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2 New Estimates of Gross National Product, Canada, 1870–1926: Some Implications for Canadian Development

M. C. Urquhart

This paper has its genesis in a project devoted to the preparation of national income estimates for Canada for the years 1870–1926: the delimitation of the period is explained by the twin facts that the first Canadian census after confederation was taken in 1871 and that the official estimates of the national income of Canada begin in 1926. The estimates are now complete—just barely. In this paper, I examine some of the consequences of the availability of the new data for the interpretation of Canadian economic development in the period covered by the estimates. In my discussion I barely scratch the surface, largely because the preparation of the estimates themselves absorbed nearly all of my time until very recently.

Before getting on with the main task I should say just a word about the new estimates. I shall be brief at this juncture, even though it is perhaps fair to say that they are the main contribution of this paper.

The estimates comprise: annual estimates of gross domestic product, at factor cost by industrial sector, and of gross national product at market prices, all in current prices; annual estimates of gross national product at market prices in constant dollars; annual estimates of government expenditure on goods and services, by level of government; annual estimates of the main components of the balance of international payments, a large part of which has been newly estimated; annual estimates of capital formation in residential construction throughout the period and of producers' durables from 1870 to 1895, which, together with new capital formation estimates for nonresidential investment prepared by Statistics Canada, provide a new series for gross

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domestic capital formation for the entire period. They are the product of a collaborative work by seven of us in academia, assisted by at least a score of research assistants, over a decade, mostly on a spare-time basis. I had hoped myself to be pretty much chairman of the board, but it did not work out that way, with the result that I must take responsibility for large parts of the new estimates as well as for the delays in their production. The division of responsibility for the various parts of the estimates is given in appendix 1.

As for the quality of the new estimates, I have considerable confidence in them, comparatively speaking, which is not to say that they do not have limitations. But then, which country's estimates do not? The estimates have been prepared from a mass of data. The basic source information, frequently hitherto untapped, proved to be substantially better than we had expected it to be. And we have put a good deal of effort into developing processes that make the greatest feasible use of that information. Having said this much, I hasten to add, as I am sure everyone knows, that the basic information was considerably less in quantity and quality than that on which the official estimates for Canada, beginning in 1926, are based. Ultimate judgment of the quality of the estimates must come, of course, from others than those of us who were engaged in the project. A general statement of the sources of the data is given in appendix 2; a detailed statement would be of such volume as to be unmanageable on this occasion.

I do not intend to proceed with a detailed discussion of the basis of the estimates but rather to see what inferences, if any, can be easily made from them about the nature of Canadian economic development. However, given that the estimates are the most important part of the paper, I present them immediately. They are given on an annual basis because the annual data contain much information, useful to my later musings, that would be submerged in annual averages.

Table 2.1 presents gross domestic product (GDP) at factor cost, by industry, and gross national product (GNP) at market prices. For all industries but two the data are given on an annual basis; the industry groups, "wholesale and retail trade" and "community, business and personal services," have been given only for census dates and for 1926, the first year of the official accounts, these being the years for which primary data are available and there being no satisfactory specific annual interpolaters. The aggregate GDP at factor cost was interpolated between census years and to 1926 on the basis of the sum of those series for which annual estimates are available—the latter make up by far the larger part of GDP.

Table 2.2 presents data on gross capital formation broken down by a number of categories. As has been stated already, our project's contribution to this material is limited to the estimates for residential con-

Table 2.1 **Gross National Product, Canada (Thousands of Dollars)**

	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881
Agriculture	143797	145281	147381	144490	154516	146516	139172	144466	134193	158421	159339	197021
Forestry (excluding agriculture)	5790	6960	7669	9175	9257	8184	7101	7244	6565	5911	5908	7923
Hunting, trapping	211	306	516	867	998	1047	1047	894	850	752	1019	1101
Fisheries	2921	3362	4249	4775	5186	4596	4936	5330	5868	6007	6540	6978
Mining	4431	5354	5507	5436	4762	6109	5906	5237	4736	5385	5289	5404
Manufacturing	76983	89406	98954	123997	107930	97479	84232	93173	83725	86996	103615	122923
Manufactured gas	399	505	641	744	778	813	848	562	534	825	719	847
Construction	20000	21000	26300	28700	32000	29000	22700	19500	17300	17400	20400	22400
Transportation	20000	22609	22014	23372	23777	19690	19849	19323	21454	21249	25001	27929
Electric light & power												
Communications												
Banking & finance	7000	8000	10000	10000	10000	8000	9000	9000	8000	9000	10000	12000
Residential rents	20756	21959	26609	28209	28769	27725	27123	26779	26515	26290	27275	28654
Federal government	4595	5268	6086	7989	7914	8689	8782	8474	8385	7723	7980	8404
Provincial government	1589	1756	2230	2548	3076	3058	2933	2890	2604	2607	2541	2704
Municipal services	3441	3587	3908	4202	4476	4748	4986	5340	5395	5482	5586	5711
Education, public	3480	3438	3978	4428	4800	5120	5355	5935	5900	6105	6198	6221
Universities	200	203	223	243	263	283	303	323	343	363	383	420
Wholesale & retail trade	21176										31976	
Community, business, and personal service	26454										36895	
GDP (old official basis)	363223	391060	423498	462612	462896	432007	401742	414588	389621	423581	456664	539010
Public revenues from resource royalties	1027	1120	1718	1451	1230	864	1040	999	807	862	1340	1871
GDP (new basis)	364250	392180	425216	464063	464126	432871	402782	415587	390428	424443	458004	540881
Less: net interest & dividends paid abroad	5412	4034	4991	5409	7039	8192	9079	9804	10047	11993	14286	14727
GNP at factor cost	358838	388146	420225	458654	457087	424629	393703	405783	380381	412450	443718	526154
Indirect taxes less subsidies	23715	24550	27029	29114	28456	27773	27967	28913	29268	32677	38236	42535
GNP at market prices	382553	412696	447254	487768	485543	452452	421670	434696	409649	445127	481954	568689

(*continued*)

Table 2.1 (continued)

	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893
Agriculture	204892	185086	173396	165035	158063	175819	170638	177122	184656	189108	189499	181588
Forestry (excluding agriculture)	8940	9297	8685	8136	9343	9458	10170	10697	10933	11105	11422	11575
Hunting, trapping	798	745	924	1101	1130	1246	1280	1134	992	985	1013	1084
Fisheries	7459	7640	8044	8090	8385	8347	8143	8031	8279	8682	8668	9623
Mining	5740	5498	6065	6250	7500	8083	9155	10348	12350	14729	12285	14505
Manufacturing	142493	148958	132910	127817	133241	141622	148915	156984	171691	172454	165317	158575
Manufactured gas	769	906	950	1166	1281	1467	1361	1506	1705	1642	1715	1715
Construction	30000	34000	38000	25700	25500	30200	31600	34200	30100	31200	28600	26200
Transportation	29051	31301	31015	28672	32168	33604	36177	36320	40460	39840	42429	42234
Electric light & power									936	1012	1089	1166
Communications						526	548	636	745	855	921	1162
Banking & finance	13000	14000	14000	14000	15000	17000	18000	19000	18000	20000	22000	21000
Residential rents	31080	30687	30112	29689	28986	33892	35496	36580	37493	38724	41267	42442
Federal government	9240	10259	11091	12436	11249	11297	11250	11117	11416	11565	11818	12275
Provincial government	2882	3014	2984	3013	3186	3423	3451	3957	3904	4388	4119	4091
Municipal services	5904	6067	6205	6554	6788	6954	7766	8447	8635	9505	9202	9437
Education, public	6339	6580	6733	7045	7268	7152	7501	7663	7987	8285	8552	8479
Universities	456	493	530	566	603	640	676	713	749	786	804	821
Wholesale & retail trade									53052			
Community, business, and personal service									60143			
GDP (old official basis)	590448	586489	560657	530544	537061	587438	602482	630731	664226	681001	676116	660909
Public revenues from resource royalties	1982	1663	1379	1483	1675	2021	2739	2388	2080	2564	3649	3193
GDP (new basis)	592430	588152	562036	532027	538766	589459	605221	633119	666306	683565	679765	664102
Less: net interest & dividends paid abroad	15745	16846	17291	17961	22199	24817	24687	26920	29904	30313	31156	31951
GNP at factor cost	576685	571306	544745	514066	516537	564642	580534	606199	636402	653252	648609	632151
Indirect taxes less subsidies	42200	40221	40432	40463	44196	46434	49770	49561	49017	50253	51676	50257
GNP at market prices	618885	611527	585177	554529	560733	611076	630304	655760	685419	703505	700285	682408

	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905
Agriculture	172555	167159	157150	186915	188867	200280	207828	243414	280116	267048	278782	303838
Forestry (excluding agriculture)	10732	10973	12162	12697	12318	13020	13137	14439	14749	15109	15594	17263
Hunting, trapping	1113	1119	1132	1046	1008	1084	1127	1143	1399	1508	1504	1611
Fisheries	9790	9517	9809	10656	9625	10504	10649	12155	10640	11291	11454	14089
Mining	14296	15010	16500	21126	28607	36481	47713	47922	44548	42201	40682	44686
Manufacturing	145114	137998	138751	156082	169539	179188	200146	203941	243475	259771	254645	308439
Manufactured gas	1728	1532	1366	1285	1255	1195	1309	1219	1238	1469	1755	1899
Construction	21300	21100	20000	23300	30000	30400	32500	40900	46800	59100	67500	78500
Transportation	42044	38658	43488	45107	52077	55589	62083	63794	73574	84534	86345	92760
Electric light & power	1241	1320	1395	1471	1546	1625	1700	2124	2652	3234	4985	6023
Communications	1162	1162	1162	1162	1512	1600	1818	2192	2548	2981	3429	4164
Banking & finance	22000	22000	24000	25000	28000	32000	39000	41000	48000	57000	45000	56000
Residential rents	44012	44544	46537	46138	49252	53288	60453	65529	68857	72380	77769	87312
Federal government	12085	11397	11987	12631	14166	14107	15672	17259	17575	19456	23380	23934
Provincial government	4334	4142	4523	4573	4687	4726	5240	5462	5872	6012	6146	6565
Municipal services	9572	9443	9763	10295	10540	10725	11330	12419	13508	14825	16504	17458
Education, public	9234	9280	9694	9737	9741	9939	10158	10687	11043	11662	12715	13435
Universities	839	857	874	892	910	928	945	963	1126	1289	1452	1615
Wholesale & retail trade							65553					
Community, business, and personal service							84469					
GDP (old official basis)	631077	611950	615771	688069	740798	792874	872830	950875	1074408	1127842	1151915	1310935
Public revenues from resource royalties	2353	2481	2341	3833	3849	4150	4740	4634	4878	5886	6300	5702
GDP (new basis)	633430	614431	618112	691902	744647	797024	877570	955509	1079286	1133728	1158215	1316637
Less: net interest & dividends paid abroad	31380	29998	30499	31195	34450	35673	37120	39540	41493	42485	45765	49639
GNP at factor cost	602050	584433	587613	660707	710197	761351	840450	915969	1037793	1091243	1112450	1266998
Indirect taxes less subsidies	49361	48985	53204	56315	59175	64631	66907	74694	81806	86907	93366	94545
GNP at market prices	651411	633418	640817	717022	769372	825982	907357	990663	1119599	1178150	1205816	1361543

(*continued*)

Table 2.1 (continued)

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917
Agriculture	318796	354676	335689	402554	402327	469654	477958	517812	490900	686638	771679	935133
Forestry (excluding agriculture)	19466	19795	18049	21187	22995	25066	25329	24341	24048	23453	26208	37850
Hunting, trapping	1947	1812	1652	2276	2774	2641	3249	3683	2318	2823	3666	5021
Fisheries	12961	12651	12356	14177	14359	16119	16059	16039	15409	17252	19269	25593
Mining	49306	53077	52388	52979	61975	57026	75072	81903	74860	81724	107252	117201
Manufacturing	363617	401828	349336	406284	452122	469566	516339	517791	447723	475178	664054	960072
Manufactured gas	1679	2146	2141	1921	2078	2203	3181	3535	3042	1953	3067	3653
Construction	91000	113100	113800	124100	158500	178200	215600	219600	172800	126500	116300	122000
Transportation	108661	132799	131485	132869	153591	174855	207943	246670	222008	190025	229617	260507
Electric light & power	6790	7660	8553	9512	9503	13786	16103	17995	20611	22080	23861	27551
Communications	4860	8223	8807	9306	10401	11387	13467	15795	17507	17549	20127	22503
Banking & finance	71000	77000	76000	75000	73000	92000	104000	125000	114000	93000	104000	131000
Residential rents	96564	105533	115264	120417	132764	142948	162753	181142	182980	181795	186371	203125
Federal government	18265	27448	30782	27759	32556	37194	42137	50515	79830	151371	239223	264918
Provincial government	8288	10165	11628	13450	15465	17792	20904	22849	21050	20588	19589	23135
Municipal services	19439	21078	23030	24722	27888	29838	34715	36692	40525	46275	48725	50274
Education, public	14333	15387	17399	18976	20776	22229	25235	27274	30464	34428	34491	36595
Universities	1779	1942	2105	2268	2431	2594	3088	3582	4075	4569	5062	5556
Wholesale & retail trade					204444							
Community, business, and personal service					148359							
GDP (old official basis)	1469022	1662569	1596733	1780389	1948308	2149376	2383463	2557526	2366984	2601585	3110974	3826914
Public revenues from resource royalties	5677	7082	7267	6816	8653	9218	9202	9877	9874	7776	7415	8048
GDP (new basis)	1474699	1669651	1604000	1787205	1956961	2158594	2392665	2567403	2376558	2609361	3118389	3834962
Less: net interest & dividends paid abroad	56030	60586	68628	77439	86239	105303	118759	141168	153271	173251	172294	173505
GNP at factor cost	1418669	1609065	1535372	1709766	1870722	2053291	2273906	2426235	2223587	2436110	2946095	3661457
Indirect taxes less subsidies	107216	119341	118421	128577	152088	179874	219970	225237	224992	252469	296627	330415
GNP at market prices	1525885	1728406	1653793	1838343	2022810	2233165	2493876	2651472	2448579	2688579	3242722	3991872

	1918	1919	1920	1921	1922	1923	1924	1925	1926
Agriculture	906176	943779	1042279	677845	720736	778527	783897	991144	927356
Forestry (excluding agriculture)	42285	49270	63740	37689	48229	46876	58588	66000	66000
Hunting, trapping	8188	12716	11536	9876	12376	11507	11159	10855	11807
Fisheries	29239	28042	25134	19118	21489	21480	22198	23919	27547
Mining	139388	113996	147166	115178	127971	136465	137769	132514	154000
Manufacturing	1084026	1042248	1271069	873027	865311	954824	899777	953898	1067402
Manufactured gas	3129	4660	6202	7558	8640	8811	6793	8759	9174
Construction	109700	148500	184600	175400	182400	215900	193900	198200	203200
Transportation	256400	334555	381516	347987	355327	363993	345071	368982	405179
Electric light & power	30858	32963	37353	39495	43718	46733	51635	59354	69877
Communications	25344	32031	31035	34156	34380	35418	37216	39815	46688
Banking & finance	132000	163000	221000	193000	169000	157000	168000	183000	209000
Residential rents	218207	242426	283216	314351	331245	344563	352049	357484	359551
Federal government	324396	172761	103221	98038	89769	87800	87632	91128	91954
Provincial government	25409	31316	39681	43758	49251	50666	49026	51564	50964
Municipal services	54540	58518	66621	76081	75599	75631	75941	75134	78671
Education, public	41168	47073	57043	68458	74549	77606	77443	79032	81111
Universities	6050	6543	7037	7335	7632	7930	8228	8526	8825
Wholesale & retail trade			439432						534000
Community, business, and personal service			303245						506000
GDP (old official basis)	4053209	4106737	4722126	3767062	3906309	4200995	4179100	4643179	4908306
Public revenues from resource royalties	8969	11612	14081	14978	13790	13175	15829	16974	18009
GDP (new basis)	4062178	4118349	4736207	3782040	3920099	4214170	4194929	4660153	4926315
Less: net interest & dividends paid abroad	176060	178467	186029	210928	225335	231279	241200	243394	208000
GNP at factor cost	3886118	3939882	4550178	3571112	3694764	3982891	3953729	4416759	4718315
Indirect taxes less subsidies	375364	427499	510708	502713	539181	572375	547796	578989	627000
GNP at market prices	4261482	4367381	5060886	4073825	4233945	4555266	4501525	4995748	5345315

Table 2.2 **Gross Fixed Capital Formation, Current Dollars (Millions of Dollars)**

Year	Total Manufac-turing	Railway & Telegraph	Other Business	Housing Construc-tion	Total Private Business	Public Schools	Govern-ment Total	Grand Total
1870				23.2				60.0
1871	5.4	12.4	11.7	31.2	60.7	0.7	1.5	62.9
1872	6.1	27.0	13.2	27.5	73.8	1.3	2.8	77.9
1873	6.6	29.3	14.2	29.6	79.7	1.7	2.9	84.3
1874	6.6	25.3	15.2	35.3	82.4	2.1	8.0	92.5
1875	6.6	24.1	14.6	30.5	75.8	2.1	7.3	85.2
1876	6.1	15.3	14.2	23.8	59.4	1.7	9.0	70.1
1877	5.9	8.7	14.3	19.6	48.5	1.4	11.6	61.5
1878	5.6	6.4	14.2	17.4	43.6	1.3	10.4	55.3
1879	5.9	8.7	14.1	17.4	46.1	0.9	9.0	56.0
1880	8.9	14.1	14.7	20.6	58.3	0.9	6.9	66.1
1881	14.6	18.3	18.2	18.2	69.3	0.8	7.1	77.2
1882	19.7	44.0	22.1	14.3	100.1	1.0	5.7	106.8
1883	18.9	57.5	24.3	12.0	112.7	0.9	7.4	121.0
1884	14.1	72.5	20.0	14.4	121.0	0.9	8.0	129.9
1885	12.3	33.8	16.9	16.6	79.6	0.9	6.4	86.9
1886	12.5	23.7	18.1	22.7	77.0	1.0	7.5	85.5
1887	13.5	23.4	20.9	31.7	89.5	1.3	8.6	99.4
1888	14.1	20.7	25.8	38.2	98.8	1.5	5.6	105.9
1889	14.3	22.1	24.0	41.8	102.2	2.1	7.5	111.8
1890	13.8	15.3	21.8	39.7	90.6	1.8	6.2	98.6
1891	12.0	14.2	28.4	42.2	96.8	1.7	6.8	105.3
1892	11.8	12.0	26.8	39.2	89.8	1.5	6.1	97.4
1893	11.2	12.9	29.0	30.4	83.5	1.4	7.5	92.4
1894	10.5	8.8	21.8	22.2	63.3	1.4	10.2	74.9
1895	10.5	6.6	27.0	19.4	63.5	1.3	13.2	78.0
1896	12.6	7.4	25.3	20.2	65.5	1.1	7.2	73.8
1897	14.4	10.7	33.0	23.5	81.6	1.0	7.5	90.1
1898	19.1	18.6	42.4	26.9	107.0	1.4	10.1	118.5
1899	24.9	15.8	42.7	28.0	113.3	1.2	11.9	126.4
1900	30.2	18.7	51.4	25.6	125.9	1.3	13.0	140.2
1901	37.2	21.7	76.8	28.3	164.0	1.6	14.6	180.2
1902	42.8	24.3	90.1	32.8	191.0	1.6	16.0	208.6
1903	54.9	33.2	104.1	42.9	235.1	1.7	18.4	255.2
1904	55.5	37.6	105.6	54.5	253.2	2.3	21.6	277.1
1905	57.3	48.3	107.8	71.0	284.4	3.6	24.0	312.0
1906	61.4	63.4	128.3	83.9	337.0	4.1	18.6	359.7
1907	72.1	103.9	146.3	83.2	408.5	6.2	33.0	447.7
1908	70.0	103.0	137.7	78.2	388.9	7.1	42.0	438.0
1909	74.2	92.9	165.4	101.2	433.7	7.5	35.8	477.0
1910	97.9	109.5	204.1	131.0	542.5	9.1	45.3	596.9
1911	123.2	125.2	230.7	148.2	627.3	11.0	55.0	694.2
1912	155.8	157.0	282.1	171.0	765.9	14.8	69.4	850.1
1913	157.6	175.4	268.6	155.7	757.3	16.7	96.5	870.5
1914	108.7	126.6	197.0	108.6	540.9	18.9	100.5	660.3
1915	85.9	97.7	130.4	61.4	375.4	16.8	78.5	470.7

Table 2.2 (continued)

Year	Total Manufacturing	Railway & Telegraph	Other Business	Housing Construction	Total Private Business	Public Schools	Government Total	Grand Total
1916	135.0	49.0	190.6	60.2	434.8	11.6	54.5	500.9
1917	143.4	76.0	263.1	58.1	540.6	11.6	39.6	591.8
1918	100.4	86.5	247.8	59.1	493.8	10.7	44.9	549.4
1919	96.2	95.1	286.9	96.6	574.8	14.9	70.8	660.5
1920	152.1	115.5	335.9	127.3	730.8	20.7	87.7	839.2
1921	99.7	100.0	273.1	136.2	609.0	26.2	93.8	729.0
1922	92.1	50.5	227.7	180.9	551.2	27.6	90.7	669.5
1923	141.5	102.9	300.3	176.0	720.6	31.3	109.5	861.5
1924	136.7	83.1	252.6	164.0	636.4	22.1	102.9	761.4
1925	119.1	52.2	298.5	168.2	638.0	21.7	107.4	767.1
1926	129.8	84.3	304.0	184.2	702.3	19.7	84.4	806.4

struction and the estimates of investment in machinery and equipment before 1896 which are necessary to obtain estimates of total fixed capital formation, 1870–95. The other estimates are those of Statistics Canada. They have been prepared as a part of Statcan's program to obtain capital stock estimates for 1926 and later years by the perpetual inventory method (Statcan 1981).

