022
1849	54	1889	12,628	1929	41,380
1850	66	1890	13,151	1930	42,047
1851	159	1891	13,838	1931	42,280
1852	205	1892	14,564	1932	42,409
1853	506	1893	15,005	1933	42,336
1954	764	1894	15,627	1934	42,270
1855	877	1895	15,977	1935	42,916
1856	1,414	1896	16,270	1936	42,552
1857	1,444	1897	16,550	1937	42,727
1858	1,863	1898	16,870	1938	42,742
1859	1,994	1899	17,250	1939	42,637
1860	2,065	1900	17,657	1940	42,565
1861	2,146	1901	18,140	1941	42,441
1862	2,189	1902	18,714	1942	42,339
1863	2,189	1903	18,988	1943	42,346
1864	2,189	1904	19,431	1944	42,336
1865	2,240	1905	20,487	1945	42,352
1866	2,278	1906	21,423	1946	42,335
1867	2,278	1907	22,446	1947	42,322
1868	2,278	1908	22,966	1948	42,248
1869	2,524	1909	24,104	1949	42,978
1870	2,617	1910	24,731	1950	42,979
1871	2,695	1911	25,400	1951	42,956
1872	2,899	1912	26,840	1952	42,953
1873	3,832	1913	29,304	1953	43,163
1874	4,331	1914	30,795		

[a] 1st June each year up to and including 1919, and 31st December for subsequent years.

TABLE 94

Hydroelectric Power and Telephones Installed, Canada, Selected Years, 1883–1953

Year[a]	Hydroelectric Power Installed Thousands of Horsepower	Telephones Installed Thousands of Units	Year[a]	Hydroelectric Power Installed Thousands of Horsepower	Telephones Installed Thousands of Units
1883	—	4	1930	6,125	1,403
1891	71	—	1931	6,666	1,364
1898	—	44	1932	7,045	1,261
1900	173	—	1933	7,332	1,192
1901	239	63	1934	7,547	1,197
1902	273	—	1935	7,909	1,209
1903	298	—	1936	7,946	1,266
1904	355	—	1937	8,113	1,323
1905	454	—	1938	8,191	1,359
1906	608	—	1939	8,289	1,397
1907	728	—			
1908	821	—	1940	8,584	1,461
1909	890	—	1941	8,845	1,562
1910	977	—	1942	9,226	1,628
1911	1,363	303	1943	10,215	1,692
1912	1,481	371	1944	10,284	1,752
1913	1,689	464	1945	10,284	1,849
1914	1,951	521	1946	10,312	2,026
1915	2,105	533	1947	10,491	2,231
1916	2,222	548	1948	10,871	2,452
1917	2,287	604	1949	11,613	2,700
1918	2,379	662			
1919	2,470	779	1950	12,563	2,917
1920	2,516	856	1951	13,343	3,114
1921	2,754	902	1952	14,306	3,352
1922	3,008	944	1953	14,929	3,606
1923	3,192	1,009			
1924	3,591	1,072			
1925	4,338	1,143			
1926	4,549	1,201			
1927	4,799	1,260			
1928	5,349	1,335			
1929	5,727	1,383			

[a] For hydroelectric power installed, data are for the end of March, 1891, and the end of December in other years. For telephones, the data relate to the end of June, 1883–1918, and are for the end of December in more recent years.

TABLE 95

Production of Wheat and Yearly Average Price No. 1 Northern Wheat per Bushel, Canada, 1868–1953

