

Manufacturing Output in New Zealand: 1870-1940

Paper for the 1992 Conference of the Economic History Association of
Australia and New Zealand, Perth, July 8-10

by Keith Rankin, Economics Department, University of Auckland

Abstract

This paper presents a provisional time series of New Zealand factory output from 1870 to 1940. This series is to be based on a full utilisation of official factory statistics, commencing with those attached to the 1871 population census. My technique is to, for each industry, estimate the volume of output and of raw materials utilised. Applying such volume indexes to net value-added yields implicit price series for each industry. Real manufacturing output for each sector is then estimated by aggregating the price indexes, and applying the aggregated price series to aggregated value-added, for each sector and for all sectors. The provisional data presented here does not include annual interpolations between quinquennial censuses in the years to 1916.

I would like to thank Tony Endres, Steve Jones and Sean Keefe for their comments on an earlier draft of this paper.

Manufacturing Output in New Zealand; 1870-1940

Introduction

This paper is part of two projects; to provide an empirical basis for my PhD work on the political economy of manufacturing in New Zealand's first century, and to be the core of a comprehensive database on New Zealand manufacturing from which useful long-run time series can be drawn. Ideally, I would like the database to be able to incorporate additional scraps of data as they become available.

In New Zealand, time series work on manufacturing has been done by G.R. Hawke (1980) for the pre-World War I period, and B.T. Lineham (1968) for the inter-war years. I have also done some preliminary work, mainly focussed on the factory labour force, in my MA thesis (Rankin, 1990). This project seeks to go considerably further, both in coverage and in method. However, the present paper seeks to do no more than summarise the official Factory Statistics, estimating missing data from known proportions.

In the years before WORLD WAR I, the New Zealand factory statistics were taken in conjunction with the (usually) quinquennial census. From 1918/19, annual statistics have been kept, although there is no published detail of output quantities between 1915/16 and 1921/22. There are useful official sources of annual factory statistics that I have not yet mined. Specifically, the Department of Labour Reports from the early 1890s to World War 1 contain much detailed information about all registered factories by industry. I plan to use these data sources to extend my pre-war estimates to annual series, and to help in evaluating the extent of coverage in the manufacturing censuses. For the 1880s, there is also useful annual information in the Report of the Marine Department. This department was in charge of licensing engines whether for shipping or land use.

Terms Used

"Manufacturing" is the transformation of raw materials into products demanded in the marketplace. Manufacturing is manufacturing even if the raw materials are primary products extracted from a nearby location. In this paper, a factory is a workplace covered by the Government Statistician's ("Registrar-General" in the nineteenth century) official returns, with a few exceptions noted below. A workshop is a registered "factory" not covered by the official Factory Statistics. Handicraft manufacturing is manufacturing conducted neither from a factory nor a workshop. The key criteria for statistical coverage were having at least

two employees, or having motive power (eg NZOYB, 1914, p.659; NZFBS, 1923, p.v) . Some workshops were quite large, such as some dressmaking and tailoring concerns, but only featured in the official statistics for a few years at the beginning of the twentieth century. Other large workshops not covered were those of Government operations; specifically the Government Printing Works and the Government Railway Workshops.

"Volume" means the quantity of either finished product or raw material that passes through a factory. Thus, volume is the same as "throughput". "Output values" are the gross receipts from the sale of manufactured goods. "Output" or "production", however, is the same as "net value-added at constant prices". Aggregate volume would be weighted by output values; aggregate output is weighted by value added.

Areas of Incompleteness.

The present series, made up only from official factory statistics, does not provide comprehensive coverage of industrial production. Missing at present are detailed adjustments where not all factories completed returns for, for example, the value of materials. This means that "value-added" may be too high in some of the earlier years, while gross output may be understated.

Industries with fewer than four firms have been added to "other industries" in the Factory Statistics, although some of them are quite large and clearly belong in specific sector groupings. An example is sugar refining, which was conducted by a large monopoly firm. As more information becomes available (eg by making estimates based on years in which there were at least four firms in such an industry, or from archives such as those of Chelsea Sugar) I will attempt to reallocate data from the "other industries" column. Otherwise, "other industries" reflects emerging industries. In the earlier years, some activities were not covered because of lags in the recognition of new activities. In other cases, industries for which no data was given were, in earlier years, incorporated with related industries.

I have excluded mining activities and public utilities from the nineteenth century factory statistics. However, I have retained the coke and tar production from the country's gasworks, placing it in the sector "building materials & solid fuel".

Value added from repair work in factories has been retained in the presented statistics. It is true that in the engineering, coachbuilding and boatbuilding industries, repairs appear to comprise an increasing share of output. But this may be a statistical illusion, to some extent,

more a result of better information about repairs than a reflection of a proportionate increase in repairs. In addition, in earlier years, the distinction between repairs and manufacturing was somewhat blurred, because of the greater likelihood that repairs to, for example, a coach or a ship, would involve the manufacture of parts. To keep comparisons valid between the 1880s and 1930s, it is probably better for repair to be retained in the interwar series.

Method of Calculation

The most important methodological problems relate to the method of calculating "net added value", and the problems of aggregating index numbers.

In Australia the standard dataset remains that in N.G. Butlin's 1962 work on Gross Domestic Product for 1861 to 1939. While developing a technique of measuring aggregate manufacturing output for the interwar years, I applied that technique to both Australian and New Zealand data, and was pleased to find that my estimates of growth rates in manufacturing closely matched those of Butlin, but that my magnitudes of "value-added" were in excess of his and closer to those of Crawford and Clark (1938). While I had simply used gross value-added, it seems that Butlin had gone too far in his netting procedure.

Butlin (1962, p.173) refers to New Zealand data when deciding to what extent "other expenses" should be deducted from "value-added", noting that "other expenses" might be in the order of 18% of gross value-added.

New Zealand, like Australia, shows very much higher [than Britain and America] proportions of miscellaneous outlays to gross output. By miscellaneous expenses, in this context, we mean outlays on account of insurance, advertising, legal expenses, office expenses other than wages and salaries or allowances, office lighting, indirect taxes and other sundry administrative expenses ... this New Zealand miscellaneous series refers to "other expenses" less coal, fuel and power and depreciation.