Table 2.3 presents estimates of government expenditure on goods and services by federal, provincial, and municipal government and by public schools. The last is included because, in Canada, public education has been, in the main, organized under local school boards and, in our period, financed mainly by property taxes.

Table 2.4 presents data on the main components of the balance of international payments, both current and capital account. A great deal of work has been done on these data for this project. Some parts of earlier estimates have been used, but much is new. And everything has been rechecked and reexamined.

Now to return to the main task, my scheme, in broad terms, is to address conflicting interpretations of Canadian development from 1870 to the mid-1920s that have been a subject of controversy. One interpretation of Canadian development, the traditionalist view, is that, at least until the Second World War, the pace of Canadian economic growth was determined by the presence or absence of export staples. The best-known expositer of this view is perhaps H. A. Innis in his works on the fur trade and the codfisheries. And Arthur Lower has emphasized the exploitation of the forest. It was W. A. Mackintosh, however, who dealt most specifically and in greatest detail with the

Table 2.3 **Government Expenditure on Goods and Services (Millions of Dollars)**

Year	Federal	Provincial	Municipal	Public Education	Total
1870	7.0	1.8	4.7	5.0	18.5
1871	8.9	2.9	4.9	5.0	21.7
1872	9.6	3.6	5.8	6.2	25.2
1873	12.5	4.0	6.2	7.1	29.8
1874	14.9	4.9	8.5	7.9	36.2
1875	14.6	4.9	8.6	8.3	36.4
1876	15.6	4.7	9.6	8.3	38.2
1877	13.9	4.7	10.9	8.7	38.2
1878	13.8	4.3	10.6	8.6	37.3
1879	13.2	4.3	10.0	8.5	36.0
1880	13.3	4.1	9.5	8.6	35.5
1881	14.3	4.2	9.6	8.5	36.6
1882	15.6	4.6	9.3	8.9	38.4
1883	20.8	5.0	10.2	9.0	45.0
1884	19.4	5.1	10.6	9.2	44.3
1885	32.4	5.1	10.5	9.6	57.6
1886	18.8	5.5	11.1	10.0	45.4
1887	21.7	6.1	11.8	10.0	49.6
1888	20.1	5.9	11.6	10.6	48.2
1889	17.9	7.1	13.0	11.3	49.3
1890	18.5	7.2	12.9	11.5	50.1
1891	20.7	7.6	14.0	11.8	54.1
1892	19.6	7.0	13.4	11.9	51.9
1893	20.8	7.0	14.2	11.7	53.7
1894	20.5	7.2	15.3	12.6	55.6
1895	19.8	6.8	16.2	12.6	55.4
1896	21.5	7.4	14.6	13.1	56.6
1897	22.3	7.4	15.4	13.0	58.1
1898	24.7	7.4	16.8	13.4	62.3
1899	25.7	7.4	17.7	13.5	64.3
1900	27.5	8.2	18.9	13.9	68.5
1901	32.1	8.5	20.9	14.8	76.3
1902	31.5	9.1	22.7	15.3	78.6
1903	41.8	9.3	25.2	16.1	92.4
1904	43.8	9.5	28.6	18.0	99.9
1905	46.3	10.2	30.6	20.2	107.3
1906	46.8	12.9	31.1	21.8	112.6
1907	53.0	16.3	38.9	25.2	133.4
1908	61.3	19.5	45.0	28.6	154.4
1909	56.6	22.3	44.6	31.0	154.5
1910	61.6	25.8	52.4	34.8	174.6
1911	74.8	30.5	58.2	39.4	202.9
1912	78.5	35.9	69.9	46.0	230.3
1913	101.2	40.1	82.9	50.4	274.6
1914	173.7	36.8	89.2	56.6	356.3
1915	257.5	33.2	89.1	59.4	439.2

Table 2.3 (continued)

Year	Federal	Provincial	Municipal	Public Education	Total
1916	361.4	31.6	82.2	54.3	529.5
1917	361.1	36.6	79.2	53.9	530.8
1918	457.9	40.1	88.8	61.6	648.4
1919	515.9	51.7	104.8	173.1	745.5
1920	325.1	70.3	108.0	91.2	594.6
1921	281.1	76.0	118.6	110.9	586.6
1922	247.8	85.4	119.9	119.8	572.9
1923	188.0	85.6	127.0	127.3	527.9
1924	168.8	81.7	125.0	117.9	493.4
1925	174.0	85.1	128.9	119.4	507.4
1926	169.5	82.8	119.4	120.0	491.7

period from Confederation (1867) to the 1930s, and many others elaborated on his work.

The traditionalist view was that the period from 1870 to 1900 was a period of laggard growth because Canada had lost external markets for wheat and forest products with the evolution of free trade in Britain and the end of reciprocity with the United States (in 1866) and with the substantial replacement of activities based on wood, wind, and water, such as wooden ship building and other construction, by those based on steam and iron (or steel). The loss of markets for forest products stemmed directly from the decline in use of lumber and timber; the loss of the grain market stemmed indirectly from the competition with grain from the Middle West of the United States made more than competitive by the presence of the new railways. Then, from the mid- or late 1890s onward, when some cost and price changes occurred into which we need not go, the development of new export staples and most especially of wheat as the country's great export staple, supplemented later by the development of base and precious metals and by pulp and paper, led to a period of unprecedented growth. In fact, so the argument goes, the emergence of Canada as a developed economy stems from the emergence of wheat and to a lesser degree pulp and paper and base and precious metals: the agricultural expansion provided a market for industrial products for the two big central provinces, Ontario and Quebec, and this led to the economic integration of the various polities that had joined together at Confederation and afterwards.[1]

Following the Second World War a twofold questioning of this view took place. On the one hand, it was argued that there was a considerable growth in manufacturing output and in productivity in manufacturing even from 1870 to 1900 and that the process of growth in manufacturing from 1900 onward was merely a continuation of what went before. On

Table 2.4 **Canada's Balance of International Payments (Thousands of Dollars)**

	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880
Credits											
Exports (adjusted)	66385	72981	81777	85609	80789	76781	76137	76080	74020	77470	90841
Exports of gold coin & bullion	700	1600	3000	1200	1900	3100	2100	1600	2100	600	1800
Freight	1328	1459	1636	1712	1616	1536	1523	1522	1480	1549	1817
Tourist receipts	2100	2400	2600	3300	3300	3300	3300	3300	3300	4100	4100
Migrants' capital (net)	804	1195	1466	2409	1303	688	419	711	790	2109	1723
Noncommercial remittance											
Insurance								4328			
Interest & dividends	850	1151	710	856	838	1173	975	973	858	1010	1116
Total current	72167	80787	91189	95086	89746	86578	84453	88513	82548	86838	101397
Capital (long term)	3394	13290	8019	22742	38509	14709	16303	10900	11414	14262	12358
Capital (short term)		7350		289		3303	36	1913			
Net errors & omissions	25470	13519	35699	22443	17454	18267	10341	12200	14401	3719	6546
Total current & capital	101031	114944	134907	140559	145709	122858	111133	113526	108363	104819	120300
Debits											
Imports (adjusted)	81220	100267	115557	123169	121044	104679	93064	93785	85484	81698	93565
Imports of gold coin & bullion											
Freight	5463	5957	7498	6985	7399	5579	4660	6141	5492	4772	4607
Tourist payments	2400	2500	2600	2500	2400	2200	2200	2200	2400	2500	2700
Migrants' capital											
Noncommercial remittance	553	658	785	835	755	696	666	624	583	541	550
Insurance	129	378	335	805	655	339	489		967	543	1067
Interest & dividends	6262	5185	5701	6265	7877	9364	10054	10777	10905	13003	15402
Total current	96026	114944	132476	140559	140129	122858	111133	113527	105831	103057	117891
Capital (short term)	5005		2431		5580				2532	1762	2409
Total current & capital	101031	114944	134907	140559	145709	122858	111133	113527	108363	104819	120300

	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891
Credits											
Exports (adjusted)	98782	98807	92548	87402	85252	86376	89085	88164	89868	94477	103388
Exports of gold coin & bullion	1600	1500	1000	1200	400	2000	800		4800		1400
Freight	1976	1976	1851	1748	1705	1728	1782	1763	1797	1890	2068
Tourist receipts	4100	4100	4100	4700	4700	4700	4700	4700	4900	4900	4900
Migrants' capital (net)	612	3935	4425	2130	494	1046	2219	1704	1270	336	2907
Noncommercial remittance											
Insurance											
Interest & dividends	1050	1146	1175	1463	1211	1237	1358	1845	2440	2412	2023
Total current	108119	111464	105099	98643	93762	97086	99944	98177	105076	104014	116686
Capital (long term)	25775	10310	18704	23927	46870	35200	15632	66519	21334	22478	15048
Capital (short term)				5052					569		
Net errors & omissions	3210	29450	32409	10754		10654	41087		32407	39975	41938
Total current & capital	137104	151224	156212	138375	140632	142940	156663	164695	159386	166461	173671
Debits											
Imports (adjusted)	109819	122777	120823	108387	101871	105090	108786	109684	115652	117435	119736
Imports of gold coin & bullion								1900		800	
Freight	5699	5676	6198	5130	4549	5693	5412	5561	6145	5701	5865
Tourist payments	2900	3300	3200	3200	3200	3800	3800	3800	4100	4100	4100
Migrants' capital											
Noncommercial remittance	688	1179	1444	1946	1946	1869	1861	1987	2105	2028	1899
Insurance	303	817	763	958	1184	643	884	1451	2024	1735	984
Interest & dividends	15777	16891	18021	18754	19172	23436	26175	26532	29360	32316	32336
Total current	135186	150640	150449	138375	131922	140531	146918	150915	159386	164116	164918
Capital (short term)	1918	584	5763		533	2409	9745	11900		2345	8753
Errors & ommissions					8177			1880			
Total current & capital	137104	151224	156212	138375	140632	142940	156663	164695	159386	166461	173671

(*continued*)

Table 2.4 (continued)

	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902
Credits											
Exports (adjusted)	111896	113806	111220	111004	122498	142958	152908	153399	168695	179216	198499
Exports of gold coin & bullion						2900	12900	22100	24800	21500	13700
Freight	2238	2276	2224	2220	2450	2859	3058	3068	3374	3584	3970
Tourist receipts	4900	4900	4700	4700	4700	4700	4500	9600	7000	8000	11000
Migrants' capital (net)	859	777	11			39	2037	2385	5537	6915	13412
Noncommercial remittance											
Insurance									1196	214	
Interest & dividends	2373	2771	3156	3351	3576	4024	4294	4506	4945	4831	5979
Total current	122266	124530	121311	121275	133224	157480	179697	195058	215547	224260	246560
Capital (long term)	28625	15921	31101	6568	10559	28036	16722		25350	33161	20367
Capital (short term)									2860		
Net errors & omissions	30207	35853	10071	31627	29446		9388	42144		27737	22800
Total current & capital	181098	176304	162483	159470	173229	185516	205808	237202	243757	285158	289727
Debits											
Imports (adjusted)	121689	117975	109672	106921	111248	122538	144055	166632	180572	192136	213450
Imports of gold coin & bullion	3300	1600	600	300	2900						
Freight	6072	6024	6095	6397	6361	7649	10148	10983	11142	11068	11981
Tourist payments	4100	4300	4400	4500	5000	5300	5500	5300	4900	5400	6100
Migrants' capital				187	174						
Noncommercial remittance	1662	1695	1768	1514	1311	1352	1484	1800	2487	3484	4335
Insurance	793	363	556	666	952	404	565	46			3123
Interest & dividends	33529	34722	34536	33349	34075	35219	38744	40179	42065	44371	47472
Total current	171145	166680	157628	153834	162021	172462	200496	224940	241166	256459	286461
Capital (long term)								1285			
Capital (short term)	9953	9624	4855	5636	11208	6741	5312	10977		28699	3266
Errors & omissions						6313			2592		
Total current & capital	181098	176304	162483	159470	173229	185516	205808	237202	243757	285158	289727

	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
Credits											
Exports (adjusted)	199704	188580	209015	239512	250527	251756	281116	285361	295366	348265	421392
Exports of gold coin & bullion	6800	6500	12500	3900	1400		2700			11300	
Freight	3994	3772	4180	4790	5011	5035	5622	5708	5907	6965	8428
Tourist receipts	10500	12800	13300	16800	16200	19200	19600	24700	26200	29400	30500
Migrants' capital (net)	15264	12326	17191	18292	18258	9397	19825	26639	28023	24092	21366
Noncommercial remittance											
Insurance		4799									
Interest & dividends	6110	5441	6287	6918	6418	5545	9243	10587	9552	9690	9682
Total current	242372	234217	262474	290212	297814	290933	338106	352994	365049	429712	491368
Capital (long term)	30290	79091	108438	81306	69847	177045	185176	222072	172535	277868	326413
Capital (short term)	16723			12514	21824			25886		182	
Net errors & omissions	19914	32422	21	25215	71842	71577	5288		189348	164151	113384
Total current & capital	309299	345730	370933	409246	461327	539555	528570	600952	726932	871913	931165
Debits											
Imports (adjusted)	235037	246848	263513	303919	346256	307148	354317	429411	500023	631720	632593
Imports of gold coin & bullion						19100		4100	21800		7400
Freight	12410	12347	14521	15194	16080	13992	16131	18783	23882	32550	30160
Tourist payments	6000	6900	9400	12900	13400	15100	16600	21600	25200	29000	33200
Migrants' capital											
Noncommercial remittance	5640	7280	9054	11624	17690	17029	19829	27014	36056	47483	55797
Insurance	1616		2734	2661	897	555	1409	874	1666	2711	2403
Interest & dividends	48595	51206	55926	62948	67004	74173	86682	96827	114855	128449	150850
Total current	309299	324580	355148	409246	461327	447096	494968	598609	723482	871913	912403
Capital (short term)		21150	15785			92459	33602		3450		18762
Errors & omissions								2344			
Total current & capital	309299	345730	370933	409246	461327	539555	528570	600952	726932	871913	931165

(*continued*)

Table 2.4 (continued)

	1914	1915	1916	1917	1918	1919	1920
Credits							
Exports (adjusted)	442587	678205	1039296	1462570	1336938	1300372	1265965
Exports of gold coin & bullion	22600		14000		16300	15700	34200
Freight	41100	70700	91700	84100	83800	86900	114400
Tourist receipts	29600	36600	53200	64400	66100	73000	64200
Migrants' capital / Noncommercial remittance	28200	18300	19200	20000	21600	32200	40700
Insurance	3900	2000	3600	6600	3200	2900	4800
Interest & dividends	10400	9600	14100	19300	18900	20000	20900
Total current	578387	815405	1235096	1656970	1546839	1531072	1545165
Capital (long term)	381836	28633	95823	55720	53570	57811	132745
Capital (short term)	21200			10800			42400
War finance, external	24300	60400					31000
Net errors & omissions		90583	113097		69624	4450	
Total current & capital	1005723	995021	1444015	1723489	1670031	1593332	1751310
Debits							
Imports (adjusted)	521572	516370	783825	958428	953372	1053065	1225783
Imports of gold coin & bullion		9400		1700			
Freight	80200	101000	145500	139000	144100	125600	170100
Tourist payments	35000	25000	29000	27000	30000	47000	48400
Migrants' capital / Noncommercial remittance	20100	11300	12300	18000	21200	12100	10000
Canadian expend frce	5000	30000	100000	175000	170000	95000	20000
Insurance	6100	5700	5000	8300	8600	14800	19400
Interest & dividends	163671	182851	186394	192805	194960	198467	206929
Total current	831643	881621	1262015	1520233	1522231	1546032	1700611
War finance, external			52600	113100	119300	25600	
Capital (short term)		113400	129400		28500	21700	
Net errors & omissions	174080			90156			50699
Total current & capital	1005723	995021	1444015	1723489	1670031	1593332	1751310

	1921	1922	1923	1924	1925	1926
Credits						
Exports (adjusted)	894290	918272	1042507	1075538	1270589	1272000
Exports of gold coin & bullion	42200		82200	4600	15100	30000
Freight	84300	78500	89200	83000	86700	96000
Tourist receipts	68300	78900	103300	117000	128500	152000
Migrants' capital / Noncommercial remittance	36300	31900	38000	37800	37800	83000
Insurance	4100	6500	8100	10500	15700	
Interest & dividends	19200	13400	12300	12800	13500	32000
Total current	1148690	1127472	1375607	1341238	1567889	1665000
Capital (long term)	50516	131453	117150	152563	55438	52300
Capital (short term)	144400	27000				
War finance, external	27900	46800	63800	20700	1900	2300
Net errors & omissions						
Total current & capital	1371507	1332725	1556557	1514501	1625227	1719600
Debits						
Imports (adjusted)	890409	807417	891996	840267	915483	973000
Imports of gold coin & bullion		45300				
Freight	116500	94300	121400	99100	106400	105000
Tourist payments	43300	40900	43900	49100	55900	99000
Migrants' capital / Noncommercial remittance / Canadian expend frce	23100	16900	8400	9400	20800	121000
Insurance	10600	9900	9900	14100	18600	
Interest & dividends	230128	238736	243579	254000	256894	240000
Total current	1314037	1253453	1319175	1265967	1374077	1538000
War finance, external						
Capital (short term)			12700	15700	92800	51800
Net errors & omissions	57470	79273	224682	232834	158350	129800
Total current & capital	1371507	1332725	1556557	1514500	1625227	1719600

the other hand, there was an attempt to show that the rents from wheat production produced by the populating of the prairies by 1910 were so small that settlement of the latter could have had little effect in the growth of per capita income that took place from 1900 to 1910. Both approaches downplayed the role of the staple.[2]

It is not the aim of this paper to try to reconcile the contending views of Canadian growth or to try to pick a winner, if indeed there is one. But our data do provide a considerable amount of new information that has a bearing on the contending interpretations, and it is to these that we turn.

I present the remaining material of this paper in three parts. First, some background facts, not new to this paper but of relevance to our material, are presented. Second, the relationships among the aggregates are examined. Third, the nature of changes in the structure of GNP are examined.

2.1 Background Facts

A most important set of facts relates to the underlying population base and its growth. On one hand, Canada failed to retain the natural increase in its population in each decade from 1870 to 1900, despite having a substantial number of immigrants; on the other hand, it gained large numbers from net immigration in 1900–1921 (and to 1926). The relevant data are shown in table 2.5: it relates to the population 10 years of age and over, since only for them could estimates of survival from the last census be made—the natural increase, the immigration and emigration all apply to the 10 and over age groups.

The loss from net out-migration in the 10-year and older age group in each decade from 1871 to 1901 averages 4.9% of the beginning population. Other data show that Quebec's net loss by migration of pop-

Table 2.5 **Population and Changes in Population 10 Years of Age and Over, by Decades, 1861–1931 (Thousands of Persons)**

Decade	Population at End of Decade	Natural Increase	Immigration	Emigration	Net Migration
1861–71	2630	563	186	376	−191
1871–81	3164	619	353	438	−85
1881–91	3628	669	903	1108	−205
1891–1901	4101	654	326	507	−181
1901–11	5528	711	1782	1066	+715
1911–21	6677	916	1592	1360	+233
1921–31	8169	1389			+103

Source: Historical Statistics of Canada, 1st ed., p. 22.

ulation was very high in both 1881–1891 and 1891–1901 and that insofar as they were nativeborn most of the migrants left the country; Ontario also lost large numbers, especially in 1891–1901, but a quite large part of the loss comprised migration of the nativeborn to Western Canada.

By contrast, in 1901–11 the countrywide net inflow of migrants aged 10 years and over was of the same order as the natural increase in the same age group, and the net inflow remained substantial although smaller in the succeeding two decades. Supplementary data show that Quebec and the Maritime Provinces continued to lose population by migration—in this regard Quebec's relatively high rate of natural increase should be kept in mind—that the Prairie Provinces were big gainers in 1901–11 and 1911–21, that British Columbia was a big gainer in all three decades, and that Ontario also gained substantial numbers from net in-migration in all three decades, a point of which we shall see the relevance later. The figures for total population in Canada and the significant provincial groupings are given in table 2.6.

While there are differing estimates of the labor force and its industrial distribution before 1901, the general lines of the division between agricultural and other pursuits are sufficiently accurate to be useful. The so-called gainfully occupied and the numbers engaged in agriculture are given in table 2.7. It should be noted at once that in 1900 the numbers in agriculture and total gainfully occupied are too low owing to the omission of a considerable number of unpaid farmers' sons from the count.

A next "fact" concerns the railways in Canada. Of 1870, it can be said, with only slight exaggeration of fact, that the Canadian railways system was limited to a main line from north of Quebec City, through Montreal and Toronto to Sarnia (near Detroit) with a connection from Montreal to Portland, Maine, lines from the Niagara Peninsula and from Hamilton to Detroit, and a few short spurs from these lines; the Maritime Provinces had only 379 miles in 1867 at Confederation. Rail-

Table 2.6 **Population of Canada and Five Provincial Groups, Census Dates 1871–1931 (Thousands of Persons)**

Year	Canada	Maritime Provinces	Quebec	Ontario	Prairie Provinces	British Columbia
1871	3689	768	1192	1621	73	36
1881	4325	871	1359	1927	89	49
1891	4833	881	1488	2114	252	98
1901	5371	894	1649	2183	469	179
1911	7207	938	2006	2527	1343	393
1921	8768	1000	2361	2934	1968	525
1931	10377	1009	2875	3432	2367	694

Source: Historical Statistics of Canada, 1st ed., p. 14.

Table 2.7 **Total Gainfully Occupied and the Numbers Engaged in Agriculture, Census Dates, 1871–1921 (Thousands of Persons)**

Year	Total Gainfully Occupied	Total Engaged in Agriculture	Proportion Engaged in Agriculture
1871	1130	579	0.5124
1881	1378	667	0.4803
1891	1606	744	0.4633
1901	1783	717	0.4021
1911	2724	958	0.3517
1921	3164	1041	0.3290
1931	3922	1128	0.2875

Source: Historical Statistics of Canada, 1st ed., p. 59; and R. M. McInnis, "Output and Productivity in Canadian Agriculture," in this volume; Firestone 1958, p. 184, for gainfully occupied in 1871.