Crop Year[a]	Production, Million Bushels	Yearly Average Price of No. 1 Northern Wheat per Bushel[b]	Crop Year[a]	Production, Million Bushels	Yearly Average Price of No. 1 Northern Wheat per Bushel[b]
1868	22	—	1910	132	96.6
1869	23	—	1911	231	100.8
1870	17	—	1912	224	89.4
1871	23	—	1913	232	89.4
1872	24	—	1914	161	132.4
1873	24	—	1915	394	113.3
1874	24	—	1916	263	205.6
1875	26	—	1917	234	221.0
1876	23	—	1918	189	224.1
1877	26	—	1919	193	217.5
1878	30	—			
1879	34	—	1920	227	199.3
			1921	301	129.7
1880	32	—	1922	400	110.5
1881	38	—	1923	474	107.1
1882	48	—	1924	262	169.0
1883	31	—	1925	395	151.2
1884	45	—	1926	407	146.3
1885	43	—	1927	480	146.3
1886	38	—	1928	567	124.0
1887	39	—	1929	305	124.0
1888	33	—			
1889	31	—	1930	421	64.2
			1931	321	59.8
1890	42	90.4	1932	443	54.3
1891	61	87.0	1933	282	68.1
1892	48	74.9	1934	276	81.8
1893	41	65.6	1935	282	85.1
1894	43	71.0	1936	219	122.7
1895	56	61.1	1937	180	131.0
1896	40	72.6	1938	360	63.6
1897	54	98.9	1939	521	76.5
1898	66	72.4			
1899	60	69.8	1940	540	74.0
			1941	315	76.5
1900	56	79.5	1942	557	94.7
1901	88	72.7	1943	284	123.0
1902	97	74.9	1944	417	125.0
1903	82	86.2	1945	319	183.3
1904	72	97.4	1946	414	183.3
1905	107	77.5	1947	342	183.3
1906	136	79.5	1948	386	183.3
1907	93	104.7	1949	371	183.3
1908	112	116.1			
1909	167	102.4	1950	462	185.5
			1951	553	183.3
			1952	688	—[c]
			1953	614	—[c]

[a] Crop year ending 31st August of the following year up to 1923 and ending 31st July of the following year from 1924 onward.
[b] Fort William-Port Arthur basis.   [c] Not available.

Table 95

Data on the production of wheat are from *Quarterly Bulletin of Agricultural Statistics*, Vol. 34, p. 206, for 1868–1940, and from *Handbook of Agricultural Statistics*, Part 1, for 1940–51. The 1952 and 1953 estimates are from the *Quarterly Bulletin of Agricultural Statistics*, January-March, 1953 and 1954. The yearly average prices of No. 1 Northern wheat per bushel, Fort William–Port Arthur basis, for 1890–1951 are from Leonard D. Nesbitt, *The Story of Wheat*, March 1953, pp. 77 and 79.

SECTION 12

SOURCES OF DATA IN TABLES 1 TO 82

Tables 1, 2, 3 and 4

Based on Tables 83 and 84.

Tables 5 and 7

The ratios are those derived from the decennial censuses, applied to the year-end population estimate in Table 83. The number and age distribution of males in Table 5 and the break-down between urban and rural, and farm and non-farm in Table 7 for intercensal years were obtained by straight-line interpolation of the distributions given for the census years.

Table 6

Data on labour force, employment, and unemployment, 1950–53 are from *The Labour Force, November 1945 to January 1955*, Reference Paper No. 58, Dominion Bureau of Statistics, and refer to June of each year. The corresponding data for 1933, 1939, and 1945 are from *Civilian Labour Force Estimates, 1931–1950*, Dominion Bureau of Statistics, and refer to 1st June. The estimates for 1920, 1929, and 1930 are based on straight-line interpolation of the ratio of labour force to population in the 1921 and 1931 censuses. Data on the labour force 1880–1920 are estimates based on decennial censuses: to the number gainfully occupied given in the census were added estimates of persons with part-time jobs, including females working on farms, and of persons seeking their first jobs, to conform to the labour force concept for recent years. The adjustment was made by use of the ratio for non-coverage in 1941, given in *Civilian Labour Force*

Estimates, 1931–1950. The adjustment factor was fairly small, 18 per cent being added to the gainfully occupied females and 2 per cent to the males. The estimates of total labour force for 1867 and 1870 were derived by using the ratio of labour force to total population for 1880. The estimates of unemployment for 1920, 1929, and 1930 were based in part on unemployment reported for members of trade unions in *The Labour Gazette* and in part on information on general economic activity. The employed for 1920, 1929 and 1930 were derived by subtracting the unemployed from the total labour force. No satisfactory data were available to make estimates of the unemployed for 1867–1910. The figures on unemployed in Table 6 are based on impressions of the degree of employment obtained by appraising various indicators of economic activity, e.g. exports and imports, bank clearings, production, and other data relating to industrial and financial operations.