Butlin assumed that such expenses were largely those of service inputs. He estimated such expenses to be 4% of gross output, and deducted them from value-added. However, these expenses were principally factor costs which should not have been deducted. G.C. Billing (1935) noted, from a private communication with the Government Statistician (J.W. Butcher), that "other expenses" consist of "rent, interest, bank charges, rates, taxes other than income expenses". While I deduct coal, power, depreciation and sundry charges such as dairy marketing and cartage costs, I regard other miscellaneous expenses as essentially factor income drawn from manufacturing production, and do not deduct them from gross value added. For the years before 1927, this item is estimated, and, for the years before 1923, all miscellaneous expenses are estimated from their 1920s' proportions.

My method of aggregation has been to construct a volume index series for each separately enumerated industry from appropriate price indexes. Where quantity data are not given, I have imported a suitable price index and applied that to the gross output values to give a measure of factory throughput. So far, I have simply used my GDP deflator price series (Rankin, 1992) as a price series where no other was immediately at hand. I plan to use more specific indexes for some industries which at present use the general price index. In some cases, I have used an index of raw material prices, to measure the volume of raw materials as a measure of factory throughput.

Where quantity details are present, I have constructed price indexes for each product made in that industry, aggregated the price indexes using appropriate product weights for each year, and applied that price index to output values in the same way as if I had used an imported price index. Thus, miscellaneous output in each sector is assumed to be subject to the same price patterns as do the mainstream products. Where output data has been inadequate, I have used input quantities to construct price indexes for raw materials.

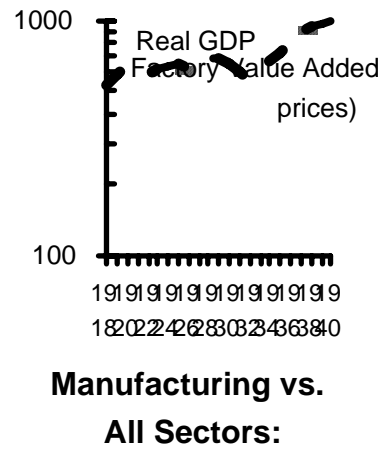
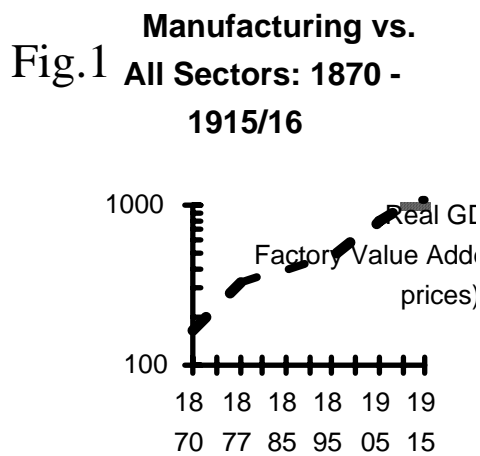
Application of the industry volume indexes to nominal value added gives an implicit price deflator for each industry. Price deflators are then combined using prevailing industry weights to give price deflators for each sector, and sector price deflators combine to give an overall price deflator for factory manufacturing. Applying the aggregated price deflators to value added gives the constant price series of manufacturing output for each sector and for all sectors. At no stage do I directly aggregate volume indexes; that would have introduced very significant index number problems no matter what weighting system was used.

Fortunately, although price levels varied much throughout the period of study, the price index numbers are of the same order of magnitude throughout the time period (with 1930s' product prices similar to those of the 1870s), reducing the potential for distortion when aggregating price indexes.

Presentation of Data

In this paper, I have only space to present my findings at the sector and all-sectors level. Thus, I have presented (in Tables 1.13, at the end of this paper) for each sector: net value-added at current prices, value-added at constant (1929) prices, inter-sector weights showing the percentage contribution of each sector for each year to the aggregate factory product, and implicit price series for factory output. In addition, I have included graphs

(Fig.1) showing the growth of factory output compared to estimates of gross national product at constant prices (Rankin, 1992).



The

Sector Groupings

Primary Production Processing

This group covers meat processing (slaughter, freezing and preserving), boiling-down and manure works, ham and bacon works, sausage casings, fish curing and preserving, dairy factories, tanning, woolscouring and fellmongery. Thus, it is essentially the processing of animal products. In the pre-refrigeration years, this sector was dominated by the processing of hides and raw wool.

Flax Mills

This industry is kept separate because of its somewhat quirky nature. The industry was largely driven by the price of its superior substitute, manila hemp from the Philippines. Flax mills would start up and shut down at short notice, as and when it was profitable. Flax mills supplied the rope and twine industry. Flax milling was a significant activity in the early 1870s, early 1890s, and 1900s-1920s.

Food and Drink

This sector comprises traditional colonial activities such as grain milling and brewing. It also includes biscuit-making, confectionary, jams, other preserves, coffee and spice preparation, sauces, vinegar and non-alcoholic beverages. There was also an early "colonial wine" industry, which is at present classed as "other" but will be transferred to this sector pending satisfactory estimates.

Clothing, Textiles and Footwear

This sector comprises woollen mills, clothing factories, and makers of hosiery, canvas fabrics (sails, tents, oilskins), and footwear. It excludes the many handicraft producers, and registered tailoring, dressmaking and millinery establishments. This sector, at all components, expanded considerably in the 1880s, and it was mainly about concern of "sweating" in this industry that the 1890 Royal Commission (The "Sweating Commission") was formed, which in turn inspired the labour reforms of 1894 - the Industrial, Conciliation and Arbitration Act, an act frequently modified but nevertheless the cornerstone of Industrial Relations in New Zealand for 97 years.

Building Materials and Solid Fuels

This sector includes lime and cement works, timber, brick, tile and pottery works, leadlight and glass bevelling, concrete and plaster, and coke and tar. Naturally protected, its fortune largely fluctuated with that of the construction industry. In addition, sawmills were important as a forward linkage from what seemed to early settlers an inexhaustible supply of trees that were often seen as a barrier to the development of pastoral farming. The high power to output ratio of New Zealand industry owes much to the sawmilling operations. Reticulated gas has been excluded, not because it is not a tangible processed product, but because its substitute, electricity, has also been excluded.

