

Source Papers in Economic History

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IN NINETEENTH-CENTURY
AUSTRALIA**

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Source Paper No. 20

November 1997



**THE AUSTRALIAN NATIONAL UNIVERSITY
GPO Box 4, Canberra 2601, Australia**

Australian National University
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ISBN: 0 7315 1069 0
ISSN: 0813-5398

November 1997

Patents, R&D and invention in nineteenth-century Australia

In the nineteenth century, Australians of all backgrounds evinced a keen readiness to embrace new technology. This receptiveness to new ways of doing things was perhaps no more clearly reflected than in the proliferation of patenting that took place in all Australian colonies from the mid-nineteenth century onwards. Yet, in addition to reflecting the attitudes of the colonists to innovation, such patenting is also of significance to the modern researcher in a number of other ways. As the literature on patenting over the last thirty years has abundantly demonstrated, patent data, when interpreted with care, can shed considerable light on the scale and effectiveness of inventive activity, or R&D, that has taken place.¹ In a similar manner, patent data can also be used to analyse the ebb and flow of foreign technology. Unlike other quantitative sources, though, patents are able to do so right across the entire spectrum of industries and inventive activities. Yet, despite their strengths as analytical tools, Australian colonial patent statistics have rarely been used by students of Australia's technological history; a neglect that has chiefly stemmed from the fact that colonial patents have hitherto only been available to researchers in a form that has not lent itself well to statistical analysis. This source paper attempts to redress this problem somewhat by presenting colonial patent data, mainly from Victoria, in a form that is more amenable to research.

1. Sources and Methods

Prior to the establishment of the Commonwealth Patent Office in 1904, each Australian colony operated its own independent patent system. Although the legislation regarding patents in each colony was in principle based on British precedent, in practice each of these systems varied considerably not only in terms of application procedures and costs, but also in the criteria used to determine eligibility and the nature of the protection offered. Moreover, a patent taken out in one of the Australasian colonies, or for that matter anywhere else in the world, even in Britain, afforded no protection whatsoever to the holder of that patent in any other colony. As a result, an inventor wishing to protect his or her idea right across Australia was compelled to file an application in each of the six colonies. This was a costly and time-consuming exercise. The number of patent applications filed in each of the colonial system is given in Table 1 of this paper.²

¹ For a useful introduction to this literature, see Z. Griliches, "Patent statistics as economic indicators: a survey", *Journal of Economic Literature* 28:4 (December 1990), 1661-1707.

² The total number of patent applications filed in each colony is given in M. Easthope, *Australian colonial patents, 1847-1904: lists of legislation, indexes and patent specifications of the Australian colonies before Federation* (Canberra: Patent Office Library, 1992). The population figures used throughout this source paper come from J.

The first general patent legislation in Australia was promulgated in New South Wales in 1852. As the preamble to this legislation made clear, the legislators' intent was to clear away the doubt about the status of British patent law in Australia that the British Parliament's passing of the Patent Law Amendment Act of 1852 had created.³ This Act, among other things, explicitly excluded the colonies from the jurisdiction of British patent law; a development which fostered confusion amongst colonists and ultimately prompted them to establish their own patent systems. Following the New South Wales lead, patent legislation was eventually passed in Victoria in 1854, Tasmania 1858, South Australia 1859, Queensland 1867, and Western Australia 1872.⁴

Prior to these pieces of legislation, the only way a colonial inventor could establish legal protection over his or her intellectual property was to petition parliament for a patent to be granted by means of a Private Bill. The first of these appears to have been passed by the South Australian legislature in 1848 when it granted a patent to Andrew John Murray of Adelaide for his 'improved windlass'. The number of patents granted this way in Australia, however, remained small, as, with the creation of formal patent systems, the need for Australian legislatures to pass such bills was finally obviated.⁵

In terms of costs, efficiency, and enforcement, the Victorian patent system has generally been regarded as the most modern and effective in operation in nineteenth-century Australia; an observation evidenced by the unrivalled popularity that it enjoyed with both the foreign and local inventor at this time. As a result, Victorian patent data are still probably the best measures of Australian inventive effort in the late colonial period available to students of Australian technological history.⁶ Consequently, most data presented in this source paper are derived from the Victorian system.

By nature, all patent systems, that are truly serious about protecting the rights of the first and true inventor, must maintain and make public as much information as possible about all of the applications they receive. In Victoria, this task was chiefly undertaken through the publication of patent notices and records in various government journals and papers. Thus, in addition to appearing in the Victorian *Government Gazette*, each patent application lodged in Victoria was also listed in a publication

C. Caldwell, "Population", in W. Vamplew (ed.), *Australians: historical statistics* (Sydney: Fairfax, Syme & Weldon Associates, 1987), pp. 23-41.

³ A. G. Taylor, *The Law and practice of New South Wales letters patent for inventions and improvements in the arts and manufactures* (Sydney: Charles Potter, Government Printer, 1888), p. 17; M. Coulter, *Property in ideas: the patent question in mid-Victorian Britain* (Kirksville, Mo.: Thomas Jefferson University Press, 1991), p. 136.

⁴ Easthope, *Australian colonial patents*.

⁵ B. Hack, *A history of the patent profession in colonial Australia* (Melbourne: privately published, 1984), p. 9.

⁶ The reasons for this belief are more fully explained in G. B. Magee, "Patenting and the supply of inventive ideas in colonial Australia: evidence from Victorian patent data", *Australian Economic History Review* 36:2 (September 1996), 36-8.

compiled by the Victorian Patent Office entitled *Patents and Patentees*.⁷ From 1868 until 1893, when it seems that the lack of the adequate funding needed to cope with the ever-growing number of applications prevented its continuance, this publication appeared on an annual basis. A single volume for the years from the beginnings of the Victorian patent system in 1854 to 1866 was also printed. This means that from this publication it is possible to create a continuous series of all patent applications filed in Victoria between 1854 and 1889. In the final five years of its publication, however, *Patents and Patentees* only gave details of those patent applications that had been successful. These made up around 60 per cent of all applications filed in those years. All of these patents have been recorded. There is no a priori reason to believe that the pattern and spread of these granted patents should differ significantly from that of all patent applications.

For the remaining period of the Victorian patent system's existence, 1895 to 1903, information on Victorian patents can be obtained from copies of the actual applications, which are available on microfiche in the State Library of Victoria. These records, however, are incomplete. Given that the number of patents involved in this period is large and that some of the applications are illegible, there are strong practical reasons to collect a sample of patents for this period.

The most obvious and simplest method of sampling in this instance would be to take a cluster of units such as, for example, those comprising all patents filed in the first three months of each year. Despite its practicality, this approach would create an inefficient and unrepresentative sample, primarily because it would give undue weight to those patents and patentees who lodged their applications in the early part of the year. This would cause problems for two reasons. First, observation of patenting behaviour reveals that patentees who have more than one invention to protect in a given year often file all their applications at around the same time, not least because each of their inventions are intimately connected. Second, there are distinct surges in patenting activity in particular areas at particular times, which reflect the phenomenon of multiple discovery and the subsequent race to prove priority. Furthermore, in the immediate wake of a significant breakthrough in any given field of technology, it is normal for a flurry of other related inventions, extending and building upon the initial idea, to occur. Both of these features of patenting behaviour rule out cluster sampling. The same conclusion, albeit with less force, applies to totally random or haphazard sampling. Since the structure of patenting may vary from month to month, a random draw, by selecting most of its sample (by chance, rather than intention) from one period, could still create a sample that is disproportionate and unrepresentative. This would be especially so in this instance, because of the tendency for nearby patents to resemble each other. This problem could be resolved by thoroughly shuffling the population units, so as to put them in a truly random ordering, though given the nature of the data in question that option is quite impractical.

A far more expedient approach is to create what is called a systematic sample. Such a sample is constructed by a selection procedure that consists of taking the k th sampling unit after a random start. Thus, for a population size N , and a desired sample

⁷ Victoria, *Patents and Patentees* (Melbourne: Government Printer, 1868-1893)

size of n , the required sampling interval would be k , where $k = N/n$. The interval k divides the population into n zones of k units each. According to this selection procedure, the sample will draw only one unit from each of these zones. That unit would come from the same position in the ordering in each of the n zones of k . As the initial unit is chosen at random from the 1st to k th unit, each unit therefore has the same probability of selection, $1/k$.⁸ For example, if the population size was 50, and the desired sample size just 10, then the appropriate selection interval would be 5; that is, one unit should be selected from every group of five consecutive units. If it is then determined by random to begin the sample with, say, the first unit, then it would follow that the first unit in each of the subsequent zones would also be selected for the sample. In other words, in this example, the required sample of 10 would be made up of the units numbered 1, 6, 11, 16, 21, 26, 31, 36, 41, and 46. If the population size is not an integral multiple of k , as it was in this example, then the sample size should be allowed to be either n or $(n + 1)$. This would be done by setting the selection interval, k , at a level where $(n + 1)k > N > nk$. The actual size of the sample, n or $(n + 1)$, would then be determined by the random start.⁹

An obvious advantage of systematic sampling is that it is easy to carry out, and does not require any manipulation or reordering of the data. More importantly for the results, however, is the fact that the systematic sampling of a population usually yields a proportionate sample, so that whatever stratification exists in the ordering of the population list, one could reasonably expect it to be reflected in the sample. Thus, a systematic sample generated from a list of names ordered alphabetically would be expected to have the same proportion of names from each letter as the population. The selection of only one unit from each interval, however, obviously imposes some limits on the accuracy of the stratification produced, though these would not be great. The proportionality has an absolute error of less than one unit for any stratum. Moreover, the relative error for a stratum of ck units is less than $1/c$, which for large strata would be small.¹⁰

As each unit has an equal probability of being selected, the sample mean of a systematic sample with a random start will be an unbiased estimate of the population mean; assuming, of course, that the sample size is fixed. Where that is not the case, it will nevertheless provide a good estimate of the population mean. The variance of a systematic sample is more problematic, but where chronologically ordered units are subject to variation along the time dimension, and where there is no monotonic trend or regular periodic fluctuations coinciding with the selection interval, so that, for example, every fifth unit has a particular characteristic, the results of a systematic sample can be accepted for practical purposes as a good approximation for random choice.¹¹ As the patent series conform to these characteristics, a systematic stratified random sampling model, as just outlined, could be expected to produce an economic and practical sample of patents from which statistical inferences about the patenting behaviour of the

⁸ L. Kish, *Survey sampling* (New York: John Wiley & Sons, 1965), p. 113.