Table 8

Based on Tables 6 and 83.

Table 9

Based on Tables 85 and 89.

Table 10

Based on Tables 6, 9 and 86.

Table 11

Percentage changes based on data in Table 10.

Table 12

Based on Table 85.

Table 13

Based on Tables 10, 35, and 85.

Table 14

Based on Tables 83, 85, and 86.

Table 15

Based on Table 14.

Table 16

Data for 1930–53 are from the official National Accounts. Data for 1870–1920 are from Table 85.

Table 17

Based on Table 16.

Table 18

Data for 1871–1921, inclusive, are from various issues of *Canada Year Book*. Data on per capita consumption of spirits and beer for other years were derived by dividing total consumption figures given in the *Canada Year Book* by population as of 1st June, published by the Dominion Bureau of Statistics. Consumption of tobacco in pounds for 1931, 1941, and 1951 was estimated by converting the quantities of cigarettes and cigars consumed into their tobacco equivalents and adding the quantities of tobacco sold at retail in an unmanufactured state.

Table 19

Population data are from Table 83. Data on housing stock for the years 1867–1945 are from O. J. Firestone, *Residential Real Estate in Canada*, Toronto, 1951. Data for 1950–53 are estimates by the Economic Research Department, Central Mortgage and Housing Corporation, based on the decennial censuses of 1941 and 1951 adjusted for new completions and demolition and destruction.

Table 20

From Table 90.

Tables 21 and 23

All data are from the decennial censuses except the number of hospital patients for 1941 and 1951, which are from the *Annual Report of Hospitals in Canada*, Dominion Bureau of Statistics.

Table 22

From Table 91.

Table 24

From the decennial censuses.

Table 25

Life insurance in force in Canada is from the *Report of the Superintendent of Insurance for Canada*, 1875, p. 45, and for 1953, Vol. II, p. 15a. The consumer price index in Table 63 was used for the constant dollar estimates.

W

Table 26

Family expenditures for a sample of families in Winnipeg in 1910 are from the *Report of the Board of Inquiry into Cost of Living in Canada*, 1915, Vol. 2, p. 1018. Data for 1947 and 1948 are from the family expenditure and income surveys conducted by the Dominion Bureau of Statistics.

Tables 27 and 28

From *Family Income and Expenditure in Canada, 1937–1938*, Dominion Bureau of Statistics, 1941, and *Survey of Family Expenditure, 1947–1948*, Dominion Bureau of Statistics, Reference Papers, 1950.

Table 29

Total construction for 1870–1920 are from Table 85. They cover all new construction except that undertaken on account of government departments. The split between residential and other construction for 1900, 1910 and 1920 was derived by estimating residential construction and subtracting it from the total. The value of residential construction work put in place was estimated by applying an estimated value of construction work per unit to the number of dwellings completed as shown in Table 90. The value of construction cost per unit for 1900, 1910, and 1920 was derived by applying the construction cost index to the average construction cost per dwelling in 1921 as given in *Residential Real Estate in Canada*. (This technique may not make enough allowance for changes in the quality of housing in the intervening period.) Data on new residential construction, other construction, and total for 1929–53 are from the official National Accounts, as are the estimates of machinery and equipment for the same period. Data on machinery and equipment for 1870 to 1920 are those included in the gross investment in durable physical assets in Table 85. Gross national expenditure is from Table 85, population from Table 83, and persons working from Table 6.