Soaps, Chemicals and Fertilisers

This sector includes soap and candle factories, various chemical products - including patent medicines, paints and varnish (although paint and varnish are at present classed under "other industries" before 1910) - and fertilisers (superphosphates and chemical fertiliser). It is very much an import substitution sector, although the growth of fertiliser production in the interwar years is the result of linkages from an increasingly intensive approach to pastoral farming, and, due to their bulk, the industry has a considerable degree of natural protection.

Wood and Paper Products

This sector includes furniture-making, wood turning, the construction of barrels and packing cases, paper bags and boxes. Paper milling would be included, but, because of the small number of operators, detailed statistics are not available. So paper-milling is at present included as an "other industry". Furniture making has always been an important craft industry particularly suited to New Zealand, and products from large firms such as Dunedin's Guthrie and Larnach always attracted attention at international industrial exhibitions. (Unfortunately, that firm became a victim of its own success, and in the financial crisis of 1879-80, its bankers panicked and withdrew its credit facilities, forcing the company into liquidation.)

Metal Products and Engineering

This sector comprises agricultural equipment and dairy machinery, metal fabrication (tinware), iron foundries, engineering works, electrical engineering, rangemaking and wireworking. Because it predominantly supplies producers, it has been subject to much cyclical fluctuation, but along a significantly rising trend. New Zealand shows clear evidence of having a comparative advantage in this area. Agricultural machinery, for example, was always a low tariff industry because of the political dominance of farming industry, yet it is an activity that not only held its own, but also was a relatively significant exporting industry.

Transport Equipment and Servicing

This activity basically consists of vehicles and vessels, although aircraft servicing appears, but in the "other industries" category. New Zealand yards have produced many small boats, and, in the nineteenth century, a number of significantly large ships. This creates problems in assessing the volume of shipbuilding production, because one large ship is the equivalent to many small boats. Graving dock and patent slip operations have been excluded from these tables, but other boat repairs are included. This sector includes bicycle production.

In the nineteenth century, New Zealand firms were active in the construction of a wide variety of horse-drawn vehicles. In the 1920s, this largely gave way to a significant volume of production of "motor bodies", especially trucks and buses. Again, this points to New Zealand firms having a comparative advantage in specialised motor vehicles. Repairs are included, but it should be borne in mind that many specialist motor repair shops were registered factories, but did not feature in the Government Statistician's annual statistics.

Miscellaneous Import Substitutes

This sector includes a variety of traditional craft industries: saddles and harnesses, leather goods, rope and twine, brushware and basketware, mattresses, jewellery and watch-making.

Printing

This sector covers the production of newspapers, and of other printing/publication work ("job printing"). It is largely a sheltered activity, although job-printing could at times be in direct competition with imported publishing. The growth of printed matter reflects growing literacy, and rising discretionary incomes. Its role as an income-elastic medium in the years to 1935 mirrors that of radio in later years and television even more recently.

Other Industries

All other industries included in the factory statistics, excluding those industries already noted - such as mining, dressmaking, and public utilities - which have been deducted from the aggregates.

Commentary

In the 1870s and 1880s, New Zealand settlers went through a considerable degree of soul-searching about how their country should industrialise and whether it really should industrialise (Rankin, 1991). Most commentators were "progressives" of some form, so the affirmative answer to the latter question was frequently taken for granted. Free traders sometimes opposed industrialisation as a goal when they feared that the means adopted to achieve it would prove detrimental to the sectoral interests with which they were associated.

A considerable degree of industrialisation took place in these years, partly despite and partly because of moderate protective tariffs. The key period was that from 1880 to 1885, when, under considerable balance of payments pressures, something of an industrial revolution took place, despite a lack of growth in per capita incomes. The factory data show an increase of about 30% in factory output in those five years. That figure would have been higher had the Railway workshops been included. Much of the growth was in heavy engineering and textiles, analogous to the early phase of industrialisation in Britain. The increase in horsepower utilised was well in excess of 30% during that period. Otago University's Professor Mainwaring Brown, in his attempt to estimate New Zealand's national income, expressed surprise at the extent of industrialisation that had taken place (1888, pp.2,17). At the industrial exhibition in Wellington in 1885, many commentators were surprised at the range and quality of New Zealand "colonial" manufactures (Rankin, 1991, p.20 n20). At about this time New Zealand raised its profile as an exporter of manufactures, mainly to Australia. New Zealand exported a small but significantly higher share of its manufactured output until 1906 (Bloomfield, 1984).

Much of the industrialisation was based on falling wages relative to other countries (Blyth, p.7). The growth of the domestic market remained constrained by emigration, unemployment, and high levels of public and private debt; in short by the severity of New Zealand's "long depression" of the 1880s. This economic structure, while it might have led to accelerated industrial growth once domestic incomes recovered, proved to be a holding pattern; a set of activities that New Zealanders had to develop while waiting for something else more profitable. This period, however, played an important role in developing entrepreneurial and technical skills, ensuring that New Zealand was well equipped to take advantage of new opportunities that came its way. Some of these workers took advantage of

employment opportunities in Australia, but returned to New Zealand in the mid-1890s (Rankin, 1992, p.64).

The new opportunity came from developments in refrigeration technology. The processing of perishable primary products was an activity that experienced a high degree of natural protection. Primary production processing constitutes, in Rostovian terms (Rostow, 1971), the leading sector of New Zealand's industrial take-off, with forward linkages from the production of pastoral commodities, and backward linkages from northern hemisphere consumers.¹

A Rostovian take-off requires a rapid spurt in growth, a marked increase in the gross investment rate, and an identifiable leading sector with backward linkages creating a positive feedback stimulus to supplying industries. It should also be followed by a stage of self-sustaining growth; the "drive to maturity".

There was undoubtedly a growth spurt from 1896 to 1906, with primary manufacturing industries (Blyth, 1974, pp.10-11) making the dominant contribution to additional industrial capacity. New Zealand is lacking in data on gross fixed capital investment in the early twentieth century, but the factory statistics show that the value of industrial plant, machinery and buildings increased by 90% from 1895 to 1905, in a decade in which domestic price levels barely changed (Census, 1906, Appendix p.vi). The value of industrial land rose even more quickly.