⁹ *Ibid.*, p. 115.

¹⁰ *Ibid.*, pp. 114-5.

¹¹ *Ibid.*, pp. 117-9.

population could be meaningfully made. This is the sampling procedure that has been adopted in this paper to create a representative sample of Victorian patents in the period between 1895 and 1903, when no Patent Office publications were printed. The sample size was set at 25 per cent of the population, so that on average around 260 patents were collected for each year. The sampling interval, k , was accordingly fixed at 4. This meant that every fourth patent in the chronological list was selected and recorded.

The information available for most Victorian patents is quite detailed. *Patents and Patentees* listed each patent application under three separate indexes. The first of these was the Subject-Matter Index, which categorised each application according to the technology or the technological area it concerned. This index has not been used to gauge inventive activity as it lists some inventions under several headings, and would, thus, lead to double counting. For example, a pump designed for evacuating water from mine shafts would be found under at least three different headings in this index: mining equipment, pumps, and the prevention of accidents (by mining). Despite this, however, an idea of the *diversity* of patenting can be gleaned from the number of categories in this index listed as having received patent applications in any particular year.¹² These categories did not change between 1868 and 1891.

The second index lists patents alphabetically by the name of the main patentee. As this index, gives no more than the patentee's name, the short title of the invention, and the application number, it is of little use for our purposes. The final index is a Chronological and Descriptive Index. This index ranks inventions by date of application and supplies the most detailed description of the patentee and the invention of all the publications available.¹³ The only other place where the same information can be obtained is from the actual application itself.

Each entry in *Patents and Patentees* begins by giving the invention's application number, the outcome of the application, and the dates on which the application was received and sealed. Given that the time between the lodgement of an application and its sealing could vary between three and twenty-four months, depending on the resources available to the Patent Office and the nature of the invention for which patent protection was sought, the date of filing is clearly the more meaningful of the two dates; assuming, of course, that what one is interested in is the timing of invention.¹⁴ This information is followed by the name(s) of those on the application, their occupations and addresses. From the patentees' names we can glean information about *inter alia* the gender distribution of patenting and the frequency with which different inventors patented both individually and collaboratively. There is, of course, no way of

¹² Categories and annual numbers for each can also be found in the production book of the *Statistical Register of the Colony of Victoria* (Melbourne: Government Printer, various years) for the years 1868 to 1891.

¹³ Between 1854 to 1866, there is no Chronological and Descriptive Index, so the Subject-Matter Index has to be used. As the numbers involved in these years are relatively small, it is easy to check for possible double counting.

¹⁴ P. Israel and R. Rosenberg, "Patent office records as a historical source: the case of Thomas Edison", *Technology and Culture* 32:4 (October 1991), 1097.

determining in every case whether the person claiming patent protection was indeed the actual inventor or just someone who had financed or even stolen the invention, or for that matter, where there were more than one patentee, who exactly was responsible for the invention. However, the applications do indicate when the invention had been assigned or communicated to the patentee, and in such cases the name, occupation, and address of the actual inventor are also supplied. Assignment usually occurred when the inventor, lacking adequate funds to develop the idea him or herself, sold his or her patent rights to the invention to a capitalist, although there are also cases, especially amongst female inventors, where these rights out of convention were simply transferred to a spouse or a relative. By contrast, communication took place when an inventor from another colony or country appointed someone else, usually a patent agent, to administer his or her patent rights in Victoria. Whenever a patent has been assigned or communicated, the name and details of the original inventor, rather than that of the assignee or of the person to whom the patent has been communicated, has been recorded.

Each patentee was also asked to provide his or her occupation and address. While there is no way of ascertaining whether all of these patentees did what they claimed they did or in fact lived where they said they did, there are likewise no grounds for believing that they did not. Indeed, checking the stated occupations and addresses of well-known inventors against those given in their *Australian Dictionary of Biography* entries suggest that patentees in these regards were in the main truthful. The only noticeable misreporting appears to be by those who preferred to be known as gentlemen rather than as professionals or tradesmen. Allowances, however, can be made for such a proclivity when the data comes to be analysed. As such then there is no reason that this source of information cannot be used to shed light on the occupational structure, location, and skill levels of those engaged in inventive activity.

Where patents were applied for by individuals of different occupations or from various places, the patent was divided between each of the occupations and colonies cited according to the percentage of the patentees of that occupation and from that colony. For example, if four individuals put their name to a single patent, and two of them gave addresses in Victoria, one in Tasmania, and one in Queensland, 0.5, 0.25, and 0.25 would be added to the respective colonies' patent count. Similarly, if three of these patentees were engineers and the other a blacksmith, 0.75 and 0.25 would also be added to the engineers and blacksmith counts respectively. In the absence of significant inside information about the contribution of the different individuals involved, this seems the only fair and reasonable way of distributing the inventive effort between the different patentees.

2. Industrial Classifications

Perhaps the most important piece of information supplied by the patent applicant was the specification of his or her invention. All applications by law were required to provide not only a short title, but also a detailed description of their invention. In order for patent protection to be granted in fact, it was mandatory that this description reveal sufficient information about the invention for a patent examiner or an appropriately trained

individual to be able to understand and recreate it from the specification alone. Failure to achieve the required degree of clarity was the most common reason for applications being rejected. In most cases, this requirement meant that the specification also needed to be accompanied by technical drawings. These drawings and specifications were all published in *Patents and Patentees*. They provide a potentially rich source of data on the direction and nature of both foreign and local inventive efforts in the nineteenth century.

To make use of this source, however, there is a need first to classify all patents by type in a thorough and consistent manner. The literature suggests three alternative ways of approaching this problem. The first of these is to categorise each patent according to technological or functional properties, as done in the Subject-Matter Index. We would thus have categories, for example, for patents concerning the internal combustion engine, electrical generators, steam engines, harvesters and so on. This mode of classification is of most use to the historian of technology, who wishes to study the history and development of a particular technology.¹⁵ Focusing on the technical dimension, however, it does not lend itself as effectively as other classifications to the analysis of the interplay of technological and economic development. The same can be said for the second type of classification which categorises patents by the industry of its origin, or more precisely, by the industry that would produce it. While this type of classification might tell one something about various considerations on the supply side, such as the returns to R&D expenditure in a particular industry, the fact that virtually all mechanical inventions come from one sector, the capital goods industry, means that it gives this sector too much influence and in the process blocks out as much light on the determinants of patenting as it sheds. The third alternative is to classify each patent according to the industrial sector of primary intended use (rather than origin); that is, the industry where the principles and ideas embodied in the patent were expected by the patentee to be employed. This form of classification is the most relevant of the three to economic analysis, and is therefore best able to capture the interaction between the industry, the macroeconomy and the supply of inventive ideas. Not surprisingly, this is the type of categorisation that has been most frequently utilised in the economics literature.¹⁶ It is also the method adopted in this source paper.

The actual industrial taxonomy employed in this project is largely derived from the standard classification of the manufacturing industries first formulated at a conference of Australian statisticians in 1902 and subsequently used in the compilation of statistics in relation to factories in New South Wales, and by Noel Butlin and other

¹⁵ For an Australian example of this type of classification, see S. Encel and A. Inglis, "Patents, inventions and economic progress", *Economic Record* 42:4 (December 1966), 581-2. Since this classification system is based on technological functions rather than products and industries, it has seldomly been used by economists.

¹⁶ For example, see J. Schmookler, *Invention and economic growth* (Cambridge, Mass.: Harvard University Press, 1966) and K. L. Sokoloff, "Inventive activity in early industrial America: evidence from patent records, 1790-1846", *Journal of Economic History* 48:4 (December 1988), 813-50.

researchers.¹⁷ To these classes, I have added eleven others. These additional classes account for all inventive activity pertaining to the primary, tertiary, mining, and household sectors. In all, there are 33 different categories of industry; categories which together span the entire breadth of the economy. These classes, as well as examples of the types of products produced by some of those classes, are given below. They are grouped according to which sector of the economy they belong.

Primary Sector

Class 1 -Agriculture

Class 2 - Pastoral

Class 3 - Dairying, Fishing and Forestry

Mining Sector

Class 4 - General Mining

Gold.
Coal.
Others.

Class 5 - Mechanical and Chemical Mining and Metal Extraction

Extraction of metals from ores by chemical and mechanical processes.

Secondary Sector

Class 6 - Construction

Class 7 - Treatment of Non-Metalliferous Mine and Quarry Products

Coke works.
Briquetting and pulverised coal.
Carbide, lime , plaster and asphalt.
Marble and slate.
Cement and cement goods.
Other.

¹⁷ New South Wales, *New South Wales Year-Book for 1938/9* (Sydney: Government Printer, 1939), pp. 933-4; N. G. Butlin, *Investment in Australian economic development, 1861-1900* (Canberra: A.N.U. Press, 1976), pp. 203-4; H. R. Edwards, "Employment in the New South Wales manufacturing industries, 1877 to 1938/9", *Economic Record* 26:2 (December 1950), 274-5.

Class 8 - Bricks, Pottery and Glass

Bricks and tiles, fire bricks and fire-clay goods.
Earthenware, china, porcelain, terra-cotta.
Glass and glass bottles.
Modelling.
Other.

Class 9 - Wood Working and Basketware

Sawmills, plywood mills and bark mills.
Joinery and cooperage.
Boxes and cases.
Wood turning and wood carving.
Basketware and wickerware.
Perambulators.
Other.

Class 10 - Furniture and Bedding

Billiard tables, cabinet and furniture making and upholstery.
Bedding and mattresses.
Furnishing drapery.
Picture frames.
Window blinds, verandah blinds.
Other.

Class 11 - Carriages and Coaches

Construction and repair of all types of vehicles.

Class 12 - General Engineering Equipment

Valves, pumps, gauges, and engines.
Electrical machinery, cables and apparatus.
Other.

Class 13 - Industrial Metals

Smelting, converting, refining, and rolling of iron and steel and other metals.

Class 14 - Machines, Implements, and metalworking

Cutlery and small tools.

Agricultural Implements.

Brass and copper.

Ship and boat-building and repairing.

Galvanised Iron-working and tin smithing.

wire working, art metal works, stoves and ovens, lead mills.

Gas fittings, meters, and lamp fittings

Arms and sewing machines.

Other.

Class 15 - Clothing and Textiles

Tailoring, dressmaking, and millinery (including repairs).

Waterproof and oilskin clothing.

Shirts, collars, and underclothing.

Stays, corsets, handkerchiefs, ties, and scarves.

Hats, caps and gloves.