Table 30

The current dollar figures in Table 29 deflated by the price indices in Table 92.

Table 32

From Tables 93 and 94 in Section 11.

Table 34

From *Private and Public Investment in Canada, 1926–1951*, *Private and Public Investment in Canada, Outlook*, 1953 and 1955, and *National Accounts*, 1926–50, 1950–53, and *Fourth Quarter and Preliminary Annual 1954*.

Table 35

Gross investment in current dollars is from Table 29. Capital consumption in 1870–1920 was estimated separately for manufacturing, agriculture, 'other business', and residential. In general, the ratio of depreciation to stock available for 1926 was applied to estimates of capital invested excluding land in 1870, 1890, 1900, 1910, and 1920. Capital invested in manufacturing is shown in Table 74. For 1900 and 1910 an adjustment was made to allow for incomplete coverage. For agriculture, capital invested was available back to 1900, as shown in Table 69. A special estimate was made for 1870 and 1890 on the basis of changes in the gross value of agricultural production. For residential capital consumption, a technique similar to that used by the Dominion Bureau of Statistics in the official National Accounts was adopted. Capital consumption was assumed to be 20.9 per cent of gross rent, the ratio the Bureau uses for 1926. The method of estimating gross rent for the earlier years is described in the notes to Table 85. For the business sectors other than manufacturing and agriculture, it was assumed that capital consumption would follow the trend of capital consumption for manufacturing and agriculture combined. This assumption probably yields an understatement of capital consumption for the early period, since capital in some sectors, particularly public utilities, may have increased at a higher rate. Estimates of capital consumption for 1929–53 are from the official National Accounts.

Gross investment in constant dollars is from Table 30. Capital consumption in constant dollars was obtained by adjusting capital consumption in current dollars by the weighted index of prices of capital goods, given in Table 92.

Table 36

Changes in inventories for 1870–1920 are described in the notes to Table 85. Data for 1929–53 are from the official National Accounts. The current value of physical change in

inventories is from the *Report of the Royal Commission on Prices*, Vol. II, p. 124. Gross national expenditure is from Table 85.

Table 37

From the official National Accounts.

Table 38

The method for current dollar data for 1870–1920 is described in the notes to Table 85. Current and constant dollar data for 1929–53 are from the National Accounts. Constant dollar estimates for 1870–1920 were derived by adjusting current dollar data by the price index in Table 63. Gross national expenditure is from Tables 85 and 86.

Table 39

For 1929–53 from the official National Accounts. Total expenditures by Federal Governments for 1870–1920 are from the public accounts for the corresponding fiscal years. Transfer payments and 'other' government expenditures were derived by subtracting Federal expenditures on goods and services, given in Table 38, from total expenditures. Total Federal Government expenditures for 1870–1920, and 1929–53, are not comparable because the data for the earlier period have not been adjusted to assure comparability with the concepts used in the official National Accounts.

Table 41

Based on data in Tables 38 and 83.

Table 42

Based on data in Tables 38 and 41.

Table 43

Government expenditures on goods and services are from Table 38. Public investment is from *Private and Public Investment in Canada, 1926–1951*, and *Private and Public Investment in Canada, Outlook, 1953 and 1955*. Government expenditures on other goods and services were derived by subtracting public investment from total government expenditures on goods and services.

Table 44

Based on data in Tables 39, 63, and 83.

Table 45

From the official National Accounts.

Table 46

See notes to Table 85 for derivation of estimates for years 1870–1920. Data for 1930 and later years are from *The Canadian Balance of International Payments, 1926 to 1948*, and *1953*, published by Dominion Bureau of Statistics. Apart from the use of different estimating methods the chief difference between the data for years up to and including 1910 on the one hand and those for 1930 and subsequent years is in the treatment of gold exports. Before 1930 net exports of gold include exports of monetary gold while from 1930 onward the data cover only non-monetary gold. The adjusters for changes in price used for the years up to and including 1920 are those in Table 63 for *commodity* exports and imports.

