

"Our Prosperity Rests Upon Manufactures": Industry in the Central Canadian Urban System, 1871

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Article abstract

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Abstract:

How urban was industrial activity in 1871, when only one in five Canadians lived in incorporated cities, towns or villages? This paper explores central Canada's urban-industrial system at a time of transition in industrial technology, business organization and work discipline. Based on analysis of the manuscript schedules of the First Census of Canada made machine-readable by the CANIND71 project, the article has three main parts. First, the whole urban-industrial system is described, using a classification that combines measures of the significance of industrial work in each place and of specialization in particular sectors with the population size of urban centres. Next, a typology of industrial workplaces is presented, combining measures of the number of workers with the extent to which non-manual power was used in the industrial process. Patterns of industry within urban places (especially Trois-Rivières and Guelph) are examined in order to assess factors such as rail and water transport, types of power, scale of process and size of output, and types of workplace and workforce. The authors propose questions and directions for further research on industry in Canada's urban centres.

Then we traded; now we manufacture. Then we over-traded and over-specified, and ran into debt and we have become bankrupt; now our industry is steady and calculating, and we are getting out of debt. Our prosperity rests not on the money we make as agents... but upon manufactures which cannot fail of a market (*Hamilton Spectator*, 18 August 1871).¹

In their review of Canadian urban history, Artibise and Linteau note the significance of industrialization in reshaping the urban system after 1850.² More generally, Scott has asserted that "industrialization as a generalized process of economic organization and social integration (involving the social division of labour, the transactional nature of production and the dynamics of local labour market formation) is the basis of modern urban development."³ A systematic, comparative approach to the experience of all urban centres in a regional system offers a useful perspective for understanding processes of change in the "industrial era". On the one hand, it can provide historians with a substantive and methodological framework for case-studies of individual towns and cities, showing in which respects their experience was similar and in what ways they were unique. On the other hand, such research can contribute to general concepts and models of urbanization and industrialization by addressing key questions about these interacting processes.

While the connections between industrial development and urban growth can be observed at the scale of the individual town or city, an understanding of the relationships within the larger urban system has been harder to achieve. One pioneering study in the 1960s examined the growth of manufacturing in selected "urban areas" of central Canada between 1870 and 1890, though data limitations at that time meant that the urban areas

had to be county units or electoral areas rather than actual cities or towns.⁴ The published results of the first national census in 1871 were very limited in scope and geographical coverage. Consequently, studies of early industrial development have tended to generalize on the basis of limited data or to begin in 1881 when the published census reports have a more comprehensible geographical organization.⁵

The computerization of the 1871 census manuscripts now permits us to reconstruct and compare patterns of industry for all urban places reported in the census.⁶ The CANIND71 database provides unique cross-sectional evidence of industrial structure and location at a time of transition in technology, business organization and work discipline. First, we consider the questions "How urban was industrial activity in central Canada in 1871?" and "How much did industry matter to particular urban places?" The whole urban-industrial system of central Canada is described in terms of a classification that combines measures of the significance of industrial work in each place and of specialization in particular sectors with the population size of urban centres. Next, a typology of industrial workplaces is proposed, combining measures of the number of workers with the extent to which non-manual power was used in the industrial process. This typology of workplaces is used in examining patterns of industry within urban places (especially Trois-Rivières and Guelph). Generalizations developed from the analysis highlight differences between the Ontario and Quebec urban systems and give a clearer sense of the medium-sized and small centres in the hierarchy of urban places.

The Spatial Pattern of Industry

This paper considers urban industry in Ontario and Quebec when 184 urban

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Résumé:

A quel point l'activité industrielle était-elle urbaine en 1871, étant donné que seul un Canadien sur cinq vivait dans une ville, un bourg ou un village? Cette recherche porte sur le système industriel et urbain du centre du Canada à une période où technologie industrielle, organisation des affaires et discipline de travail étaient en transition. Basé sur l'analyse des données du premier Recensement du Canada qui ont été informatisées dans le cadre du projet CANIND71, l'article comporte trois parties. D'abord, le système industrio-urbain entier est décrit, selon une classification rendant compte à la fois de l'importance du travail industriel dans chaque lieu and de sa spécialisation par secteurs particuliers et fournissant la population des centres urbains. Ensuite, une typologie des lieux de travail industriels est présentée, fournissant des données sur le nombre d'ouvriers ainsi que sur la part dans le processus industriel du travail non-manuel. Les configurations de l'industrie au sein de zones urbaines (surtout Trois-Rivières et Guelph) sont étudiées afin d'évaluer les facteurs tels que le transport ferroviaire et par voie d'eau, les types d'énergie, l'ordre de grandeur du processus et de la production, les types de lieux de travail et de main d'oeuvre. Les auteurs posent des questions et suggèrent une direction à suivre pour une recherche future sur l'industrie des centres urbains canadiens.

places had the municipal status of city, town or village.⁷ Ontario and Quebec together accounted for over 80 per cent of the establishments; over 83 per cent of the industrial workers, fixed capital investment, and industrial power from water-wheels or steam engines; and nearly 88 per cent of the value of industrial output recorded in the 1871 census. New Brunswick and Nova Scotia had only a small industrial base in 1871, their combined value of output of \$28.1 million being considerably smaller than Montreal's gross value of production. The two maritime provinces had yet to be economically integrated with the Canadian core and their urban municipal government was very limited.⁸

By 1871, central Canada had a well established industrial sector.⁹ For the export market, there were flour mills and sawmills processing raw materials from farms and forests. Local market demand provided the basis for a much broader range of manufacturing activities. Most household requirements for foodstuffs, clothing, footwear, textile and building materials were met by the output of bakeries, tanneries, woollen mills, stove foundries, sash and door factories, and brickworks. More specialized demands for machinery, steam engines and railway locomotives were supplied by machine shops and engineering works. Despite the small size of its population—only 2.4 million in all of Ontario and Quebec—central Canada had an impressive array of manufacturing activities.

Modern interpretations of the growth of urban-industrial areas in North America emphasize the significance of regional market demand as the critical factor in development.¹⁰ The intensification of rural settlement provided the initial catalyst, and linkages between activities extended the range of industrial output. In Ontario and Quebec, the building of the railway network in the 1850s not only

transformed accessibility but added new demands for materials and equipment.¹¹ During the 1860s enterprising firms were able to move beyond the confines of localized market demand, and significant businesses could be found in a variety of small places by 1871.

If regional and local demand were critical in broadly based urban-industrial development, the role of traditional export staples, especially wood products, should not be overlooked. Wood processing was still the most common leading sector in urban places in 1871. In the smaller urban centres of southwestern Ontario, sawmills produced materials for local consumption. Elsewhere, mills in towns from Collingwood to Belleville and from Arnprior to Hawkesbury in the Ottawa Valley were among the largest establishments in the application of power and value of output. The wood trade dominated communities as small as Garden Island¹² and as large as Ottawa and Quebec City/Levis.

Manufacturing industry has always had complex relationships with urban places. For some activities there are benefits of centralization in towns—a clustered labour force, linkages with sub-contractors and other related manufacturers, ready access to wholesalers, banking services and transportation. However, the benefits of centralization could be outweighed by production considerations. Access to water-power was essential in the early factory age while proximity to resources was also vital when transport services were limited. In some trades, cheaper and more flexible labour outside incorporated towns was also a factor. The balance of urban and rural locations in manufacturing has shifted over time as production technology and industrial organization have altered the structure of costs and profits.

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Table 1: Value of Industrial Output 1871
\$000

	ONTARIO	%	QUEBEC	%	CENTRAL CANADA	%
Urban ¹	70,520.6	58.8	51,766.8	64.6	122,287.4	61.1
Rural	49,375.9	41.2	28,385.0	35.4	77,760.9	38.9
Total	119,896.5	100.0	80,151.8	100.0	200,048.3	100.0

Notes: ¹ Incorporated cities, towns and villages as listed in 1871 Census

Source: CANIND71 database

The urban/rural distribution of industrial output in central Canada is illustrated by Table 1. Urban places were the incorporated cities, towns and villages which were distinguished as separate Census Districts (CDs) or Census Sub-Districts (CSDs). The rural areas included a variety of different types of industrial location. Hamlets, small villages and the open countryside were the sites for traditional enterprises—blacksmiths, wagon builders, grist mills, woollen mills and saw mills. On the wilderness fringes there were often major sawmilling activities and the occasional mine. Some localities, close to established towns but not yet incorporated as villages or towns, may have had major industrial enterprises. Hull was the largest such place, with seven enterprises employing some 1,762 workers and making goods valued at nearly \$1.4 million. This large industrial settlement was incorporated as a city in 1875.