Table 2.8 **Railway Track and Equipment, Selected Years, 1870–1925**

Year	Miles of First Main Track in Operation	Number of Locomotives	Number of Passenger Cars	Number of Freight Cars
1870	2617			
1875	4331	980	1000	20297
1880	6858	1157	1170	24079
1885	10273	1524	1655	38318
1890	13151	1771	2018	49356
1895	15977	2023	2658	56963
1900	17657	2282	2828	64979
1905	20487	2906	3006	86196
1910	24730	4079	4320	119713
1915	34882	5486	6326	201690
1920	38805	6030	6557	224489
1925	40350	5752	6839	224227

Source: Historical Statistics of Canada, 1st ed., pp. 528, 532, 533.

way building played a major role in Canadian development from 1870 to the First World War both in the direct impact of the railway building on the economy and through its contribution to freight and passenger movement once it was built. Some measure of its impact is given by the miles of line in operation and the equipment in use which is given in table 2.8. We will return to the railways later.

Finally, there is a question about the course of prices through this period and how movements in real GNP differ from those measured in current prices. Estimates of GNP measured in 1900 dollars along

with an implicit price index and real GNP per capita are given in table 2.9. The deflation of GNP in current prices was essentially done by two components. Gross domestic fixed capital formation in current prices broken into residential and nonresidential items was deflated by indexes of costs of capital goods appropriate to each of the items. All of the remaining part of the GNP was deflated by an index of consumer prices, part of which was constructed within this project.[5]

The deflation procedure can probably be improved, but I have sufficient confidence in our findings that I do not expect further refinements in the deflation process to result in changes that would lead to any significant reinterpretation of the meaning of the data.

In order to aid the interpretation of the data in table 2.9, certain growth ratios calculable from it are given in table 2.10 and for comparative purposes comparable growth rates are given for the United States. The entries are usually for decadal periods; however, the first entry in each panel is for 9 years and the final entry in panel C, real GNP per capita, is for 19 years. For both countries, the rates of growth of population are between the single years at the beginning and end of each period; for both countries, the rates of growth of real GNP are those between the averages of 3 years centered on the beginning and on the ending year of each period. I am most indebted to Robert Gallman for providing me with the estimates of the growth of real GNP and real GNP per capita in the United States from 1871 to 1900.

We should note at once that there is a considerable arbitrariness in the growth rates that are obtained for each period determined by the choice of beginning and ending years of the period. Thus, if the first decade were made to end in 1882 and the second in 1892, the calculated growth rate for income in Canada for the first period would be raised and that for the second period lowered; or if we divide the decade from 1890 to 1900 into two parts, we can see from table 2.9 that all of the growth in per capita income took place between 1896 and 1900. It is important that we keep these properties of the data of table 2.10 in mind when we come to draw inferences from them.

The main series of relationships among aggregates which utilize our new data and that appear to be relevant to the issues about the nature of Canadian development are given in table 2.11. The figures are given on an annual basis because the year-to-year movements themselves contain valuable information. The ratios are between values in current dollars.

A few comments about the data of table 2.11 are in order. First, all of the absolute values from which the ratios are calculated appear in other tables and hence are not given here. Second, the gross fixed capital formation ratio includes public as well as private capital formation; the public component—budgetary capital formation—is ordi-

Table 2.9 **Gross National Product in Current and Constant Dollars and Real Gross National Product per Capita, 1870–1926**

Year	GNP in Current Market Prices ($mm)	GNP in Constant (1900) Prices ($mm)	Implicit Price Index 1900 = 100	Population in Thousands of Persons	Real GNP per Capita in 1900 Dollars
1870	382.6	369.5	104	3625	102
1871	412.7	385.9	107	3689	105
1872	447.3	382.8	117	3754	102
1873	487.8	419.3	116	3826	110
1874	485.5	427.8	113	3895	110
1875	452.5	417.1	108	3954	105
1876	421.7	391.1	108	4009	98
1877	434.7	416.5	104	4064	102
1878	409.6	402.6	102	4120	98
1879	445.1	441.8	101	4185	106
1880	482.0	462.1	104	4255	109
1881	568.7	527.0	108	4325	122
1882	618.9	547.2	113	4375	125
1883	611.5	545.7	112	4430	123
1884	585.2	592.0	99	4487	132
1885	554.5	556.3	100	4537	123
1886	560.7	559.4	100	4580	122
1887	611.1	579.0	106	4626	125
1888	630.3	616.1	102	4678	132
1889	655.8	620.9	106	4729	131
1890	685.4	657.4	104	4779	138
1891	703.5	679.9	104	4833	141
1892	700.3	676.2	104	4883	138
1893	682.4	666.9	102	4931	135
1894	651.4	700.6	93	4979	141
1895	633.4	698.9	91	5026	139
1896	640.8	680.7	94	5074	134
1897	717.0	757.2	95	5122	148
1898	769.4	786.5	98	5175	152
1899	826.0	857.8	96	5235	164
1900	907.4	907.8	100	5301	171
1901	990.7	984.1	101	5371	183
1902	1119.6	1073.6	104	5494	195
1903	1178.2	1115.1	106	5651	197
1904	1205.8	1131.4	107	5827	194
1905	1361.5	1248.2	109	6002	208
1906	1525.9	1380.6	111	6097	226
1907	1728.4	1456.0	119	6411	227
1908	1653.8	1383.3	120	6625	209
1909	1838.3	1520.4	121	6800	224
1910	2022.8	1655.4	122	6988	237

Table 2.9 (continued)

Year	GNP in Current Market Prices ($mm)	GNP in Constant (1900) Prices ($mm)	Implicit Price Index 1900 = 100	Population in Thousands of Persons	Real GNP per Capita in 1900 Dollars
1911	2233.2	1770.7	126	7207	246
1912	2493.9	1905.4	128	7389	258
1913	2651.5	1979.8	134	7632	259
1914	2448.6	1835.6	133	7869	233
1915	2688.6	1964.4	137	7981	246
1916	3242.7	2182.5	149	8001	273
1917	3991.9	2273.2	176	8060	282
1918	4261.5	2141.4	199	8148	263
1919	4367.4	1994.9	219	8311	240
1920	5060.9	1992.0	254	8556	233
1921	4073.8	1800.3	226	8788	205
1922	4233.9	2060.9	205	8919	231
1923	4555.3	2194.0	208	9010	244
1924	4501.5	2210.1	204	9143	242
1925	4995.7	2450.3	204	9294	264
1926	5345.3	2611.8	205	9451	276

narily less than 10% of the total, as may be seen from table 2.2. Third, the net capital inflow has been measured, for all years, by the current account balance on international account. Fourth, the implied domestic saving is simply the difference between the gross fixed capital formation ratio and the capital inflow ratio. Fifth, the export ratio and the government expenditure ratio are, respectively, for merchandise exports and for government expenditures on goods and services. Finally, the ratio of export prices to import prices, the terms of trade, are given to show the qualitative nature of the impact of international prices on real income in Canada.

We are now in a position to examine the bearing of the data that we have considered on the matter at issue. I shall not go into the details of the way in which the traditionalists saw the staples as contributing to growth nor the arguments of the critics about the inadequacies of the traditionalists' explanations: such would take too much space. A well-rounded analytical statement and evaluation of the issues and contentions is given in Richard E. Caves's "Export-Led Growth and the New Economic History" in the Kindleberger festschrift (Caves 1971). Rather, I shall just examine the extent to which our data at least seem consistent with what the traditonalists or their critics would expect us to observe. Suffice it to say that in a period of expansion the traditionalists saw a growth of the export sector of the economy (the

Table 2.10 **Comparative Growth Rates of Canada and the United States (All Growth Rates in Compound Rates Percent per Annum)**

Years	Canada	United States
	A. Population	
1871–80	1.6	2.3
1880–90	1.2	2.3
1890–1900	1.0	1.9
1900–1910	2.8	2.0
1910–20	2.0	1.4
1920–25	1.7	1.7
	B. Total Real GNP	
1871–80	2.6	5.7
1880–90	3.2	3.5
1890–1900	3.5	3.6
1900–1910	6.0	3.8
1910–20	1.6	2.5
1920–25	4.7	4.7
	C. Real GNP per Capita	
1871–80	1.0	3.3
1880–90	2.0	1.2
1890–1900	2.4	1.7
1900–1910	3.2	1.8
1910–20	−0.4	1.1
1920–25	2.9	2.9
1871–90	1.5	2.2

Source: For Canada, calculated from the data of table 2.9. For the United States, for 1871–1900, real GNP and per capita growth rates provided by Robert Gallman from data underlying his paper in vol. 30 of the Conference series; for 1900–1925, Kendrick 1961, pp. 298–99, and *Historical Statistics of U.S., Colonial Times to 1970*, p. 8.

high-productivity sector) lead to a more general expansion that permeated from the export sector to most other parts of the economy. For example, for the period 1895–1920, W. A. Mackintosh, in describing the main measured dimensions of growth—in which, incidentally, the high population growth was mentioned first—wrote:

> The most fundamental single characteristic of the period was a high rate of investment induced by improved expectations of profit from the exploitation of natural resources, which had been newly discovered, newly tapped by the extending railways, subjected to new productive techniques, or converted into profit possibilities by favourable shifts in costs and prices. Overwhelmingly most important were the wheat lands of the Prairie Provinces. Prospective profitableness in the exploiting industries created markets for other industries and for a time investment fed on itself. (Mackintosh 1939, p. 41)

There remains one matter of contention that requires comment. The traditionalists did not elaborate on whether economic growth meant

Table 2.11 Ratios of Selected Aggregate Expenditure Items to GNP and Terms of Trade

Year	Capital Formation/ GNP[a]	Capital Inflow/ GNP[b]	Implied Savings Ratio[c]	Exports/ GNP[d]	Government Spending/ GNP[e]	Export/ Import Prices[f]
1870	0.157	0.062	0.095	0.174	0.048	0.68
1871	0.152	0.083	0.069	0.177	0.053	0.66
1872	0.174	0.092	0.082	0.183	0.056	0.72
1873	0.173	0.093	0.080	0.176	0.061	0.76
1874	0.191	0.104	0.087	0.166	0.075	0.78
1875	0.188	0.080	0.108	0.170	0.080	0.82
1876	0.166	0.063	0.103	0.181	0.091	0.82
1877	0.141	0.058	0.083	0.175	0.088	0.89
1878	0.135	0.057	0.078	0.181	0.091	0.88
1879	0.126	0.036	0.090	0.174	0.081	0.86
1880	0.137	0.034	0.103	0.188	0.074	0.86
1881	0.136	0.048	0.088	0.174	0.064	0.91
1882	0.173	0.063	0.110	0.160	0.062	0.93
1883	0.198	0.074	0.124	0.151	0.074	0.92
1884	0.222	0.068	0.154	0.149	0.076	0.93
1885	0.157	0.069	0.088	0.154	0.104	0.95
1886	0.152	0.077	0.075	0.154	0.081	0.99
1887	0.163	0.077	0.086	0.146	0.081	1.06
1888	0.168	0.084	0.084	0.140	0.076	0.99
1889	0.170	0.083	0.087	0.137	0.075	1.01
1890	0.144	0.088	0.056	0.138	0.073	2.00
1891	0.150	0.069	0.081	0.147	0.077	1.05
1892	0.139	0.070	0.069	0.160	0.074	1.05
1893	0.135	0.062	0.073	0.167	0.079	1.08
1894	0.115	0.056	0.059	0.171	0.085	1.13
1895	0.123	0.051	0.072	0.175	0.087	2.06
1896	0.115	0.045	0.070	0.191	0.088	1.09
1897	0.126	0.021	0.105	0.199	0.081	1.09
1898	0.154	0.027	0.127	0.199	0.081	1.07
1899	0.153	0.036	0.117	0.186	0.078	1.00
1900	0.155	0.028	0.127	0.186	0.075	1.02
1901	0.182	0.033	0.149	0.181	0.077	1.06
1902	0.186	0.036	0.150	0.177	0.070	1.07
1903	0.217	0.057	0.160	0.169	0.078	1.05
1904	0.230	0.075	0.155	0.156	0.083	1.03
1905	0.229	0.068	0.161	0.154	0.079	1.05
1906	0.236	0.078	0.158	0.157	0.074	1.04
1907	0.259	0.095	0.164	0.145	0.077	1.06
1908	0.265	0.094	0.171	0.152	0.093	1.14
1909	0.259	0.085	0.174	0.153	0.084	1.14
1910	0.295	0.121	0.174	0.141	0.086	1.12
1911	0.311	0.160	0.151	0.132	0.091	1.13
1912	0.341	0.177	0.166	0.140	0.092	1.11
1913	0.328	0.159	0.169	0.159	0.104	1.04
1914	0.270	0.114	0.156	0.199	0.146	1.15
1915	0.175	0.025	0.150	0.252	0.163	1.24

(continued)

Table 2.11 (continued)

Year	Capital Formation/ GNP[a]	Capital Inflow/ GNP[b]	Implied Savings Ratio[c]	Exports/ GNP[d]	Government Spending/ GNP[e]	Export/ Import Prices[f]
1916	0.154	0.008	0.162	0.321	0.163	1.13
1917	0.148	−0.034	0.182	0.366	0.133	1.29
1918	0.129	0.006	0.123	0.314	0.152	1.22
1919	0.151	0.003	0.148	0.298	0.171	1.18
1920	0.166	0.031	0.135	0.250	0.117	1.08
1921	0.179	0.041	0.138	0.220	0.144	1.06
1922	0.158	0.030	0.128	0.217	0.135	1.05
1923	0.189	−0.012	0.201	0.229	0.115	0.96
1924	0.169	−0.017	0.186	0.239	0.108	1.02
1925	0.154	−0.039	0.193	0.254	0.100	1.13
1926	0.151	−0.040	0.191	0.242	0.091	1.16

[a]Ratio, gross fixed capital formation to current GNP (both in current prices).
[b]Ratio, inflow of capital to GNP (current account balance to GNP).
[c]Implied domestic savings ratio.
[d]Ratio, exports of goods to GNP.
[e]Ratio of government expenditure on goods and services to GNP.
[f]Ratio of export prices to import prices 1899 = 1.

rapid extensive growth (growth in population) or intensive growth (growth in income per capita) or some combination of the two. They usually argued that the emergence of staples led to periods of rapid population growth which would, of course, cause growth of aggregate output. In fact, Mackintosh judged the relative growth in the Province of Canada in the 1850s and 1860s by the relative rates of population growth in the two decades and, indeed, noted that a central objective of national policy after confederation was the settlement of the west, and that objective, on a grand scale, presumably meant substantial aggregate population growth. It was perhaps implied that a rise in per capita income was necessary to acquire the additional people, but that point was not made explicit.

The revisionists have tended to base their arguments on the growth of income per capita, which has been described as intensive growth. They have argued that growth of per capita output was not greatly affected by the presence or absence of exports in the period to which our data apply. Such per capita growth as there is comes from other sources. They presumably would not deny that sufficiently high growth in per capita productivity might lead to immigration and hence extensive as well as intensive growth; but they do not ordinarily go into that.

The ratios of table 2.11 are not as enlightening as one would like since the process of drawing inferences from them is complicated by

the interactions between the development of exports, population growth, and capital formation. In accordance with the staple hypothesis, one might expect to take the ratio of exports to GNP as an indicator of the role of the export sector, the high productivity sector, in driving the economy. Yet the way in which growth in the export sector works in causing economic growth in the early phases of expansion may be only in small part in its direct effect on GNP but more largely through its effect on population growth and capital formation, both of which in turn affect directly the size of GNP. If an initial growth of exports stimulates both rapid population growth and capital formation in anticipation of further export growth, the consequent rise in GNP may cause the ratio actually to decline. The process of growth is a dynamic one with leads and lags, and the growth of the export sector to maturity may take many years. I propose then to leave examination of the export sector ratios until we have looked at the way in which related variables and particularly investment have moved.

As for fixed capital formation, and especially its relationship to GNP as shown in table 2.11, there are three periods when it was especially important. It was relatively robust, for its time, in the first half of the 1870s, again through the mid- to late 1880s, and, above all, in the period from 1900 to 1914. Capital formation in the railways was important in all three of these periods. It involved the building of the intercolonial railway (a government undertaking) in the early 1870s. And it was especially the major factor in the 1880s with the building of the Canadian Pacific Railway line to the west coast, 1881–85, a private undertaking that was greatly aided by very generous treatment from the federal government and that was supplemented by a building boom in the late 1880s in Montreal, a boom most likely consequent on the building of the railway. Had it not been for this building of the CPR in the 1880s, the period from the late 1870s to the mid-1890s would have been one of continuously low investment and bleak prospects. As it was, the railway building of the 1880s ameliorated the sad export performance of the decade. However, its main impact as a going concern only came 10 years later when the volume of freight began to increase rapidly. Railway building was important also in 1900–1914, but the investment was also very broadly based in that period, as may be seen in table 2.2.

The period from 1900 to 1914 epitomizes a classic investment boom, a major part of it related directly or indirectly to the settlement of the west. In the latter regard, much of the railway building was directed toward the west—two new transcontinental lines and many branch lines in the prairies were built. And as can be seen from tables 2.5, 2.6, and 2.10, there was an extraordinarily high rate of population growth of which a most disproportionate part took place on the prairies. That the settlement of the west was based on the expectation, in the minds of

the settlers, of there being a viable market for wheat is beyond doubt. But the great engine of growth of the period was the enormous investment expenditure associated with that settlement.

During the 1914–18 war, investment expenditure languished and, although recovering somewhat from wartime levels in the 1920s, it did not retain anything like the relative eminence of the lusty levels of 1900–1914.

We shall return to the roles and interrelationships of investment and exports, but first we should look at some other relevant items.

Caves (1971) has made the point that export-led growth might affect the levels of saving, hence presumably the level of domestically financed capital formation, and hence growth rates. Our measure of the level of saving (table 2.11) leaves much to be desired since it is calculated as the residual of fixed capital formation less capital inflow and there are considerable errors of measurement in the latter. However, it seems most improbable that such revision as might be made would alter the general tenor of the inference we draw about saving. This inference is that the level of saving was of a quite different order after 1900 than it had been before. As a ratio of GNP, overall gross savings averaged 8.8% in 1870–79, 10.0% in 1880–89, and 8.3% in 1890–99. In contrast, it averaged 15.7% for 1900–1909, 16.3% for 1910–14, and 16.9% for 1921–26—the wartime years have been omitted. That there was a substantial increase in the saving rate appears to be quite clear.

Next there are the growth rates of production and of productivity which have been matters of issue and for which there are the data in table 2.10. It is clear that growth rates of population and of total real GNP in Canada were much higher after 1900 than before. The contrast would have been considerably stronger had the dividing point been taken at 1896, the date generally taken as the turning point in Canada's fortunes: in that event, the annual rate of increase of real GNP from 1871 to 1895 (3 years centered in each case) is 2.5% and from 1895 to 1913 (3 years centered) is 5.8%. The per capita real income growth rates are interesting. They do support the view that there was considerable growth in output per capita before 1900 with some increase in this growth of real output per capita in peacetime years after 1900. Again if one takes 3-year averages at the beginning and ending of the two periods from 1871 to 1895 and 1895 to 1913, the respective annual compound rates of growth of per capita real income are 1.2% and 3.4%. (If one wishes to take alternate periods of comparison, that can be done by use of the data of table 2.9.)

Account should be taken of the fact that the proportion of the population of working age that belongs to the gainfully occupied category changed from decade to decade. Unfortunately, until 1921, figures for the gainfully occupied are available only for census years (see table

2.7). Further, it is generally accepted that there was an undercount of the agricultural labor force in 1901 and hence that the figure for the gainfully occupied persons for 1901 is too low. In light of the 1901 undercount and the fact that the expansion of exports began in the 1890s and was especially significant from 1896 onward (table 2.11), we compare growth of the output per worker for three periods.[6] The average annual rate of growth was 1.1% from 1871 to 1891, 2.3% from 1891 to 1911, and 4.3% from 1921 to 1926 (end years centered on 3-year averages in each case). The high rate of growth from 1921 to 1926 may in part be a matter of recovery from a small decline in productivity per worker in the decade covering the wartime years.

Comparison with the United States shows the following. Population growth rates were clearly higher in the United States from 1871 to 1900 and in Canada from 1900 to 1920. Growth rates of aggregate real GNP in the United States were substantially higher than those in Canada in the 1870s and substantially lower than those in Canada in the decade 1900–1910; for other periods (the wartime decade excluded) the real GNP growth rates were about equal. Growth rates of real income per capita, which may be somewhat arbitrarily allocated among periods by choice of beginning and ending years, give a mixed picture. If the 1870s and the 1880s are taken together, United States per capita growth rates clearly exceeded those of Canada in 1871–90 but fall short of the Canadian rates in 1890–99. Following 1900, Canadian per capita growth rates substantially exceeded those of the United States in the decade 1900–1910 but lost such ground in the wartime years that over the whole period from 1900 to 1926 the per capita growth rates were about equal.

Now what inferences can be drawn from the export ratios of table 2.11? In order to try to abstract from influences on the data of lags between the initial and final impact of export (staple) growth on the performance of the economy, I compare first the export ratios of 1870–1900, which preceded the period of the wheat economy, with those after 1920 when the wheat economy was in full flourish. The relatively large increase in the export ratio was much more than accounted for by the increase in the value of wheat exports, which were supplemented in an important way from 1918 onward by those other resource-based (though more highly processed) exports of newsprint and wood pulp and of nonferrous metals: it was a product of the increase in exports of staple-based products. In order to give some indication of the significance of these ratios, I just mention for comparative purposes that the similar United States export rates were for the 3 years centered on 1890 just over .07 and for the 3 years centered on 1925 just under .07.