Table 47

Based on Tables 46 and 10.

Table 48

Data for 1900, 1910, and 1920 from F. A. Knox, 'Excursus on Capital Movements and the Canadian Balance of International Payments, 1900 to 1934', in Herbert Marshall, Frank A. Southard and Kenneth W. Taylor, *Canadian-American Industry*, New Haven, 1936, pp. 299 and 306. Data for 1930–53 are from Dominion Bureau of Statistics, *The Canadian Balance of International Payments, 1953* and *1954*. The principal differences in the data from these sources relate to the basis for valuing equity investments, the method of collecting and compiling the statistics, the treatment of bank balances abroad of the Federal Government and the commercial banks, and the external assets of Canadian insurance companies. Assets abroad of Canadian insurance companies are excluded from Canadian capital invested in foreign countries from 1929 onwards and bank balances of the Federal Government and the commercial banks from 1939 onward. In general, if data for earlier years were placed on the same basis as those for 1929 onward, total Canadian capital invested abroad would probably be reduced somewhat, British and foreign capital invested in Canada would be raised. This would widen the difference between the percent-

age increases in foreign capital invested in Canada and Can adian capital invested abroad from 1920 to 1953.

Table 49

From Tables 46 and 50. Figures for all years from 1929 on are from the official National Accounts.

Table 50

From Table 85.

Table 51

Exports of domestic produce, total exports, and imports for consumption are from *Trade of Canada*. Price indices used to adjust for price changes are from Table 63. Gross national expenditure data are from Table 85.

Table 52

Percentages for 1870 and 1890 were calculated from special compilations based on trade data, classified as to degree of manufacture according to the current definitions of the Dominion Bureau of Statistics. The percentages for other years were calculated from the data given in *Trade of Canada, 1953*, Part 1, p. 91.

Tables 53 and 54

Data for 1870 are from K. W. Taylor and H. Michell, *Statistical Contributions to Canadian Economic History*. Commodity exports for 1870 include foreign produce as well as Canadian produce, while for all other years only Canadian produce is covered. For 1890 a special classification of the trade data was made to derive the group totals shown. For all other years the data are from *Trade of Canada*.

Tables 55, 57 and 58

From annual issues of *Trade of Canada* and its predecessor, *Trade and Navigation*.

Table 56

From *Private and Public Investment in Canada, 1926–1951*, Section 3.

Table 59

The gross national product data are the gross national expenditure totals in Table 85. Net national income at factor cost for 1870–1920 was derived by subtracting from gross national product depreciation allowances and similar business costs, given in Table 13, and indirect taxes less subsidies, given in Table 85. Net national income at factor cost for other years is from the official National Accounts. The constant dollar series was obtained by adjusting the current dollar series by the index implicit in gross national expenditure, given in Table 63.

Table 60

Based on the data in Table 59 for net national income and in Table 86 for gross national product.

Tables 61 and 62

From the official National Accounts.

Table 63

The price indices of consumer goods and services, capital goods, and government expenditures on goods and services for 1929–53, inclusive, are those implicit in the official National Accounts price adjustment.

The price indices of consumer goods and services for 1870, 1890, 1900, 1910, and 1920 are those obtained from the current and constant dollar series of personal expenditure on consumer goods and services, given in Table 14. Similarly, the price indices of capital goods for these years are those implicit in the adjusted gross domestic investment figures given in Table 30.

The price indices of government expenditures on goods and services for 1870–1920, inclusive, were derived by combining the price indices of consumer goods and services and of capital goods. Constant weights were used, one-fifth for the capital goods index and four-fifths for the consumer goods and services index. These weights reflect the ratio of public investment to total government expenditures on goods and services of all governments in 1926. Price indices of *commodity* exports and imports for 1920–53 are based on data in *Prices and Price Indexes, 1913–1930, Export and Import Price Indexes, 1926–1948,* and *Trade of Canada,* 1950–53. Data for 1870–1910 are from *Statistical Contributions to Canadian Economic History,* Vol. II. The implicit index for gross national product for 1929–

53 is from the official National Accounts. For the earlier period each component of gross national expenditure was adjusted separately.