Urban places in 1871 accounted for 61 per cent of the total value of industrial output in central Canada and similar proportions of the value added and fixed capital.¹³ Employment was more evenly divided between urban and rural places, 55 and 45 per cent respectively. The urban/rural division of numbers of establishments and power capacity (horsepower units of waterwheels and steam

engines) was more heavily weighted in favour of rural areas. One factor in this was the past significance of rural grist and flour mills powered by waterwheels. Another was the contemporary importance of sawmills powered by water or steam on the forest frontier. The 9,722 industrial establishments in urban areas represented only 27 per cent of the total number while the urban power capacity of 48,110 horsepower units was 26 per cent of the total.

Most industrial establishments were tiny operations in 1871: one in three firms reported under \$500 worth of output and 44 per cent declared only one worker. Urban industrial units were generally larger and more productive than rural ones. The average urban firm employed over nine workers compared with under three in rural establishments. Urban firms averaged \$4,820 in fixed capital investment while the mean for rural firms was only \$1,090. Urban workers were paid more, an average \$261, while the mean for rural workers was only \$170. Nearly half of all rural units operated for less than nine months of the census year, compared with only one tenth of urban businesses. Short season was a function of reliance on water power or local transport and contributed to the lower average earnings of rural workers.

Three-quarters of central Canada's industrial leaders in 1871 (enterprises ranking in the top one per cent for all four measures of employment, fixed capital investment, gross value of output and added value) were located in urban centres. There were 39 in Montreal, 14 in Toronto, eight in Ottawa and five each in Hamilton and Quebec City. But even quite small urban places with under 5,000 people had one or two leading firms.¹⁴

Urban industries represented a wide range of types which varied in kind and intensity from place to place. Four basic industrial sectors were clearly dominant: food and beverages, wood, leather and clothing. Wood processing was the least urban with 38 per cent, while clothing with 92 per cent was the most urban of the four major groups. Each sector included a range of specific industry types, with the earlier processing stages being less urban than the later stages of fabrication. In the wood sector, for example, urban areas accounted for only 31 per cent of the total value of sawmill output but 90 per cent of the output of sash and door factories, and 84 per cent of furniture production.

The factors of raw materials, production processes and final markets shaped the location of industrial establishments. Oil refineries were largely outside towns, partly because of the noxious and dangerous nature of petroleum and its derivatives. In contrast, piano and organ making was wholly urban, since the fabrication of the products required skilled labour and a concentration of other activities available only in towns. Imported raw materials such as sugar, tobacco and rubber were processed in urban places, most notably in the chief port for central Canada, Montreal. Whatever the overall balance of urban and rural locations of industry, urban places included examples of virtually every type of establishment.

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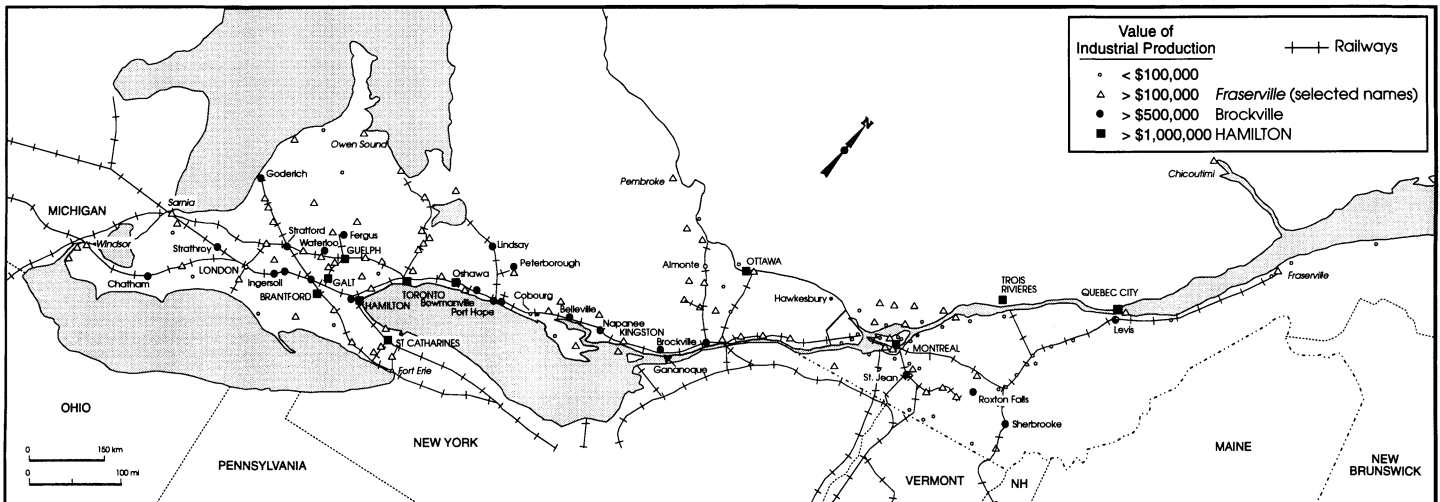


Figure 1: Urban-industrial system of central Canada, 1871.

The most ubiquitous industries were small craftshops serving basic local needs in the food, leather, clothing, wood, printing, vehicle and blacksmith/service sectors. Trades such as cooperage were particularly widespread, as the barrel was the most versatile packing container of the time. Few of these small establishments were self-sufficient but depended on supplies from elsewhere. While local wheelwright-carriage shops could and did build complete vehicles, they used commercial pattern books for most designs and purchased metal parts such as springs from manufacturers in places like Gananoque. A larger establishment selling its output over a wider area might also create some local linkages. In Georgetown, the Barber paper mill (employing 46) supplied materials to Ebenezer White (11 workers) for making envelopes and William Shaw (5 workers) for manufacturing paper blinds. In some regions, adjacent towns tended to develop complementary functions, one being the county seat with mainly commercial and administrative roles while its neighbour had different and more specialized industrial activities. Examples of such complementarity in

Ontario include Woodstock and Ingersoll, Whitby and Oshawa, Cobourg and Port Hope.

An urban-industrial corridor, extending from the St Lawrence estuary to the Detroit and St Clair river frontiers, is clearly shown in Figure 1. All the larger centres were interconnected by railways and even the smallest and most isolated urban places were linked to one another by electric telegraph and postal services. Kerr's delineation of an industrial heartland by 1881 can now be extended backwards by another decade.¹⁵ But the map and Table 2 illustrate significant contrasts between the two provinces of central Canada. Industrial development in Quebec was much more concentrated in a few large urban centres. Montreal alone accounted for nearly two-thirds of the total urban value of output of the province of Quebec; with Quebec City and Trois-Rivières as well, the share rose to 82 per cent. Middle-ranking centres in the Quebec urban hierarchy were few, only Sherbrooke, Levis, Roxton Falls and St Jean producing between \$0.5 million and \$1 million worth of industrial output. Ontario's pattern of urban-industrial

development was clearly much more dispersed, Toronto alone reporting under 22 per cent of the total urban output of the province. The ten centres in the largest output size-class accounted for only 55 per cent of the total urban output of Ontario. Urban places of the smaller output size-classes were both more numerous and more significant than their counterparts in Quebec.

While the broad spatial pattern of development was similar to that of a century later, there were some significant differences. The frontier areas of southwestern Ontario had only limited industrial development in 1871. Trans-shipment trade was still the dominant activity in Sarnia, Windsor, Port Colborne, Fort Erie and Clifton (later Niagara Falls). With the exception of St Catharines and neighbouring places at the northern end of the Welland Canal, the Niagara peninsula was under-developed. Places along the north shore of Lake Ontario were relatively more important in 1871. Oshawa, for example, was a manufacturing centre long before the introduction of the automotive industry. The six towns between Brockville and Arnprior were more significant than they

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Table 2: Value of Industrial Output for Urban Places 1871

	ONTARIO			QUEBEC			CENTRAL CANADA		
Size Class of Industrial Output \$	No. Places	Value \$000	%	No. Places	Value \$000	%	No. Places	Value \$000	%
>1,000,000	10	38,844.7	55.1	3	42,558.9	82.2	13	81,403.5	66.6
>500,000	21	14,754.1	20.9	4	2,949.6	5.7	25	17,703.7	14.5
>100,000	62	16,107.1	22.8	23	4,886.2	9.4	85	20,993.3	17.1
<100,000	17	814.7	1.2	44	1,372.1	2.7	61	2,186.9	1.8
Total	110	70,520.6	100.0	74	51,766.8	100.0	184	122,287.4	100.0

Source: CANIND71 database

would be later, with Almonte and Smiths Falls being ranked in the top 50 industrial centres. Industrial development in the Eastern Townships of Quebec was very dispersed and still in the early stages of growth.