An examination of the export ratios within the period 1870–1900 should be supplemented by a look at the movement of total exports

and of wheat exports given in table 2.12. Export ratios held up moderately well in the 1870s, but that was only because neither exports in total nor income grew through that decade; the complete absence of wheat exports and a decline in forest product export values were masked by a modest growth in some agricultural products exports—most notably barley to the United States, an item that disappeared in the early 1890s. Exports languished badly in the 1880s in the sense that they did not grow with the overall growth of the economy. They appear to have been an increasingly expansionary force in the 1890s, lead by a recovery in the export of wheat (from the pre-Confederation period), by growing exports of cheese and meats, and by some growth of exports of base and precious metals. The potentialities for wheat production on the prairies were clearly evident by 1900, when wheat production in the prairie region had reached 23 million bushels in a year (decennial census data) when yields were considerably below average. As a probably

Table 2.12 **Total Exports, Declared Values and at 1900 Prices and Net Exports of Wheat in Bushels, 1870–1915 (Values in Millions of Dollars, Wheat in Millons of Bushels)**

Year	Declared Value	Value 1900 Prices	Wheat Exports (Net)		Declared Value	Value 1900 Prices	Wheat Exports (Net)
1870	66	74	−1	1893	114	114	11
1871	67	72	−3	1894	116	115	11
1872	79	82	−1	1895	109	113	9
1873	86	87	−1	1896	116	124	10
1874	87	86	−1	1897	134	148	10
1875	77	73	−2	1898	159	165	24
1876	80	73	—	1899	155	162	14
1877	75	77	−4	1900	183	183	20
1878	79	78	−1	1901	195	190	15
1879	71	77	4	1902	210	201	31
1880	86	92	7	1903	225	209	39
1881	97	100	4	1904	211	194	24
1882	102	95	5	1905	201	191	20
1883	97	89	7	1906	247	218	47
1884	89	85	−1	1907	245	207	47
1885	87	88	—	1908	263	212	47
1886	85	89	4	1909	260	210	57
1887	90	93	7	1910	299	239	68
1888	90	89	3	1911	290	235	62
1889	87	86	—	1912	307	255	97
1890	94	91	—	1913	377	308	115
1891	98	94	3	1914	455	389	135
1892	113	109	10	1915	461	377	85

Source: Historical Statistics of Canada, 1st ed., pp. 175, 363–64.

fairly minor point we should note that the building of the intercolonial railway, especially in 1874–75, and the building of the Canadian Pacific Railway in 1881–84 were isolated exogenous events, undertaken respectively by government and by a private corporation with very heavy government subsidization, that undoubtedly tended to increase GNP in those years in cyclical fashion: they increased the denominator of the export ratio accordingly.

We come now to the 1900–1914 period. As can be seen from table 2.12, the value of exports increased two and one-half–fold between the year ending June 30, 1900 and that ending March 31, 1915 (fourfold from 1896 to 1915) and the great expansion of wheat exports was yet to come. Yet from 1900 to 1913 the ratio of exports to GNP in this great period of growth was at about the levels of the 1870s and 1880s. The explanation of the apparent conundrum has been given already. The settlement and growing cultivation of new lands based initially on expectations of future production and sale of wheat led to an enormous increase in capital formation that, along with a very rapid expansion of the population and labor force (see tables 2.5, 2.6, 2.7, and 2.9), led to a great increase in GNP even before the major increase in production of the wheat staple. The matter cannot be better put than in the words of Mackintosh that have been already quoted. At this stage of development the great source of expansion was the prospective production of great quantities of wheat even though the actual production in large quantity did not come until later.

One other matter deserves attention. As already noted, in 1900 the high-productivity export sector was relatively no larger than in the pre-1896 period. Yet it was a period of very high growth of aggregate GNP as well as GNP per capita. Clearly the capital formation sector, which is the major direct stimulus to growth, must have been a sector of reasonably high productivity. The expectations of purchasers of capital goods were sufficiently sanguine that they were prepared to pay good prices for structures and equipment.

The two remaining ratios of table 2.11 may be dealt with summarily. First, the ratio of government expenditure on goods and services to GNP shows that aside from the years of war and its immediate aftermath government purchases of goods and services for the ordinary functions of government were relatively small. The smallness of these figures may not reflect the government role well since governments did guarantee railway bonds in large quantity as well as build some line in the 1900–15 period in addition to the earlier participation which we have noted already. Governments also ran some market-oriented operations, including the Canadian National Railway after the bankruptcy of its constituent lines during the war. But it remains true that the government role was much less in 1900–1915 than in many other coun-

tries in their periods of rapid growth. Second, the terms of trade moved in Canada's favor in two significant periods. The improvement from the early 1870s to the mid-1890s was quite substantial and would play some part in contributing to the favorable conjunctures of the late 1890s. The other period of improvement from 1900 to 1915 would play some role in the expansion of that time, especially in its effects on the expectations that underlay the capital formation performance.

One final point about the aggregates must be made. In general, such stimulus to the economy as there has been from the export trade has not come because exports of goods and services exceeded imports of goods and services. In general, until the First World War, not only did current account receipts, on international account, fall quite substantially below current account expenditures, but in most years merchandise exports fell short of merchandise imports; only the years 1894–98 showed merchandise trade surpluses (usually very small). In most of these years net capital inflows were large. With the First World War and in the 1920s the international current account came roughly into balance and net capital inflows more or less disappeared. This last change was a significant development in the Canadian economy, but it nevertheless still remained true that Canada's international transactions did not directly increase the aggregate demand for Canadian goods and services.

I turn briefly now to the inferences one may draw from these data about the differences between the traditionalists and the revisionists. At the outset I wish to make it clear that I am not working with a model specified in a way that makes possible the shaping and application of specific tests. Rather, I just try to see in more general fashion whether the developments of the economy appear to be consistent with what the traditionalists specify or imply would occur according to their hypothesis or whether they fit better with the view of the revisionists or both. This procedure is not rigorous, but it is all that can be done now. I make just three points.

First, I would find it very difficult, in the light of our data, not to conclude that the staple, wheat, played the role assigned to it by the traditionalists in the extensive growth (aggregate growth) of the Canadian economy from the late 1890s onward. It is true that in the years 1870–1895 the relatively low growth of population and aggregate real GNP took place in a world setting that was not buoyant, and 1895 or there abouts is regarded as a low point of world growth. Nevertheless, in these years the United States maintained population growth rates much above those of Canada, and growth rates of aggregate real GNP considerably higher than Canada's (see table 2.11). This was the time when Canada's wheat exports, the major export of the 1850s, had disappeared and exports of forest products were faltering. In the period

from the opening and growth of the wheat economy from the 1890s onward, Canadian population growth rates exceeded those of the United States from 1900 to 1920 and matched the United States rate from 1920 to 1926; and extensive growth of GNP in Canada exceeded that in the United States from 1900 to 1910 and again from 1920 to 1926. That a major part of the growth was associated with the settlement of the prairies, and definitely based on the objectives of growing wheat, is clear. The stimulus came first through the enormous induced investment of the 1900–1915 years and then in the 1920s with the export flow of wheat and the concomitant realization of the gains of international specialization. (I omit mention of the development of newsprint and woodpulp production and export rather late in our period, and of base metal production and export somewhat earlier, which were important but played subordinate roles to wheat.) Even given the upturn in world economic activity from 1895 onward, I find it very difficult to see how balanced aggregate growth in the Canadian economy could have been induced at close to the rate of the unbalanced expansion of the post-1900 period, especially when the role of the induced investment is considered.

Second, with regard to the growth of per capita product, the revisionists have a point. There was considerable growth in GNP per capita from 1870 to 1900 even with the relatively slow aggregate growth. As to whether or not the rate of growth of product per capita increased with the expansion of the wheat boom, the picture is not entirely clear. That the intrusion of the war had adverse effects on productivity is clear, but what effect it had on cumulative productivity from 1900 to 1926 is not evident. The fact that there seems to be an acceleration in per capita product from 1896 onward (table 2.9) after a flat performance from 1890 to 1896 leads one to believe that part of the 1896–1900 per capita growth may be cyclical recovery and part true long-term growth. That there were indeed the beginnings of the influence of western growth at this time will be seen from the fact that there were already about 420,000 persons in the three prairie provinces at the 1901 census. In these circumstances it may be best to compare per capita growth from 1890 to 1910 with that from 1871 to 1890. Such a comparison (table 2.10) shows clearly that the per capita growth rate by the 1890–1910 period substantially exceeds that for 1871–90. The same comparison for productivity per worker also shows a much higher per worker productivity growth rate in the 1891–1911 period (2.3%) than in the 1871–91 period (1.1%). This increase in the rate of growth of productivity in the staple period cannot necessarily be attributed to the development of the wheat staple, but, at the same time, it does not contradict the view that such could be the case—in other words, that the wheat staple led to intensive as well as extensive growth.

Third, the higher saving rates after 1900 than before should make possible higher rates of growth of GNP. Our data are not adequate to explain why savings rates increased, but whatever the cause it must be associated with developments after 1900.

2.2 Changes in the Structure of GDP

I turn now to see what easy inferences, if any, emerge from the nature of changes in the relative contributions of various industrial groups during the country's development. The industrial distribution of GDP at factor cost in percentage form is given in table 2.13. But before examining its implications I should mention one or two of the idiosyncrasies of the industrial distribution.

Among these idiosyncrasies, the most important one relates to the manufacturing and the trade sectors. In the early part of the period covered here, many of the trading functions were carried out in the

Table 2.13 **Percentage Distribution of Gross Domestic Product at Factor Cost, Average of 3 Years Centered on Census Years and of 1925, 1926**

	1870	1880	1890	1900	1910	1920	1926
Agriculture	37.1	36.2	27.8	24.8	21.6	20.9	20.0
Forestry, hunting, trapping & fishing	2.7	3.0	3.1	3.0	2.1	2.0	1.6
Mining	1.3	1.1	1.9	5.0	2.9	3.0	3.0
Manufacturing	22.4	21.9	25.3	22.2	22.5	25.1	21.1
Manufactured gas	0.1	0.2	0.3	0.1	0.1	0.2	0.2
Construction	5.7	4.2	4.8	3.9	7.8	4.0	4.2
Transportation	5.5	5.2	5.9	6.9	7.8	8.5	8.1
Electric light & power			0.1	0.2	0.6	0.9	1.3
Communications			0.1	0.2	0.5	0.8	0.9
Banking & finance	2.1	2.2	2.9	4.3	4.1	4.6	4.1
Residential rents	5.9	5.8	5.7	6.8	6.7	6.7	7.5
Federal government services	1.3	1.7	1.8	1.8	1.6	3.0	1.9
Provincial government services	0.5	0.6	0.6	0.6	0.8	0.9	1.1
Municipal services	0.9	1.2	1.3	1.3	1.4	1.6	1.6
Education	1.0	1.4	1.2	1.2	1.1	1.6	1.9
Wholesale & retail trade	5.9	7.0	7.5	7.5	10.4	9.3	10.8
Community, business and personal service	7.4	8.1	9.6	9.6	7.6	6.4	10.3
Public resource royalties	0.3	0.3	0.5	0.5	0.4	0.3	0.4

Source: Calculated from the data in table 2.1.

Note: The percentages for wholesale and retail trade and for community, business, and personal service are taken from data for the single years given in the heading, and consequently the sums of the percentages vary slightly from 100.

so-called manufacturing establishments. Tailors, dressmakers, hatters, shoemakers, blacksmiths, and gristmillers, to mention only a few cases, dealt directly with the consumers and hence performed, in part, a function that was later performed by specialized merchants. Hence, in a sense, the income produced in the manufacturing function tends to be overstated and income generated in trade function tends to be understated in the early period. There was the added feature that some activities, such as blacksmithing, which had a large genuine manufacturing component in the earlier period, changed to producing mainly a service function. An attempt was made to retain the manufacturing component of these types of activity in the manufacturing sector.

Given these limitations—and of course, there are many others—what does the change in the industrial distribution show? The most dramatic point, in my view, is the fact that, in a time that is regarded as a great period of industrialization in Canada, from 1900 to the 1920s, agriculture's share in GDP fell so little; and such a fall as there was appears to have taken place largely between 1900 and 1910. There can be no doubt about where the growth in agricultural income occurred. Table 2.14 presents the components of agricultural gross revenue in this period. It was the emergence of wheat that explains the maintenance of agriculture as a principal income earner: the share of wheat in gross farm revenue (table 2.14) rose from less than 13% in the 3-year average centered on 1900 to more than 33% in the 3 years centered on 1925. To complete the agricultural income information, table 2.15 gives agricultural expenses and table 2.16 gives income of farmers.

The fact that the share of manufacturing did not increase more than it did is hard to interpret. In fact, the rise was much greater than apparent because much of the trading function did become separate, the evidence of the separation appearing in the growth of the share of income generated in trade. Further, just the maintenance of a constant share of income produced would represent a high rate of growth. But Canada did remain a substantial net importer of manufactured products, which explains, in part, why manufacturing's share of output did not grow more.

Tables 2.17 and 2.18, showing the distribution of manufacturing domestic product among groups, reflect some of the changes that took place in the structure of manufacturing. Unfortunately at the level of detail in tables 2.17 and 2.18 the more significant changes that took place in manufacturing do not always show up. Some things are evident, however: the declines of the leather products industry and the wood products industry (lumber, furniture, etc.) are very clear; similarly, the growth of the paper products industry (newsprint and woodpulp), the nonferrous metals products industry, the chemical industry, and the printing and publishing industry is equally evident. However, the changes

Table 2.14 **Farm Revenue from Off-Farm Sales and Farm Consumption (Thousands of Dollars)**

	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880
Wheat	22160	23979	25601	25088	20283	23564	25696	24361	25533	37181	32244
Oats	3275	3215	3316	3521	4505	3680	3694	3638	2997	4993	4120
Barley	3688	3981	3546	5089	6608	9414	5234	4824	5219	5057	7946
Rye	174	185	201	209	257	171	97	269	380	714	806
Hay	3125	3918	3463	3059	2859	2897	2649	2868	2774	2771	5178
Vegetables	8558	11047	9597	8185	10705	7648	8553	10685	10566	11466	6586
Potatoes	7463	10009	6704	5885	8507	5956	6717	8363	11652	10720	4684
Hops	149	539	348	246	365	245	354	224	206	576	239
Flax seed	161	209	253	47	129	101	85	125	58	60	75
Tobacco	63	72	81	69	88	86	77	71	74	82	91
Flax fiber	112	115	86	113	164	165	182	98	46	95	67
Eggs	4579	4835	5414	5560	5168	5475	5347	5307	4241	5327	5386
Maple sugar & syrup	1649	1709	1302	1673	1718	2324	1853	2101	2000	1345	1743
Honey	351	355	264	336	336	445	348	385	358	233	292
Apples	2480	2988	3607	3058	3452	2566	3073	3615	2301	3265	2883
Small fruit	1730	2064	2538	2131	2468	1881	2229	2583	1630	2334	1860
Grapes	102	109	131	168	239	236	209	208	233	311	362
Orchard fruit	241	317	426	397	481	378	505	615	423	589	776
Cattle & calves	32561	28751	29935	30233	24586	21866	21084	23332	22478	22324	23983
Hogs	16153	11429	11542	11211	13614	15120	13752	11245	8531	9912	11027
Sheep & lambs	4202	4642	4728	4177	3853	4821	3903	4078	4475	5439	5676
Poultry	1383	1540	1686	1787	1501	1700	1716	1622	1289	1682	1805
Cheese	2271	2663	3126	4638	4610	4304	4261	4514	3932	4278	6008
Butter	12853	14325	13117	15275	20899	17439	18500	18922	14208	16574	21578
Fluid milk	8700	8912	7988	9366	13196	11031	10006	10208	7811	9315	10892
Horses	2586	2567	2371	2194	2087	2024	2115	2375	2336	2810	3094
Seed, grass & clover	351	−15	−193	−216	−119	177	88	−56	−29	563	79
Wool	2272	3098	2814	2220	1985	2197	2214	2027	1919	2424	2248
Forest products	16402	17621	20492	21896	20122	16773	15583	15873	15559	15941	17749
Grand total	159808	165192	164498	167615	174676	164695	160138	164492	153214	178394	179489

	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891
Wheat	38437	33381	26223	21291	24088	26430	23340	26429	25484	26658	33720
Oats	5874	4586	4279	4034	4911	4188	4203	4529	3895	5053	6316
Barley	11379	7183	5819	5629	5659	5558	6562	7158	5089	3373	3272
Rye	1314	772	680	292	216	203	79	113	346	313	275
Hay	4143	4035	3715	4469	4481	4169	4922	6472	4707	3667	5157
Vegetables	13413	13252	14682	9619	10532	10085	13116	8614	12825	13094	9749
Potatoes	13981	11261	11715	6848	9900	8845	14014	6783	11021	10703	7669
Hops	347	890	313	262	195	56	171	270	64	374	186
Flax seed	103	100	109	195	105	96	145	91	130	115	92
Tobacco	113	132	149	164	159	164	172	212	192	231	232
Flax fiber	85	108	73	59	49	78	80	121	175	181	112
Eggs	6906	7927	9347	9231	8653	7496	8022	8490	8278	8501	8090
Maple sugar & syrup	1581	1557	1409	1918	1629	1691	2184	1599	1744	1798	1678
Honey	290	312	302	447	403	441	601	459	527	565	409
Apples	3742	4320	4311	3803	3230	3529	3485	3805	4283	5129	4114
Small fruit	2235	1907	1921	1766	1791	2180	1804	1018	1251	1878	1901
Grapes	506	573	486	651	791	721	760	825	1027	453	511
Orchard fruit	1325	1676	1578	1862	2380	1495	1903	1232	1806	3053	1343
Cattle & calves	20998	38135	34953	34307	28400	22828	25207	25595	24593	30443	31243
Hogs	15449	15579	12854	12026	11235	11748	13667	14427	14328	12779	8929
Sheep & lambs	8308	6312	7718	4617	4052	4146	4846	5313	6407	5423	5463
Poultry	2169	2784	2980	2836	2955	1850	2066	2526	2748	2472	2038
Cheese	5925	6822	7382	8279	6506	7154	8916	8814	9099	9032	11142
Butter	21722	22139	21274	19778	17393	18410	20291	20109	18462	22257	26530
Fluid milk	11141	12757	11553	11773	10480	10643	12360	12574	12787	14623	16528
Horses	4742	5437	−2010	6209	4572	4162	6528	6592	9154	5634	5064
Seed, grass & clover	693	7	−182	−133	−219	−251	−219	−510	−237	56	95
Wool	2137	2681	2361	2007	1563	1366	1374	1282	1631	1785	1709
Forest products	19840	21439	21553	20534	19627	19937	18621	19715	20583	21046	21275
Grand total	218911	228077	207548	194786	185749	179431	199230	194670	202411	210702	214854

(*continued*)

Table 2.14 (continued)

	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902
Wheat	26427	20725	18746	29715	22876	35754	26269	30505	28160	37127	45252
Oats	6450	5087	4076	3771	4170	5516	6168	5717	5912	7534	7213
Barley	1498	806	1218	884	1000	496	754	1544	1650	1206	1227
Rye	142	87	108	106	129	498	223	321	402	298	346
Hay	4771	5639	4617	6922	4941	3740	3122	4788	5820	7929	7552
Vegetables	10948	12962	10868	8360	7559	13058	12275	12089	8428	13834	15519
Potatoes	8845	9656	9270	4095	6044	9562	9982	8748	5051	9879	13284
Hops	365	358	143	165	145	211	181	112	180	157	288
Flax seed	95	83	390	784	229	220	340	345	197	238	530
Tobacco	270	288	281	362	382	606	542	719	754	809	852
Flax fiber	124	268	151	128	304	38	75	196	235	143	175
Eggs	7199	8294	7291	7408	7465	6912	8218	9819	9848	9337	10550
Maple sugar & syrup	1692	1604	1497	1350	1511	1014	1352	2433	1427	1747	1761
Honey	398	371	369	362	390	303	301	364	356	411	401
Apples	5678	5183	4886	4868	4379	5854	6578	6606	5058	6271	7505
Small fruit	2114	1533	1542	1776	1357	1578	1367	1376	1408	1837	1627
Grapes	395	634	546	731	720	827	569	600	1166	1182	1249
Orchard fruit	2148	1267	1320	697	925	1181	1005	1050	1805	1102	1034
Cattle & calves	30504	30486	24976	24047	23279	28718	32192	34578	36732	42722	51781
Hogs	14582	10285	19457	13577	13754	15949	19685	17835	17993	26944	32380
Sheep & lambs	8095	6468	6376	7516	4434	3559	4980	5331	5718	6037	5852
Poultry	1897	2438	2184	2357	2697	2354	2399	3103	3379	3622	3615
Cheese	12621	14444	13346	12576	13268	15699	14976	18528	19250	17994	22812
Butter	27177	27778	25562	23327	23511	23613	26187	23379	29586	31209	33531
Fluid milk	16797	17061	17326	15831	14288	14505	16580	16867	19083	17450	17899
Horses	2746	316	−1035	30	1249	985	1552	4460	6563	6464	10041
Seed, grass & clover	−233	145	325	−254	−237	−87	304	−232	14	785	359
Wool	1690	1719	1655	1375	1445	1490	1432	2057	1609	1382	1534
Forest products	20978	21012	20147	20350	21065	21164	20700	20952	21604	22686	24128
Grand total	216425	207007	197652	193229	183291	215330	220320	234201	239375	278350	320310