The wholesale price index for 1867–1953 is from *Prices and Price Indexes*, March, 1952 and January, 1954, Dominion Bureau of Statistics.

Table 65

The number of persons working by industry for 1945–53 are from the quarterly and monthly surveys of the labour force conducted by the Dominion Bureau of Statistics. The first survey was undertaken in mid-November 1945 and the figures for 1945 therefore relate to 17th November of that year. Figures for 1950–53 relate to June. The data pertain to the civilian labour force only and exclude persons in the Armed Forces. For 1881–1921 the data cover the number gainfully occupied enumerated in the respective censuses and summarized in *Census of Canada 1921*, Vol. IV, p. xv. A special adjustment was made to the manufacturing and construction categories for 1881–1911 by transferring certain classes of tradesmen listed as gainfully occupied under construction, such as plumbers, tinsmiths, painters and glaziers, to manufacturing. This adjustment was made to assure comparability with the definition of manufacturing used for the survey of manufacturing conducted as part of the census operation. No such adjustment was necessary for 1921 because beginning with 1920 the data on manufacturing production exclude the output of the construction trades. Some information on occupations of persons was available in the 1871 census, but the definition differed from the gainfully occupied concept used in 1881 and subsequent censuses so that the 1871 data could not be used. In 1881 the gainfully occupied in agriculture were 48 per cent of total gainfully occupied and in 1891, 45.8 per cent. The trend away from agriculture to other occupations was extended to 1871 but at a slower rate. It was assumed that in 1870 approximately 50 per cent of the total number of gainfully occupied worked in agriculture. For 1871 and 1881 the number of persons working in manufacturing as defined in the census of manufacturing were given. This manufacturing census definition covers the number of persons working in manufacturing at any time during the year. The enumeration includes, therefore, a good deal of double

counting since a person who changed jobs during the year was counted as 'a person working' every time he changed his job. For this reason, the number employed as given in the census of manufacturing was not used. Instead, the gainfully occupied in manufacturing in 1871 was estimated by applying the ratio of total persons working in manufacturing to total gainfully occupied in manufacturing in 1881, to the 1871 figure of total persons reported as working in the manufacturing census. This adjustment was designed to eliminate duplications. Persons gainfully occupied in tertiary industries were 19 per cent of total gainfully occupied in 1881, 24 per cent in 1891, and 28 per cent in 1901. From this trend it was estimated that persons gainfully occupied in the service sector were 17 per cent of total gainfully occupied in 1871.

Table 67

Data for 1870–1920 are from Table 89 and for all other years from the official National Accounts.

Table 69

The gross value of agricultural production for 1900–50, inclusive, are from the decennial censuses. The gross value of production for 1870, 1880, and 1890 are special estimates prepared to derive value added estimates for these years and the method used is described in the notes to Table 89. The constant dollar figures of gross value of production in agriculture for 1890–1950 were derived by adjusting the current dollar values by the wholesale price indices for field crops and animal products, given in the following publications of the Dominion Bureau of Statistics: *Prices and Price Indexes, 1913–1937* and monthly and annual issues of *Prices and Price Indexes* for subsequent years up to 1951. For 1870–90, indices of the prices of vegetable (wheat, rye, barley, oats, peas, oatmeal, and flour) and animal products (beef, dressed hogs, bacon, ham, eggs, cheese, butter, and lard) were available from Taylor and Michell, *Statistical Contributions to Canadian Economic History*, Vol. II, p. 55. These two indices were linked to the unpublished wholesale price indices of field products and animal products obtained from the Dominion Bureau of Statistics for 1890–1921. In adjusting for price changes, the value of field crops in current dollars was divided by the price indices of field products