The most obvious backward linkages were in engineering and building supplies, as a result of the demand for plant in freezing works and dairy factories. Indeed, output in "metal products and engineering" trebled in the period between the 1896 and 1901 censuses, while production in "building materials and solid fuels" nearly doubled from 1895 to 1905. Import substitute industries such as "clothing, textiles and footwear", "food and drink" and "soaps, chemicals and fertilisers" grew much less quickly, however, reflecting the increased ability of New Zealanders to finance consumption through imports.

The most important test of successful industrialisation is that it leads to a stage of economic maturing, in which the industrialising country becomes able to produce almost any form of manufactured good, although it may not produce many goods it could produce because the law of comparative advantage continues to hold for mature economies. Did New Zealand to some extent "undevelop", becoming a more dependent and less mature economic society?

¹. While NZ mainly supplied Britain in practice, high and rising prices for refrigerated food products reflected the growth of the world market of which Britain was already declining in relative importance.

Contemporaries and historians alike tend to see the period from 1905 to 1930, as a period of stagnation and instability (eg Hawke 1985, pp.99-102) - affluent stagnation at first - and dependence on a narrow range of products (Simkin, 1951). Certainly there is no evidence of a growth trend in these years (Rankin, 1992). However, while significant balance of payments pressures remained absent, the New Zealand economy was under no pressure to diversify. Other activities that could have been undertaken were not undertaken, but when balance of payments pressures did become apparent in the 1920s, the manufacturing sector did respond with a considerable increase in output (Table 13). Growth was particularly marked in the newer industries which catered for the domestic market: chemicals, furniture/woodware, metal products, vehicle construction and repairs, printing and new ("other") industries.

In the 1930s' depression there was considerable attrition in producer goods' industries, but very little fall-off in the production of export staples and basic consumer goods such as food, drink and textiles. As New Zealand's real exchange rate fell, as a result of the depreciation of sterling in 1931, a 25% devaluation against sterling in January 1933, and a domestic price level falling faster than import prices (NZOYB, 1978, p.977), New Zealand showed that it did have the ability to produce a wide range of products when market signals suggested it should.

New Zealand's real GNP per capita doubled in the 10 years from 1932 to 1942 (NZOYB 1957, p.717), with import substituting industries playing a leading role. Thus the growth of secondary industries - distinct from primary industries (Blyth, 1974, pp.10-12) - oriented around the domestic market heralded a post World War II era in which self-sustained growth was fuelled by a rapidly expanding domestic market and New Zealanders' ability to produce a wide range of products. Primary production and primary product processing remained dominant, providing the means for the continued growth of imports, but became relatively less important sources of employment in a mature economy; an economy focussing on but not dependent on primary production and primary product processing.

The experience of the 1930s can be classed as New Zealand's drive to maturity, in true Rostovian fashion. The irony is that, for writers as diverse as W.B. Sutch and C.A. Blyth, the "take-off" of primary product processing, at the expense of some classes of industry - especially of import substitutes - was seen as tantamount to deindustrialisation, whereas it would be more appropriately classed as unbalanced industrialisation (Hirschman, 1986, p.29). Blyth (1974, p.8) suggests that the experience of 1900-10 is "a clear case of the classical forces going into reverse and retarding industrialisation". Industry based on locally produced raw materials and foreign markets is as much manufacturing as is activity utilising

imported raw materials for domestic consumption, but it is not always easy to see it that way. Such industries, by focussing on an external market, will generally be organised on a different scale to those linked to the domestic market of a small country.

REFERENCES

Primary (New Zealand Government Statistician / Registrar-General)

New Zealand Population Census: 1871 to 1916; Appendix.

New Zealand Statistics: Factory and Building Production, 1921/22 to 1940/41 (NZFBS).

New Zealand Official Yearbook. (NZOYB)

Secondary

Billing, G.C. (1935); "Manufacturing Profit in New Zealand", *Economic Record*, June.

Bloomfield, G.T. (1984); *A Handbook of New Zealand Statistics*, Hall & Co., Boston.

Blyth, C.A. (1974); "The Industrialisation of New Zealand", *New Zealand Economic Papers*.

Brown, J. Mainwaring (1888); *The Wealth and Annual Production of New Zealand*, Dunedin.

Butlin, N.G. (1962); *Australian Domestic Product, Investment and Foreign Borrowing; 1861-1938/39*; Cambridge University Press.

Clark, C. & Crawford, J.G. (1938); *The National Income of Australia*, Angus and Robertson, Sydney.

Hawke, G.R. (1980); "Industrial Development in New Zealand, 1870-1914", *VUW Working Papers in Economic History 80/1*, Victoria University of Wellington.

Hawke, G.R. (1985); *The Making of New Zealand*, Cambridge University Press.

Hirschman, A.O. (1986); *Rival Views of Market Society*, Viking, New York.

Lineham, B.T. (1968); "New Zealand's Gross Domestic Product, 1918-1938", *New Zealand Economic Papers*, pp.15-26.

Rankin, K.R. (1990); *Labour Supply in New Zealand and Australia, 1919-1939*; unpublished thesis, Victoria University of Wellington.

Rankin, K.R. (1991); *Protection vs. Free Trade; the New Zealand Debates in the 1870s and 1880s*, Working Paper in Economics, no. 92, Economics Department, University of Auckland.

Rankin, K.R. (1992); "New Zealand's Gross National Product: 1859-1939", *Review of Income and Wealth* 38, no. 1, pp.49-69.

Rostow, W.W. (1971); *The Stages of Economic Growth*, 2nd edn., Cambridge.

Simkin, C.G.F. (1951); *The Instability of a Dependent Economy*, Oxford University Press.

Sutch, W.B. (1941, 1969); *Poverty and Progress in New Zealand*, Reed, Wellington.