	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
Wheat	39026	49105	56401	53547	70128	76691	119799	84584	124116	120913	137734
Oats	6428	6268	6811	7925	13131	8604	7626	8942	10272	9643	16716
Barley	1297	1423	1363	1420	2475	2523	2025	1939	3282	5564	6417
Rye	195	211	188	103	207	291	247	195	139	117	216
Hay	5958	5506	5754	6388	9276	7434	9709	8974	17573	12712	11273
Vegetables	19796	15743	18312	17134	20931	16707	15191	19918	21107	17512	21538
Potatoes	19882	14077	14467	15138	19278	16796	13411	18041	22108	16883	20152
Hops	271	304	157	227	132	112	311	290	519	374	348
Flax seed	400	462	599	968	1867	1415	2941	8472	25788	24846	15708
Tobacco	975	953	1054	1221	1352	1406	1597	1569	1242	669	1450
Flax fiber	271	410	244	73	163	120	84	125	72	24	46
Eggs	10275	13753	12720	15690	18132	17807	21702	22310	27128	26984	32387
Maple sugar & syrup	1922	1807	1864	2926	2374	2232	2211	2514	2594	2598	2471
Honey	370	361	383	567	652	699	769	713	729	790	760
Apples	9057	7003	9599	7281	10053	7677	9734	7840	10291	9515	11200
Small fruit	1703	1498	2027	2179	2634	2196	1975	2467	2840	1809	2108
Grapes	1182	887	1344	1384	1212	1215	1153	1217	823	857	1056
Orchard fruit	1418	1350	1248	1674	2739	1355	1984	1824	1786	709	1125
Cattle & calves	46816	47304	48633	41582	41686	36809	44997	55761	63530	68968	74552
Hogs	30739	30744	30439	37426	30109	30643	38803	47606	46275	48438	59899
Sheep & lambs	4971	3593	4623	4129	5686	5102	4953	5218	6122	7412	6524
Poultry	3465	3621	3921	6979	4670	5633	6757	9016	9437	10978	11189
Cheese	22056	18399	22880	26525	22085	20078	20860	19997	20809	20755	19240
Butter	33063	33274	40906	40195	42766	48186	46825	50725	40670	50565	46763
Fluid milk	18461	19089	21907	22315	25881	29256	27601	25855	24005	30073	28238
Horses	−1894	14878	10353	17954	20070	12570	23560	21107	15391	22764	29316
Seed, grass & clover	971	51	1011	−129	−208	−674	−203	564	−14	−714	−392
Wool	1636	1730	1961	1727	1748	1413	1506	1615	1472	1548	1945
Forest products	25014	24848	25612	30275	34076	30792	31765	33437	37969	38051	37549
Grand total	305738	318666	346796	364836	405315	385101	459897	462846	538087	551367	597540

(*continued*)

Table 2.14 (continued)

	1914	1915	1916	1917	1918	1919	1920
Wheat	127468	298784	280766	376802	275169	291538	383267
Oats	16149	25515	48549	38384	22295	31325	23152
Barley	3635	5581	8195	9022	9993	15861	10976
Rye	364	597	1491	1690	402	3360	4476
Hay	13406	15144	11470	12617	20465	19709	22493
Vegetables	18463	26474	32053	37444	41046	39899	46290
Potatoes	19648	24458	34254	44187	42556	46110	46676
Hops	214	170	216	80	81	206	455
Flax seed	6552	8472	17940	15261	16478	20175	14059
Tobacco	1020	801	677	1265	2476	7564	12599
Flax fiber	34	86	277	370	827	1439	1298
Eggs	32346	31285	46955	53764	61108	69557	72514
Maple sugar & syrup	2678	3062	3263	4608	7261	8828	9376
Honey	657	788	831	984	1535	1492	1633
Apples	7709	8328	9073	8883	13476	15858	15016
Small fruit	2255	2126	2010	2521	3782	6105	6957
Grapes	958	959	1059	1359	1029	1761	2328
Orchard fruit	1045	701	1368	1461	2477	1890	4130
Cattle & calves	86110	93108	106691	124018	134806	106956	124546
Hogs	56676	52962	65234	73320	103446	111234	83357
Sheep & lambs	7230	7455	9960	15655	17739	16613	8957
Poultry	10879	10794	11552	14415	21309	19043	20389
Cheese	20010	26296	36278	39176	37774	45267	39240
Butter	45154	51320	57336	71057	82494	98805	108841
Fluid milk	29152	32482	38484	38768	54265	61501	72811
Horses	22823	13799	11932	22410	16859	−3155	20003
Seed, grass & clover	−1898	−2121	−500	−422	1649	740	−447
Wool	2136	2967	3363	4435	5316	6755	6213
Forest products	41147	40888	38739	49884	63452	61666	67047
Grand total	574030	783293	879529	1063431	1061579	1108113	1228662

	1921	1922	1923	1924	1925	1926
Wheat	227439	307491	307525	291319	413771	386002
Oats	15746	16547	18653	26143	20062	11532
Barley	6323	7163	7312	21507	19085	21182
Rye	2445	5994	3467	7812	4326	5318
Hay	16783	9622	10942	9676	10526	11428
Vegetables	37283	29474	32067	36249	51206	41708
Potatoes	36803	25648	29578	25190	66623	49421
Hops	311	142	329	235	279	318
Flax seed	4506	8461	12174	19817	10542	8845
Tobacco	2252	4177	3833	3255	4924	4265
Flax fiber	167	331	185	400	109	28
Eggs	61342	56727	58052	57566	50484	67757
Maple sugar & syrup	4397	4188	5957	5991	5287	4896
Honey	1345	1068	1174	1510	1756	2164
Apples	35821	24692	24489	19747	20057	9688
Small fruit	3235	3114	3051	2566	2385	2581
Grapes	2812	3515	2742	1470	1750	720
Orchard fruit	3394	2577	2886	1718	1463	2234
Cattle & calves	45920	52198	61843	58488	75247	80375
Hogs	63057	82013	75916	73068	109471	113929
Sheep & lambs	8596	6276	8059	11315	9895	8592
Poultry	23964	23131	26312	28848	31013	32695
Cheese	28186	22682	28202	26199	37553	28851
Butter	91342	79029	89690	91446	93368	98144
Fluid milk	57158	47961	54343	52020	54921	59116
Horses	4879	−3297	3738	−1868	1623	−4369
Seed, grass & clover	−311	−223	772	1009	1862	2084
Wool	2853	3017	3304	4274	4042	3648
Forest products	51408	50965	57421	60385	57698	54882
Grand total	839462	874694	934029	937367	1161345	1108046

Table 2.15 **Farm Expenses of Production (Thousands of Dollars)**

	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881
Repairs to farm buildings	2965	3054	3047	3084	3258	3115	3006	3108	2880	3428	3401	3526
Repairs to machinery & equipment	1402	1444	1441	1458	1540	1473	1422	1470	1362	1621	1608	1993
Tractor expenses												
Fertilizer expense				22	14	22	29	24	24	3	2	4
Truck & auto expense												
Mill feeds	1720	5176	2264	7984	4302	2652	5651	4234	3856	2844	2971	2640
Binder twine												
Blacksmithing	4313	4454	4596	4738	4879	5021	5163	5305	5446	5588	5730	5749
Miscellaneous	5609	5779	5767	5835	6163	5892	5691	5882	5451	6487	6435	7974
Total operating expense	16011	19911	17117	23125	20160	18179	20966	20026	19021	19973	20151	21890

	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893
Repairs to farm buildings	3651	3862	4057	4153	4247	4372	4505	4598	4651	4731	4813	4886
Repairs to machinery & equipment	2076	1859	1734	1656	1600	1805	1750	1821	1901	1952	1959	1855
Tractor expenses												
Fertilizer expense	5	4	6	5	8	14	16	13	37	43	61	38
Truck & auto expense												
Mill feeds	3331	3589	2599	1978	2598	3141	3544	3853	3813	2875	3137	2897
Binder twine		242	484	727	969	1212	1454	1697	1939	1779	2217	1195
Blacksmithing	5815	5466	5571	5565	5540	5646	5759	6019	6098	6550	6899	7122
Miscellaneous	8305	7437	6936	6626	6402	7221	7000	7286	7604	7811	7837	7421
Total operating expense	23185	22462	21390	20714	21368	23411	24032	25289	26046	25745	26926	25419

	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904
Repairs to farm buildings	4912	4951	4986	5061	5128	5229	5343	5962	6570	7190	7693
Repairs to machinery & equipment	1788	1729	1639	1916	1970	2121	2187	2576	2939	2773	2900
Tractor expenses											
Fertilizer expense	80	94	124	126	140	175	244	302	318	355	334
Truck & auto expense											17
Mill feeds	2622	3840	3010	4351	5580	5213	3453	2743	4597	4626	4494
Binder twine	1335	1213	2252	1413	2585	3971	2171	3486	4017	2856	2559
Blacksmithing	7201	7320	7567	7842	8176	8720	9394	9560	9994	9792	10280
Miscellaneous	7155	6919	6559	7666	7881	8487	8751	10304	11756	11093	11603
Total operating expense	25097	26070	26141	28379	31453	33921	31547	34936	40194	38690	39884

	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915
Repairs to farm buildings	8266	8917	9314	9907	10471	11123	11952	12531	12813	13209	13583
Repairs to machinery & equipment	3151	3248	3651	3530	4224	4218	4918	5059	5593	5322	7393
Tractor expenses			96	266	435	678	1452	3147	3704	3462	3922
Fertilizer expense	398	485	621	705	766	773	1023	1112	1092	2336	2197
Truck & auto expense	20	48	40	76	102	204	586	1224	1504	1785	2499
Mill feeds	5297	6208	8880	7302	8764	9884	11442	11415	8780	12653	10741
Binder twine	2655	2979	1662	1487	3047	3660	3206	3233	6940	4896	7725
Blacksmithing	10574	11166	11763	12015	12630	13103	14175	15445	16922	18173	19016
Miscellaneous	12604	12993	14607	14120	16899	16873	19674	20239	22373	21289	29574
Total operating expense	42968	46040	50639	49412	57343	60519	68433	73409	79728	83130	96655

(*continued*)

Table 2.15 (continued)

	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Repairs to farm buildings	14131	14551	16361	17959	18655	18302	18172	18171	18206	18093	18100
Repairs to machinery & equipment	8347	9982	9825	10301	11484	7760	8200	8738	8731	10866	10404
Tractor expenses	4140	5956	8838	14650	21309	20510	20534	17580	18742	19154	24215
Fertilizer expense	4990	5574	6316	2084	7120	6113	5710	5855	5945	5963	6182
Truck & auto expense	3418	6938	10407	13085	18901	18391	18340	16860	19028	19896	25508
Mill feeds	9155	9364	27349	37400	26816	20648	19242	21940	18152	20638	24671
Binder twine	10508	14899	14729	5236	12334	16380	9892	11113	10707	14095	13353
Blacksmithing	19769	21101	22270	22408	23822	22465	21062	20289	19030	18028	16634
Miscellaneous	33389	39930	39303	41206	45938	31043	32802	34952	34924	43464	41619
Total operating expense	107850	128298	155403	164334	186383	161617	153958	155502	153470	170201	180690

Table 2.16 **Gross Farm Income and Farm Gross Domestic Product (Thousands of Dollars)**

Year	Gross Income	Operating Costs	Farm GDP
1870	159808	16011	143797
1871	165192	19911	145281
1872	164498	17117	147381
1873	167615	23125	144490
1874	174676	20160	154516
1875	164695	18179	146516
1876	160138	20966	139172
1877	164492	20020	144466
1878	153214	19021	134193
1879	178394	19973	158421
1880	179489	20151	159339
1881	218911	21890	197021
1882	228077	23185	204892
1883	207548	22462	185086
1884	194786	21390	173396
1885	185749	20714	165035
1886	179431	21368	158063
1887	199230	23411	175819
1888	194670	24032	170638
1889	202411	25289	177122
1890	210702	26046	184656
1891	214854	25745	189108
1892	216425	26926	189499
1893	207007	25419	181588
1894	197652	25097	172555
1895	193229	26070	167159
1896	183291	26141	157150
1897	215330	28379	186915
1898	220320	31453	188867
1899	234201	33921	200280
1900	239375	31547	207828
1901	278350	34936	243414
1902	320310	40194	280116
1903	305738	38690	267048
1904	318666	39884	278782
1905	346796	42968	303828
1906	364836	46040	318796
1907	405315	50639	354676
1908	385101	49412	335689
1909	459897	57343	402554
1910	462846	60519	402327
1911	538087	68433	469654
1912	551367	73409	477958
1913	597540	79728	517812
1914	574030	83130	490900
1915	783293	96655	686638
1916	879529	107850	771679
1917	1063431	128298	935133

(*continued*)

Table 2.16 (continued)

Year	Gross Income	Operating Costs	Farm GDP
1918	1061579	155403	906176
1919	1108113	164334	943779
1920	1228662	186383	1042279
1921	839462	161617	677845
1922	874694	153958	720736
1923	934029	155502	778527
1924	937367	153470	783897
1925	1161345	170201	991144
1926	1108046	180690	927356

that took place in the iron and steel products industry and the transportation equipment industry are not nearly as apparent. For the former industry the relative decline of blacksmithing and other such small industry and the growth of the modern iron and steel industry with blast furnaces and steel mills is masked. For the latter industry, the relative decline in production of horse-drawn vehicles and, to some extent, the production of railway equipment, on the one hand, and the growth of the automotive industry, on the other hand, are also submerged.

Another feature is the growth of the mining industry proper. The income produced in 1900 is exaggerated by the production and sale of gold from the Klondike. But the emergence of base metal mining in the late nineteenth century and its growth in the twentieth, together with a continuation of coal and gold mining from the earlier period, established the mining industry as a substantial one. We have noted already the concomitant growth of the nonferrous metals industry in manufacturing.

I mention forestry (wood operations) just briefly. It was the principal component of the category "Forestry, . . . fishing," in table 2.13. After 1900, and especially from the 1914 war onward, the relative decline in logging for lumber was progressively offset by the great growth of pulpwood production. It is of interest, first, that during its period of development the pulp and paper manufacturing industry was much more export oriented than had been the saw and planing mill industry which it was to some extent replacing and, second, that the paper and pulpwood exports had a much larger manufacturing component than primary industry component in contrast to the agricultural exports.

Finally, the banking and finance industry (table 2.13) provides a good indication of growth of an increasingly specialized economy. By 1890 there was a fairly good banking system, but the remainder of the financial system was ill developed. A great growth of this sector after

Table 2.17 **Gross Domestic Product in Manufacturing at Factor Cost, by Industry, 1870–1926 (Thousands of Current Dollars)**

	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881
1. Food & beverage	11263	12522	13697	14787	13179	12162	12022	14783	11967	12677	14413	16355
2. Tobacco & products	1014	1077	1150	1403	1693	1699	1665	1374	1021	982	1207	1421
3. Rubber products	112	141	168	199	222	146	123	171	141	153	243	390
4. Leather products	11717	13811	12632	10721	11137	8814	7314	9105	8428	9420	12825	14450
5. Textiles (excl. clothing)	2691	3751	3547	2710	2761	3047	2999	3248	3228	4314	5116	6021
6. Clothing	5386	7230	7664	7027	7052	6707	6270	6925	7120	8519	9373	10712
7. Wood products	16173	16743	16944	25499	24051	19937	15802	18960	15601	16776	22227	28488
8. Paper products	670	791	777	925	984	1044	1007	992	987	953	1035	1166
9. Printing and publishing	2270	2739	2930	3525	3880	4000	3816	3865	3906	3743	3579	4793
10. Iron and steel products	12803	16834	23698	34585	21633	21382	13459	14586	11813	10940	15485	18102
11. Transportation equipment	5943	5952	7104	13134	12883	9648	9978	9394	9844	7940	7105	9626
12. Nonferrous metal products	770	882	992	1103	1212	1322	1429	1534	1640	1745	1849	1852
13. Electric apparatus & supplies												
14. Nonmetallic minerals	2398	2521	2642	2761	2876	2991	3102	3212	3320	3425	3528	3383
15. Petroleum and coal	1119	1352	1642	1822	601	1074	1822	1156	1055	1563	1308	1334
16. Chemical products	1560	1759	1908	1993	2128	1974	2024	2234	2166	2224	2332	2509
17. Miscellaneous industries	1094	1301	1459	1803	1638	1532	1400	1634	1488	1622	1990	2321
Total GDP	76983	89406	98954	123997	107930	97479	84232	93173	83725	86996	103615	122923

(*continued*)

Table 2.17 (continued)

	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893
1. Food & beverage	17739	17681	18077	16785	17028	18754	22768	24207	26232	27785	26170	23685
2. Tobacco & products	1556	1738	2118	1938	1586	1886	2102	2255	2713	2914	2881	2908
3. Rubber products	394	328	352	342	346	435	545	508	505	556	580	635
4. Leather products	14357	13347	13374	15502	16486	14468	12730	12102	14810	15073	14504	13378
5. Textiles (excl. clothing)	7836	7180	6293	6672	7150	7458	8159	9246	9380	9524	9840	9134
6. Clothing	13456	12583	11653	12520	13925	14099	15099	18288	19251	18739	19028	17811
7. Wood products	35098	39031	33868	30067	30925	31438	32256	32679	35035	35257	29452	29658
8. Paper products	1366	1625	1718	1768	1762	1936	2086	2236	2393	2581	2794	3017
9. Printing and publishing	5610	5244	4439	4496	4393	5309	6601	6391	5809	6199	7961	8222
10. Iron and steel products	22277	28292	21204	18669	19319	23810	23679	24652	27070	24780	24141	21615
11. Transportation equipment	11015	10215	9079	8276	8885	9844	10140	10305	11806	12178	12413	11868
12. Nonferrous metal products	1942	1621	1164	1339	1943	1998	2458	3026	3337	4480	3394	3533
13. Electric apparatus & supplies									416	435	461	520
14. Nonmetallic minerals	3236	3085	2928	2769	2605	3032	3211	3798	5209	4209	4062	5285
15. Petroleum and coal	1064	1108	1036	1138	1127	1167	982	989	1020	1011	1090	1122
16. Chemical products	2902	3160	3140	3177	3323	3417	3366	3433	3596	3577	3532	3318
17. Miscellaneous industries	2645	2720	2467	2359	2438	2571	2733	2869	3109	3156	3014	2866
Total GDP	142493	148958	132910	127817	133241	141622	148915	156984	171691	172454	165317	158575

	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904
1. Food & beverage	22891	24050	24262	30203	30991	29327	33172	34653	37761	40929	43355
2. Tobacco & products	2884	2857	3185	4070	3937	3535	4012	4055	4343	4905	5332
3. Rubber products	588	663	818	1036	1269	1471	1516	1385	1421	1899	2450
4. Leather products	9859	12122	11361	17243	18719	17175	15863	17217	20889	20836	17535
5. Textiles (excl. clothing)	8014	7690	7360	9167	11036	12286	12825	13020	13599	13300	12454
6. Clothing	16451	16405	15816	16998	18751	20760	21669	23103	26223	28129	29024
7. Wood products	27959	23781	26109	27106	26126	29950	34024	33477	39258	44346	43470
8. Paper products	3287	3242	3254	3550	3831	4203	4752	4596	5471	5893	6299
9. Printing and publishing	6559	6574	7074	7298	7510	8035	8952	8955	9015	9521	10509
10. Iron and steel products	18994	14716	17801	14902	18684	20072	29077	23682	39683	39436	31718
11. Transportation equipment	11741	8855	6730	7732	9214	11045	10765	11833	15062	17303	16335
12. Nonferrous metal products	3138	3162	3105	4113	5169	5682	6257	8316	8496	9489	11060
13. Electric apparatus & supplies	587	634	714	792	1076	1269	1628	2190	2438	2607	3028
14. Nonmetallic minerals	5319	6533	4454	4608	5271	5981	6329	7233	8064	8343	8229
15. Petroleum and coal	1168	1067	983	954	964	949	1075	1059	1135	1420	1791
16. Chemical products	3029	3090	3144	3338	3794	4123	4523	5404	6238	6769	7488
17. Miscellaneous industries	2646	2557	2581	2972	3197	3325	3707	3763	4379	4646	4568
Total GDP	145114	137998	138751	156082	169539	179188	200146	203941	243475	259771	254645

(*continued*)

Table 2.17 (continued)

	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915
1. Food & beverage	48452	46528	50453	55998	61065	64767	64267	69030	66643	70857	82568
2. Tobacco & products	5703	5533	5910	7720	8430	8585	9430	9767	9735	10261	10327
3. Rubber products	2735	2983	3247	2629	3878	4497	5369	6749	5850	5964	8355
4. Leather products	21408	27282	19818	14197	25789	26746	30113	39097	27271	31448	26747
5. Textiles (excl. clothing)	13018	14323	13531	12156	14688	17894	14846	14984	15565	13678	17668
6. Clothing	32547	37089	38632	33675	43239	50605	45579	49244	50958	43019	47377
7. Wood products	49604	61148	67417	59614	66468	72168	78640	67843	62903	56641	56984
8. Paper products	7178	8449	9787	9985	11387	12388	11295	11240	12701	16320	18722
9. Printing and publishing	11086	11944	12266	13958	15667	15765	17282	18795	20559	20997	21006
10. Iron and steel products	50976	69246	87249	57338	68102	75808	78188	95780	103973	60352	72491
11. Transportation equipment	18565	23677	32452	27221	29415	31302	38919	44854	53299	43301	33281
12. Nonferrous metal products	17401	20941	22341	18324	20240	24169	22760	28287	26281	20128	28364
13. Electric apparatus & supplies	3782	4949	5789	6384	6778	7280	8471	7806	7633	7635	7181
14. Nonmetallic minerals	9706	11699	12686	11199	11058	17076	19261	22384	23458	18831	14245
15. Petroleum and coal	2047	1827	2358	2379	2155	2355	2779	4494	5640	5531	4089
16. Chemical products	8828	9801	11097	10460	10852	12890	14670	17918	17637	16160	18926
17. Miscellaneous industries	5403	6198	6795	6099	7073	7827	7697	8067	7685	6600	6847
Total GDP	308439	363617	401828	349336	406284	452122	469566	516339	517791	447723	475178