for the *succeeding* year, since much of these are sold in the year following their harvesting, while the price indices for the current years were used to obtain the constant dollar values of animal products. The series on value of farm machinery and equipment in constant dollars was obtained by adjusting current dollar data by an index of farm machinery and equipment prices. This index for 1913–50 is the price index of farm machinery and equipment, given in *Price Index Numbers of Commodities and Services Used by Farmers, 1913–1948*, and *Price Index Numbers of Commodities and Services Used by Farmers, January, 1952*. For 1901–13 a series of prices of farm machinery and equipment, given in the *Report of the Board of Inquiry into the Cost of Living in Canada*, 1915, Vol. II, pp. 52–69, was used. This index was linked to the Dominion Bureau of Statistics wholesale price index for farm machinery and equipment commencing in 1913. Since the value of farm machinery and equipment shown for 1900 is the amount reported as of 1st April 1901 the 1901 price index was used to make the adjustment for the change in prices.

Table 70

Data are from decennial censuses except the number of gainfully occupied in agriculture for 1871 which is given in Table 65. A special adjustment was made to the occupied farm acreage reported in the census of 1891 by adding an estimate for British Columbia obtained by a straight-line interpolation between the acreages shown for this province in 1881 and 1901.

Table 71

Based on data from Tables 69 and 70.

Table 72

Data of gross value of production by type of commodities for 1900–50 are from the respective decennial censuses. For 1870, 1880, and 1890 the production data are special estimates prepared to derive the estimates of 'value added in agriculture' (see notes to Table 89).

Exports of agricultural products for 1910–30 relate to the fiscal year beginning 1st April, and to the calendar year for 1940 and 1950. The data for all years except 1950 are from *Quarterly Bulletin of Agricultural Statistics, April–June*, 1941, p. 135. Data for 1950 are from *Trade of Canada, 1951*, Vol. 1, p. 31. The data for 1870–1900 relate to the fiscal year beginning 1st July. These

data cover the exports of agricultural and vegetable products, farm livestock, dairy products, meats, other animal products, and raw wool, and are from *Statistical Contributions to Canadian Economic History*, Vol. II, pp. 34 ff.

Table 73

Based on Tables 69 and 89. The value added series in constant dollars up to and including 1920 were obtained by adjusting the current dollar figures by the implicit price indices of farm products described in the notes to Table 69.

Table 74

The number of manufacturing establishments and the gross value of production for 1870–1953 are based on data in the *Manufacturing Industries in Canada 1950, Preliminary Statement of Manufactures 1953* and *Special Statement, 1953,* published by the Dominion Bureau of Statistics. The data for 1900 and 1910 cover only establishments with five or more employees and special estimates for non-coverage were made (see notes to Table 89 for details). The gross value of production figures in constant dollars were obtained by adjusting the current dollar figures by the general wholesale price index shown in Table 63. The value of fixed capital invested in manufacturing covers the value of plant, equipment, and land used for industrial purposes. The data for 1870–1910 are from the decennial censuses. The censuses of 1891, 1901, and 1911 show fixed and working capital separately but those of 1871 and 1881 show only *total* capital. Estimates of fixed capital in 1870 and 1880 were obtained by applying the 1891 census proportion of fixed to total capital to the totals for the two earlier years. The capital employed figures for the years up to and including 1900 pertain to the census date, that is, the beginning of April of 1871, 1881, and 1891, and 1st June 1901, but these are shown as at the preceding year-end in Table 69. The data for 1920–39 are from annual reports on the manufacturing industries published by the Dominion Bureau of Statistics. The figures for 1945–52 are also from this source and the 1953 estimate was obtained by the method employed by the D.B.S. to derive the 1945–52 figures, described on p. 44 of *General Review of the Manufacturing Industries of Canada 1952*. The constant dollar values of fixed capital invested are the sum of the values of buildings (including

industrial land) and the values of machinery and equipment, after adjustment for changes in prices. The adjusters are given in Table 63. For 1930-53 inclusive, the price index for the building component is the non-residential construction price index.