Boots and shoes (including repairs and accessories).

Umbrellas and walking sticks.

Dye works and cleaning.

Cotton and silk.

Wool, worsted and shoddy.

Hosiery and other knitted goods.

Rope and cordage.

Canvas goods, tents, tarpaulins and sail making.

Bags and sacks.

Other.

Class 16 - Skins and Leather (not clothing or footwear)

Furs, skins and leather.

Saddlery, harness, bags, trunks, and other leather goods.

Other.

Class 17 - Preserving and Curing of Foods

Bacon curing.

Meat and fish preserving, meat extracts.

Other.

Class 18 - Refrigeration and Ice-making

Ice and refrigerating.

Ice-cream.

Class 19 - Foods and Non-alcoholic Drinks

Flour milling,
Cereal foods and starch.
Cattle and poultry foods.
Bakeries and biscuit making.
Sugar refining and sugar mills.
Confectionary and chocolate.
Jam, fruit and vegetable canning.
Pickles, sauces and vinegar.
Butter, cheese and margarine factories.
Condiments, coffee, cocoa and spices.
Salt refining.
Aerated waters, and cordials.
Dried fruits.
Bottling of non-alcoholic goods.
Sausage skins.
Other.

Class 20 - Alcoholic Beverages

Breweries and distilleries.
Wine making.
Cider and perry making.
Bottling of alcoholic beverages.
Other.

Class 21 - Tobacco

Tobacco, cigars, cigarettes and snuff.
Other tobacco products.

Class 22 - Paper, Stationery, Print and Bookbinding

Newspapers.
Printing.
Stationery, paper products, penholders and pencils.
Stereotyping and electrotyping.
Photography.
Process engraving.
Cardboard boxes, cartons and paper bags.
Paper Making.
Other.

Class 23 - Heat, Light and Power

Electric light and power generation.
Gas works.
Other.

Class 24 - Chemicals, Dyes, Paint, Oils and Grease

Chemicals.
White lead, paints and varnish.
Oils, vegetable, animal and mineral.
Boiling down, tallow refining and bone mills.
Soaps and candles. *
Chemical fertilisers. *
Inks and polishes.
Matches.
Other.

Class 25 - Medicines and Drugs

Pharmaceuticals, tonics, elixirs and lotions.

Class 26 - Explosives

Explosives.
Fuses.

Class 27 - Other Manufacturing

Precious metals, jewellery and plate.
Rubber and rubber goods.
Musical instruments.
Linoleum.
Bone, horn, ivory and tortoiseshell.
Celluloid.
Ornamental feather dressing.
Brooms and brushes.
Surgical, optical, and other scientific instruments.
Toys and sporting equipment.
Artificial flowers.
Other miscellaneous products.

Tertiary Sector

Class 28 - Railway

Class 29 - Shipping

Class 30 - Communications

Class 31 - Service and Distribution

Household Sector

Class 32 - Household Consumer Goods

Class 33 - Household Producer Goods

It will be noted that in this classification, mining patents, rather than being put together under a single heading, have instead been divided between two classes, Class 4 and Class 5. This has been done to reflect the fact that two distinctly different, though related, areas of inventive activity are taking place in this sector. Class 4, General Mining, is concerned with inventions utilised by the actual mine employee in the course of his work. It would therefore include patents pertaining *inter alia* to any type of mining tool such as a miner's pick, safety cages, or any other equipment intended for use by the miner at the mine-site or on the river-bank. For example, cradles and puddling tubs used by the prospector would be listed under Class 4. By contrast, Class 5, encompasses all inventions to do with the mining industry which are not actually involved in the digging up or discovery of the basic material or are performed by the miner. Thus, Class 5 would include anything involving the amalgamation, crushing, stamping, separating and washing, by mechanical, chemical or electrical means, of the mined product.

One problem with classifying by industry of final use arises from the fact that a patent may in fact be used by a number of different industries. When this occurs, the researcher has no other option than to make use of whatever information is available in the specification to determine to which class the invention belongs. While this method is admittedly rough, in most cases where this problem is present, it does at least give one a fairly good indication of where the patent should be classified.¹⁸ For example, in December 1893, F. A. Harris, W. Machar, and W. G. Sandys applied for a patent for their 'two-wheeled barrow'. As a wheel barrow could be used in virtually every industry, and even the household, it is not clear from the title of the invention in which class it should be placed. Closer inspection of the specification, however, reveals that the invention was devised '... principally for the purpose of conveying earthenware and stoneware pipes from one place to another during the process of manufacture'.¹⁹ The patent was accordingly categorised as a Class 8 patent.

¹⁸ Moreover, this roughness should diminish considerably when the individual classes are aggregated to create a new wider category.

¹⁹ Victoria, *Patents and Patentees* (1893), patent number 11040, 18 December 1893.

3. Gauging Australian inventive activity as a whole in the colonial period

The contributions of the various Australian colonies to the Victorian patent system can be used to formulate a series for Australian inventive effort as a whole in the second half of the nineteenth century. In Table 7, two estimates of such a measure are presented. Estimate A is simply calculated by adding together the patent applications of all Australian colonies in Victoria in any given year. Given the preponderance of Victorian applications in the system, however, this estimate necessarily gives too much weight to the contribution of Victorian inventive activity on the Australian series. Estimate B attempts to circumvent this problem by weighting the total number of patent applications in Victoria from each colony by its share of the total Australian population. Looking at Table 7, it is apparent that both series move in close parallel. Up till the 1880s, however, Estimate B is at all times below Estimate A. This relation between the two estimates is a reflection of the relatively minor contribution of non-Victorian Australians during this period; a fact that works to reduce the numerical value of Estimate B in those years. By the 1880s, as the increasingly greater involvement of non-Victorian Australians in the Victorian patent system began to be felt, this weakness of Estimate B is steadily removed.

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Table 1. Total number of patent applications filed in each of the Australian colonies, 1848-1903

Year	Victoria	New South Wales	Queensland	South Australia	Tasmania	Western Australia
1848				1		
1849				1		
1850				0		
1851				0		
1852				0		
1853				0		
1854	15	1		0		
1855	11	3		0		
1856	3	16		0		
1857	50	1		1		
1858	110	10		3	2	
1859	110	12		0	7	
1860	121	11	1	8	7	
1861	100	12	3	8	2	
1862	82	13	2	5	3	
1863	74	23	4	19	5	
1864	99	20	6	7	4	
1865	103	12	9	14	8	
1866	100	28	6	13	5	
1867	99	27	14	15	5	
1868	125	35	13	17	7	
1869	139	43	15	13	5	
1870	119	13	11	15	5	
1871	133	38	9	15	10	
1872	122	46	14	21	7	
1873	146	55	28	16	7	
1874	147	62	21	28	15	
1875	154	40	18	27	7	
1876	155	65	18	28	11	2
1877	145	84	28	48	18	4
1878	147	65	37	60	17	2
1879	158	84	27	51	11	3
1880	176	106	46	56	19	8
1881	197	135	71	80	27	8
1882	242	162	79	102	55	21
1883	249	189	109	104	37	28
1884	295	193	91	109	42	10
1885	457	192	111	125	38	11
1886	485	236	160	120	54	18
1887	677	529	236	185	80	30
1888	883	741	340	372	120	33
1889	951	796	380	398	144	39
1890	1017	766	395	449	103	44
1891	956	792	335	456	129	58
1892	882	703	315	353	111	83
1893	830	606	270	332	103	125
1894	853	720	322	350	151	203
1895	867	778	360	392	158	280
1896	1048	858	469	551	251	443
1897	1040	913	559	582	290	462
1898	955	835	496	512	262	433
1899	1012	954	577	565	315	465
1900	971	844	504	572	295	438
1901	1050	937	575	586	322	448
1902	1241	1128	650	667	356	515
1903	1132	997	564	680	370	543

Table 2. Total patent applications filed in each colony per 100,000 inhabitants, 1848-1903

Year	Victoria	New South Wales	Queensland	South Australia	Tasmania	Western Australia
1848				2.6		
1849				1.9		
1850				0.0		
1851				0.0		
1852				0.0		
1853				0.0		
1854	4.8	0.4		0.0		
1855	3	1.1		0.0		
1856	0.8	5.5		0.0		
1857	10.8	0.3		0.9		
1858	21.8	3.0		2.5	2.3	
1859	20.7	3.7	0.0	0.0	8.0	
1860	22.5	3.2	3.6	6.4	7.8	
1861	18.5	3.4	8.7	6.1	2.2	
1862	14.8	3.6	4.4	3.7	3.3	
1863	12.9	6.1	6.5	13.3	5.5	
1864	16.5	5.1	8.2	4.6	4.3	
1865	16.6	2.9	10.4	8.7	8.5	
1866	15.7	6.5	6.3	7.7	5.2	
1867	15.2	6.1	14.2	8.7	5.2	
1868	18.5	7.6	12.3	9.6	7.1	
1869	19.9	8.9	13.7	7.2	5.0	
1870	16.4	2.6	9.5	8.1	5.0	
1871	17.8	7.4	7.4	8.0	9.8	
1872	16.1	8.6	10.9	10.9	6.8	
1873	18.9	9.9	20.0	8.1	6.7	
1874	18.8	10.8	13.6	13.7	14.4	
1875	19.5	6.7	10.6	12.9	6.7	
1876	19.3	10.6	9.9	12.5	10.4	7.2
1877	17.8	13.1	14.3	20.2	16.8	14.2
1878	17.8	9.7	18.5	23.8	15.5	7.0
1879	18.8	11.9	13.2	19.2	9.8	10.3
1880	20.5	14.3	21.8	20.3	16.6	27.1
1881	22.4	17.4	32.0	28.0	22.9	26.5
1882	26.9	20.0	32.6	34.9	45.7	67.7
1883	27.0	22.1	38.8	34.4	30.0	87.3
1884	31.2	21.5	30.2	35.3	33.2	29.8
1885	47.2	20.3	35.1	40.4	29.5	30.6
1886	48.5	24.0	48.1	39.1	41.2	44.3
1887	65.7	52.1	67.1	59.7	59.0	68.5
1888	82.0	71.0	92.6	120.2	87.0	75.3
1889	86.2	74.1	99.6	126.5	101.7	85.4
1890	89.7	68.8	100.7	140.8	71.1	90.7
1891	82.6	68.7	83.7	140.4	85.3	109.1
1892	75.5	59.4	76.9	105.3	73.9	141.7
1893	70.6	50.2	64.4	96.3	68.5	192.5
1894	72.1	58.5	74.9	100.4	99.0	248.8
1895	73.1	62.0	81.3	111.4	102.0	278.6
1896	88.8	67.4	103.6	156.5	157.6	323.8
1897	87.9	70.5	120.7	165.2	176.9	287.9
1898	80.7	63.4	104.5	144.3	155.5	259.5
1899	85.1	71.2	118.6	157.3	182.8	273.1
1900	81.1	62.0	102.1	160.1	170.6	243.4
1901	86.7	68.1	113.5	163.1	183.8	231.4
1902	102.4	80.5	126.9	186.8	198.4	243.0
1903	93.6	70.0	108.9	190.5	202.3	241.6