	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
1. Food & beverage	103300	144219	156916	169843	187062	152471	141002	143715	150220	156065	169158
2. Tobacco & products	11884	15997	20060	13957	19557	16646	18358	16960	16879	9779	12918
3. Rubber products	12744	17935	19665	22929	30558	18097	22236	24430	27188	32405	28366
4. Leather products	42026	39180	36692	43937	45462	36716	40818	38661	37228	35700	38795
5. Textiles (excl. clothing)	22932	36734	47618	54141	58872	46725	54141	54099	41450	41083	50047
6. Clothing	68874	80108	91133	107804	109493	83249	87978	89630	83364	84810	93436
7. Wood products	56703	85863	93048	107388	137470	87188	84079	101393	88223	87215	93509
8. Paper products	31507	47850	60691	74242	134378	71203	78066	92893	86010	94258	105444
9. Printing and publishing	26477	33403	32504	42105	54323	52162	52235	53007	53327	54537	58047
10. Iron and steel products	124805	185523	198134	158876	207531	125452	98746	132855	114033	124093	147981
11. Transportation equipment	37544	76866	106980	110800	111534	61432	58043	68923	61191	79775	95991
12. Nonferrous metal products	41393	45321	35666	33352	36970	17595	21204	26784	26380	33445	34170
13. Electric apparatus & supplies	10178	15909	12108	14707	22213	20141	18603	19744	26292	28506	32401
14. Nonmetallic minerals	14918	17950	17792	19664	33494	25481	28856	29060	27932	28207	29365
15. Petroleum and coal	7621	10531	13169	14730	17208	10942	11553	4711	8254	8325	15129
16. Chemical products	41941	93829	124797	34433	39688	28061	29704	37941	35911	38497	43259
17. Miscellaneous industries	9207	12854	17053	19340	25256	19416	19689	20018	15895	17198	19387
Total GDP	664054	960072	1084026	1042248	1271069	872977	865311	954824	899777	953898	1067403

Table 2.18 **Percentage Distribution of Gross Domestic Product, Manufacturing, Census Years, 1870–1920 and 1926**

	1870	1880	1890	1900	1910	1920	1926
Food & beverage	14.6	13.9	15.3	16.6	14.3	14.7	15.9
Tobacco & products	1.3	1.2	1.6	2.0	1.9	1.5	1.2
Rubber products	0.2	0.2	0.3	0.8	1.0	2.4	2.7
Leather products	15.2	12.4	8.6	7.9	5.9	3.6	3.6
Textiles (excl. clothing)	3.5	4.9	5.5	6.4	4.0	4.6	4.7
Clothing	7.0	9.1	11.2	10.8	11.2	8.6	8.8
Wood products	21.0	21.4	20.4	17.0	16.0	10.8	8.8
Paper products	0.9	1.0	1.4	2.4	2.7	10.6	9.9
Printing & publishing	3.0	3.5	3.4	4.5	3.5	4.3	5.4
Iron & steel products	16.6	14.9	15.8	14.5	16.8	16.3	13.9
Transport equipment	7.7	6.9	6.9	5.4	6.9	8.8	9.0
Nonferrous metal products	1.0	1.8	1.9	3.1	5.4	2.9	3.2
Electric apparatus and supplies	—	—	0.2	0.8	1.6	1.8	3.0
Nonmetallic minerals	3.1	3.4	3.0	3.2	3.8	2.6	2.8
Petroleum and coal products	1.5	1.3	0.6	0.5	0.5	1.4	1.4
Chemical products	2.0	2.3	2.1	2.3	2.9	3.1	4.1
Miscellaneous industries	1.4	1.9	1.8	1.9	1.7	2.0	1.8

1890 is evident from the data, a growth in which several Canadian institutions, especially the banks, became big players in the world scene.

2.3 Conclusion

What does this add up to? In the interests of brevity and to focus our attention, I make just two points.

First, the Canadian economy developed in a fundamentally different way after 1900 than it had before. The best evidence in support of this statement from our data is provided by the performance of capital formation. Levels of sustained capital formation relative to GNP were of a distinctly higher order after 1900 than before; equivalently, levels of domestic saving appear to have been clearly of a much higher order after 1900 than before. Of particular significance, the level of investment in manufacturing became permanently much higher than it had been (table 2.2): Canadian manufacturing underwent a fundamental change between 1890 and 1910. Accompanying the change in manufacturing, the specialized trade sector and the financial sector went a long way toward assuming their modern form. And the electric power and communications system underwent like development (table 2.1).

Second, the evidence of our data supports most strongly the presumption that the growth and many of the changes in the Canadian economy were a consequence of the settlement of the prairies. The continued high level of the contribution of agriculture to GDP was a direct result of this settlement. And one should add that the foundation of western settlement was the production or prospect of production of wheat. The effects of western settlement and of the incomes consequent on it were felt strongly in Central Canada, where the manufacturing financial, and commercial functions were performed predominantly. Ontario gained population by net in-migration from 1900 onward.

I have put the matter rather starkly. Of course, other factors entered the picture. I have mentioned already the growth of the mining industry, itself highly dependent on external markets. I have not mentioned the effects of the war, which led to large growth of some sectors of the manufacturing industry. But these events were of the second order of magnitude.

I leave the matter there. I do not attempt to resolve the dispute between the traditionalists and the revisionists. I would just say that I do not see that their views are entirely antithetical. Of more importance, I hope that the new data provided herein stimulate further research. There are many things still to be explained.

Appendix 1
The Background of the Project

This project began, on my initiative, about nine years ago as a collaborative undertaking among seven of us in academia. The final project is attributed as follows with special reference to the industrial categories of table 2.1.

Alan Green was responsible for the estimates in transportation, communications, and electric light and power. This included estimates for the steam railways, the electric railways, the telegraph, the telephone, and the electric utilities.

Duncan McDougall prepared estimates of wage and salary payments and of outlays on goods and services of federal and provincial governments, in great detail for 1910 and in somewhat lesser detail for 1900, 1890, 1880, and 1870. I was responsible for estimates for provinces for 1920 and also for the interpolation of the yearly data between census years and between 1920 and 1926 when the official estimates begin. Duncan McDougall was also responsible for the preparation of the major part of the fisheries estimates; I did some work in reconciling

the estimates at a point of junction of two series where the nature of the underlying data changed.

Marvin McInnis and I developed the methodology of estimation of income for the agricultural sector in preparing an estimate for 1910. Marvin McInnis then wrote up the estimates for that year. I did the detailed direction of the preparation of the estimates for the full period and must bear the responsibility for their quality. Marvin McInnis is doing the detailed writeup of the preparation of the estimates.

Thomas Rymes, of Carleton University, prepared the estimates for the finance, insurance, and real estate sector.

Alasdair Sinclair, of Dalhousie University, prepared the balance of payments estimates.

Marion Steele, of the University of Guelph, prepared the estimates of residential rent and also the estimates of capital formation through residential construction.

I am responsible for the preparation of the remainder of the estimates.

We were assisted in our work at various times by a score or so of research assistants.

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Appendix 2
Notes on Methods and Sources

This note contains two parts. First, the method of estimation of GDP for the period 1870–1926 and the rationale for the use of this method are presented. Second, the major sources of data and their strengths and weaknesses are described.

The Method of Estimation of GDP

There are three possible methods of estimating GDP or the closely related GNP which are not necessarily alternatives but which, in fact, often are just that, at least for the preparation of historical estimates. It is about the method appropriate for historical estimates that I shall speak, although I shall also make reference, at times, to current practice.

The Expenditure Method

One such method comprises the estimation of expenditure (actual and imputed) on final goods and services, on consumer commodities, on capital goods, on goods and services purchased by government, and on net purchases of goods and services by residents of foreign coun-

tries, to obtain GNP. It is then adjusted for net international income flows to obtain GDP. Practically all countries make estimates of such expenditure in their current preparation of their national accounts and, more important, make such estimates from data that are, for the most part, independent of those used to estimate GNP or GDP by alternative methods as well. However, most countries do not have the luxury of being able to make good historical estimates, from independent data, by both the expenditure method and either one or a combination of the two other methods that can be followed and consequently rely primarily on one method or another.

Many countries do not depend primarily on expenditure estimates for historical periods. However, the United States is one country that does. The historical GNP estimates for early years for the United States (before 1919) are based primarily on Kuznets's work; he obtained his estimates by use of the expenditure method. This method was reasonably appropriate for the United States since its census of manufactures obtained a large amount of commodity data from as early as 1869. These data made it possible to separate finished products from intermediate products and, in turn, along with such items as trade data, data on production of agricultural products, information on freight costs and on trade margins, and reports of government bodies, made possible the derivation of reasonably decent estimates for large components of gross national expenditure.

This method was much less appropriate for Canada because her census of manufactures did not report commodity data until 1917: only the value of output was reported. Hence it is much more difficult to separate production of intermediate products from final products and to divide the latter among consumer goods, capital goods, and goods sold to governments in Canada than in the United States. And we decided at an early stage not to use this method.

The Income Method

A second method of estimating GDP is to add together factor costs of production to obtain national income at factor cost, to further add on capital consumption allowances to obtain GDP at factor cost, and then, finally, if desired, to add indirect taxes less subsidies to obtain GDP at market prices. One can then, if one wishes, obtain GNP at market prices by subtracting factor incomes paid abroad and adding factor incomes received from abroad.

This factor income method is widely used currently to obtain most of the items of the factor income and GNP statements of the national accounts. Its use depends on the direct availability of data on, first, labor income and, second, property income. Such data are now available in Canada and many other countries from personal and corporate

income tax returns and from many surveys done by statistical agencies. However, in the historical period in which we are interested, before the widespread use of income taxes to obtain revenue, data on property income are not directly available, and while reports of wage data are somewhat better, even they may be incomplete. Hence many countries find the use of this method unsatisfactory for estimation of historical GNP. The United Kingdom is an exception: its continuous use of the income tax dates from 1842/43. There are few data for Canada to yield direct estimates of property income before the First World War—reports for the banks, insurance companies, railways, and governments are exceptions—and so this method has for Canada only limited use for historical estimates.

The Value-Added Method

The third method involves obtaining estimates of GDP at factor cost by the value-added method and then deriving from them estimates of GNP by adding factor incomes received from abroad and subtracting factor incomes paid abroad. Basically, the value-added method of estimation involves subtracting nonfactor costs of production from gross value of production or gross sales on an industry basis in order to obtain gross value added by industry (that is, the sum of factor costs and depreciation). This is the method used even yet in the official estimates of agriculture income in Canada: a synthetic account is set up in which estimated nonfactor costs of farming items such as cost of feed, fertilizer, machinery operating costs, and farm taxes are subtracted from farm sales plus an imputation of income in kind for farm products consumed as final products on the farms on which they were produced.

This method is often the one most suited, at least for a first approach, to making historical estimates of GDP at factor cost for both the farm sector and the manufacturing sector, which are, by any measure and by a substantial margin, the two largest sectors in Canada throughout the period 1870–1926 and which are really dominant in the earlier part of this period. Other goods-producing industries such as mining, forestry, construction, and even the fisheries may be approached by the factor income method.

The Method Adopted

The method adopted in our project may best be given by a brief description of the procedure followed for selected industries, tedious as that procedure may be. Accordingly, I give now such an industry description.

Agriculture. Estimates for agriculture were made by the value-added method: the method is described more fully in the section of this paper

that gives the estimates of income generated in agriculture. Here I just note that the main innovation is the direct estimation, in the first instance, of off-farm sales and farm consumption of farm products without its being necessary to deal with the presence of intermediate farm products that are used in further production in the farm sector itself. The only expenses that are relevant then are the costs of purchases from outside the farm sector.

Manufacturing. The value-added method is used: a general outline of the method is given in the section of this paper that deals with the manufacturing data. Basically, the method involves subtracting cost of materials, cost of fuel and electricity, and "miscellaneous" expenses (items like repair and maintenance expenditures, insurance, and office supplies) from gross value of production to obtain GDP at factor cost. The labor income component of GDP can be estimated directly from data collected in censuses of manufactures, and the property income emerges as a residual.

Mining. The value-added method is used for 1921–26 by use of Dominion Bureau of Statistics census of industry data. For 1870–1920 the estimates were made separately for each of five groups into which total mining was divided, namely, metallic mines; coal (further divided by province); asbestos; other nonmetallic minerals and fuels; and sand, gravel, and stone. For each of these, it was possible to get long annual series of gross value of production (GVP) running right back to 1886 for all minerals but coal and gold and for coal and gold themselves back to 1870. For the first four groups noted above we also had wage and salary costs for 1900, 1910, 1921–26, and for coal alone for 1917–18. The ratio of these wage and salary costs to GVP was constant for all of these aforementioned years. Estimates of annual wages and salaries were obtained by assuming that the ratios of wages and salaries to GVP, by groups, were the same before 1900 as in 1900 and that these ratios could be interpolated linearly between 1900 and 1910 and between 1910 and 1920 (with the exception of coal for which there were additional ratios for 1917 and 1918). Multiplication of gross values of products by these ratios then yielded estimates of wages and salaries.

In the absence of data before 1921, to permit a direct estimate of property income an improvisation was necessary. Ratios of property income to labor income were available by groups for 1921–26, and for 1966 onward (Corporation Financial Statistics). Overall ratios for mining were also available from the *National Accounts* for 1926 onward. There was sufficient stability in these ratios through time to suggest that we might assume that such stable ratios existed prior to 1921 at the level of industry subdivision that we used.

A variation of the method was used for the sand, gravel, and stone subdivision, but it is not worth detaining us for the details at this point, particularly since this item was very small in early years.

After the above calculations were made, a small percentage was added to the whole series to take account of income of the self-employed. This percentage was based on data for the national accounts from 1926 onward.

Transportation: The railways. For as far back as 1907 both wage and salary payments and property income are calculated from annual reports, submitted to the government, which are published. Prior to 1907 other methods were necessary, since the necessary data were not available in published reports. However, wage and salary data were available for a quite large sample of companies, in material housed in the national archives, for many years in the earlier period. By relating them to operating data one could obtain ratios that formed a basis for estimation of wages and salaries for all companies, since operating data were reported for all companies from 1875 onward. Property income was calculated from bond interest expenses—bonded indebtedness was fully known—and from reports of dividends paid in Poor's, an allowance being made for undistributed profits.

These estimates can be taken as being quite reliable.

Finance, insurance, and real estate, excluding house rents. The estimates for finance and insurance were prepared predominantly by the income method. Insurance companies of all kinds have long had to report to the Federal Superintendent of Insurance for federally incorporated companies or to provincial counterparts for provincially incorporated companies. These reports contained the material from which estimates of both labor and property income could be made. Labor income included a large component of "commissions." It required summing of information for each company to obtain the aggregates.

The estimates for banks were also derived basically by the income method but with an added wrinkle. First, annual estimates of both wages and salaries and property income were obtained from records of two of the major banks made available by the banks themselves: for one of the banks both wage and salary income and property income were obtained directly from the bank statements; for the other bank wages and salaries were obtained directly but property income was obtained from the statements by the value-added method. GDP for the whole banking industry was obtained by multiplying the GDP for the two banks by the ratio of assets of all banks to the assets of the two banks.

Labor income of loan and mortgage companies and the real estate and brokerage sections of the "Finance, etc." industry was obtained by extrapolating estimates prepared by Statistics Canada (previously the Dominion Bureau of Statistics) for the 1920s backward, on the basis of assets of building societies and mortgage loan companies and of trust companies. The real estate and brokerage section extrapolation was tied into estimates of wage and salary income of real estate dealers and brokers for 1911 derived from wage and salary data obtained in the population census of 1911. The labor income of all of the financial operations described in this paragraph are a relatively small part of such income for the whole finance, insurance, and real estate industry.

Government: Federal, provincial, municipal, public education. The main income item for all of the government components is salary and wage expense. Estimates of labor income for all of the government components are from annual reports that are reasonably complete for the federal and provincial governments and for education, and sufficiently good to permit passable estimates of municipal wages and salaries.

Miscellaneous service industries. These industries include wholesale and retail trade, business service, health and welfare, religion, recreation, other community services, and personal and domestic service. Labor income makes up a very large part of GDP in all of these industries. The estimation of labor income in all of these groups depends very heavily on the use of data collected in the population census on occupations of the gainfully occupied persons in all censuses from 1871 onward and on wages and salaries of every employed person in the censuses of 1901, 1911, 1921, and 1931. Labor income for the self-employed is imputed at rates that are derived from wages and salaries paid to hired workers. For census years before 1901, one obtains estimates of labor income by projecting wages and salary rates in 1900 by such items as average earnings in manufactures, reports of wages and salaries in Royal Commission reports and records of hearings (e.g., Royal Commission on the Relations of Labour and Capital in Canada; *Report,* 1889), reports of wage and salary rates in both agriculture and industry by the Ontario Bureau of Industries in the 1880s (and later for agriculture only), reported wage and salary rates for public servants and schoolteachers, and a considerable amount of other such information.

Residential rents. The new estimates of residential rents are much more firmly based than those available hitherto. The preparation of the estimates are best summarized in the words of Marion Steele, the author.

Estimates of residential rent in Canada 1871–1925 currently do not exist, except for those of Firestone (1958) for decade-ending years. In this note we present and describe new annual estimates for 1871–1930. The fundamentals of our estimation procedure are simple. First we estimate mean paid and imputed rent in 1931, using the Census data of that year. Next we estimate an index of mean rents back to 1870; this index is a patchwork of separate indexes which we estimate from sources as diverse as surveys carried out by Ontario Bureau of Industry in the 1880s and James Mavor's Toronto survey in the 1900s. Third, we estimate the stock of dwelling units by urbanization level—urban, rural nonfarm, farm—and so derive gross rents by urbanization level. Finally we estimate deductions from gross rents: expenditure on repairs and maintenance and on fire insurance premiums.

Major Sources of Data

It would take far too much space to even list all sources of data. Hence only the most important ones will be covered. The sources of data are grouped into three classes: benchmark data sources, annual data sources, and occasional data sources.

Benchmark Data Sources

The data for some years are sometimes much more complete than those for adjacent years. These are the benchmark years. The main benchmark years for 1870–1926 are the decennial census years. The decennial census was taken in the first half of the first year of each decade. The production data collected in the census were for the preceding year. For example, the production data collected in the census of 1901 are for the year 1900. In the census years the following relevant special census data were obtained.

a) Census of manufactures for 1870, 1880, 1890, 1900, and 1910. (The annual census of manufactures began in 1917, and hence this census was separated from the decennial census.) Later I elaborate on these data.

b) Census of agriculture for each decennial census year from 1870 to 1980. Special data continued to be collected for decennial census years, even after the annual censuses of production in agriculture began. Quantities of products only were obtained in the censuses of 1870, 1880, and 1890. Quantities and values of products were collected in 1900 and later censuses. There was not much collected in the way of cost data until the census of 1920, and even then the information obtained was quite limited. Further information on these data is contained in the discussion of the agricultural data that are presented later.

c) A usable census of mineral products was taken with each of the decennial censuses of 1900 and 1910. Quantities and values of

minerals produced were obtained. The numbers of persons employed and their wages or salaries were also obtained. There were no other cost data, but there was a description of plant and equipment.

d) A census of forest production was taken from 1870 onward to 1910, but it was of limited use until 1900, in which year it appears to have been quite complete. It covered only production on farms in 1910. There were no cost data.

e) The decennial census of population contained two valuable sources of data. First, from 1870 onward, in every census, the occupations of the gainfully occupied were obtained: the occupational data of the 1910 census were particularly valuable because they were classified on an industrial basis very much like the 1948 standard industrial classification. In addition to obtaining occupational data, the population censuses from 1901 to 1931 (and beyond) obtained records of remuneration in the form of wage or salary from every hired person in the population. Information on the number of weeks worked as well as age and sex characteristics were also obtained (on the same census form, of course). These data were tabulated according to occupational classifications that corresponded with those used for the gainfully occupied population.

Special mention must be made of the wage and occupational data for 1910. The tabulations by the census office for this year were much more elaborate than those for either 1900 or 1920. There was the additional fact that since the classification was like that of the 1948 standard industrial classification, it was possible to compare wages and salaries reported in the population census with those reported in the census of manufactures, in the census of mines, in reports of government bodies on the wage bill of the public service, in reports of teachers' wage bills in departmental reports, in reports of the railways on wages and salaries, and in other such reports. In general the correspondence was quite good. Such satisfactory correspondence gives one confidence in the reliability of the labor income data for other workers for whom there is ordinarily little information. Thus, it seemed appropriate to use these wage and salary data for such industries as trade (wholesale and retail), business service, recreation, domestic service, and other such groups for 1910. The year 1910 became in effect a benchmark year par excellence.

Annual Data Sources

The number of sources of relevant annual data is very large; only a small selection is mentioned here.

a) External trade data provide continuous annual series from Confederation onward. They are most important for the balance of pay-

ments. They have many other uses, of which I shall give only two examples. First, exports of wheat (quantity and value) help in the earlier years in the estimation of wheat production. Second, imports of raw cotton (and cotton thread) can be used as an interpolater between census years of value of production of the cotton textile industry.

b) Mineral production statistics, collected or assembled by the Geological Survey of Canada and successor bodies, are available on an annual basis for all minerals from 1886 onward; output of coal and gold is available annually back to 1870 from both provincial and federal government sources.

c) Agricultural field crop production data are available annually for Ontario from 1882 onward (Ontario Bureau of Industries); stocks of animals are available also for Ontario from 1882 onward and sales and slaughter are available from 1892; cheese production is available from 1882. Similar data are available from provincial sources for Manitoba from 1883, for New Brunswick from 1898, and for the Northwest Territories (Alberta and Saskatchewan) from 1898. From 1908 onward the federal Census and Statistics Office collected crop production data and data on numbers of animals annually for all but British Columbia, which was added in 1911; with the establishment of the Dominion Bureau of Statistics in 1918, annual production data on meat, dairy, and poultry products were added.

d) Government annual reports provide information on wages and salaries in the public service at all levels of government; they also provide expenditures on educational salaries for all provinces.

e) Government reports of excise and bounty data and on inspection services provide annual data on items such as pig iron production, tobacco products made, production of beer and spirits, production of petroleum products, and other items.

f) Forestry branches of the federal government collected annual output of sawmill products from 1908 onward.

g) Government bodies collected railway statistics annually from 1875 onward and banking and insurance company data from Confederation onward.

h) Price data are available from many sources right from 1867. Chief among these are the work of H. Michell in *Statistical Contributions to Economic History, Volume 2,* of R. H. Coats in *Wholesale Prices 1890–1909* and subsequent annual volumes, and of DBS once it was established. The basis of much of this work was newspaper price quotations.

i) And then there are all the Dominion Bureau of Statistics data from 1917 onward in the census of industry, the census of agriculture, and so forth.