Integration of all the varied industrial activities of central Canada was accomplished in various ways. Merchants were obviously critical, not only in connecting most manufacturers with their final markets but also in connecting the spatially separated stages of production in particular industries. Some merchants had already invested or directly developed manufacturing enterprises related to their main lines of merchandise. Price Brothers, lumber merchants in Quebec City, owned the Chicoutimi sawmill which employed 220 men in 1871. Shaw Brothers, owners of a major tannery in Roxton Falls, maintained their own offices and warehouse in Montreal for the distribution of leather to the city's footwear manufacturers. Large metropolitan manufacturers often had specialized branch operations in rural areas or small towns. Gooderham and Worts operated a grain mill near Streetsville to supply their large Toronto

distillery. Robert Hay and Co., which employed 430 in its Toronto furniture factory, had a branch plant at New Lowell, near Collingwood, which supplied wood components to the main factory. The largest business organization in central Canada was the Grand Trunk Railway which, in addition to its workshops in Montreal, had a large works in Brantford and lesser repair shops in places like Richmond, Quebec. Evidence from census and other sources shows that there was a complex and integrated urban-industrial system operating in 1871, with Montreal and Toronto as the dominant commercial centres having powerful roles.¹⁶

Significance of Industry in Urban Places

Industrial activity was far more important to some communities than others. Some were veritable "hives of industry", a phrase used with pride by various Ontario towns and villages in the later nineteenth century. Industrial activity was insignificant in other places which functioned chiefly as service centres for surrounding rural hinterlands. The wide range of statistical values for the 184

incorporated urban places creates various problems in comparing places. Montreal had the highest value of output (\$34.2 million) as well as the largest city population (107,225), while Toronto ranked second with industrial output of \$15.4 million. The lowest urban values in central Canada were recorded in villages in the greater Montreal region—Soulanges with an output of \$1,000 and New Glasgow with only 168 residents.

Various techniques may be used to address the question of how much industry mattered to particular urban places.¹⁷ We have used measures of population size (in the absence of labour force data before 1891) and industrial employment to analyze aspects of the character of urban industry. A typology of industrial characteristics has been developed in order to group urban places of broadly similar qualities, while recognizing that each place was unique in its specific combination of enterprises in relation to the local circumstances. Our first criterion is the degree of industrialization of local employment, distinguishing urban centres which had more or less than the regional mean of 15 per cent of urban

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population employed in industry. The second criterion is the degree of domination of a community by a single industry, distinguishing those places with more than 25 per cent of industrial workers in a single leading industry group. Such a classification allows for four main types of urban centre based on the intensity and the diversity or specialization of their industrial activity.¹⁸ The basic types including the remainder (Type Z) are summarized in Figure 2.

When the typology is applied to the industrial data for the 184 urban places in central Canada, distinctive groupings emerge. Figure 3 provides a graphic representation of the typology and summary data are presented in Table 3 which also relates the types of urban-industrial places to their population size-classes. With the sole exception of Danville, all the other places classified in the A-D typology had a value of output greater than \$100,000. The type-face in Figure 3 indicates the general output size-classes used in Table 3. Altogether, 107 urban places are distinguished in Types A, B, C or D.

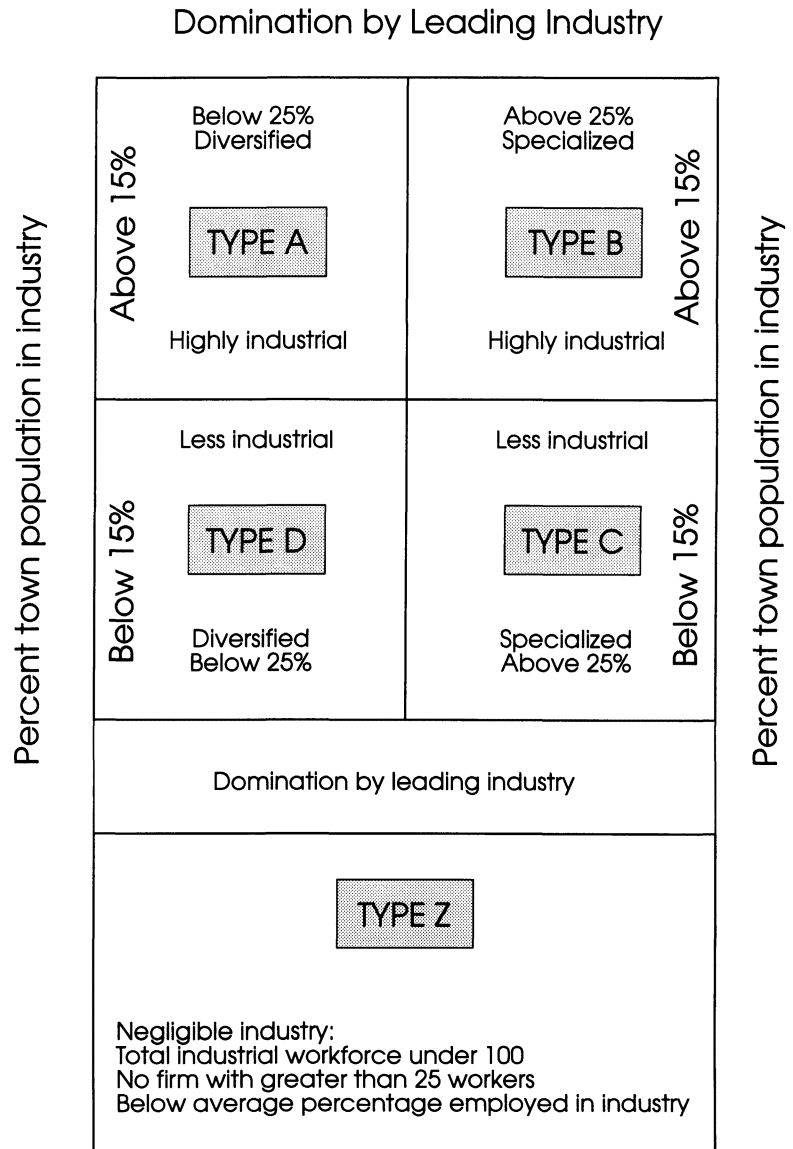
Type A places combined above-average employment in industry with a diversified industrial structure and no dominant industry or enterprise. The seven Type A places, all in Ontario, spanned the range of population size-classes from Toronto (Class 7) through Hamilton (Class 6), St Catharines (Class 4) and Peterborough (Class 3) to Merrickville (Class 1).

Type B places were more numerous and varied in size from Montreal (Class 7) to Listowel and Danville (Class 1). Places in this type had above-average industrial employment like Type A, but were more specialized in their industrial structure, with over 25 per cent of employment in a particular sector or enterprise. Several highly specialized and highly industrial communities show up clearly—textile towns such as Hespeler and Almonte,

and wood-processing centres like Chicoutimi, Buckingham, Hawkesbury, Garden Island, Carleton Place and Trenton. Some places were dominated by a single enterprise, such as Lauzon (shipyard), Roxton Falls (tannery) and Portsmouth, near Kingston (Penitentiary

industries). Larger cities of Type B, especially Montreal but also Brantford and Guelph, could have both a diversified range of industry types *and* a measurable specialization (with at least one in four of their industrial workers employed) in a specific sector.

Figure 2: Typology of industrial activity in urban places.