Table 76

The number of persons working in manufacturing is from Table 65. The split between wage earners and salaried employees and owners for 1900 and 1910 was obtained by using the proportions shown in decennial census data. For all other years this information is given in the annual reports on the manufacturing industries published by the Dominion Bureau of Statistics. The 1901 census reported the *average* number of hours worked by wage earners per week but no direct record of the hours worked per week is available for any other year in the 1870–1910 period. It was only possible to gain some impressions about the length of the work week in the years 1870 to 1890. These were obtained mainly from the *Report of the Royal Commission on Capital and Labour*, submitted in 1896. Most workers in manufacturing appear to have been working about ten hours a day with two hours or a half-day off on Saturday. Thus, around 1889 the work week in manufacturing appears to have been about fifty-eight to sixty hours, and fifty-nine hours is used for 1890. The Report of this Commission alludes to the progress toward shorter hours which accompanied industrialization and hence it seems reasonable to assume that the average work week in manufacturing was around sixty-four hours in 1870. The census of 1911 reports the average number of hours worked per week by *individual* industries (except for the 'miscellaneous' class) but does not give any country or provincial averages. A sample of individual manufacturing industries having 5,000 or more wage earners in 1910 indicates a decline of 4.3 per cent in the hours worked per week in 1910, compared with 1900. This suggests a work week of about 53.3 hours in manufacturing in 1910. Comparing the reduction in the number of hours worked per week from 1870 to 1900 with that indicated for 1900 to 1950, the improvement in the former period was about two-thirds that indicated for the latter. This finding is in line with the general experience that as a nation becomes more highly industrialized a greater reduction in the number of hours

worked per week becomes possible. In any event it bears emphasis that the figure for 1870 is not an estimate but rather an impression of what the average work week might have been for wage earners in manufacturing industries, defined broadly to include certain types of tradesmen. The 1930 figure is an estimate based on data on the length of the average work week in manufacturing in 1928 and 1932 reported in the *General Review of the Manufacturing Industries of Canada* for 1928 and 1932. The figures for the years 1945 to 1953 are from *The Review of Man-Hours and Hourly Earnings, 1945–1954*, published by the Dominion Bureau of Statistics, and relate to the average number of hours worked per week by hourly rated wage earners of manufacturing firms which customarily employ fifteen or more persons. Total wages in current dollars are from the *Manufacturing Industries of Canada, 1950*, Section 3, and subsequent annual reports. Total wages in constant dollars were estimated by adjusting these current dollar totals by the implied price indices implicit in consumer goods and services expenditures, given in Table 63.

Table 77

Based on Tables 74 and 76.

Table 78

Data for 1870–1910 are from the decennial censuses, with the 1900 and 1910 figures adjusted for full coverage (see notes to Table 89), and for 1920–53 from the annual reports on manufacturing industries, published by the Dominion Bureau of Statistics.

Table 79

Data on the exports of manufactured products for 1920–53 are from *Trade of Canada, 1953*, Part I, p. 91. Data for 1870–1910 are special compilations based on the respective reports on *Trade and Navigation*. The gross value of manufacturing production is from Table 74.

Table 80

Current dollar figures of value added in manufacturing and gross national product are from Table 67. The 1940 figure is from the official National Accounts. The constant dollar series

was derived by adjusting the current dollar data by the general wholesale price index, shown in Table 63.

Table 81

Gross national product per man-year is from Table 10. Gross value of manufacturing production per man-year for all workers and per man-hour for wage earners are from Table 77. Gross value of agricultural production per man-year for all workers is from Table 71.

Table 82

The value of fixed capital per person working and per thousand dollar output for manufacturing is from Table 77 and for agriculture from Table 71.