Occasional Data Sources

There were several occasional data sources:

a) Ontario Bureau of Industry Reports in the 1880s give a wide range of wage data for many occupations and also price data.

b) Some data came from commissions or committees of inquiry. Perhaps chief of these was the Report of the Inquiry into the Cost of Living (1915) of the Federal Department of Labour which was mainly Coats's work and which contains an enormous amount of data of many kinds.

c) Some data were collected on a nonrepetitive basis by government statistical agencies, for example, municipal financial data in the Statistical Yearbook of 1894, the predecessor of the Canada Year Book published by the Census and Statistics Office.

Appendix 3

Notes on the Estimates of Income Produced in Agriculture, Canada, 1870–1926

Concept of National Income Produced in Agriculture

The ultimate objective is to make an estimate of gross and net income originating in Canadian agriculture regardless of who receives this income. Thus it includes rent paid to nonresident owners of farms, interest paid to nonfarm holders of farm mortgages, and wages paid to hired farm labor, as well as all income from farm operations accruing from farm operations in Canada to the farmers themselves. Conversely, it does not include income accruing to Canadian farmers from sources outside of the farm sector of Canada, such as property income from nonfarm property or labor income received by farmers for work they have done outside of the farm sector. Gross income produced in Canadian agriculture is gross of capital consumed in agricultural production. Net income produced is obtained by deducting capital consumption allowances from gross income produced.

Coverage

The income estimates provide only a total for all Canada. Geographically, they cover the provinces of New Brunswick, Nova Scotia, Ontario, Quebec, and Prince Edward Island for all years from 1870 to 1879, even though the latter province did not enter confederation until 1873; they cover all of present-day Canada, excluding Newfoundland, from 1880 to 1926.

The income estimates cover all activity that results in an output of agricultural products wherever it takes place. Thus, they include the

feeding of animals on commercial feedlots as well as on farms. They cover production of all crops and especially fruits and vegetables on small lots. They cover the very considerable production of dairy and poultry products in villages, towns, and cities by nonfarmers, and they cover output of farm products consumed by farmers or owners of small lots themselves. Only the products of urban kitchen gardens are excluded.

The income is measured for each year from 1870 to 1926. The estimates for census years are particularly important since they are based on more complete data than those for other years. But, except for the 1870s, there are many production data for intercensal years.

Methodology

Two alternative methods, basically, are available for estimating agricultural income produced. The first method involves adding the value of consumption of farm-produced products by farm families (income in kind) to the value of off-farm sales of farm products for the whole agricultural sector and then subtracting the expenses of those nonfactor inputs that are purchased from off the farms to arrive at income produced on the farms themselves. The second method involves making estimates of the values of all products that are produced on farms, regardless of whether they are consumed by farm families themselves, used as intermediate commodities for use in further farm production (mainly feed crops), or sold off farms, and then subtracting the values of the intermediate products used for further farm production and also the expenses of off-farm purchases of nonfactor inputs, in order to arrive at income produced on the farms.

If marketing data (or information that serves the same purpose) can be obtained for the sale of farm products, the advantages lie with the first method. Its use eliminates the necessity to estimate the value of the intermediate farm products that are used for further farm production. The first method has been used by Statistics Canada for many years and is the basis on which the offical statistics have been prepared for as far back as 1926.

The advantage of the second method, if market data are not available, is that agricultural statistics, once they are collected, have typically provided gross production data—that is, data on the total quantities of crops and other commodities produced regardless of whether they are sold off the farm or used on the farm for further production. If, then, some information can be obtained about the parts of gross farm production that are used as intermediate inputs, the second method may be better than the first. In the pre–World War II period the Dominion Bureau of Statistics had some such information, obtained from farmers, and used this second method.

A variant of the first method was used for two reasons. First, there is scarcely any information on the amounts of feed crops and other farm products that are used on the farms themselves for further farm production in the period before World War I. It would be very risky to assume that the ratio of intermediate products to the total gross output of all products was the same in the pre–World War I period as in the post–World War I period. The bulk of the intermediate products is made up of field crops, and the proportion of field crops that are used on the farms varies greatly between types of farms, especially between grain farms and livestock farms. Grain farms output grew much more rapidly than livestock farms output after 1900. Second, we have been able to find data that we believe permit us to make reasonably good estimates of the part of crops that is for off-farm disposal or for farm family consumption without getting involved in estimating the production of intermediate products in any major way.

The Estimation of Net Farm Output of Final Products

We give now the general method of arriving at off-farm disposal and farm family consumption of crops and other vegetable products, on the one hand, and livestock and dairy products on the other. The general practice, in almost every case, was to estimate the volume of such movements, first, and then to obtain a unit money value which permitted a valuation of total farm product, net of intermediate products.

The disposal of farm crop and vegetable products, net of intermediate products, is composed of human consumption (of both farm and nonfarm families), plus nonhuman off-farm uses in Canada, plus net exports (exports minus imports), plus increases (or minus decreases) of inventories. If we can estimate each of these for each product, we would have one way of estimating the volume of farm products produced, net of intermediate products. Let us deal with these in turn.

First, total human consumption of each product was calculated from estimates of per capita consumption and the numbers in the Canadian population. The numbers in the Canadian population are readily available on an annual basis throughout the whole period. Estimates of per capita consumption were arrived at in various ways, depending on the product. The way in which the per capita consumption estimates were obtained was specific to each product. It is sufficient at this point to note that it has been possible to obtain estimates in which one may have a considerable degree of confidence.

Second, nonhuman off-farm uses of field crops were calculated by a variety of methods, the chosen method being suited to the crop. The amounts of hay and oats sold to feed nonfarm horses were calculated

by making estimates of consumption of each product per horse and of the number of off-farm horses. Barley used for malting could be obtained from excise figures; the consumption of grains for distillation was obtained in like manner. In some years the supply of flax fiber could be obtained from statements of raw materials used in scutching mills, and so forth. Fortunately, our decision to include commercial feedlots and nonfarm production of milk and poultry products in the agriculture sector eliminated the need to estimate the feeds that went from farms to these particular nonfarm uses.

Third, external trade data, both exports and imports, were obtainable from the published trade returns for every fiscal year from 1870 onward. Usually the information was given in sufficient detail to provide information for individual commodities. However, in some cases, in the earlier years of our period, data were grouped in the source, and it was necessary to estimate individual commodities from the grouped data. The export figures used were those for Canadian products only, and the import figures were "imports for consumption."

Fourth, except for wheat, there are practically no data on inventories throughout the period. The lack of availability of inventories may affect the assignment of income to particular years. However, at this stage in Canadian development, carryovers at the end of crop years from one year to the next were probably rather small but, of course, insofar as minimum inventories, on the average, did increase, our estimates omit that part of the disposition of products that was directed toward the building up of inventories.

Of course, we also made use of whatever production data of field crops and fruits and vegetables were available. These production data, along with the trade data, for decennial census years often provided the basis of the estimates of human consumption in Canada, for census years, of those grains, fruits, or vegetables that were not intermediate products. Of course, a reconciliation of production and use data, where such is possible, provides the best ultimate check on reliability.

In some cases the production data alone provided the basis of the estimates. At the same time, the production data were of little help for those products for which a large part of the output is intermediate.

There was such diversity in the way that the farm prices, for valuing the farm products, were obtained that a general description of our method in short compass is not possible. The way in which individual prices were obtained was specific to each product.

Estimates of the net value of products of livestock and poultry were obtained in a fashion similar to that for crops, with one difference. For all but the earliest decades of our period we had annual direct estimates of the production of crops and fruits and vegetables, for Ontario from

1882 onward, for Manitoba from 1885 onward, for Alberta and Saskatchewan from 1898 onward, for New Brunswick from 1898 onward, for all provinces except British Columbia from 1908 onward, and for British Columbia from 1911 onward. In the case of the provincial data on livestock we had estimates of the stocks of animals on farms for those periods described in the preceding sentence but, with one exception, not for off-farm disposition and farm family consumption. The exception was Ontario, for which many livestock sales and slaughter data were available from 1892 onward. Of course, the decennial census from 1870 provided production data as well as stocks for most livestock products. The nature of the data available meant that, for provinces other than Ontario and even for some of Ontario's products, in making our estimates for intercensal years, we had to infer production of livestock products from data on stocks of livestock and poultry. The availability of data on stocks of animals meant that we could take account of changes in inventories from year to year, a procedure that we could not follow in the case of crops.

The Estimation of Expenses of Off-Farm Purchases of Inputs

The expenses of off-farm purchases of inputs must be subtracted from the net value of products to obtain farm income produced. These purchases cover the acquisition of such items as tractor oil and grease, binder twine, blacksmithing, commercial fertilizers, fencing materials, harness and saddlery, and many other such items. Fortunately, many items that are expenses for an individual farm are only intermediate products for the agricultural sector as a whole, and our method of estimation is such that we do not have to estimate the quantities and values of these intermediate products. In addition, since we are interested in income originating in agriculture, we do not have to estimate the cost of hired labor, the interest paid on farm indebtedness, and the rents of farmland.

These circumstances still leave a formidable list of expenses to be calculated. The data for their estimation are best at the end of our period and become increasingly less satisfactory as we go back in time. Luckily, expenses for off-farm purchases become relatively less important the further back we go. For example, there were no purchases of oil for farm tractors when there were no farm tractors or only steam tractors; these expenses increased more than in proportion to output as the use of farm tractors became increasingly widespread. Similarly, as the use of increasingly elaborate machinery grew with the passing of time, outlays on machinery parts and machine service grew. The introduction and spread of the use of binder twine, from about 1890 onward, added an element to off-farm costs that grew through the years. And one can add to the list readily. There were some elements of

substitution, of course. For example, the interchangeable part probably replaced one element of the blacksmith's services. But these appear not to have been of great importance.

The quality of the estimates of farm expenses is best for the late years and less good the further back in time we go. They are sufficiently small in the earliest part of the period that even if the margin of error of their estimation is quite large it does not have an important effect on the estimates of income produced in agriculture.

Sources of Data

The details of the sources of data are too voluminous to be given here; it is possible to give only the general sources of information. These include: the decennial census reports for the Dominion together with the quinquennial reports for the Prairie Provinces; the reports of first the Census and Statistics Office (based in the Federal Department of Agriculture) and later the Dominion Bureau of Statistics (DBS) on an annual basis from 1908 onward; provincial reports on agricultural production; the external trade reports; and finally, certain publications that give us prices.

From the agricultural censuses for 1870 onward, the data collected in the decennial census included the quantity of output of the main field crops and the larger types of livestock. In addition the numbers on farms, at a specific date, of the main types of livestock were obtained. No valuations of products were obtained until the census of 1900; from 1900 onward values as well as quantities produced and numbers and values of the inventory of livestock were obtained. The collection of data for some minor products was added in 1900.

The Census and Statistics Office collected annual data from 1908 onward on production and values of field crops, vegetables and fruit, and of numbers and values of the inventory of livestock (but not annual slaughter). For 1920 onward DBS made estimates of off-farm disappearance. Many of these data appear in a series, *Handbook of Agricultural Statistics*, in a number of volumes prepared by DBS after World War II.

Several provinces collected provincial data on an annual basis before the Dominion reporting system was set up in 1908. The Province of Ontario began the annual collection of data on the production of most field crops, of the numbers of livestock on farms, of capital invested in farms, and of prices of farm products in 1882; data collection on the sale or slaughter of farm animals was begun in 1892. The Province of Manitoba began the collection of considerable amounts of agricultural data in 1883, Alberta and Saskatchewan (initially the Western Territories) in 1898, and New Brunswick in 1898.

External trade data, both quantities and values, are available for every year from 1870 (and before) onward. Unit values of exports and imports may be calculated from these data.

In addition to the price or unit value data available from these just enumerated sources, there are two other general sources that give considerable agricultural price data. They are H. Michell in Taylor and Michell, *Statistical Contributions to Canadian Economic History,* volume 2, and Department of Labour, *Wholesale Prices, Canada 1890–1909,* along with its successor annual publication, *Wholesale Prices,* which begins with 1911.

There were, in addition to these general sources of data, many other sources that apply to more limited periods or to specific agricultural products.

Appendix 4

Notes on the Estimates of Income Produced in Manufacturing, Canada, 1870–1926

The estimates for the manufacturing industry, like those of most other sectors, were prepared by the income-produced method.

The source data for manufactures estimates were of three main sorts. First, the most basic data were obtained from censuses of manufactures, which themselves were of three types: a census of manufactures was taken with each decennial census, from 1871 to 1911, the data applying to the calendar year preceding the census date—these censuses of manufactures were taken by enumerators; two postal censuses were taken for the years 1905 and 1915, both of which suffered from incomplete coverage; an annual census of manufactures was taken from 1917 onward. Second, a large quantity of data of many kinds and from many miscellaneous sources, nearly all of them official documents, were used to obtain estimates for the intercensal years. Third, quite extensive use was made of data on occupations and wages collected in the censuses of population. The 1911 census was the most valuable for this purpose. In that year the equivalent of an industrial classification of the labor force, very similar to the standard industrial classification of 1948, was used to classify the labor force. The part of the labor force classified to manufacturing matched very closely that of the numbers recorded in the census of manufactures. In addition, in 1911 the wages and salaries of every employed person collected in the census were useful for comparative purposes as well as for filling gaps

for those industries employing fewer than five persons that were omitted from the 1911 census. Similar data from the 1901 and the 1921 censuses were likewise useful, though in a more limited fashion since there was not as satisfactory an industrial classification of the labor force for these years.

The information obtained in the censuses before 1917 was limited. The basic data obtained were gross value of products, costs of materials, payments of wages and salaries, cost of fuels beginning in 1900, and in one year, 1900, outlays on other miscellaneous expenses. In all of these early censuses there was a quite fine breakdown of industries, the number of individual industries varying from slightly less than 200 upward to 250, but there was no commodity detail.

For the years from 1917 onward the censuses contained considerably more information than hitherto. The largest change was the addition of the collection of commodity data. In addition, for the years 1917–23 data on "miscellaneous" expenses were obtained.

Three features of the set of data should be noted immediately. First, from 1870 to 1915 the census included what has variously been called custom and repair work or the hand trades, and, indeed, data were collected for these trades, although tabulated separately, in the annual census from 1917 to 1921. It was not feasible to separate the data for custom and repair from manufacturing proper before 1917, and consequently the estimates for 1870–1916 include these trades. In order to maintain comparability from 1917 onward, custom and repair, though tabulated separately, were also included with the various manufacturing industries to which they were related. This procedure is in contrast to the official estimates, which begin in 1926 and do not include custom and repair with manufactures.

Second, the censuses of 1900, 1905, 1910, and 1915 all fell somewhat short of complete coverage of the manufacturing industry. The census of 1900 did not cover businesses employing fewer than five persons, except in the cases of cheese factories and of brick and tile yards, which were covered completely. The census of 1910, in general, also did not include businesses employing fewer than five persons, but the exceptions for which full coverage was taken were extended to cover such industries as sawmills and flour and grist mills, with the result that the undercoverage was much less than in 1900. The censuses of 1905 and 1915, the first postal censuses, also had their shortcomings: the number of establishments covered in the census of 1905 appears small in comparison with the numbers in 1900 and 1910, and in any event, information on cost of materials was not obtained; the census of 1915 omitted collection of data from businesses producing products valued at less than $2,500, irrespective of the number of persons employed, except for flour and grist mills, butter and cheese factories,

fish-preserving factories, sawmills, brick and tile yards, lime kilns, and electric light plants, which were covered whatever their size. The greatest shortfall in coverage in 1915 would be bakeries, tailoring, and blacksmithing; sawmills were also considerably underreported. The shortfalls in the coverage of 1900 and 1910 required the construction of special estimates to fill in the gaps of the census data for those years.

Third, for the first volume of *Historical Statistics of Canada,* the manufacturing data for all censuses from 1870 to 1959 were classified, on as nearly a uniform basis as possible, into 17 industry groups in accordance with the Canadian standard industrial classification of 1948; this work was done in the DBS. This classification was most useful since the entire industrial distribution of GDP by industry in the official accounts for the years 1926–46 is based on the Standard Industrial Classification of 1948.

The Basic Estimates

The most basic estimates are those for the decennial census years of 1870, 1880, 1890, 1900, 1910, for 1915, and for each year from 1917 to 1926, all years in which a census of manufactures was taken. As has been noted, some supplemental estimation for the omitted establishments employing fewer than five persons in 1900, 1910, 1915, and 1917 was necesssary, but a description of the method of calculating income generated in manufacturing in the decennial census benchmark years and in the later annual census of manufactures years is given.

The method is very simple. In the census of manufactures all business establishments reported the gross value of their products, the costs of materials, and wage and salary and piecework costs. In addition, in the 1900 census an estimate (provided by the establishments themselves) of the numbers engaged and of the value of labor services of owners and firm members was obtained. Also, in 1900 and in 1917–23 the costs of miscellaneous expenses, which included such items as rent of works and offices, insurance, travel, taxes, repairs, advertising, interest, royalties, and ostensibly all other expenses, were collected. If these expenses were complete, GDP at factor cost in manufacturing should be derivable by a process of subtracting the cost of materials, of fuel and power, and of such part of the miscellaneous expenses as contains items that are true costs and not themselves a part of factor returns from gross value of production. In fact, the method followed was actually to subtract relevant costs from gross value of production, the estimation process being done at the level of each of the 17 industry groups of the 1948 standard industrial classification.

The question then becomes one of trying to obtain estimates of gross value of product, of cost of materials, of cost of fuel and power, and

of miscellaneous expenses that are as correct as possible. These items are dealt with in order.

Gross Value of Product

As for estimates of gross value of product (GVP), the amounts reported in the census returns themselves were accepted without amendment for the part of manufacturing that was covered in the censuses. It was accepted that the coverage was complete in 1870, 1880, 1890, and virtually complete in 1917–26; in 1900 and 1910, it was necessary to add estimates of output of those businesses employing fewer than five persons that were omitted in these censuses; in 1915 it was necessary to add estimates for those businesses producing less than $2,500 output; and for 1917–26 it was necessary to estimate custom and repair work. A rather extensive examination of some individual establishment returns for 1870, the only year for which individual establishment data are available, suggests that sometimes minor products and their values were not reported in that year. Hence the reported total of product values for that year is probably understated by an unknown amount. But there is no basis for making any revision of the reported figures. Further, it seems probable that in 1870 the cost of raw materials was also understated—the inspection noted above suggested that minor raw materials might have been omitted. If both GVP and costs of raw materials were understated, the biases would be offsetting for calculating GDP.

A scrutiny of the questionnaires used in the censuses shows the following. For 1870, 1890, and 1900, the questionnaires under the heading "Products" (1870 and 1890) or "Goods Manufactured" (1900) simply asked for "kind" or "classes" of products, "quantities," and "values" (1870 and 1890) or "value or price at work" (1900), with a single line being left for each of these stubs; in 1880 the request was limited to "aggregate value in $ of products"; in 1910 the headings were like those for 1890 but there were several blank lines to allow the listing of products. A request "Received for custom work and repairing" was added in 1900. It was not until 1915 that the instruction on the questionnaire specifically requested the inclusion of by-products and the value of containers sold with goods, and that a request for the item "all other products (value only)" was specifically printed on the questionnaire. The censuses from 1917 onward specified the commodity detail desired on forms that were specific to each industry and probably elicited full reporting.

Three other points are relevant. First, there is little or no information on instructions given to the enumerators about the taking of the censuses of manufactures. Second, there is no indication of whether or not construction work (of a capital account nature) done by establishments for their own use was included in value of product—it most likely was not. (Some information on establishments' construction with

their own workforce was sought in 1919, but there is no evidence that the resulting information was used.) Third, it is probably safe to say that goods were valued at the works from 1900 onward although the specific instruction to so value them was not contained in the 1910 schedule; the instructions for 1870, 1880, and 1890 do not specify the place of valuation.

Cost of Materials

The figures reported in the censuses for cost of materials were also accepted as reported (except for such adjustment as was necessary owing to the undercoverage of small businesses in 1900, 1910, and 1915 and custom work, 1919–26).

There are some uncertainties about the reliability of the recorded raw material costs on which some light is cast by the questions in the questionnaires. The exact wording of the relevant parts of the census questionnaire for censuses from 1870 to 1915 follows.

WORDING ON CENSUS OF MANUFACTURES

re information on raw materials and entire exact wording on form

1870 Raw material
12. Kind
13. Quantities
14. Aggregate value, in dollars

1880 17. Aggregate value in $ of raw material

1890 Materials used
18. Kind
19. Quantities
20. Cost at the factory using them including freight charges

1900 Materials used
In crude state
42. Kinds
43. Cost delivered, $
In partly manufactured state
44. Kinds
45. Cost delivered, $

1905 No information on raw materials

1910 39. Kind or class of raw or partly finished materials used at the works in year.

_____
_____ (several lines left)
_____

40. Cost value of raw or partly finished materials used at works in year.

_____
_____ (several lines left)
_____

1915 4. Materials used:
Give cost values including freight, duty, etc., of all materials actually used in the manufacture of goods, whether raw or partly manufactured or whether entering into the product, used as containers (boxes, barrels, cans, etc.), or consumed in the process or manufacturing. Do not consider stock used as identical with stock purchased. Materials produced by the establishment itself and used by it for further manufacture are not to be included.

Total cost value of all materials used—$_____.