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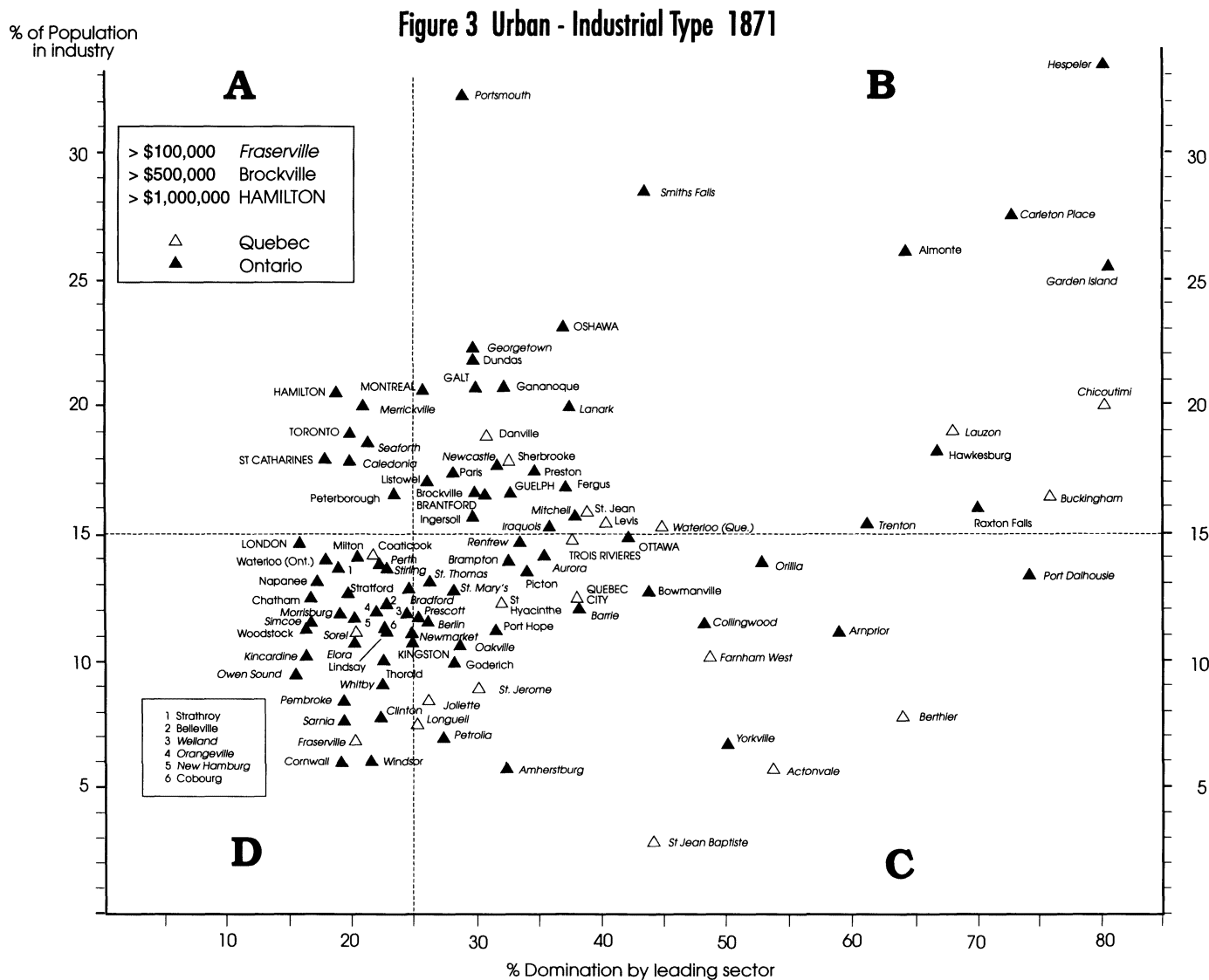


Figure 3: Urban-industrial typology in central Canada, 1871.

Type C places were less industrial, with lower than average shares of their people employed in industry. These places were, however, characterized by high degrees of specialization, with at least 25 per cent of the industrial workers in a leading industry group. Places of this type represent a broad range of urban places from capital cities to suburban

municipalities adjoining major cities. They also included a full range of population size-classes from Quebec City (Class 6) to small places such as Acton Vale (Class 2) and Renfrew (Class 1). As with Type B, there were several highly specialized industrial communities in Type C—Arnprior (wood processing), Berthier (tannery), Port Dalhousie (ship-

yard), St Jean-Baptiste (furniture) and Yorkville (brickyards).

Type D places were neither highly industrial nor specialized. London and Kingston (Class 5) were the largest urban places in this category while Milton and Stirling (Class 1) were the smallest. Many of the towns in Type D were county

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Table 3: Central Canada: Industrial Status of Urban Centres

Population Size Class		No. of Places Type						Value of output \$000 %	
		A	B	C	D	Z	Total		
1	(<1,000)	1	7	1	2	58	69	5,749.7	4.7
2	(1,000-2,499)	2	16	14	18	19	69	15,983.5	13.2
3	(2,500-4,999)	1	7	11	10	—	29	16,715.6	13.7
4	(5,000-9,999)	1	4	2	3	—	10	12,154.6	9.9
5	(10,000-24,999)	—	—	1 ⁴	26	—	3	9,219.2	7.5
6	(25,000-49,000)	1 ¹	—	1 ⁵	—	—	2	12,890.1	10.5
7	(>50,000)	1 ²	13	—	—	—	2	49,574.7	40.5
	Total	7	35	30	35	77	184	122,287.4	100.0
	Ontario	7	25	20	32	26	110	70,520.6	57.7
	Quebec	0	10	10	3	51	74	51,755.8	42.3

Notes: ¹ Hamilton; ² Toronto; ³ Montreal; ⁴ Ottawa; ⁵ Quebec City; ⁶ London, Kingston

Source: CANIND71 database

seats, service centres and frontier towns where the carrying trade was important. Several places such as Sarnia, Windsor and Cornwall, noted for their industrial activity in later periods, were largely undeveloped in 1871.

The remaining 77 urban places are classified in Type Z. These all had below-average percentages of employment in industry, industrial workforces of under 100, no firms employing more than 25 workers and all were in population size-classes 1 or 2. Slightly less than one quarter of the places had outputs valued at more than \$100,000. Altogether, while Type Z centres represented 42 per cent of the total number of urban places, their combined industrial output amounted to

only 4 per cent of the total urban industrial production in central Canada.

A few small communities with under 100 industrial workers, but with above-average percentages of their people in industry and some with large industrial establishments, might be considered as a separate Type X. Examples include New Edinburgh, where one woollen mill provided 70 per cent of the village's industrial output, and Lachine where Dawes brewery accounted for 64 per cent of total output. New Glasgow, with 59 of its 168 people employed in industry, is an interesting example of the specialized industrial village. The village was dominated by John Hale's tannery which employed 45 men making sole leather for the Montreal footwear industry. Hale was not only tannery

proprietor but mayor of the village (incorporated 1863) and justice of the peace.¹⁹ In common with many other small places in 1871, New Glasgow's subsequent history showed virtually no further industrial or population growth.

The diversity of industry in urban places may be further illustrated by the nature of the largest industrial sector in the 107 places classified as Types A to D. As noted in Table 4, wood processing was the largest industry in the greatest number of places. It was also the most widespread, dominating the local economies of places from Strathroy and Goderich in the west to Levis and Chicoutimi in the east. Leather (tanning and footwear) was the largest industry in 17 centres, followed by clothing in 16 places. Food and

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Table 4: Leading Sector in Industrial Centres (Types A-D)

SEC ⁽¹⁾		No. of Places	Places of Size Class 4 and above (% total industrial employment)
5.01	Food, Beverages	1	–
5.04	Leather	17	London (15.7), Montreal (25.4), Quebec City (37.9)
5.05	Textiles	9	–
5.06	Knitwear	1	–
5.07	Clothing	16	Port Hope (31.2), St. Catharines (17.7), Toronto (19.6)
5.08	Wood	24	Belleville (22.6), Levis (49.2), Ottawa (41.9), Trois Rivières (37.3)
5.09	Furniture	4	–
5.10	Paper	1	–
5.12	Primary metals	1	–
5.13	Metal fabricating	1	Brockville (29.5)
5.14	Machinery	19	Chatham (17.6), Guelph (32.4), Sorel (20.3)
5.15	Transportation Equipment	8	Brantford (30.2), Hamilton (18.6), Kingston (24.9)
5.17	Non-metallic mine/minerals	3	–
5.18	Oil refining	1	–
5.19	Chemicals	1	–
	Total	107	

Notes: ⁽¹⁾ Sector or Major Group in the Standard Industrial Classification. SECs 5.02, 5.03, 5.11 and 5.20 not represented.

Source: CANIND71 database

beverage industries led only in Windsor, where 22 per cent of the industrial labour force were employed in 12 food and beverage establishments.²⁰

The machinery sector was surprisingly important with no fewer than 19 places in which machinery was the dominant

industry type. Most of these places were quite small such as Clinton, Mitchell, Fergus and Elora, while larger centres included Galt, Oshawa, Dundas and Ingersoll. Sorel and Coaticook were the only Quebec centres dominated by machinery industries. Transportation equipment was the largest industry in

eight places. Locomotive and rolling stock building and repair were represented in the largest places, while various small centres specialized in shipbuilding, the manufacture of carriages and wagons or of parts such as hubs, spokes and springs. Textile towns include the well-known examples of Sherbrooke, Almonte and Hespeler, but also Listowel, Lanark, Cobourg, Preston and St Jerome. In the smaller industrial sectors, Petrolia was dominated by oil refining, Paris by knitting mills, and Danville by chemicals (a match factory).