Table 3. Colonial patent applications in the Colony of Victoria, 1857-1903

Year	Victoria	New South Wales	South Australia	Western Australia	Queensland	Tasmania
1857	73	0	4	0	0	0
1858	98	1	2.5	0	0	0
1859	102	0	1	0	0	0
1860	112	1	0	0	0	1
1861	83	0	1	0	0	0
1862	52	1	0	0	1	0
1863	67	2	0	0	0	0
1864	89	1	5	0	0	1
1865	88	1	1	0	0	1
1866	89	4	0	0	0	0
1867	87.6	6	2	0	0	0
1868	106	3	0	0	0	1
1869	122	8	1	0	1	0
1870	92	2	2	0	1	0
1871	105	1	3	0	2	0
1872	92	5	1	0	0	0
1873	113	6	4	0	1	1
1874	106	10	3	0	0	0
1875	122	5	6	0	0	0
1876	111.5	5.5	2	0	3	0
1877	106	4	1	0	0	0
1878	85.5	14	3	0	0	1
1879	98	11	5	0	2	0
1880	88	16	3	0	1	1
1881	103	7	13	1	1	0
1882	110	21	5	0	2	0
1883	128.5	15	4.5	0	1	1
1884	159	38	10	0	1.5	2
1885	286.5	50.5	10	0	2	1
1886	273.5	29.5	6	1	3.5	3
1887	384.67	66.33	19.5	1	13	2
1888	423.75	121.25	25.5	0	8	3
1889	492.5	117.5	23.5	0	13	0.5
1890	418.5	142.5	34.5	3	22	1.5
1891	376	134.5	42.5	0	22.5	1.5
1892	339	89	23	4	13	3
1893	355	100	24	2	24	7.5
1894	547.5	88.5	25.5	3	5	3
1895	466	80	12	4	16	6
1896	543.33	105.33	42	9.34	10	2
1897	468	114	32	4	12	18
1898	396	116	36	20	12	12
1899	408	124	34	6	12	8
1900	444	76	36	12	24	4
1901	480	98	20	4	4	10
1902	528	116	32	16	16	8
1903	521	90	39	17	13	13

Table 4. Victorian patenting per capita in Victoria

Table 5. Patent categories reported

Year	Victoria patent applications in Victoria per 10,000 inhabitants
1857	1.60
1858	1.98
1859	1.96
1860	2.08
1861	1.54
1862	0.94
1863	1.18
1864	1.49
1865	1.42
1866	1.40
1867	1.35
1868	1.58
1869	1.75
1870	1.27
1871	1.41
1872	1.21
1873	1.46
1874	1.35
1875	1.53
1876	1.38
1877	1.29
1878	1.03
1879	1.16
1880	1.02
1881	1.18
1882	1.23
1883	1.41
1884	1.70
1885	2.98
1886	2.75
1887	3.75
1888	3.93
1889	4.46
1890	3.69
1891	3.25
1892	2.90
1893	3.02
1894	4.63
1895	3.93
1896	4.61
1897	3.96
1898	3.35
1899	3.43
1900	3.71
1901	3.97
1902	4.37
1903	4.32

Year	Number of patent categories listed by Patent Office
1868	72
1869	61
1870	51
1871	69
1872	78
1873	54
1874	72
1875	69
1876	67
1877	71
1878	66
1879	80
1880	90
1881	90
1882	98
1883	85
1884	121
1885	182
1886	179
1887	232
1888	290
1889	405
1890	423
1891	238

Table 6. Patents granted in Victoria, 1854-1893

Year	Total
1854	8
1855	9
1856	3
1857	66
1858	75
1859	71
1860	55
1861	53
1862	53
1863	43
1864	68
1865	60
1866	58
1867	52
1868	63
1869	74
1870	72
1871	84
1872	58
1873	83
1874	101
1875	88
1876	97
1877	104
1878	92
1879	98
1880	131
1881	136
1882	187
1883	163
1884	206
1885	253
1886	300
1887	376
1888	517
1889	583
1890	613
1891	555
1892	538
1893	444

Table 7. Two estimates of Australian inventive activity and inventive activity per capita, 1857-1903

Inventive activity (1900 = 100)			Inventive activity per capita (1900 = 100)		
Year	Estimate A	Estimate B	Year	Estimate A	Estimate B
1857	12.92	8.99	1857	50.14	34.98
1858	17.03	11.63	1858	61.02	41.75
1859	17.28	11.22	1859	59.30	38.58
1860	19.13	14.21	1860	62.87	46.82
1861	14.09	8.94	1861	45.43	28.91
1862	8.89	5.91	1862	27.74	18.46
1863	11.58	7.59	1863	34.62	22.75
1864	16.11	12.75	1864	45.78	36.32
1865	15.27	11.21	1865	41.36	30.43
1866	15.60	10.36	1866	40.69	27.06
1867	15.27	11.63	1867	38.74	29.58
1868	18.46	13.20	1868	45.14	32.35
1869	22.15	15.81	1869	52.38	37.46
1870	16.28	10.81	1870	37.19	24.76
1871	18.62	12.30	1871	41.23	27.29
1872	16.44	11.35	1872	35.52	24.58
1873	20.97	16.41	1873	44.01	34.50
1874	19.97	15.15	1874	40.65	30.92
1875	22.32	15.41	1875	44.27	30.63
1876	20.47	14.39	1876	39.35	27.73
1877	18.62	11.62	1877	34.53	21.58
1878	17.37	15.87	1878	31.25	28.62
1879	19.46	15.83	1879	33.89	27.62
1880	18.29	17.33	1880	30.86	29.31
1881	20.97	16.88	1881	34.23	27.61
1882	23.15	21.17	1882	36.51	33.45
1883	25.17	20.48	1883	37.82	30.84
1884	35.32	36.56	1884	51.04	52.95
1885	58.72	51.63	1885	82.06	72.30
1886	53.10	42.87	1886	71.72	58.02
1887	81.63	76.49	1887	106.67	100.17
1888	97.57	105.34	1888	123.21	133.32
1889	108.56	108.28	1889	133.47	133.42
1890	104.36	123.36	1890	124.70	147.72
1891	96.81	118.40	1891	112.48	137.85
1892	79.03	86.10	1892	90.01	98.29
1893	85.99	103.21	1893	96.31	115.84
1894	112.84	98.15	1894	123.98	108.09
1895	97.99	92.92	1895	105.67	100.43
1896	119.46	112.37	1896	126.60	119.35
1897	108.72	125.09	1897	113.16	130.48
1898	99.33	121.18	1898	102.06	124.78
1899	99.33	115.44	1899	100.65	117.22
1900	100.00	100.00	1900	100.00	100.00
1901	103.36	101.13	1901	101.75	99.78
1902	120.13	125.85	1902	116.72	122.54
1903	116.28	119.53	1903	111.78	115.17

Note: **Estimate A** is the total number of Australian patents filed in Victoria; **Estimate B** is the total number of each colonies patents in Victoria weighted by its share of population

Table 8. UK, USA, New Zealand and total foreign patent applications in Victoria, 1857-1903

Year	UK	USA	New Zealand	Total Foreign
1857	1	0	0	1
1858	7.5	0	0	7.5
1859	4	0	0	4
1860	1	3	0	5
1861	1	0	0	1
1862	4	0	0	4
1863	5	0	0	5
1864	3	0	0	3
1865	7	4	0	12
1866	3.5	1	0	7
1867	4	0	1	6
1868	10	3	1	17
1869	4.67	2	2	9
1870	12	7	1	27
1871	9	7	5	22
1872	15	1	4	24
1873	12	5	1	23
1874	16	6	2	28
1875	10	3	6	21
1876	16	9	1	34
1877	14	10	5	33
1878	24	12.5	1	43.5
1879	25	9	0	42
1880	25	27	4	62
1881	18	36	6	72
1882	59	21	6	104
1883	55	21	8	99
1884	48.5	17	10	85.5
1885	53	24	18	109
1886	89	34	18	160
1887	101	42	28	196.5
1888	128	69.5	57	303.5
1889	153.5	84	41.5	308
1890	214	84	57	395
1891	206	94	40.5	377
1892	188.5	123	43	409
1893	125	100	41	316.5
1894	98	30	30.5	179.5
1895	124	60	68	284
1896	160	72	72	336
1897	128	104	96	392
1898	150	82	72	364
1899	160	132	68	420
1900	156	112	52	376
1901	160	148	48	436
1902	152	192	96	524
1903	151	118	77	438

Table 9. Foreign patent applications in Victoria per 10,000 inhabitants of Victoria

Year	Foreign patents per 10,000 inhabitants	Year	Foreign patents per 10,000 inhabitants
1857	0.02	1881	0.82
1858	0.15	1882	1.16
1859	0.08	1883	1.08
1860	0.09	1884	0.91
1861	0.02	1885	1.14
1862	0.07	1886	1.61
1863	0.09	1887	1.92
1864	0.05	1888	2.81
1865	0.19	1889	2.79
1866	0.11	1890	3.48
1867	0.09	1891	3.25
1868	0.25	1892	3.50
1869	0.13	1893	2.69
1870	0.37	1894	1.52
1871	0.29	1895	2.40
1872	0.32	1896	2.85
1873	0.30	1897	3.32
1874	0.36	1898	3.08
1875	0.26	1899	3.53
1876	0.42	1900	3.14
1877	0.40	1901	3.60
1878	0.52	1902	4.34
1879	0.50	1903	3.64
1880	0.72		