Itemize principal materials used in the following schedule:

	Articles	Quantities	Cost Values
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.	Fuel for power purposes		
9.	All other (value only)		

1917 (onward)

From 1917 onward itemized forms for material costs specialized to industries were used. I have several of these. It would appear that in some industries in 1917 the listing of material inputs was not complete, since there was no heading for "all other materials" and containers were not included; in other industries the specifications were fairly complete even in 1917. In all industries the specifications were quite complete by 1920–22. From then on containers, etc., and other package materials were always included with costs where relevant. The consequence is that for some industries the 1917–19 figures for materials used are too low.

Cost of Fuel and Power

The data reported for cost of fuel and light and rent of power and heat are less well covered than those for GVP and for cost of material. Such data were not collected at all before 1900, although some part (probably small) of fuel costs may have been included in the cost of materials. In 1900, the money cost of "rent of power and heat" and expenses of "fuel and light" were collected explicitly; in 1910, the weight of coal used and the value of all fuels consumed were collected but not the cost of purchased power which, although requested on the form, was not tabulated; in 1915, although cost of fuel used for power purposes was collected, it was not tabulated separately and is most

likely included in cost of materials for that year—fuel-for-power costs were collected in the same section as material costs; from 1917 onward, costs of fuel of all kinds and of rent of power were collected. It became necessary, then, to make estimates for the census years not covered. Only the simplest methods could be used. Purchased power for 1910 was estimated by first interpolating linearly the percentage of costs of purchased power to GVP for each of the 17 industry groups, between 1900 and 1917, and then applying the relevant percentage figure for each group in 1910 to the GVP in 1910. The purchased power costs were then added to fuel costs, which were collected in the census of 1910, to obtain fuel and power costs. Fuel and power costs for each industry in 1915 were estimated by linear interpolation between 1910 and 1917 of the ratio of such costs to GVP and then applying the 1915 ratios to GVP in 1915. For 1870, 1880, and 1890, the ratios of fuel and power costs to GVP for each of the 17 industries were taken as being the same as in 1900, and the estimates were made on that basis. The changes between 1900 and 1917 were sufficiently moderate that one has a reasonably comfortable feeling in following this procedure.

Miscellaneous Expenses

The most difficult problem to deal with was the estimation of "miscellaneous expenses." The purpose of obtaining these miscellaneous expenses presumably was to collect all expenses of manufacture other than material and fuel costs and salary and wage cost, excepting only capital consumption allowances.

The history of the collection of these costs is of some interest. "Miscellaneous expenses" under the headings given here were first requested on the questionnaire in the census of manufactures for 1900.

Headings of Miscellaneous Expenditure, 1900

Rent of works (if any), $	Rent of offices, interest, insurance, internal revenue tax, etc. $
Rent of power and heat (if any), $	
Fuel and light, $	
Municipal taxes, $	Amount paid for contract work (if any), $
Provincial taxes, $	

The largest item reported is the second from the last in the list ("rent of offices," etc.): it was obviously a catchall item—it frequently amounted to one-half or more of the total—but just what was included is not clear. For example, it is not clear whether or not it includes costs of repairs and maintenance, office supplies, postage, travel, local transportation costs, and other such items.

It was not until 1917 that the same kind of information was collected again. From 1917 to 1921 "miscellaneous expenses" were col-

lected under headings like those for 1919 enumerated here, which are typical of other years.

Miscellaneous Expenses during the Year 1919

Rent of offices, works, and machinery
Cost of purchased power
Insurance (premium for year only)
Taxes § Excise
Excess Profits Tax
Provincial and Municipal
Royalties, use of patents, etc.
Advertising expenses
Travelling expenses
Repairs to buildings and Machinery
All other sundry expenses (do not include fuel costs, materials used, salaries and wages).

Total:

In 1922 and 1923 only the totals for all miscellaneous expenses (without any details) were collected; thereafter, this information was no longer obtained in the census of manufactures. In the enumerated data for 1917–21 the item "all other sundry expenses" was the largest one, often amounting to one-half or more of the total.

There was one other important body of data on miscellaneous expenses. At the time of preparation of the national income estimates for the Royal Commission on Dominion-Provincial Relations, in the late 1930s, a questionnaire requesting a great deal of information on value of products, cost of materials, wage and salary costs, depreciation, and a very wide range of miscellaneous expenses for the years 1929, 1933, and 1936 was sent to a very large number of manufacturing establishments, and a large response was obtained. The listing of expense items was quite exhaustive. By means of its use it was possible to ascertain that the "miscellaneous expenses" obtained by 1921 in the census of manufactures were quite complete, except for depreciation.

There are some items in the "miscellaneous expenses," as recorded in the census of manufactures data, that should not be treated as an expense for the purposes of estimating GDP. Thus, excess profits tax, royalties, use of patents, etc., and interest paid should not be deducted as expenses. A basis for calculating the interest payments (included in sundry expenses) was obtained from the royal Commission data alluded to above. These items were removed from the miscellaneous expense series used as a cost item in the calculation of GDP.

Basic data on miscellaneous expenses, then, were available by industrial groups for the years 1900 and 1917–23. Estimates for the

years 1924–26 were made by interpolation of the ratios of miscellaneous expenses to GVP between 1923 and 1929, the data for the later year being the Royal Commission material. The data for 1900 yielded estimates that appeared to be much too low in comparison both with years 1917–26 in Canada and especially with estimates for the United States for 1889, 1899, 1904, and 1910. A considerable amount of supplementary material along with the material of the census was used to obtain individual industry benchmarks in 1900. Estimates for each year from 1901 to 1916 were made, for each of 17 industry groups, by linear interpolation of the ratio of miscellaneous expenses to GVP between 1900 and 1917. The expense ratios for the years 1870–99 were assumed to be the same as in 1900.

I have some reservations about these estimates of miscellaneous expenses for the earlier years. I believe that the supplementation of the data for 1900 with other information was justified: the figures that were used reflected my best judgment of reality. Yet it remains true that an element of estimation not based on complete information was involved. It is possible also that even if the 1900 figures are reasonably accurate, the ratios might have been somewhat lower in the 1870s and 1880s; but the absence of data precludes taking a different course than that followed.

Such then were the procedures used to obtain estimates of GDP in manufacturing.

Appendix 5
The Cost of Living Index

The cost of living index that was used to deflate the component of GNP (expenditure) that excluded gross fixed capital formation was prepared from three temporally distinct segments that were linked together at overlapping years.

The first segment, covering the years 1913–26, was a full-blown estimate prepared by the Dominion Bureau of Statistics. It appears as series K1 in *Historical Statistics of Canada*, 2d edition.

The second segment, covering the years 1900–1913, was based on an index prepared by Gordon W. Bertram and Michael B. Percy which appeared in "Real Wage Trends in Canada, 1900–26: Some Provisional Estimates," *Canadian Journal of Economics* (May 1979). Bertram and Percy revised the federal Department of Labour's "Index Numbers of a Family Budget," which covered the years 1900, 1905, and 1909–26 (Urquhart and Buckley, p. 303) in two ways. First, they used an im-

proved weighting system for aggregating the basic data, which were fully available. Second, they added a clothing component, prepared from mail-order catalogs of the T. Eaton Company for the years 1900–13, to the existing Department of Labour components of food, fuel and light, and rent.

The Bertram-Percy index was used as given for the years which they covered from 1900 to 1913. It remained to fill in figures for the years 1901–4 and 1906–8, which they, following the Department of Labour, had not covered. The latter years were interpolated between 1900 and 1905 and 1905 and 1909, respectively, by use of the wholesale price index, excluding gold (Urquhart and Buckley, ser. J 34).

The third segment, covering the years 1870–1900, was based on a cost of living index for Kingston, Ontario, prepared by R. F. J. Barnett and appearing in his M. A. thesis at Queen's University, "A Study of Price Movements and the Cost of Living in Kingston, Ontario, for the Years 1865 to 1900" (1963). Barnett prepared his index by using newspaper material on prices supplemented by information obtained from good records of a food store that was in business throughout his period, similar types of records for a fuel company, and records of expenditures by the House of Industry (the poor house), which records were in the archives of the City of Kingston.

Barnett's weighting system used all available Canadian and United States data relevant to the period and, in addition, information on consumer expenditure patterns collected by the Ontario Bureau of Industry for the 1880s. It was quite good for what it covered. However, Barnett was able to cover only food and fuel and light, which made up a large part of the consumer budget of the time but omitted clothing and rent (as well as items like household furnishing, etc.).

Although it was not possible, at this time, to do anything about the omission of clothing, it was possible to make an improvisation for rent. In her work on estimating expenditure on residential housing, Marion Steele had prepared a construction cost index for housing. This index was used as a surrogate for an index of rents. Such a procedure is, of course, a makeshift measure. However, a check with United States rent data (the Rees-Long-Hoover data noted below) and United States construction cost indexes (United States Historical Statistics, Colonial Times to 1970, Series N138 and N139) showed a not unreasonable correspondence in the period from 1870 to 1900. And so a rental index component was added to Barnett's index, the weight given to rent being based on data for Kingston in the 1880s from the Ontario Bureau of Industry surveys of the time. (The actual weight was 0.2.)

I believe that the resulting index for Kingston, although admittedly based on narrow regional data, reflects living cost movements considerably better than does a wholesale price index. It lacks a clothing

component, which perhaps biases the index downward in the 1870s. However, at the same time the use of a construction cost index as a surrogate for rental rates may constitute a slight upward bias in the 1870s.

For readers to make their own judgments, I give table 2.A.1 (see p. 88) for comparing movements in our cost of living with a comparable one for the United States and with the DBS wholesale price index (Urquhart and Buckley, ser. J34). The United States index is derived by linking together Rees's index for 1890–1900 (Albert Rees, *Real Wages in Manufacturing 1890–1914,* p. 74) with Clarence Long's index for 1880–90 and Ethyl Hoover's index for 1860–80 (Clarence Long, *Wages and Earnings in the United States 1860–1890,* pp. 156, 157). The United States index for 1870–78 is adjusted downward by the amount of the premium on gold in United States currency for that time. Concerning the DBS wholesale price index, I just note that an alternative index by H. Michell (Urquhart and Buckley, ser. J1) shows considerably lower relative prices in the 1870s than does the DBS index.

Notes

1. In response to suggestions made at the Williamsburg Conference, I have made two small additions to the paper as it was originally presented. First, estimates of indirect taxes less subsidies have been prepared, making possible the presentation of GNP at market prices. Second, an improved estimate of real GNP replaces the notional estimates of the original paper, and real growth rates are presented.

2. The actual procedure used was to calculate the ratio of gross product at factor cost in "trade" and in "community . . . services" to gross product in all other industries in census years and in 1926, to interpolate this ratio linearly between census years and to 1926, and then, in effect, to get annual intercensal data for these two industries by multiplying, year by year, the interpolated ratios by the sum of gross product at factor cost in all other industries. The actual figures for intercensal years for these two industries are not reproduced in the table just because for these years they have not been estimated from basic data in the style of all other industries.

3. The best single reference to what I have called the traditionalist view is in the Royal Commission on Dominion-Provincial Relations *Final Report* (1940).

4. I give two references for the revisionists: Bertram 1963, and Chambers and Gordon 1966.

5. See appendix 5 for a description of the construction of the consumer price index.

6. Even if a reasonable correction is made to the numbers of gainfully occupied persons reported in 1901 census, the actual output per gainfully occupied person increased at a somewhat more rapid compound annual rate for the decade 1891–1901 (3 years centered in each case) than for the decade 1901–11 (3 years centered in each case). All of this increase in productivity in the 1891–1901 decade occurred after 1896. Part of the growth of output per gainfully occupied person from 1896 onward to 1901 must have reflected cyclical upswing, but some considerable part must have reflected long-term growth. Unless the growth of these years 1896–1901 is an artifact of the statistics, and I do not believe that it is, an investigation of the rapid productivity increase in these years should be well worth while.

Table 2.A.1 **Comparison of Barnett and Rees-Long-Hoover Cost of Living Indexes and Canadian Wholesale Price Index, 1871–1900 (Base of Index 1900 = 100)**

Year	Barnett (Canadian)	Rees-Long-Hoover (U.S.)	DBS Wholesale Price Index	Year	Barnett (Canadian)	Rees-Long-Hoover (U.S.)	DBS Wholesale Price Index
1870	107	135	128	1886	103	111	100
1871	108	134	130	1887	109	112	102
1872	116	133	145	1888	105	112	106
1873	115	129	146	1889	107	109	106
1874	112	128	138	1890	105	108	108
1875	108	118	133	1891	105	108	108
1876	109	117	124	1892	105	108	100
1877	106	125	118	1893	104	107	101
1878	104	121	109	1894	95	102	95
1879	103	120	105	1895	91	100	93
1880	106	121	115	1896	95	100	90
1881	111	121	116	1897	96	99	91
1882	118	121	116	1898	100	99	95
1883	119	119	113	1899	97	99	97
1884	104	117	107	1900	100	100	100
1885	104	114	101				

Comment J. H. Dales

For the better part of a decade Professor Urquhart and a small band of colleagues have doggedly pushed forward with the preparation of a completely new set of historical National Accounts for Canada. This paper, along with those of McInnis and Green, gives us our first substantial view of a project that has increased the volume of numbers available to students of the Canadian economy by many orders of magnitude. The project was initiated by Urquhart, and has been animated and directed by him; and in the end he also became directly responsible for a large portion of the new figures.

The quantitative output of the project is, quite simply, stupefying. The core of the work is the set of detailed, annual estimates of GNP at factor cost for the whole period from 1870 (the first Canadian census) to 1926 (when official National Accounts figures became available). In addition, A. Sinclair of Dalhousie University has completed "annual estimates of the main components of the balance of international payments, a large part of which has been newly estimated"; and there are new data on investment—an annual series on residential capital formation prepared by Marion Steel of the University of Guelph, and a series on investment in producer's durables from 1870 to 1985 prepared by Urquhart. Despite all this new work there is still one obvious soft spot in our national accounts history. As Urquhart notes, the GNP figures have not yet been deflated,* implicit prices appear in the agricultural, but not in the manufacturing or total GNP estimates. It would indeed be a pity to deflate these high-quality estimates by the coarse price indexes that are currently available, and the new estimates have given a new urgency to historical work on prices in Canada.

The new estimates constitute the second attempt to provide a comprehensive set of historical National Accounts for Canada; the first such estimates were prepared by O. J. Firestone some 30 years ago and published in his 1958 volume, *Canada's Economic Development, 1867–1953*. Since the two sets of numbers are bound to be compared, I hope Urquhart will prepare a short account of the major differences between them and possible explanations for the differences. (McInnis provides a good commentary on the agricultural figures, perhaps the main source of these major differences.) The point would only be to satisfy our gross curiosity; the estimates differ in concept, construction, and especially in the amount of raw data that underlies them, and it would be pointless to attempt to reconcile them in any detailed way.

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*These remarks by Dales relate to the draft of Urquhart's paper delivered at Williamsburg. Urquhart subsequently computed deflators. (Eds.)

Here I comment on the estimates from the point of view of their probable effect on research in Canadian economic history. In retrospect I find it rather surprising that Firestone's estimates have stimulated so little research. Two reasons may be suggested. First, the Firestone figures were simply too skeletal, consisting essentially of estimates at census dates, with only a few annual series for large aggregates that represented interpolations made on a more or less mechanical basis between census years. Second, the worksheets of the people involved in the Firestone project were apparently never brought together in a safe repository, and over time they became lost. The result was that the scholarly community was faced with numbers that could be used to calculate decadal growth rates for a few major aggregates, but not for much else. More important, there was not much chance of fleshing out the skeleton by building on the raw data and attempting to improve the estimates, which is why improved estimates necessitated a whole new start.

If the Firestone estimates had a low research multiplier, I feel sure that the Urquhart estimates will greatly enrich the study of Canadian economic history. The main reason is their richness in detail. The GNP totals, for example, are built up from estimates for twenty sectors: agriculture, manufacturing, and six lesser commodity sectors; construction; transportation; residential rents; three government sectors; public education; three minor service sectors, and two large ones—trade, and personal and business services. Of these only the last two, constituting about 15% of the total, have had to be interpolated on a mechanical basis between census years; enough ancillary data have been found to develop annual series that can be used as interpolators for the other 18 sectors. Moreover, the sectors are themselves constructed from subsectors: some 28 separate commodity series for agriculture, and 17 separate series for manufacturing. There is more than enough here to enrich scores of doctoral dissertations, and it is hard to think of any research in the field that will not benefit from this new material. Constant use, in turn, will act as a continuous testing of the data, and, when anomalies appear, will lead to attempts to improve individual series. Our new numbers can confidently be expected to increase our research metabolism. (To make sure I was saying what I wanted to say, I checked "metabolism" in *The Concise Oxford Dictionary,* and was delighted to find that it is the process by which "nutritive material is built up into living matter.")

I now turn away from the numbers themselves, as Urquhart has done, in order to speculate about how they may affect current interpretations of Canadian development between Confederation and 1930. I begin with a telling quotation from an article on "The Political Economy of National Statistics" by William Alonso and Paul Starr in the Social Science Research Council's *Items* of September 1982:

> Statistics are lenses through which we form images of our society. Frederick Jackson Turner announced his famous views on the significance of the closing of the frontier on the basis of data from the 1890 Census. Our [the American] self-image today is confirmed or challenged by numbers which tell of drastic changes in the family, the reversal of rural-to-urban migration . . . and many others. Whether the meanings read into the data are reasonable or fanciful, these numbers provide a common reference in popular and professional discussion. Even when they misrepresent reality, they often standardize our perception of it.
>
> The process is thus recursive. Winston Churchill observed that first we shape our buildings and then they shape us. The same may be said of our statistics. (P. 30)

Of course there are lenses other than statistics. The time-honored view of Canadian economic history is that the economy suffered from something like secular stagnation from 1870 to 1900. This view was based primarily, it seems, on the fact that no new major staple export industry appeared in Canada between Confederation in 1867 and the wheat boom that got under way in western Canada at the turn of the century; but it may also have reflected the two most readily accessible statistics for the period, those that demonstrated falling prices and net emigration throughout at least the first 25 years of these 3 decades.

In the past quarter century a somewhat different interpretation has become quite common. It may very well have developed from Firestone's numbers, and especially from the emphasis he put on the growth of manufacturing in Canada in the nineteenth century. The new interpretation rather diffidently suggests that the 30 years after Confederation may not have been such a washout after all, and rather more stridently blames the "staple theory" for putting far too much emphasis on the western wheat boom and giving far too little attention to central Canadian manufacturing *and* agriculture, both before and after 1900.

Neither view is very carefully specified, and their proponents quite often talk past one another rather than disagreeing with one another. No one would dispute the view that the Canadian *economy,* or national GNP, grew much more slowly from 1870 to 1900 than it did in either of the 3 decades before and after this period, and very much more slowly than the United States economy during the same 30-year period. On the question of growth in the well-being of Canadians, or national GNP per person, there is less discussion. In traditional accounts, the great contrast drawn between the years before and after 1900 no doubt left the impression that per capita trends moved with the total trends, but Canadian historians have displayed a remarkable lack of interest in discussing trends in the Canadian standard of living. On the general question of emphasis, I offer two comments that weigh in on the re-

visionist side of the debate, which in truth might more accurately be described as a duel in the dark.

First, net emigration from Canada over the period can be viewed positively, that is to say as a necessary means of supporting the standard of living during these years, rather than negatively as clear evidence of a national catastrophe. If the various parts of Canada are viewed as regions in North America, the emigrations may appear less shocking, and indeed as a process that has on occasion occurred in different parts of the United States. It remains true that after 1870 all sections of Canada had bad luck at the same time, and that the growth of Canadian manufacturing, though not insignificant, could not begin to compensate for the decline in the Maritimes' shipping and shipbuilding industries and for the rapid growth of population in Quebec where agricultural land was already fully occupied. Even in Ontario, where the economy was much more buoyant, the good land had all been taken up and farmers' sons made the sensible decision to head for the American West, despite the lamentations of journalists, notably of George Brown, one of the fathers of Confederation.

Second, nearly all students would agree that the positive effect of western development on the Canadian standard of living after 1900 was flawed, to an unknown extent, by government support for a ridiculous amount of overinvestment in railways. The efficiency of the economy must also have been reduced, but again to a completely unknown extent, by government policies promoting uneconomically rapid settlement of the West (the Canadian homestead program was on a much larger scale, proportionally, than the American program), and perhaps also by the effect of western development in expanding tariff-protected manufacturing in central Canada.

Urquhart makes no claim that his new estimates settle this debate. He thinks the new figures may give marginal support to the traditionalists, mainly on the ground that agriculture is shown to have grown much more slowly before 1900, and considerably more rapidly after 1900, than Firestone's figures implied. The same pattern is repeated in the total GNP figures in current dollar terms. Indeed, the new estimates of GNP are some 15%–20% below Firestone's estimates for the years before 1900, and only a favorable deflator can save our forebears from the prospect of an even lower standard of living than we had imagined they had attained. The Urquhart numbers for manufacturing are also lower than Firestone's, but the revisionists will be able to take a little bit of comfort from the fact that the ratio of manufacturing to agricultural output is marginally higher in the new series, and that manufacturing's growth rate is slightly higher both before and after 1900 than in Firestone's figures. But deflators can be dynamite, and we are all of us, both traditionalists and revisionists, hoping for the best, but

fearing the worst, about what constant dollar figures will show. In the meantime we *do* have a more accurate picture of the western boom than we have had in the past. Urquhart shows that it was at first primarily an investment boom, and that wheat exports did not explode until after 1910.

Allow me, in closing, to make a strong plea for someone to provide us users of statistics with sectoral workforce statistics of a quality to match our new output statistics, so that reliable sectoral productivity estimates may be calculated. My reason is that I have become sated with growth rates and am anxious to trade off a good deal of additional knowledge about economic *performance* for a better understanding of economic *process*. I have always delighted in the way that Gallman's sectoral productivity figures meshed so neatly with Salter's theoretical analysis of how differential sectoral productivities worked their way through the price system to produce easily observable features of the growth process. One of the great virtues of Urquhart's new estimates is that they bring us within a relatively short distance of several additional breakthroughs in our understanding of Canada's economic past.

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