Urban Work Environments

In recording all information of individual establishments, the CANIND71 database allows us to probe beyond the broad patterns outlined earlier. Distinctive qualities of places can be examined in relation to the organization of industrial work at a time of transition from artisanal craftshops to factories using powered machinery and more integrated production processes. Such analysis may shed light on preconditions for the development of modern industry in particular places, including the phenomenon of "proto-industrialization" and the ways in which the transition from domestic to factory industry affected work experience.²¹ Earlier interpretations of the industrialization process, based on the "textile paradigm" in which the craftsman was confronted and abruptly displaced by the modern factory, have been modulated into an awareness of more variable paths of development followed by different industrial sectors.²²

Scale of operation (expressed in the number of workers per establishment) and the extent of powered mechanization have been used as the bases for a typology of work environments in the urban centres of central Canada. Originally inspired by the Philadelphia research of Laurie and Schmitz, this typology dis-

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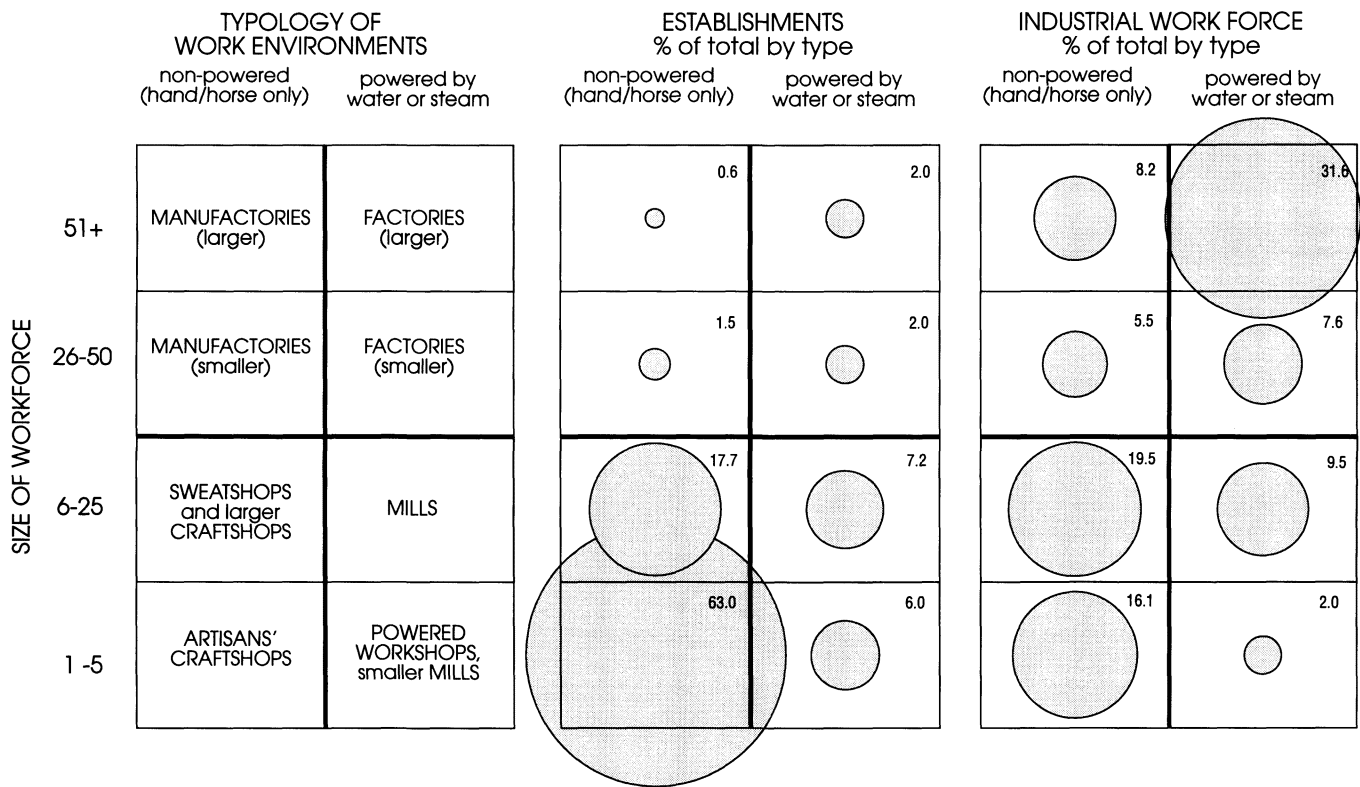


Figure 4: Typology of workplaces

tinguishes eight major types of industrial workplaces in central Canada in 1871 (Figure 4).²³

The average urban industrial business in central Canada was small. Slightly more than two-thirds of all urban establishments employed five or fewer workers. Only 2.7 per cent reported more than 50 workers but these larger workplaces accounted for almost two-fifths of all urban industrial output. The mix of different-sized establishments also varied from place to place, the proportion of larger firms being significantly higher in the largest urban centres.

Only a minority of urban establishments—17 per cent—used inanimate energy in

the form of waterwheels or steam engines. Steam power represented slightly less than half of all the power capacity of factories, although the proportion of total output powered by steam was considerably higher. For most urban places, the available water-power potential was already fully exploited, so that future development would depend on steam and, from the 1890s, on hydro-electricity.²⁴ Steam power was certainly essential in the development of Toronto, Hamilton and Quebec City and in many smaller places. Montreal, where the Lachine Canal provided about 37 per cent of the city's industrial power capacity,²⁵ and Ottawa, with power developed at falls on the Ottawa River and Rideau Canal, were unusual for large cities.

Basic distinctions are drawn between workplaces with no inanimate power (represented on the left side of the diagram). Work environments are further categorized by the size of their workforces, producing four size-classes: workplaces with 1 to 5 workers, 6 to 25 workers, 26 to 50 workers, and 51 or more workers. Powered establishments with at least 26 workers are called factories (qualified as large if they employed more than 50) while manufactories are non-powered establishments with at least 26 workers (also qualified as large if they employed over 50). Smaller powered establishments are called mills if they had from 6 to 25 workers, powered craftshops if they had 5 or fewer workers. Workplaces using human hand or horse power are

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**Table 5: Work Environment in Largest Cities
Percent of Workers**

	Urban Central Canada	Montreal	Toronto	Quebec City	Hamilton
Total no. employed ¹	90,188	22,164	10,585	5,970	5,775
NON-POWERED ESTABLISHMENTS					
Size class, no. of employees					
1-5	16.1	7.2	6.1	14.0	7.5
6-25	19.5	16.9	16.2	23.2	18.7
26-50	5.5	7.6	6.6	6.1	6.0
>50	8.2	12.2	15.3	17.2	7.9
Sub-total	49.3	43.9	44.2	60.5	40.1
POWERED ESTABLISHMENTS					
1-5	2.0	0.2	0.5	0.2	0.5
6-25	9.5	3.7	5.4	3.5	6.0
26-50	7.6	6.9	7.2	4.3	6.6
>50	31.6	45.3	42.7	31.6	46.8
Sub-total	50.7	56.1	55.8	39.5	59.9
Total	100.0	100.0	100.0	100.0	100.0

Note: ¹ The employment figures for the cities differ from those published in the 1871 Census (Vol. 3, Table LIV). Montreal, Toronto and Hamilton totals were undercounted due to the exclusion of some major establishments. Quebec City was overcounted as a result of the inclusion of four census subdivisions which were not in the City proper.

Source: CANIND71 database

called artisans' craftshops if they employed 5 or fewer workers. Slightly larger craftshops, without power and employing between 6 and 25 workers, were called sweatshops by Laurie and Schmitz in the Philadelphia context although they acknowledged that the term presented definitional problems. Outworkers who toiled at home under the putting-out system, would be included with the artisans' craftshops, since it is hard to distinguish them on census manuscript evidence alone. We note that the terms used to describe the eight types of workplace in this typology do not match contemporary usage when

factory, manufactory and shop were generic terms used interchangeably for all size of establishment, whether powered or not.²⁶

Each industrial sector had varying proportions of artisanal craftshops, manufactories and factories, reflecting differences in technical and economic organization. More than 60 per cent of the labour force in wood-processing, paper-making, textiles, primary metal-working and machinery worked in powered factories employing at least 26 workers. The dominance of large, powered establishments in these sectors

may be contrasted with the mix of non-powered workplaces in the clothing industry especially, but also in such sectors as leather, food and beverages, printing, non-metallic minerals, chemicals and miscellaneous manufacturing.