TABLE 1

Primary Product Processing	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	68,557	56,186	1220	6.5%
1873	97,985	72,475	1352	6.1%
*1877	154,930	124,945	1240	6.9%
1880	188,474	170,393	1106	7.6%
1885	297,688	286,667	1038	9.6%
1890	635,186	608,687	1044	18.4%
1895	815,971	826,294	988	22.0%
1900	1,638,033	1,483,454	1104	26.3%
1905	2,121,127	1,888,870	1123	25.0%
*1910	1,337,066	2,192,907	610	16.9%
*1915	3,543,100	2,686,115	1319	33.2%
*1918	4,066,960	2,601,369	1563	29.6%
*1919	5,850,847	3,022,600	1936	32.9%
*1920	4,512,301	2,982,372	1513	21.6%
*1921	4,722,098	3,122,944	1512	20.6%
*1922	5,957,510	3,415,526	1744	24.4%
*1923	5,654,373	3,564,380	1586	22.3%
*1924	5,876,798	3,733,963	1574	21.8%
*1925	5,215,003	3,698,623	1410	19.0%
*1926	5,495,092	3,915,223	1404	20.4%
*1927	5,663,366	4,075,215	1390	21.2%
*1928	5,130,265	4,302,546	1192	18.9%
*1929	4,606,018	4,606,018	1000	16.5%
*1930	4,194,521	4,719,832	889	16.9%
*1931	4,421,309	4,822,042	917	22.4%
*1932	4,557,931	5,241,681	870	23.8%
*1933	4,791,546	5,033,402	952	23.8%
*1934	4,602,407	5,492,432	838	20.5%
*1935	4,777,166	5,486,485	871	19.2%
*1936	5,529,125	5,666,417	976	18.6%
*1937	5,409,894	5,580,770	969	16.5%
*1938	5,710,223	5,595,543	1020	17.3%
*1939	6,748,858	5,900,164	1144	19.1%
*1940	7,589,704	6,306,908	1203	19.6%

* 'Fiscal Year' to
following March

TABLE 2

Flax Mills	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	51,558	70,824	728	4.9%
1873	54,401	67,610	805	3.4%
*1877	14,280	18,908	755	0.6%
1880	14,506	21,966	660	0.6%
1885	12,314	22,196	555	0.4%
1890	143,816	230,428	624	4.2%
1895	19,980	48,812	409	0.5%
1900	124,924	193,365	646	2.0%
1905	342,438	360,462	950	4.0%
*1910	174,592	252,720	691	2.2%
*1915	289,008	295,519	978	2.7%
*1918	418,292	276,671	1512	3.0%
*1919	266,532	205,696	1296	1.5%
*1920	242,014	178,792	1354	1.2%
*1921	172,713	153,676	1124	0.8%
*1922	183,513	165,625	1108	0.8%
*1923	232,376	201,070	1156	0.9%
*1924	358,100	270,893	1322	1.3%
*1925	394,831	299,847	1317	1.4%
*1926	335,832	279,979	1199	1.2%
*1927	278,805	251,127	1110	1.0%
*1928	231,153	206,217	1121	0.9%
*1929	206,820	206,820	1000	0.7%
*1930	34,043	36,464	934	0.1%
*1931	20,871	35,645	586	0.1%
*1932	30,875	70,149	440	0.2%
*1933	50,278	81,679	616	0.2%
*1934	60,660	83,894	723	0.3%
*1935	105,595	115,501	914	0.4%
*1936	145,130	119,039	1219	0.5%
*1937	147,743	120,972	1221	0.5%
*1938	72,995	81,802	892	0.2%
*1939	69,504	63,004	1103	0.2%
*1940	74,834	60,215	1243	0.2%

* 'Fiscal Year' to following March

TABLE 3

Food & Drink	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	335,990	403,087	834	31.8%
1873	346,901	378,628	916	21.5%
*1877	446,581	523,835	853	19.8%
1880	441,176	657,660	671	17.9%
1885	495,095	974,517	508	15.9%
1890	540,321	1,344,656	402	15.6%
1895	562,688	1,162,526	484	15.2%
1900	751,235	1,242,477	605	12.0%
1905	905,246	1,592,203	569	10.7%
*1910	916,403	1,969,761	465	11.6%
*1915	872,088	2,018,663	432	8.2%
*1918	1,207,220	1,829,499	660	8.8%
*1919	1,653,979	2,074,825	797	9.3%
*1920	2,096,988	2,274,747	922	10.0%
*1921	2,162,254	2,404,490	899	9.4%
*1922	2,026,581	2,469,532	821	8.3%
*1923	2,027,064	2,435,264	832	8.0%
*1924	2,340,834	2,601,513	900	8.7%
*1925	2,373,076	2,691,418	882	8.7%
*1926	2,456,129	2,661,081	923	9.1%
*1927	2,604,038	2,756,273	945	9.7%
*1928	2,680,412	2,862,564	936	9.9%
*1929	2,810,232	2,810,232	1000	10.1%
*1930	2,587,267	2,655,967	974	10.4%
*1931	2,217,316	2,327,940	952	11.2%
*1932	1,986,478	2,269,034	875	10.4%
*1933	2,041,282	2,344,656	871	10.1%
*1934	2,314,473	2,644,585	875	10.3%
*1935	2,461,750	2,830,393	870	9.9%
*1936	2,820,106	3,151,060	895	9.5%
*1937	3,039,619	3,592,799	846	9.3%
*1938	2,680,163	3,738,276	717	8.1%
*1939	2,941,353	3,967,768	741	8.3%
*1940	3,190,321	4,087,259	781	8.2%