Table 10. Patenting in Victoria by country and colony of origin, 1857-1903

Country	Applications	Share (%)	Country	Applications	Share (%)
Argentina	5.5	0.03	Mauritius	4	0.02
Austria	44	0.21	Norfolk Island	1.5	0.01
Belgium	50.5	0.24	Norway	17	0.08
Brazil	1	0.004	New South Wales	2043.41	9.64
Canada	151.5	0.71	New Zealand	1087.5	5.13
Ceylon	2	0.01	Portugal	7	0.03
Chile	2	0.01	Queensland	262	1.24
China	4	0.02	Roumania	0.67	0.003
Colombia	1	0.004	Russia	18	0.08
Denmark	57.83	0.27	South Australia	600	2.83
Ecuador	1	0.004	South Africa	49.5	0.23
Fiji	2	0.01	Spain	6	0.03
Finland	8	0.04	Straits Settlement	1	0.001
France	209.33	0.99	Sweden	87.83	0.41
Germany	217.83	1.03	Switzerland	13.5	0.06
Hawaii	1	0.004	Tasmania	117	0.55
Holland	11.5	0.05	UK	3119.17	14.72
India	17	0.08	USA	1909	9.01
Italy	12.5	0.06	Victoria	10936.75	51.60
Jamaica	0.34	0.001	Western Australia	107.34	0.51
Japan	1.5	0.01			

Table 11. Victorian, Non-Victorian Australian, Australian, UK, USA, and total foreign shares of Victorian patent applications, 1857-1903 (in percentages)

Year	Victoria	Non-Victorian Australia	Australia	UK	USA	Total Foreign
1857	93.6	5.1	98.7	1.3	0	1.3
1858	89.9	3.2	93.1	6.9	0	6.9
1859	95.3	0.9	96.3	3.7	0	3.7
1860	94.1	1.7	95.8	0.8	2.5	4.2
1861	97.6	1.2	98.8	1.2	0	1.2
1862	91.2	1.8	93	7	0	7
1863	90.5	2.7	93.2	6.8	0	6.8
1864	89.9	7.1	97	3	0	3
1865	85.4	2.9	88.3	6.8	3.9	11.7
1866	89	4	93	3.5	1	7
1867	87.6	6.2	93.8	4.1	0	6.2
1868	83.5	3.2	86.7	9.4	2.4	13.3
1869	86.5	7.1	93.6	3.3	1.4	6.4
1870	74.2	4	78.2	14.5	5.6	21.8
1871	78.9	4.6	83.5	6.8	5.3	16.5
1872	75.4	4.9	80.3	12.3	0.8	19.7
1873	76.4	8.2	84.6	8.1	3.4	15.4
1874	72.1	8.8	80.9	10.9	4.1	19.1
1875	79.2	7.2	86.4	6.5	1.9	13.6
1876	71.5	6.7	78.2	10.3	5.8	21.8
1877	73.6	3.5	77.1	9.7	6.9	22.9
1878	58.2	12.2	70.4	16.3	8.5	29.6
1879	62	11.5	73.5	15.8	5.7	26.5
1880	51.5	12.4	63.9	14.6	15.8	36.1
1881	52.3	11.2	63.5	9.1	18.3	36.5
1882	45.5	11.6	57.1	24.4	8.7	42.9
1883	51.6	8.6	60.2	22.1	8.4	39.8
1884	53.7	17.4	71.1	16.4	5.7	28.9
1885	62.4	13.8	76.2	11.5	5.2	23.8
1886	57.4	9	66.4	18.7	7.1	33.6
1887	56.3	14.9	71.2	14.8	6.1	26.8
1888	47.9	17.8	65.7	14.5	7.9	34.3
1889	51.6	16.3	67.9	16.1	8.8	32.1
1890	41.2	19.9	61.1	21	8.4	38.9
1891	39.2	21.1	60.3	21.5	9.8	39.7
1892	38.4	15	53.4	21.4	13.9	46.6
1893	42.9	18.9	61.8	15.2	12.1	38.2
1894	64.2	14.7	78.9	11.5	3.5	21.1
1895	53.7	13.6	67.3	14.3	6.9	32.7
1896	51.8	16.1	67.9	15.3	6.9	32.1
1897	45	17.3	62.3	12.3	10	37.7
1898	41.4	20.5	61.9	15.7	8.6	38.1
1899	40.3	18.2	58.5	15.8	13	41.5
1900	45.7	15.6	61.3	16.1	11.5	38.7
1901	45.8	12.9	58.6	15.3	14.1	41.4
1902	42.6	15.2	57.7	12.3	15.5	42.3
1903	46	15.2	61.2	13.3	10.5	38.7

Table 12. Patent applications in Victoria by sector, 1854-1903

Year	Primary	Manufacturing	Mining	Tertiary	Household
1854	1	2	4	1	0
1855	0	0	9	0	0
1856	0	0	2	0	0
1857	6	34	24	7	8
1858	5	62	31	6	6
1859	9	55	37	5	4
1860	6	55	45	10	5
1861	6	40	41	12	1
1862	12	43	18	5	3
1863	4	37	20	12	2
1864	11	51	17	11	9
1865	5	57	30	8	2
1866	4	42	29	13	12
1867	12	54	23	4	6
1868	19	65	30	3	8
1869	17	67	27	11	19
1870	13	68	23	4	10
1871	16	85	12	12	8
1872	24	71	11	5	12
1873	23	81	28	3	11
1874	23	78	24	8	14
1875	22	70	26	16	30
1876	22	92	17	7	18
1877	16	90	13	13	12
1878	9	97	8	23	9
1879	16	92	18	16	16
1880	31	96	11	21	14
1881	24	115	20	24	14
1882	22	158	24	40	8
1883	35	135	29	29	21
1884	38	156	38	41	16
1885	74	255	31	59	40
1886	57	278	30	77	45
1887	106	317	52	130	73
1888	97	511	80	130	77
1889	92	575	67	138	85
1890	105	587	85	160	75
1891	143	542	61	141	72
1892	105	520	78	130	52
1893	97	489	89	105	49
1894	93	395	102	162	97
1895	80	484	104	100	100
1896	64	692	88	100	104
1897	68	644	140	70	108
1898	68	616	84	132	48
1899	136	616	100	84	72
1900	112	556	100	132	72
1901	120	636	84	136	72
1902	160	784	60	144	82
1903	129	711	47	129	116

Table 13. Patents granted in Victoria by sector, 1854-1893

Year	Primary	Manufacturing	Mining	Tertiary	Household
1854	1	2	4	1	0
1855	0	0	9	0	0
1856	0	1	2	0	0
1857	5	29	20	5	7
1858	4	45	19	4	3
1859	6	39	21	4	1
1860	3	27	16	6	3
1861	3	23	20	6	1
1862	9	29	7	5	3
1863	4	20	10	7	2
1864	8	33	12	9	6
1865	3	30	23	3	1
1866	2	24	16	9	7
1867	8	29	13	0	2
1868	11	32	15	2	3
1869	11	33	21	4	5
1870	6	44	11	4	7
1871	13	51	8	9	3
1872	10	40	3	3	2
1873	10	55	18	2	3
1874	15	53	18	5	10
1875	13	40	10	10	15
1876	18	57	10	5	7
1877	11	63	10	10	10
1878	5	62	6	14	5
1879	10	60	11	10	7
1880	19	83	4	16	9
1881	15	88	15	13	5
1882	16	126	20	23	2
1883	19	94	19	20	11
1884	24	118	23	32	9
1885	27	146	22	39	19
1886	27	154	58	44	17
1887	57	191	28	78	22
1888	52	307	52	69	37
1889	51	372	47	81	32
1890	68	363	51	89	42
1891	83	313	35	82	42
1892	64	317	48	77	32
1893	52	262	48	56	26

Table 14. Sectoral shares of Victorian patent applications, 1854-1903 (in percentages)

Year	Manufacturing	Tertiary	Household	Primary	Mining
1854	25	12.5	0	12.5	50
1855	0	0	0	0	100
1856	0	0	0	0	100
1857	43	8.9	10.1	7.6	30.4
1858	56.4	5.5	5.5	4.5	28.2
1859	50	4.5	3.6	8.2	33.6
1860	45.5	8.3	4.1	5	37.2
1861	40	12	1	6	41
1862	53.1	6.2	3.7	14.8	22.2
1863	49.3	16	2.7	5.3	26.7
1864	51.5	11.1	9.1	11.1	17.2
1865	55.9	7.8	2	4.9	29.4
1866	42	13	12	4	29
1867	54.6	4	6.1	12.1	23.2
1868	52	2.4	6.4	15.2	24
1869	47.5	7.8	13.5	12.1	19.1
1870	57.6	3.4	8.5	11	19.5
1871	63.8	9	6.1	12	9
1872	57.6	4.1	9.8	19.5	8.9
1873	55.5	2.1	7.5	15.8	19.2
1874	53.1	5.4	9.5	15.6	16.3
1875	45.4	10.4	19.5	14.3	16.9
1876	58.9	4.5	11.6	14.1	10.9
1877	62.6	9	8.3	11.1	9
1878	66.4	15.8	6.2	6.2	5.5
1879	58.3	10.1	10.1	10.1	11.4
1880	55	12.1	8.1	17.9	6.4
1881	58.4	12.2	7.1	12.2	10.2
1882	62.6	15.9	3.2	8.7	9.5
1883	54.2	11.6	8.5	14.1	11.6
1884	54	14.2	5.5	13.1	13.1
1885	55.5	12.9	8.7	16.1	6.8
1886	57	15.8	9.3	11.7	6.2
1887	46.7	19.2	10.8	15.6	7.7
1888	57.1	14.5	8.6	10.8	8.9
1889	60.1	14.4	8.9	9.6	7
1890	53.6	15.8	7.4	10.4	8.4
1891	56.5	14.7	7.5	14.9	6.4
1892	58.8	14.7	5.9	11.9	8.8
1893	59	12.7	5.9	11.7	10.7
1894	46.5	19.1	11.4	11	12
1895	55.8	11.5	11.5	9.2	12
1896	66	9.5	9.9	6.1	8.4
1897	62.5	6.8	10.5	6.6	13.6
1898	65	13.9	5.1	7.2	8.9
1899	61.1	8.3	7.1	13.5	9.9
1900	57.2	13.6	7.4	11.5	10.3
1901	60.7	13	6.9	11.5	8
1902	63.7	11.7	6.7	13	4.9
1903	62.8	11.4	10.2	11.4	4.2

Table 15. Industry and sector shares of all, Australian, and foreign patenting, 1854-1903