Most industrial sectors in 1871 showed the co-existence of varying scales of operation and varied degrees of application of industrial power. In printing, a highly urbanized activity, there were large, steam-powered factories such as Hunter Rose (173 employed) in Toronto and John Lovell in Montreal (147 employed) which combined printerries

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Illustration 1: *The Sanford & McInnes clothing establishment on King Street, Hamilton was the largest manufactory in Canada, employing 455 (including 350 women and girls). The business prospered with the rising demand for ready-made clothing and was an early adopter of the hand sewing machines manufactured locally by the Wanzer business.*

Source: *Hamilton Public Library*

and book-binding. Some newspapers such as *The Globe* in Toronto (80 employed) had yet to acquire a steam engine, as did the banknote printing manufactory in Ottawa (82 employed). Most local newspapers and printshops were still using hand-operated presses. In the transportation equipment sector, most

establishments were small craftshops making and repairing carriages and wagons. By 1871 many of these small units were, however, incorporating parts such as axles and metal goods made in specialized factories in Gananoque, Oakville and St Catharines. Shipbuilding used handicraft skills in shaping and fabricat-

ing wood, so shipyards in Port Dalhousie and Lauzon were manufactories. In contrast, the railway equipment industry was almost wholly metal-based and the work was organized in large powered factories. Railway workshops were the largest industrial establishments at this time: the Grand Trunk employed 790 in Montreal

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and the Great Western reported 984 in its Hamilton car and locomotive shops.

The workplace environments for all urban centres in central Canada and for the four largest cities are summarized in Table 5. Montreal and Toronto were very similar to one another and different from the general pattern for all urban centres in having well over half their workers in workplaces that employed more than 50, especially in powered factories.²⁷ Large manufactories employed sizeable proportions of the workforce in both these large cities, especially in establishments making footwear or clothing. The proportion of workers in large manufactories in Quebec City was a little higher than in Montreal or Toronto, reflecting the importance of footwear in the city's industrial structure. The artisanal and hand-powered character of Quebec City's workplaces in 1871 may also reflect both the age of the city and the fact that it was not yet directly connected to wider markets by railway. Hamilton's structure of workplaces was closer to that of Toronto or Montreal, although its proportion of workers in large manufactories was the smallest of the four large cities of central Canada. The Sanford McInnes clothing manufactory in Hamilton (with 455 employed) was the largest non-powered establishment in Canada at this time (Illustration 1). Unlike Toronto and Montreal, however, Hamilton had no other large manufactories of a broadly similar size.

The larger scale of industrial organization had several implications for the larger cities. The increasing size of the factory meant that few could be accommodated within the central business district or along existing central waterfront zones. Already, the large railway workshops, as in Hamilton, had been built on the edge of the built-up area. Large processing establishments such as oil refineries were being located beyond the municipal boundary, as in London. As more fac-

tories were being built at the edge of the urban area, there was a tendency for an increasing segregation of homes from workplaces. Aspects of spatial segregation and a lengthening "journey to work" have been explored for Toronto by Goheen, for Hamilton by Doucet, and for Montreal by Lewis.²⁸

A high proportion of the factories and manufactories of urban central Canada was concentrated in the 17 centres with at least 5,000 population (size-classes 4 to 7). These places accounted for three-quarters of all workplaces with over 26 workers, 88 per cent of the manufactories and 69 per cent of the factories. In the smaller urban centres, the structure of the workplace environment could be very variable, reflecting the nature of the basic types of local industry and the enterprise of local businessmen and investors. If the large cities and towns show broad similarities to the central Canada mean (which they weight with their large size) the smaller urban centres exhibit more marked variations. Such variations were very evident in the extent of use of inanimate power and in the work environments. Four small places (Hespeler, New Edinburgh, New Glasgow and Victoriaville) had more than 90 per cent of their workforce in powered establishments. At the other extreme, 14 places had less than 10 per cent of the industrial workers in powered establishments and 21 places, mostly in Quebec, had no powered workplaces at all.²⁹

The nature of workplace environments showed very substantial variations from place to place. In 1871, 31 urban centres (all of Type Z) had more than 75 per cent of their workforces in small artisanal workshops employing 1 to 5 people. Twelve of these places had all their workers in artisanal workshops. At the other end of the scale, 14 urban centres had more than 50 per cent of their workforce in large, powered factories each employing

more than 50 workers. Most of these places were dominated by a large textile mill or sawmill.

Table 6 illustrates the varied range of work environments in a selection of places in size-class 2 (population 1,000-2,499). Gananoque, Chicoutimi and Almonte are clear examples of places where powered workplaces were dominant. Chicoutimi, with four of five of its industrial workers in the Price Brothers sawmill, is a classic case of a place on the resource frontier. Gananoque, with its specialization in small metal products, and Almonte, a woollen mill village, have more varied work environments. Waterloo, Ontario, while almost identical to the central Canada urban mean in the ratio of powered to non-powered employment, is quite different in the relative significance of artisanal workshops and mills. Lauzon, St Thomas and Yorkville exemplify places with low proportions of workers in powered establishments. Lauzon's work environment was dominated by three shipyards and a single powered sawmill. St Thomas had an industrial structure like that of many other county towns such as Simcoe and Picton before the advent of railways; its largest establishment was a cooperage employing 30 men. In Yorkville, on the northern boundary of Toronto, brickmaking was the largest single activity. Half the workforce in the 6-25 worker category was employed in four brickyards which, like similar establishments elsewhere, used horses for the basic processes of milling the clay.

Male and female workers were associated with different kinds of industrial workplaces. The most common type of industrial workplace for urban women and girls was the large factory with more than 50 workers, followed by the craft workshop or sweatshop employing between 6 and 25. Women and girls in urban centres were more than twice as

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**Table 6: Work Environments in Selected Class 2 Urban Places
Percent of Workers**

	Urban Central Canada	Gananoque	Chicoutimi	Almonte	Waterloo, Ontario	Lauzon	St. Thomas	Yorkville
Total no. employed		419	277	543	220	350	293	151
NON-POWERED ESTABLISHMENTS Size class, no. of employees								
1-5	16.1	13.4	18.3	16.8	39.5	9.1	37.5	24.5
6-25	19.5	—	—	3.7	13.6	—	34.8	67.5
26-50	5.5	—	—	—	—	—	10.2	—
>50	8.2	—	—	—	—	67.7	—	—
Sub-total	49.3	13.4	18.3	20.5	49.5	76.8	82.6	92.0
POWERED ESTABLISHMENTS								
1-5	2.0	7.9	2.2	4.6	11.4	6.0	8.9	—
6-25	9.5	24.3	—	10.7	25.0	—	8.5	7.9
26-50	7.6	25.5	—	13.6	14.1	—	—	—
>50	31.6	28.9	79.6	50.6	—	17.1	—	—
Sub-total	50.7	86.6	81.8	79.5	50.5	23.1	17.4	7.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: CANIND71 database

likely as their country cousins to be employed in large factories powered by water or steam and with at least 50 fellow employees. Urban women and girls were more than four times as likely as rural women to be employed in non-powered manufactories with at least 26 employees. Urban women and girls were also more commonly employed in manufactories of any size than were urban men and boys.³⁰

The typology of work environments has considerable value in differentiating places in a more comprehensive way beyond total value of output or total number employed. At the scale of the individ-

ual establishment, the typology can provide a useful link between business history and social history. More knowledge of size of establishments and the application of power to production processes also enhances the appreciation of types of locations within urban areas.

Patterns of Industry Within Urban Areas

Traditional interpretations of the patterns of industry in urban centres tend to emphasize the apparent homogeneity of manufacturing establishments and their centralization in the core zone. In the predominantly commercial city of the mid-

nineteenth century, these interpretations had some validity. Decentralization of workplaces was regarded as a process that did not seriously begin until the turn of the century.