* 'Fiscal Year' to
following March

TABLE 4

Clothing, Textiles & Footwear	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	6,194	6,824	908	0.6%
1873	34,185	38,055	898	2.1%
*1877	70,372	85,607	822	3.1%
1880	230,805	305,741	755	9.4%
1885	375,579	581,396	646	12.1%
1890	438,188	736,262	595	12.7%
1895	465,256	894,227	520	12.6%
1900	573,895	1,107,902	518	9.2%
1905	584,815	1,099,016	532	6.9%
*1910	668,205	1,388,358	481	8.4%
*1915	1,001,628	1,614,719	620	9.4%
*1918	1,388,866	1,510,022	920	10.1%
*1919	1,943,907	1,687,750	1152	10.9%
*1920	2,369,321	2,131,707	1111	11.3%
*1921	2,266,042	2,025,876	1119	9.9%
*1922	2,132,257	2,227,015	957	8.7%
*1923	2,384,783	2,455,071	971	9.4%
*1924	2,284,598	2,221,201	1029	8.5%
*1925	2,371,760	2,383,363	995	8.7%
*1926	2,399,626	2,434,935	985	8.9%
*1927	2,496,776	2,561,615	975	9.3%
*1928	2,671,258	2,617,269	1021	9.9%
*1929	2,741,192	2,741,192	1000	9.8%
*1930	2,539,671	2,592,560	980	10.2%
*1931	2,256,531	2,509,627	899	11.4%
*1932	2,380,451	2,903,322	820	12.5%
*1933	2,487,187	3,149,536	790	12.3%
*1934	2,652,313	3,406,037	779	11.8%
*1935	2,809,780	3,423,056	821	11.3%
*1936	3,297,982	3,959,289	833	11.1%
*1937	3,606,045	3,901,860	924	11.0%
*1938	3,351,087	3,567,110	939	10.1%
*1939	4,552,170	4,422,389	1029	12.9%
*1940	5,988,934	5,486,765	1092	15.4%

* 'Fiscal Year' to
following March

TABLE 5

Building Materials & Solid Fuel	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	477,205	747,649	638	45.2%
1873	813,712	1,147,338	709	50.4%
*1877	1,029,117	1,556,608	661	45.6%
1880	967,591	1,668,255	580	39.2%
1885	1,018,684	2,089,909	487	32.8%
1890	728,180	1,623,207	449	21.1%
1895	805,814	1,884,960	427	21.8%
1900	1,188,262	2,408,847	493	19.1%
1905	2,046,390	3,244,040	631	24.1%
*1910	1,585,727	3,539,588	448	20.0%
*1915	1,122,929	2,715,927	413	10.5%
*1918	1,585,300	2,193,011	723	11.5%
*1919	1,933,792	2,670,885	724	10.9%
*1920	3,833,869	3,621,766	1059	18.3%
*1921	4,454,159	3,536,338	1260	19.5%
*1922	4,379,835	3,717,673	1178	18.0%
*1923	4,887,910	4,206,088	1162	19.3%
*1924	5,312,615	4,628,966	1148	19.7%
*1925	5,358,100	4,900,245	1093	19.6%
*1926	4,733,044	4,555,233	1039	17.5%
*1927	4,209,752	4,237,091	994	15.8%
*1928	4,196,816	4,166,323	1007	15.5%
*1929	4,383,629	4,383,629	1000	15.7%
*1930	3,642,655	3,723,278	978	14.7%
*1931	1,955,366	2,473,826	790	9.9%
*1932	1,793,194	2,344,365	765	9.4%
*1933	2,124,972	2,688,744	790	10.5%
*1934	2,692,496	3,199,367	842	12.0%
*1935	3,281,052	3,840,950	854	13.2%
*1936	4,018,289	4,278,665	939	13.5%
*1937	4,545,086	4,582,661	992	13.9%
*1938	4,687,443	4,879,793	961	14.2%
*1939	4,948,531	5,244,551	944	14.0%
*1940	5,045,818	5,312,238	950	13.0%

* 'Fiscal Year' to
following March

TABLE 6

Soap, Candles, Chemicals & Fertilisers	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	13,302	18,091	735	1.3%
1873	20,635	25,391	813	1.3%
*1877	27,284	37,839	721	1.2%
1880	34,093	52,314	652	1.4%
1885	66,839	122,816	544	2.2%
1890	69,502	112,963	615	2.0%
1895	73,907	188,495	392	2.0%
1900	60,532	188,140	322	1.0%
1905	89,097	221,539	402	1.1%
*1910	82,018	256,037	320	1.0%
*1915	133,446	264,752	504	1.3%
*1918	205,369	246,308	834	1.5%
*1919	247,605	321,150	771	1.4%
*1920	258,046	322,016	801	1.2%
*1921	402,536	365,388	1102	1.8%
*1922	541,211	482,545	1122	2.2%
*1923	533,139	651,327	819	2.1%
*1924	753,285	880,751	855	2.8%
*1925	827,262	976,025	848	3.0%
*1926	895,061	880,503	1017	3.3%
*1927	893,689	965,544	926	3.3%
*1928	944,262	1,016,235	929	3.5%
*1929	1,030,522	1,030,522	1000	3.7%
*1930	965,978	1,008,121	958	3.9%
*1931	813,882	975,398	834	4.1%
*1932	915,193	1,198,571	764	4.8%
*1933	895,038	1,164,267	769	4.4%
*1934	1,040,037	1,271,488	818	4.6%
*1935	1,088,723	1,343,976	810	4.4%
*1936	1,212,494	1,579,741	768	4.1%
*1937	1,292,262	1,732,305	746	4.0%
*1938	1,324,074	1,779,766	744	4.0%
*1939	1,708,969	2,172,801	787	4.8%
*1940	1,827,199	2,391,386	764	4.7%

* 'Fiscal Year' to
following March

TABLE 7

Wood & Paper Products	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	5,779	6,607	875	0.5%
1873	8,069	8,345	967	0.5%
*1877	15,945	17,569	908	0.7%
1880	71,242	89,772	794	2.9%
1885	100,721	154,887	650	3.2%
1890	79,119	142,217	556	2.3%
1895	78,925	125,716	628	2.1%
1900	177,712	307,073	579	2.8%
1905	233,547	448,089	521	2.8%
*1910	333,133	524,499	635	4.2%
*1915	527,894	654,255	807	4.9%
*1918	590,709	597,717	988	4.3%
*1919	836,420	790,618	1058	4.7%
*1920	1,067,458	927,352	1151	5.1%
*1921	957,460	791,995	1209	4.2%
*1922	1,024,559	952,950	1075	4.2%
*1923	1,072,453	1,013,373	1058	4.2%
*1924	1,141,557	1,058,034	1079	4.2%
*1925	1,186,264	1,147,355	1034	4.3%
*1926	1,288,122	1,285,860	1002	4.8%
*1927	1,280,461	1,220,616	1049	4.8%
*1928	1,259,936	1,252,096	1006	4.6%
*1929	1,318,023	1,318,023	1000	4.7%
*1930	1,157,668	1,186,935	975	4.7%
*1931	765,398	892,633	857	3.9%
*1932	696,506	876,363	795	3.6%
*1933	606,796	836,131	726	3.0%
*1934	839,439	1,030,998	814	3.7%
*1935	1,010,276	1,249,995	808	4.1%
*1936	1,373,747	1,540,684	892	4.6%
*1937	1,576,555	1,682,138	937	4.8%
*1938	1,689,347	1,765,865	957	5.1%
*1939	1,895,590	1,888,545	1004	5.4%
*1940	2,025,949	2,006,154	1010	5.2%