INDUSTRY	Share of	Share of	Share of
	patents (%)	Australian patents (%)	foreign patents (%)
agriculture (1)	8.6	10.6	3.8
books, paper, printing (22)	2.1	1.7	2.9
bricks, pottery, glass (8)	1.6	1.6	1.6
furniture, bedding (10)	1.2	1.3	0.9
woodworking (9)	1.1	1.2	1.0
chemicals, dyes, oils (24)	3.1	2.4	4.6
medicines and remedies (25)	0.3	0.4	0.1
explosives (26)	0.7	0.5	1.3
construction (6)	6.2	6.9	4.4
dairy, fishing, and forest products (3)	0.7	0.9	0.4
alcoholic beverages (20)	0.7	0.6	0.9
food processing (19)	4.6	4.4	5.0
food preservation (17)	1.0	0.9	1.1
refrigeration and ice-making (18)	1.2	1.1	1.5
tobacco products (21)	0.6	0.4	0.9
heat, light, power (23)	2.4	1.2	5.1
household consumer (32)	5.0	6	2.7
household producer (33)	3.1	3.7	1.9
leather (16)	1.8	1.8	1.7
chemical/mechanical extraction of metal from ores (5)	8.3	8.5	8.0
carriage and coach-making (11)	3.5	3.8	2.6
engineering (12)	6.6	6.0	7.9
industrial metals (13)	1.0	0.8	1.3
metalworking (14)	10.5	10.0	11.9
general mining (4)	2.8	3.5	1.3
treatment of non-metal mine products (7)	1.1	1.1	1.0
other manufacturing (27)	1.6	1.2	2.4
pastoral (2)	2.5	2.7	2.2
railway (28)	4.2	3.6	5.6
shipping (29)	1.3	1.3	1.2
communication (30)	1.0	0.6	1.7
services and distribution (31)	6.2	6.2	6.3
textiles, clothing and footwear (15)	3.6	3.1	4.9
BUILDING MATERIALS (8, 9, 10)	3.9	4.1	3.6
CHEMICALS (24, 25, 26)	4.0	3.2	5.9
METALS (5, 11, 12, 13, 14)	29.8	29.1	31.6
FOOD AND DRINKS (17, 18, 19, 20, 21)	8.0	7.5	9.4
PRIMARY	11.9	14.2	6.4
MANUFACTURING	56.2	52.4	65.0
TERTIARY	12.7	11.7	14.8
HOUSEHOLD	8.1	9.6	4.6
TOTAL MINING	11.1	12.0	9.3

Note: The industrial classification number of each industry is given in parenthesis.

Table 16. Patent applications in Victoria by industry, 1854-1903

Year	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9
1854	1	0	0	1	3	2	0	0	0
1855	0	0	0	1	8	0	0	0	0
1856	0	0	0	0	2	0	0	0	0
1857	4	1	1	8	16	9	1	1	2
1858	4	1	0	14	17	5	7	2	2
1859	7	1	1	10	27	6	1	4	2
1860	4	2	0	7	38	9	10	6	2
1861	5	0	1	4	37	2	6	3	1
1862	9	2	1	6	12	1	2	1	2
1863	2	2	0	4	16	2	0	2	0
1864	3	8	0	6	11	4	1	2	0
1865	1	4	0	16	14	7	3	1	2
1866	2	1	1	3	26	2	1	1	4
1867	8	4	0	12	11	1	1	3	0
1868	9	10	0	13	17	4	0	3	0
1869	9	7	1	9	18	2	6	5	4
1870	9	7	1	9	18	2	6	5	1
1871	5	6	2	6	17	6	3	5	1
1872	8	2	6	4	8	3	7	6	1
1873	19	5	0	2	9	5	2	7	1
1874	22	1	0	6	22	9	5	6	3
1875	13	10	0	4	20	8	2	4	1
1876	13	10	0	4	20	8	2	4	1
1877	11	9	2	4	12	7	1	0	1
1878	16	4	2	6	11	12	2	0	1
1879	13	3	0	6	7	14	0	1	1
1880	6	1	2	2	6	12	0	0	2
1881	14	2	0	10	8	11	0	0	2
1882	28	3	0	3	8	12	2	1	1
1883	20	2	2	5	15	14	0	1	2
1884	19	2	1	7	17	15	2	3	0
1885	30	5	0	9	20	19	3	3	4
1886	31	5	2	15	23	26	2	11	3
1887	68	3	3	10	21	41	7	9	6
1888	40	12	5	4	26	41	6	10	7
1889	72	31	3	15	37	39	4	12	11
1890	70	23	4	15	65	82	4	18	6
1891	64	22	4	20	47	76	6	17	8
1892	76	25	4	16	69	54	9	10	16
1893	96	40	7	9	52	45	16	16	12
1894	56	39	10	8	70	52	8	7	7
1895	58	22	17	7	82	52	6	9	15
1896	63	21	9	28	74	33	4	5	5
1897	40	24	16	0	104	32	4	8	8
1898	56	8	0	16	72	24	4	8	12
1899	52	16	0	44	96	32	0	28	12
1900	56	12	8	24	60	48	0	8	16
1901	104	32	4	28	72	52	4	16	8
1902	100	8	4	28	72	48	4	8	8
1903	104	12	4	16	68	44	0	4	12
	124	20	16	16	44	120	12	4	8
	77	13	39	17	30	77	13	17	13

Table 16. Patent applications in Victoria by industry, 1854-1903, cont.

Year	Class 10	Class 11	Class 12	Class 13	Class 14	Class 15	Class 16	Class 17
1854	0	0	0	0	0	0	0	0
1855	0	0	0	0	0	0	0	0
1856	0	0	0	0	0	0	0	0
1857	0	0	3	1	3	1	1	0
1858	4	1	7	0	10	3	1	1
1859	2	1	13	2	12	1	1	0
1860	0	1	6	1	3	2	1	0
1861	0	1	3	1	5	4	1	0
1862	0	0	6	1	3	5	3	2
1863	3	2	7	0	3	2	5	1
1864	0	0	9	3	8	3	0	2
1865	1	6	7	2	3	5	0	2
1866	2	3	9	0	1	3	2	3
1867	0	0	9	2	7	0	3	8
1868	0	2	9	0	4	4	1	11
1869	0	2	7	1	11	3	4	6
1870	0	4	15	0	4	4	2	7
1871	0	6	11	1	6	6	1	8
1872	0	1	11	2	5	8	5	7
1873	1	3	8	3	4	3	3	7
1874	3	3	13	1	4	6	3	6
1875	0	3	8	5	13	5	5	3
1876	2	6	13	7	4	5	8	6
1877	2	8	16	2	5	3	2	5
1878	0	6	12	1	16	3	2	0
1879	0	2	18	2	11	3	4	2
1880	2	3	12	1	6	4	7	2
1881	1	5	13	1	12	10	4	3
1882	3	8	15	6	28	11	5	1
1883	1	4	10	4	25	10	12	0
1884	1	11	20	7	26	5	1	1
1885	7	7	33	9	55	11	8	3
1886	8	13	31	2	63	13	7	0
1887	11	18	44	4	50	29	4	0
1888	10	32	33	8	117	20	20	3
1889	11	41	54	7	140	26	16	5
1890	10	21	73	4	156	39	18	3
1891	22	38	107	9	74	29	3	0
1892	13	28	64	3	136	42	18	3
1893	15	8	45	6	150	37	19	0
1894	11	30	69	7	63	33	21	0
1895	8	60	32	4	72	60	24	0
1896	8	140	56	0	152	48	12	8
1897	24	136	40	4	116	32	16	12
1898	4	64	36	16	116	56	16	4
1899	16	52	72	16	108	32	12	8
1900	8	36	68	4	152	52	12	0
1901	12	28	56	0	168	64	28	8
1902	32	48	40	20	188	80	12	4
1903	13	60	95	9	155	65	9	9

Table 16. Patent applications in Victoria by industry, 1854-1903, cont.

Year	Class 18	Class 19	Class 20	Class 21	Class 22	Class 23	Class 24	Class 25
1854	0	0	0	0	0	0	0	0
1855	0	0	0	0	0	0	0	0
1856	0	0	0	0	0	0	0	0
1857	1	1	0	0	3	3	3	1
1858	1	5	2	0	2	5	3	1
1859	1	1	0	0	3	1	3	0
1860	1	4	1	0	1	2	5	0
1861	1	2	1	1	3	1	4	0
1862	0	6	1	1	1	2	5	0
1863	1	5	1	0	0	0	3	0
1864	0	5	2	0	3	1	5	1
1865	0	3	2	3	2	0	2	0
1866	1	3	1	1	1	0	3	0
1867	1	6	3	0	1	0	3	0
1868	6	11	0	1	2	0	2	2
1869	1	3	1	1	1	2	4	1
1870	0	10	2	0	0	0	3	1
1871	3	12	2	0	2	1	6	0
1872	1	3	0	0	2	2	5	0
1873	3	4	0	0	2	6	7	2
1874	3	11	0	0	1	2	4	0
1875	4	4	0	2	4	3	0	0
1876	2	10	0	1	4	2	3	1
1877	0	9	1	1	0	2	6	5
1878	10	17	0	1	1	2	7	3
1879	6	10	0	0	5	8	2	1
1880	6	8	2	0	1	19	4	1
1881	7	10	1	0	2	23	4	1
1882	4	5	3	0	1	26	14	1
1883	0	10	1	0	0	10	12	1
1884	2	13	2	1	6	2	12	0
1885	0	19	5	1	11	5	11	1
1886	4	16	5	0	13	6	23	0
1887	10	16	5	0	14	6	23	1
1888	7	55	6	1	13	21	33	0
1889	12	30	11	2	29	36	27	1
1890	21	34	12	1	31	13	33	1
1891	10	43	3	10	26	19	36	0
1892	3	49	8	15	18	15	15	0
1893	17	43	0	9	17	7	13	2
1894	4	39	2	7	19	16	12	5
1895	8	44	12	32	28	4	32	0
1896	16	76	8	16	20	8	20	4
1897	12	40	0	8	28	16	28	0
1898	4	64	4	12	28	44	32	0
1899	8	44	12	0	36	28	44	12
1900	0	36	0	16	28	44	16	0
1901	0	80	0	4	36	32	8	0
1902	8	64	4	16	24	40	32	0
1903	13	65	4	0	4	22	30	4

Table 16. Patent applications in Victoria by industry, 1854-1903, cont.