Recent work by Muller and Groves on Baltimore and Lewis on Montreal has provided a more subtle interpretation of the patterns and processes at work, especially in larger cities.³¹ The use of directories, unpublished census returns, and assessment and water tax records has greatly enhanced our knowledge of the location of manufacturing in particular cities. While the central business district was the locus of industrial establish-

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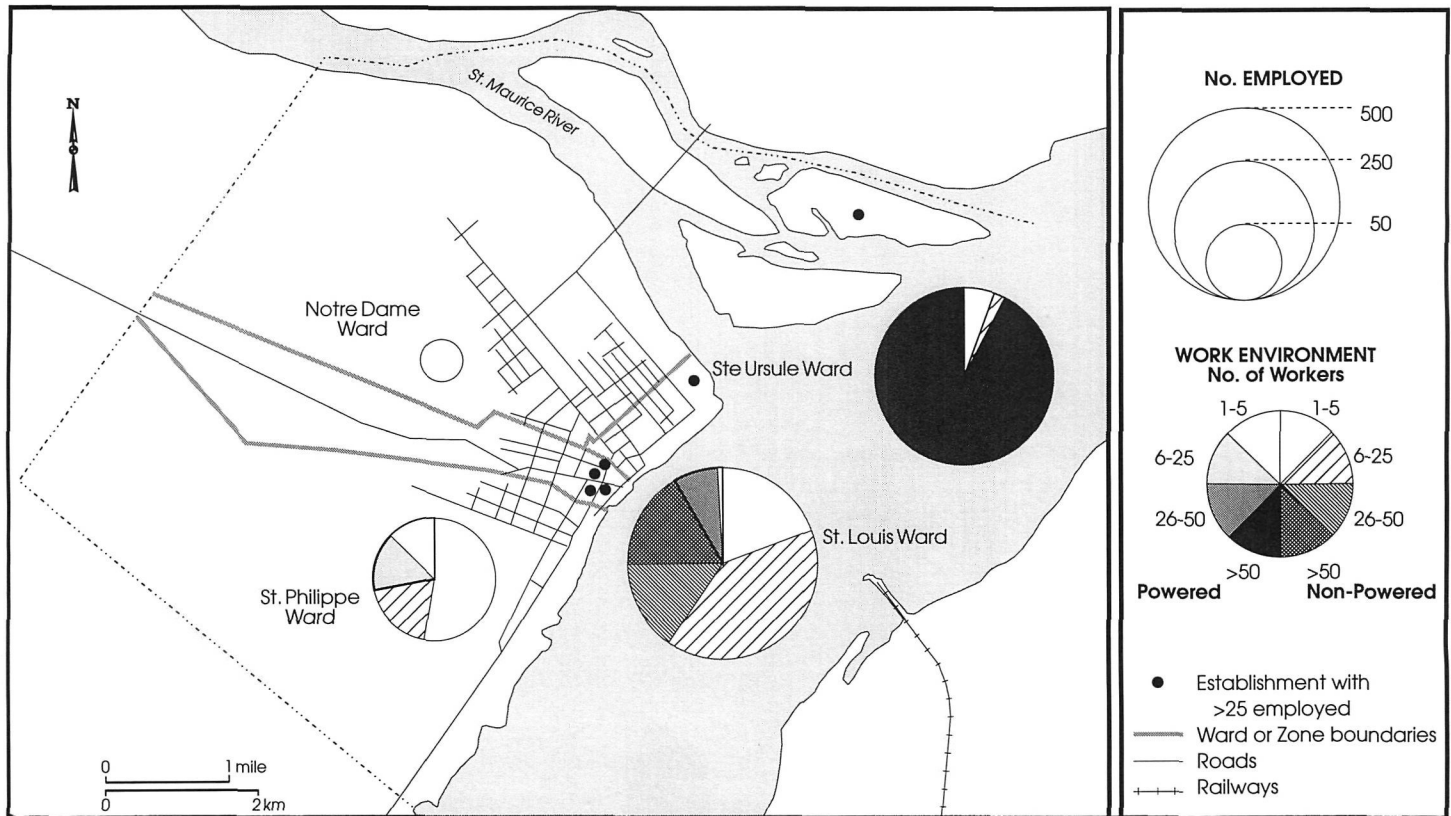


Figure 5: Trois-Rivières: industrial workplaces by wards.

ments and employment, it was by no means universally dominant. Various factors, such as technological change, power requirements, and scale of operation, compelled many industrialists to seek new sites on the edge of the built-up area of cities and towns. Detailed studies of the industrial structure of cities not only confirm the co-existence of a great variety of enterprises from artisanal workshops to very large factories; they also show a great diversity of locations within urban areas. Indeed, in his study of the industrial districts of Montreal, Lewis argues "that the nineteenth-century city was characterized by a fragmented and cellular industrial geography."³² While many industrial entrepreneurs chose to remain in the core, others could select a variety of peripheral locations to develop

new factories. Competitive pressures and technical requirements in many industries also compelled factory building on more spacious sites away from the immediate city centre.

Some distinctions may be made between the old established cities of Montreal and Quebec City and the much newer foundations in Ontario. The oldest cities in Quebec had well-developed urban cores where the original administrative, commercial and religious functions were mingled with artisanal craftshops. These old city cores were distinctively different from the newer peripheral areas in physical structure and density of development. The newer Ontario cities lacked such contrasts: in most cases, the central cores merged into the surrounding

peripheral zones without any marked difference except for a gradual decrease in the density of development.

The old walled centre of Quebec City was the clearest example of a traditional urban core dominated by craftshops. Only six of the 108 establishments in the two central wards, Palais and St Louis, employed more than 26 workers. Five of these were printeries while the other made fur goods. Only three establishments, all printeries, were powered. By 1871, the centre had lost any previous dominance in the total industrial structure of the city. The central core had only 15 per cent of the industrial workers of Quebec City and 14 per cent of the value of output. Larger establishments, whether powered or not, were located either on the waterfront or in the

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Figure 6: Guelph: industrial workplaces by zones.

newer industrial-residential wards of St Roch and Jacques Cartier along the St Charles River.

While the old Quebec City was already becoming an industrial backwater in 1871, the three central wards of Montreal had managed to make the transition into the age of large establishments. In spite of the age and density of existing commercial and other land uses, the three central wards (West, Centre and East) still had the largest concentration of workers (43 per cent) and value of output (34 percent) in the city. Within the three wards, almost two-thirds of the total work-

force were employed in large establishments reporting more than 50 workers each. Two large boot and shoe factories each employed more than 350 workers. However, forces of decentralization were at work and St Anne's Ward, immediately west of the city centre, had already developed as a major industrial suburb within the city boundaries.

In most Ontario cities the nature of development and the delineations of ward boundaries do not readily allow us to make such clear distinctions between the centre and other urban zones. The extensive waterfront zones in Toronto and Kingston provided

scope for a continuum of industrial types close to the commercial city centres.³³ In Toronto, even the largest establishments such as Gzowski's rolling mills and the shops of the Northern Railway were located within two kilometres of City Hall.

Various forces were at work in the development of suburban industrial districts, outside the central core but within the city limits. Space constraints were clearly important in Quebec City and Montreal. Water power was significant in the development of large establishments along the Lachine Canal in St Anne's Ward, Montreal.³⁴ The contrasts between an

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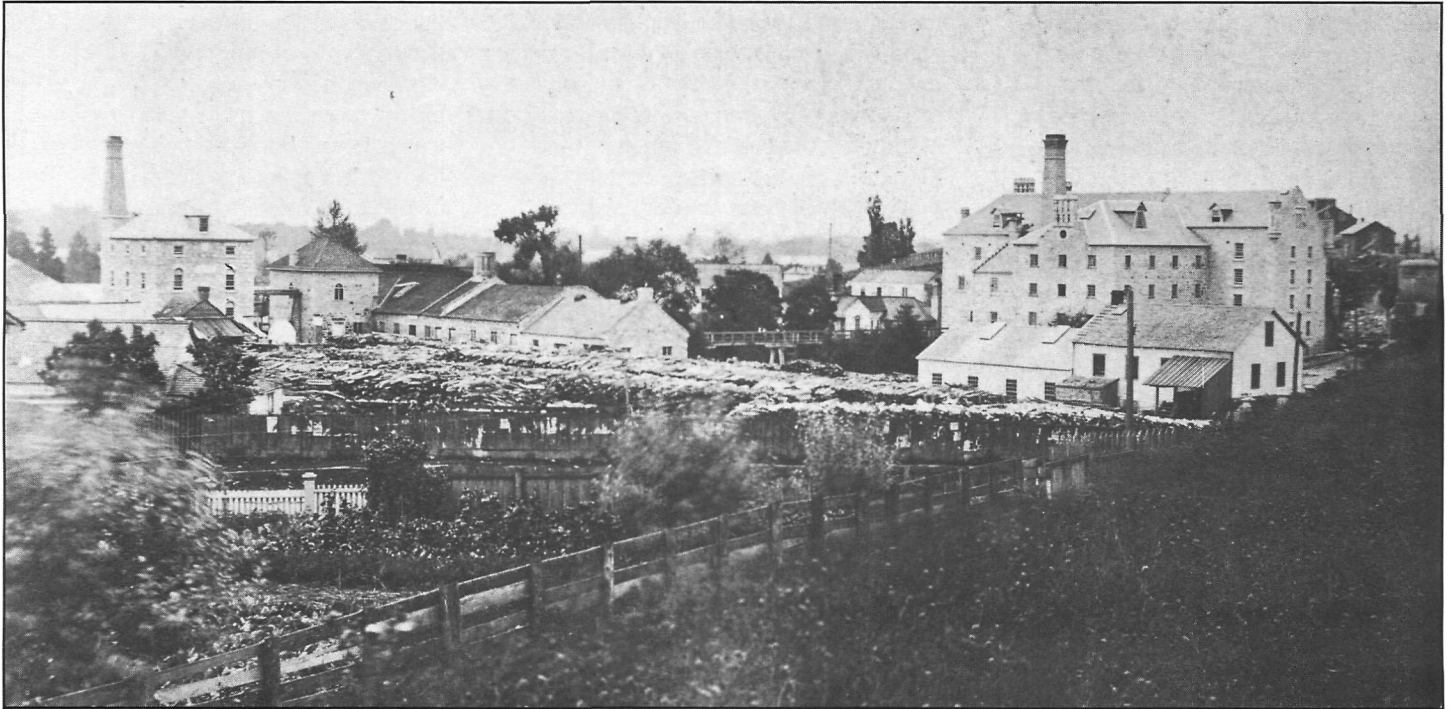