* 'Fiscal Year' to
following March

TABLE 8

Metal Products & Engineering	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	14,736	12,257	1202	1.4%
1873	36,196	27,237	1329	2.2%
*1877	179,355	110,088	1629	7.9%
1880	213,785	153,351	1394	8.7%
1885	317,226	262,028	1211	10.2%
1890	290,209	445,052	652	8.4%
1895	245,872	315,403	780	6.6%
1900	566,628	1,111,692	510	9.1%
1905	578,328	1,137,092	509	6.8%
*1910	931,413	1,269,780	734	11.8%
*1915	913,732	857,647	1065	8.6%
*1918	1,317,958	807,493	1632	9.6%
*1919	1,574,375	995,813	1581	8.8%
*1920	2,060,029	1,152,641	1787	9.8%
*1921	2,023,961	1,156,756	1750	8.8%
*1922	1,857,158	1,245,200	1491	7.6%
*1923	2,156,872	1,566,996	1376	8.5%
*1924	2,199,951	1,723,441	1276	8.1%
*1925	2,419,513	1,872,419	1292	8.8%
*1926	2,368,637	1,902,187	1245	8.8%
*1927	2,322,741	2,091,373	1111	8.7%
*1928	2,483,667	2,333,800	1064	9.2%
*1929	2,583,303	2,583,303	1000	9.3%
*1930	2,231,165	2,210,253	1009	9.0%
*1931	1,427,738	1,596,600	894	7.2%
*1932	1,341,990	1,523,890	881	7.0%
*1933	1,411,682	1,739,487	812	7.0%
*1934	1,776,921	2,293,175	775	7.9%
*1935	2,212,565	2,769,610	799	8.9%
*1936	2,833,983	3,277,029	865	9.5%
*1937	3,154,713	3,925,249	804	9.6%
*1938	3,394,181	3,946,702	860	10.3%
*1939	3,677,255	4,187,213	878	10.4%
*1940	4,449,312	4,799,923	927	11.5%

* 'Fiscal Year' to
following March

TABLE 9

Transport Equipment	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	64,925	129,703	501	6.2%
1873	59,031	87,381	676	3.7%
*1877	140,764	215,691	653	6.2%
1880	78,957	114,656	689	3.2%
1885	121,679	212,099	574	3.9%
1890	120,295	203,824	590	3.5%
1895	130,643	240,516	543	3.5%
1900	183,911	375,258	490	2.9%
1905	238,323	493,042	483	2.8%
*1910	384,764	721,649	533	4.9%
*1915	490,464	569,579	861	4.6%
*1918	686,835	867,034	792	5.0%
*1919	937,704	1,149,962	815	5.3%
*1920	1,259,340	1,252,839	1005	6.0%
*1921	1,210,019	1,204,838	1004	5.3%
*1922	1,202,179	1,324,317	908	4.9%
*1923	1,326,001	1,392,133	952	5.2%
*1924	1,457,615	1,387,193	1051	5.4%
*1925	1,693,704	1,545,297	1096	6.2%
*1926	1,858,658	1,631,836	1139	6.9%
*1927	1,888,870	1,657,263	1140	7.1%
*1928	2,046,735	2,122,365	964	7.5%
*1929	2,310,312	2,310,312	1000	8.3%
*1930	1,919,848	2,003,804	958	7.7%
*1931	1,346,109	1,428,964	942	6.8%
*1932	1,160,320	1,624,758	714	6.1%
*1933	1,156,548	1,773,161	652	5.7%
*1934	1,504,096	1,971,926	763	6.7%
*1935	2,045,074	2,450,051	835	8.2%
*1936	2,880,341	3,119,397	923	9.7%
*1937	3,834,220	3,490,824	1098	11.7%
*1938	3,942,841	3,477,755	1134	11.9%
*1939	3,479,604	2,786,474	1249	9.9%
*1940	2,895,094	2,186,979	1324	7.5%

* 'Fiscal Year' to
following March

TABLE 10

Miscellaneous Import Substitutes	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	4,808	6,161	780	0.5%
1873	5,320	6,465	823	0.3%
*1877	7,261	8,028	904	0.3%
1880	13,284	13,115	1013	0.5%
1885	26,471	32,181	823	0.9%
1890	43,293	86,808	499	1.3%
1895	76,770	133,676	574	2.1%
1900	138,540	231,120	599	2.2%
1905	144,170	249,607	578	1.7%
*1910	203,898	343,337	594	2.6%
*1915	310,347	411,853	754	2.9%
*1918	303,000	361,045	839	2.2%
*1919	405,940	422,649	960	2.3%
*1920	583,052	499,449	1167	2.8%
*1921	646,696	482,395	1341	2.8%
*1922	573,288	506,487	1132	2.4%
*1923	561,261	559,870	1002	2.2%
*1924	560,409	550,804	1017	2.1%
*1925	561,600	529,336	1061	2.0%
*1926	559,148	556,176	1005	2.1%
*1927	533,588	529,588	1008	2.0%
*1928	536,032	516,441	1038	2.0%
*1929	545,568	545,568	1000	2.0%
*1930	460,579	504,319	913	1.9%
*1931	343,973	367,936	935	1.7%
*1932	331,458	377,226	879	1.7%
*1933	330,402	382,839	863	1.6%
*1934	385,582	456,653	844	1.7%
*1935	438,670	478,979	916	1.8%
*1936	567,717	640,894	886	1.9%
*1937	547,203	615,530	889	1.7%
*1938	557,389	582,822	956	1.7%
*1939	536,931	544,190	987	1.5%
*1940	635,848	650,231	978	1.6%