Year	Class 26	Class 27	Class 28	Class 29	Class 30	Class 31	Class 32	Class 33
1854	0	0	0	0	0	1	0	0
1855	0	0	0	0	0	0	0	0
1856	0	0	0	0	0	0	0	0
1857	0	0	3	4	0	0	6	2
1858	0	0	2	2	1	1	4	2
1859	0	1	2	1	2	0	3	1
1860	0	0	6	2	1	1	4	1
1861	0	0	8	1	1	2	1	0
1862	0	1	1	2	1	1	2	1
1863	0	0	3	2	0	5	0	2
1864	1	1	4	1	1	5	4	5
1865	4	2	1	1	1	5	2	0
1866	1	0	1	7	0	5	11	1
1867	1	5	1	2	0	1	2	4
1868	0	3	2	0	0	1	5	3
1869	1	1	3	5	1	2	19	0
1870	1	0	0	3	0	1	5	5
1871	2	1	3	4	0	5	5	3
1872	4	0	3	1	0	1	7	5
1873	2	0	1	1	0	1	2	9
1874	2	1	1	2	2	3	6	8
1875	1	1	6	5	0	5	15	15
1876	2	1	2	3	0	2	11	7
1877	4	2	6	2	1	4	6	6
1878	2	0	8	2	3	10	5	4
1879	1	4	5	3	0	8	6	10
1880	2	0	9	1	4	7	8	9
1881	1	0	14	0	6	4	8	6
1882	4	3	14	1	4	11	5	3
1883	2	4	16	3	2	8	11	10
1884	2	2	20	3	5	13	12	4
1885	1	5	18	8	1	32	27	13
1886	2	8	36	2	14	25	30	15
1887	3	13	49	15	6	60	51	22
1888	11	11	40	12	7	71	50	22
1889	7	13	40	12	4	82	55	30
1890	7	19	42	15	7	96	36	39
1891	0	21	43	19	14	65	53	19
1892	5	10	46	7	10	67	31	21
1893	4	15	22	4	9	70	30	19
1894	2	12	60	11	2	89	79	18
1895	0	12	20	4	12	64	60	40
1896	0	52	40	0	8	52	60	44
1897	8	52	12	16	8	44	52	56
1898	8	36	20	8	8	96	20	28
1899	16	20	8	8	20	48	28	44
1900	4	12	40	4	12	76	40	32
1901	8	44	36	8	0	92	44	28
1902	8	20	24	8	24	88	44	48
1903	4	30	47	13	14	56	69	47

Table 17. Patents granted in Victoria by industry, 1854-1893

Year	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9
1854	1	0	0	1	3	2	0	0	0
1855	0	0	0	1	8	0	0	0	0
1856	0	0	0	0	2	0	0	0	0
1857	4	1	0	6	14	6	1	1	2
1858	3	1	0	8	11	2	7	1	1
1859	4	1	1	4	17	5	0	3	2
1860	1	2	0	2	14	3	5	3	2
1861	2	0	1	1	19	0	3	1	1
1862	6	2	1	1	6	1	1	0	1
1863	2	2	0	1	9	2	0	1	0
1864	2	6	0	3	9	2	0	2	0
1865	1	2	0	13	10	4	1	1	0
1866	1	0	1	3	13	1	1	1	2
1867	6	2	0	6	7	0	1	2	0
1868	5	6	0	9	6	2	0	1	0
1869	6	5	0	7	14	0	2	4	2
1870	2	3	1	3	8	4	3	3	0
1871	6	2	5	2	6	3	5	4	1
1872	8	2	0	0	3	1	2	3	1
1873	9	1	0	4	14	7	3	5	2
1874	7	8	0	4	14	6	2	3	1
1875	6	7	0	3	7	4	0	0	0
1876	12	4	2	3	7	4	0	0	1
1877	8	3	0	3	7	12	0	0	2
1878	5	0	0	1	5	8	0	0	1
1879	9	1	0	4	7	8	0	0	2
1880	16	3	0	2	2	9	0	1	1
1881	13	1	1	4	11	12	0	1	0
1882	14	2	0	6	14	13	1	2	0
1883	16	3	0	3	16	12	1	1	1
1884	19	4	1	7	16	22	1	8	2
1885	25	1	1	9	13	17	7	4	4
1886	18	6	3	40	18	26	3	6	4
1887	37	18	2	8	20	22	3	9	6
1888	35	16	1	6	46	47	3	14	3
1889	36	12	3	10	37	40	4	11	7
1890	49	16	3	8	43	35	5	7	11
1891	56	23	4	5	30	26	9	9	7
1892	34	24	6	5	43	32	5	4	4
1893	31	12	9	4	44	28	3	5	8

Table 17. Patents granted in Victoria by industry, 1854-1893, cont.

Year	Class 10	Class 11	Class 12	Class 13	Class 14	Class 15	Class 16	Class 17
1854	0	0	0	0	0	0	0	0
1855	0	0	0	0	0	0	0	0
1856	0	0	0	0	0	0	0	0
1857	0	0	2	2	3	0	1	0
1858	3	1	6	0	8	1	1	1
1859	1	0	7	2	12	1	1	0
1860	0	1	3	1	2	0	1	0
1861	0	0	3	1	2	2	1	0
1862	0	0	4	1	2	4	2	2
1863	2	1	2	0	0	1	2	1
1864	0	0	8	2	3	1	0	2
1865	1	3	4	1	3	3	0	2
1866	2	2	3	0	0	3	2	1
1867	0	0	4	2	3	0	2	4
1868	0	2	3	2	0	4	1	6
1869	0	0	3	1	5	2	3	4
1870	0	4	9	0	0	2	2	5
1871	0	3	6	1	3	3	0	5
1872	0	1	4	0	3	7	3	7
1873	1	1	3	3	3	0	3	5
1874	1	0	11	1	2	4	0	6
1875	0	2	6	2	7	3	4	0
1876	2	2	5	6	3	4	5	3
1877	1	5	12	2	4	1	2	4
1878	0	3	9	1	14	1	1	0
1879	0	1	10	1	5	0	4	2
1880	2	9	1	4	3	2	6	2
1881	1	3	10	1	7	10	1	2
1882	3	6	9	6	20	11	4	1
1883	0	3	7	4	18	6	9	0
1884	0	7	12	4	20	4	1	1
1885	3	3	23	6	32	8	4	2
1886	2	18	6	19	1	9	4	0
1887	4	9	25	3	31	21	4	0
1888	9	10	22	6	73	10	9	2
1889	5	15	39	5	87	20	11	3
1890	7	13	48	3	100	25	12	1
1891	13	22	62	5	43	17	2	0
1892	8	17	39	2	83	26	11	2
1893	8	5	24	3	80	20	10	0

Table 17. Patents granted in Victoria by industry, 1854-1893, cont.

Year	Class 18	Class 19	Class 20	Class 21	Class 22	Class 23	Class 24	Class 25
1854	0	0	0	0	0	0	0	0
1855	0	0	0	0	0	0	0	0
1856	1	0	0	0	0	0	0	0
1857	1	1	0	0	4	2	2	1
1858	1	3	2	0	1	4	1	1
1859	0	0	0	0	3	0	1	0
1860	0	2	1	0	0	0	3	0
1861	1	1	1	1	1	1	3	0
1862	0	6	1	1	0	1	1	0
1863	1	5	0	0	0	0	2	0
1864	0	4	2	0	2	1	3	0
1865	0	1	1	1	1	0	1	0
1866	0	2	1	1	1	0	1	0
1867	1	4	3	0	0	0	1	0
1868	3	4	0	0	1	0	1	1
1869	1	2	1	0	1	0	1	0
1870	0	8	2	0	0	0	1	0
1871	2	8	0	0	2	1	2	0
1872	0	1	0	0	1	2	3	0
1873	3	4	0	0	1	5	6	0
1874	3	7	0	0	1	2	2	0
1875	2	2	0	2	2	2	0	0
1876	2	7	0	1	4	2	2	1
1877	0	6	1	0	0	1	3	2
1878	2	13	0	1	0	1	4	1
1879	4	8	0	0	2	8	1	1
1880	5	6	2	17	1	6	3	1
1881	7	7	1	0	0	20	3	1
1882	3	2	2	0	0	23	13	1
1883	0	7	1	0	0	9	9	1
1884	2	12	2	1	3	2	10	0
1885	0	8	4	0	6	2	6	1
1886	4	11	4	0	11	5	15	0
1887	5	8	3	0	10	5	12	0
1888	5	29	5	1	9	16	19	0
1889	9	15	8	1	21	33	21	1
1890	9	18	8	1	17	8	20	1
1891	6	25	2	6	15	11	21	0
1892	2	30	5	9	11	9	9	0
1893	9	23	0	5	9	4	7	1

Table 17. Patents granted in Victoria by industry, 1854-1893, cont.

Year	Class 26	Class 27	Class 28	Class 29	Class 30	Class 31	Class 32	Class 33
1854	0	0	0	0	0	1	0	0
1855	0	0	0	0	0	0	0	0
1856	0	0	0	0	0	0	0	0
1857	0	0	3	2	0	0	5	2
1858	0	0	2	1	0	1	2	1
1859	0	1	2	1	1	0	1	0
1860	0	0	5	1	0	0	2	1
1861	0	0	3	1	1	1	1	0
1862	0	1	1	2	1	1	2	1
1863	0	0	2	2	0	3	0	2
1864	1	0	4	1	1	3	3	3
1865	2	0	0	1	1	1	1	0
1866	0	0	1	5	0	3	6	1
1867	0	2	0	0	0	0	0	2
1868	0	1	2	0	0	0	2	1
1869	1	0	1	2	1	0	5	0
1870	1	0	0	3	0	1	4	3
1871	2	0	2	4	0	3	1	2
1872	1	0	2	1	0	0	1	1
1873	0	0	1	1	0	0	0	3
1874	1	0	1	1	1	2	5	5
1875	1	1	6	2	0	2	6	9
1876	2	1	2	2	0	1	4	3
1877	3	2	5	1	1	3	5	5
1878	2	0	6	0	2	6	3	2
1879	1	2	4	2	0	4	2	5
1880	2	0	9	1	4	2	4	5
1881	1	0	6	0	5	2	4	1
1882	3	3	10	1	4	8	2	0
1883	1	4	11	2	2	5	5	6
1884	2	2	17	2	5	8	7	2
1885	1	5	14	5	1	19	13	6
1886	2	4	4	21	7	12	12	5
1887	3	8	26	11	5	36	15	7
1888	10	5	16	4	7	42	27	10
1889	7	9	29	4	1	47	23	9
1890	4	10	23	9	4	53	20	22
1891	0	12	25	11	8	38	31	11
1892	3	6	26	4	6	41	19	13
1893	2	8	12	2	5	37	16	10

Table 18. Country share of Victorian patent applications by industry, 1854-1903 (in percentages)