* 'Fiscal Year' to
following March

TABLE 11

Printing & Publishing	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	0			0.0%
1873	121,160	47,894	2530	7.5%
*1877	137,573	57,939	2374	6.1%
1880	177,663	85,567	2076	7.2%
1885	186,070	106,677	1744	6.0%
1890	240,876	142,774	1687	7.0%
1895	264,359	175,652	1505	7.1%
1900	478,469	301,468	1587	7.7%
1905	756,197	449,496	1682	8.9%
*1910	1,013,131	524,348	1932	12.8%
*1915	1,203,471	904,226	1331	11.3%
*1918	1,295,645	767,902	1687	9.4%
*1919	1,656,733	813,986	2035	9.3%
*1920	2,058,955	946,441	2175	9.8%
*1921	2,213,296	985,893	2245	9.7%
*1922	2,520,282	1,683,482	1497	10.3%
*1923	2,562,739	2,012,933	1273	10.1%
*1924	2,869,831	2,406,303	1193	10.6%
*1925	3,148,942	2,674,481	1177	11.5%
*1926	3,247,955	2,863,765	1134	12.0%
*1927	3,101,792	2,968,846	1045	11.6%
*1928	3,290,389	3,070,012	1072	12.1%
*1929	3,376,334	3,376,334	1000	12.1%
*1930	3,138,383	3,186,124	985	12.7%
*1931	2,607,186	2,642,529	987	13.2%
*1932	2,364,948	2,497,604	947	12.4%
*1933	2,411,992	2,632,300	916	12.0%
*1934	2,619,531	3,029,588	865	11.7%
*1935	2,764,984	3,456,457	800	11.1%
*1936	3,011,774	3,775,575	798	10.1%
*1937	3,245,374	3,972,940	817	9.9%
*1938	3,171,497	3,960,392	801	9.6%
*1939	3,129,757	3,490,921	897	8.9%
*1940	3,067,587	2,855,215	1074	7.9%

* 'Fiscal Year' to following March

TABLE 12

Other Industries	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	12,088	22,367	540	1.1%
1873	17,710	29,649	597	1.1%
*1877	34,480	61,501	561	1.5%
1880	35,929	73,288	490	1.5%
1885	88,733	215,456	412	2.9%
1890	128,125	321,638	398	3.7%
1895	161,723	455,105	355	4.4%
1900	354,737	946,613	375	5.7%
1905	443,770	1,053,511	421	5.2%
*1910	280,961	966,594	291	3.6%
*1915	262,704	901,209	292	2.5%
*1918	674,299	1,000,771	674	4.9%
*1919	481,880	853,785	564	2.7%
*1920	585,149	1,072,623	546	2.8%
*1921	1,668,908	1,355,517	1231	7.3%
*1922	1,978,831	1,436,828	1377	8.1%
*1923	1,901,563	1,472,605	1291	7.5%
*1924	1,863,908	1,436,997	1297	6.9%
*1925	1,855,034	1,486,196	1248	6.8%
*1926	1,363,154	1,460,057	934	5.0%
*1927	1,435,437	1,703,253	843	5.4%
*1928	1,641,372	1,720,816	954	6.1%
*1929	1,937,884	1,937,884	1000	7.0%
*1930	1,936,591	1,988,906	974	7.8%
*1931	1,552,605	1,591,150	976	7.9%
*1932	1,554,952	1,650,441	942	8.1%
*1933	1,847,615	1,872,348	987	9.2%
*1934	1,944,245	1,889,291	1029	8.7%
*1935	1,903,708	1,701,819	1119	7.6%
*1936	2,040,180	1,892,426	1078	6.9%
*1937	2,295,323	2,374,990	966	7.0%
*1938	2,467,253	2,425,688	1017	7.5%
*1939	1,589,734	3,180,166	500	4.5%
*1940	2,017,348	4,171,689	484	5.2%

* 'Fiscal Year' to following March

TABLE 13

ALL SECTORS	Value Added £	Real Value-Added £ 1929	Implicit Prices (1929=1000)	Sector Weights
1870	1,055,141	1,415,013	746	100.0%
1873	1,615,307	1,698,812	951	100.0%
*1877	2,257,942	2,436,331	927	100.0%
1880	2,467,505	2,926,414	843	100.0%
1885	3,107,100	4,299,769	723	100.0%
1890	3,457,111	5,014,946	689	100.0%
1895	3,701,909	5,452,342	679	100.0%
1900	6,236,877	8,269,758	754	100.0%
1905	8,483,448	10,380,199	817	100.0%
*1910	7,911,309	11,017,758	718	100.0%
*1915	10,670,809	11,141,822	958	100.0%
*1918	13,740,454	11,403,997	1205	100.0%
*1919	17,789,716	12,663,139	1405	100.0%
*1920	20,926,523	15,842,657	1321	100.0%
*1921	22,900,142	16,557,999	1383	100.0%
*1922	24,377,205	18,468,575	1320	100.0%
*1923	25,300,535	20,644,618	1226	100.0%
*1924	27,019,500	22,188,530	1218	100.0%
*1925	27,405,088	23,681,904	1157	100.0%
*1926	27,000,459	23,941,610	1128	100.0%
*1927	26,709,314	24,475,201	1091	100.0%
*1928	27,112,296	26,019,688	1042	100.0%
*1929	27,849,837	27,849,837	1000	100.0%
*1930	24,808,370	25,777,699	962	100.0%
*1931	19,728,284	21,572,587	915	100.0%
*1932	19,114,296	22,417,510	853	100.0%
*1933	20,155,338	23,400,943	861	100.0%
*1934	22,432,199	26,614,638	843	100.0%
*1935	24,899,343	28,940,372	860	100.0%
*1936	29,730,869	32,752,844	908	100.0%
*1937	32,694,037	35,183,128	929	100.0%
*1938	33,048,493	35,189,854	939	100.0%
*1939	35,278,256	36,301,845	972	100.0%
*1940	38,807,948	38,284,651	1014	100.0%

* 'Fiscal Year' to
following March