INDUSTRY	Austria	Belgium	Canada	Denmark	France	German Empire	NSW	NZ	QLD	SA	South Africa
agriculture (1)		0.1	1.38	0.1		0.1	5.12	3.15	0.49	7.68	0.02
books, paper and printing (22)	0.49		2.32		0.39	1.16	8.81	2.7	1.16	0.77	
bricks, pottery and glass (8)					1	1.49	8.96	0.5		1.49	
furniture and bedding (10)		0.68	2.7				8.11	7.43	0.68	2.7	
woodworking (9)			0.72			0.72	8.63	4.32	0.72	2.52	
chemicals, dyes and oils (24)	0.26	0.54		0.62	2.9	1.34	8.84	3.21	0.54	1.07	
medicines and remedies (25)							11.11	2.78	2.78	2.78	
explosives (26)	1.12				8.99	10.11	10.11			1.12	
construction (6)	0.26		0.13	0.13	0.53	0.53	13.06	7.72	1.58	1.25	0.4
dairy, fishing, and forest products (3)				1.08			4.3	4.3		3.23	
alcoholic beverages (20)					0.35	4.55	4.55		2.27	2.27	
food processing (19)	0.88	0.09	0.35	0.18	0.61	0.53	7.71	4.9	2.45	2.1	
food preservation (17)	1.65	1.65			0.83	3.31	4.13	4.96	0.83	2.48	
refrigeration and ice-making (18)					2.72	0.68	18.37	2.72	1.36	0.68	
tobacco products (21)				1.47	5.88		7.35	2.94	1.47		
heat, light, power (23)	2.68	0.33	0.67		2.34	0.67	10.03	1	0.33	0.67	0.33
household consumer (32)			0.32	0.16	0.24		8.25	4.19	1.44	2.16	
household producer (33)						0.26	5.4	9	0.77	1.54	
leather (16)		0.9			3.17	2.41	8.37	5.43	0.9	7.24	
chemical/mechanical extraction of metals from ores (5)	0.2	0.2	0.2	0.1	1.5	1.15	13.49	2.36	2.26	3.36	1.2
carrage and coach-making (11)			2.08		1.16	0.46	11.69	3.7	0.23	3.47	0.23
engineering (12)		0.12	0.24		0.98	2.2	5.18	2.57	0.61	2.69	
industrial metals (13)					4.92		12.7	1.64		4.1	
metalworking (14)	0.58	0.23	0.68	0.15	0.46	1.56	10.04	4.37	0.87	2.09	
general mining (4)			0.14		0.29	0.29	4.29	2.86	0.86	0.29	0.29
treatment of non-metal mine products (7)				1.53	0.76	3.44	7.63	2.29		1.15	
other manufacturing (27)			1.52	1.01	1.01	2.02	10.1	2.53		1.51	
pastoral (2)			0.31		0.63	0.63	21.38	9.12	2.2	2.28	
railway (28)	0.39	0.39	0.97	0.39	0.78	1.74	11.34	2.33	1.74	2.13	
shipping (29)			0.62			1.23	5.86	8.64	3.09	3.09	
communication (30)	0.84	2.52		0.84	0.84		10.5	2.52		0.84	
services and distribution (31)			0.13		0.85	0.32	10.33	5.63	1.5	2.22	0.27
textiles, clothing and footwear (15)		0.45	0.67		1.11	1.56	4.31	4.45	0.67	2.67	
BUILDING MATERIALS (8, 9, 10)		0.2	1.02		0.41	0.82	8.61	3.69	0.41	2.15	
CHEMICALS (24, 25, 26)	0.4	0.4		0.47	3.79	2.82	9.26	2.62	0.6	1.21	
METALS (5, 11, 12, 13, 14)	0.12	0.16	0.6	0.08	1.09	1.41	10.18	3.26	1.09	2.8	0.35
FOOD AND DRINKS (17, 18, 19, 20, 21)	0.7	0.25	0.2	0.2	1.45	1.2	8.5	4	2	1.8	
PRIMARY MANUFACTURING		0.07	1.05	0.14	0.14	0.21	8.68	4.55	0.84	6.18	0.01
TERTIARY HOUSEHOLD	0.39	0.21	0.6	0.16	1.25	1.43	9.05	3.95	0.91	2.14	0.07
TOTAL MINING	0.19	0.32	0.45	0.32	0.74	0.87	10.21	4.62	1.64	2.18	0.13
TOTAL MINING	0.15	0.15	0.18	0.07	1.18	0.92	11.02	2.47	1.88	2.54	0.96

Table 18. Country share of Victorian patent applications by industry, 1854-1903 (in percentages), cont.

INDUSTRY	Sweden	TAS	UK	USA	VIC	WA	Australia	Foreign	Non-Vic Australia	Europe
agriculture (1)		0.74	3.94	4.38	72.64	0.1	86.77	13.23	14.13	0.3
books, paper and printing (22)	0.39	0.77	19.69	13.13	46.01		57.72	42.28	11.71	2.82
bricks, pottery and glass (6)	0.5	1	19.9	4.48	58.71		70.16	29.84	11.45	4.49
furniture and bedding (10)			8.11	4.78	64.86		76.35	23.65	11.49	0.68
woodworking (9)	0.72	0.72	13.31	7.91	59.71		72.3	27.7	12.59	1.44
chemicals, dyes and oils (24)		0.27	27.13	7.5	43.91		54.63	45.37	10.72	5.66
medicines and remedies (25)		5.56		2.78	72.22		94.45	5.55	22.23	
explosives (26)	3.37		23.6	6.74	33.71		44.94	55.06	11.23	23.86
construction (6)	0.13	0.92	8.44	3.83	60.95	0.66	78.42	21.58	17.47	1.84
dairy, fishing, and forest products (3)	2.15 ^e		8.6		76.34		83.87	16.13	7.53	3.23
alcoholic beverages (20)			20.45	10.23	53.41		62.5	37.5	9.09	6.04
food processing (19)	2.16	0.61	17.75	3.85	54.2	0.18	67.25	32.75	13.05	5.17
food preservation (17)			16.53	4.13	57.02		64.46	35.54	7.44	8.27
refrigeration and ice-making (18)		1.36	17.69	14.3	40.14		61.91	38.09	21.77	4.08
tobacco products(21)			7.35	27.94	42.65		51.47	48.53	8.82	8.82
heat, light, power (23)			28.43	27.09	24.41	0.33	35.77	64.23	11.36	6.68
household consumer (32)		0.72	7.61	3.21	70.59	0.48	83.64	16.36	13.05	0.56
household producer (33)		0.51	6.17	1.8	73.65	0.26	82.13	17.87	8.48	1.03
leather (16)			11.31	2.26	55.88	0.45	72.04	27.96	16.16	7.23
chemical/mechanical extraction of metals from ores(5)	0.2	0.1	13.54	9.13	51.6	0.35	71.16	28.84	19.56	3.9
carriage and coach-making (11)	0.23	0.35	10.88	3.7	61.73	0.08	77.55	22.45	15.82	2.08
engineering (12)	0.73	0.24	18.55	11.27	55.08	0.12	63.92	36.08	8.84	4.27
industrial metals (13)			14.75	18.03	41.39		58.43	41.57	17.04	6.56
metalworking (14)	0.15	0.08	17.29	9.27	52.61	0.3	65.99	34.01	13.38	3.17
general mining (4)		0.29	4.86	5.71	79.29	1.14	86.16	13.84	6.87	0.58
treatment of non-metal mine products (7)			15.65	5.34	62.21		70.99	29.01	8.78	5.73
other manufacturing (27)		0.51	28.03	8.33	41.41	0.51	54.04	45.96	12.63	5.56
pastoral (2)		0.31	11.79	3.77	47.25	0.31	73.73	26.27	26.48	1.26
railway (28)	0.19		20.64	11.34	43.9	0.78	59.89	40.11	15.99	4.26
shipping (29)			11.11	5.56	59.57		71.61	28.39	12.04	1.23
communication (30)	0.84		22.69	20.17	35.71	0.84	47.9	52.1	12.18	5.88
services and distribution (31)		0.32	16.74	6.01	54.67	0.19	69.23	30.77	14.57	1.69
textiles, clothing and footwear (15)		0.89	16.93	15.6	50.71		59.25	40.75	8.54	3.12
BUILDING	0.41	0.61	14.45	5.53	60.86		72.64	27.36	11.78	2.25
MATERIALS (6, 9, 10)			24.64	7.05	44.31		55.98	44.02	11.67	8.68
CHEMICALS (24, 25, 26)	0.6	0.6	15.72	9.31	53.58	0.24	68.04	31.96	14.46	3.48
METALS (5, 11, 12, 13, 14)		0.3								
FOOD AND DRINKS (17, 18, 19, 20, 21)	1.23	0.55	17.03	7.6	51.35	0.1	64.3	35.7	12.95	5.83
PRIMARY MANUFACTURING	0.14	0.59	5.98	3.95	67.13	0.14	83.56	16.44	16.43	0.7
TERTIARY	0.4	0.43	16.93	9.04	52.3	0.2	64.75	35.25	12.45	4.23
HOUSEHOLD	0.13	0.16	17.89	8.79	50.19	0.42	64.9	35.1	14.71	2.95
TOTAL MINING	0.15	0.15	11.2	8.18	58.36	0.55	74.5	25.5	16.14	3.02

Notes: The industrial classification number of each industry is given in parenthesis. Austria includes both the Austrian and Hungarian components of what became the Austria-Hungarian Empire after the *Ausgleich* of 1867. German Empire includes all states that were to join the German Empire after 1871. South Africa includes all states that were to become part of the Union of South Africa. Europe excludes the United Kingdom.

Table 19. The gender distribution of patenting in Victoria, 1868-1903

Year	Applications lodged by women	Female Share of Patenting
1868	2	1.43
1869	0	0
1870	1	0.64
1871	2	1.2
1872	0	0
1873	1	0.54
1874	1	0.57
1875	0	0
1876	1	0.52
1877	1	0.59
1878	1	0.59
1879	2	0.98
1880	2	0.97
1881	0	0
1882	3	1.02
1883	1	0.31
1884	2	0.59
1885	6	1.08
1886	4	0.68
1887	8	0.98
1888	9	0.8
1889	4	0.33
1890	6	0.59
1891	7	0.73
1892	9	1.07
1893	12	1.44
1894	20	2.31
1895	7	0.76
1896	27	2.58
1897	13	1.25
1898	19	1.97
1899	10	1.03
1900	17	1.73
1901	17	1.62
1902	7	0.57
1903	22	1.92

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