Illustration 2: The grist mill (right) and distillery (left) of David Allan on the Speed River, Guelph. After experience in Scotland and Sweden, the Allans bought the town's first mill in 1832. By 1871, the original waterpower required supplementing with steam (note the wood piles in the distillery yard). Although only 26 workers were employed in the two establishments, the total value of output amounted to \$300,000.
Source: Guelph Civic Museum

industrial suburb and the rest of the city were particularly marked in Ottawa. Victoria Ward, which included the industrial zone at the Chaudière Falls and Le Breton flats, had a work environment dominated by the six large sawmills which accounted for over 84 per cent of the workforce in this ward and were all powered by waterwheels. In contrast, By Ward which included much of the Lower Town had 99 per cent of its workforce in artisanal craftshops and small manufactories, without power from steam engines or waterwheels.³⁵

Railways were becoming a new factor in the location of industries by 1871. The direct requirements of the huge workshops for rolling stock and locomotives needed horizontal space for single-sto-

rey buildings and storage sidings. Such requirements had created the basis for the extensive facilities of the Grand Trunk at Montreal's Point Charles. In Hamilton a new industrial zone had emerged on the west side of the city around the shops of the Great Western Railway.³⁶ There is also some evidence of some relocation of factories from the urban core to the peripheral zone crossed by the railway. London's railways, with an extensive area of yards east of the city centre, were also in the process of creating a distinctive railway-oriented industrial district. Part of this district was beyond the city boundary. Although the London Board of Trade had obtained favourable rates on the Great Western Railway for processing the crude oil from Kent and Lambton counties, the London City Council

objected to the noxious and odorous refining process so the refineries were located just beyond the eastern city limits in London Township.³⁷ Dominated by the large refinery of Englehart and Co., this industrial complex also included cooperages making barrels for the shipment of lamp oil, a boiler-making shop and a small chemical works.³⁸

***Trois-Rivières and Guelph:
Middle-sized Urban Centres***

Some of the contrasts between places may be illustrated by comparisons of case studies of Trois-Rivières and Guelph. Both places had urban population and industrial workforces of similar size but differed in their other characteristics. The industrial structure of Trois-

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Rivières was dominated by a few industrial sectors while Guelph's was more diversified. Though the two towns were similar in population and employment, their physical structure was very different. Figures 5 and 6, prepared at the same scale, not only illustrate fundamental contrasts in setting but also suggest considerable differences in the density of development.

Trois-Rivières in 1871 was a long-established administrative, religious and commercial centre. With close to the regional average of its population employed in industry, the town was classified in Type C (Figure 3), very similar to Ottawa. Wood (37 per cent), clothing (29.5 per cent) and leather were the largest industrial sectors. In the typology of work environments, the city had above-average shares of its workforce in the smaller, non-powered workshops. Trois-Rivières was fairly unusual at this time in lacking any direct rail connection, access to the network being by ferry across the St Lawrence River. As shown in Figure 1, the city was isolated from other industrial places. Until the improvement of the St Maurice River with log booms and slides in the 1850s, Trois-Rivières was also isolated from its resource hinterland.³⁹ While the Saint-Maurice ironworks, about 11 km north of the city, is considered the earliest metallurgical enterprise in Quebec and was owned by J. McDougall and Son, a Trois-Rivières merchant in 1871, there was little other apparent association between the works and the city at this time.⁴⁰

A detailed examination of the structure of industry in the four wards shows not only major contrasts between parts of the city but also a rather different general industrial structure than is suggested by the overall statistics. Most traditional industry was located in St-Louis Ward where 92 per cent of the workers were employed in non-powered establishments. A small

machine shop with four workers and a shoe factory employing 34 were the only powered establishments. The artisanal craftshops of the centre were mostly engaged in making clothing, footwear, fur goods, tinware and agricultural hand tools. Many of these smaller establishments were probably associated with a commercial enterprise in retailing or wholesaling.

To the west, St-Philippe Ward included most of the powered establishments of the city. Except for a small, water-powered flour mill and a carding mill, all ten were powered by steam engines; the largest was a machine shop employing 10 workers. All the other powered businesses were engaged in metal fabrication of various sorts. Even in this ward, most workers were engaged in making clothing, footwear and saddlery. Notre Dame Ward, with only 25 workers had minimal industrial activity: in its largest shop, seven workers made snowshoes.

Ste-Ursule Ward had the only examples of large-scale industry in Trois-Rivières. Two large sawmills, Baptiste and Sons and St Maurice Lumber, employing 150 and 250 respectively, accounted for 36 per cent of the total industrial workforce and 41 per cent of the total value of output. Both mills were powered by steam engines, a reflection of the technical and economic problems of harnessing the power of the St Maurice River at this location. Apart from the urban workforce, the site and access to forest resources via the St Maurice River, these large, wood-processing plants had few linkages with the industrial structure of Trois-Rivières. Some of the small machine shops might have helped with repairs, but that was probably all. The sharp contrast between traditional and new industries, in character and scale of operations, would have long lasting implications for the industrial structure of Trois-Rivières.⁴¹

In contrast to Trois-Rivières, Guelph was fairly recently established as a town, having been founded only in 1827. By 1871, the town was at the junction of two railways, the main line of the Grand Trunk from Sarnia to Toronto and a branch line of the Great Western from Harrisburg (near Brantford) to the current railhead at Alma, north of Fergus. Guelph was also well located in the most industrial zone of central Canada and had access to a rich agricultural hinterland. With slightly more than the regional average of its population employed in industry, the town was classed in Type B (Figure 3), very similar to Brantford. With a slightly smaller population than Trois-Rivières and almost identical in the number of industrial workers, Guelph's value of output was 60 per cent larger. In 1871, 43 per cent of Guelph's workforce was employed in the metal fabricating, machinery and vehicle-making sectors, compared with only 9 per cent in Trois-Rivières.

None of the census enumerators for Guelph noted addresses for particular industrial establishments; nor was the town divided into wards for census purposes. So all establishments have had to be located using evidence from directories and other sources. As in Trois-Rivières, virtually all industrial establishments were located within a one-mile radius of the centre of the town. Four zones have been generalized to provide a framework for discussing the types of industrial areas within the town.

Guelph's central business district comprised the northern part of the Market Square, Wyndham Street and adjacent commercial streets. As in many other towns of comparable size, this zone was dominated by hand-powered craftshops. The sole steam-powered establishment combined a planing mill and sash and door factory. Many of the central establishments were small workshops serving primarily local needs, but there were six

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manufactories making boots and shoes, clothing and organs. The two organ factories of William Bell & Co. and McLeod Wood & Co employed 32 and 27 workers respectively and served a market well beyond Guelph.

Other industrial zones of Guelph were dominated by powered establishments. In the "frame" zone surrounding the central business district, there were two large sewing-machine factories, several foundries and machine shops, as well as carriage- and axle-making establishments. Surrounding the eastern and southern fringes of the town centre was the river zone where water power was or had originally been a critical factor in the location of industry. In 1871 this zone was still the most significant when measured by power capacity and value of output. Two large flour mills and an associated distillery were the largest enterprises (by value of output). There were, in addition, smaller grist mills, textile mills, and the important engine works and machine shop of Inglis and Hunter.

The remaining area of the city contained isolated establishments including a brewery, a woollen mill and a small foundry making machine tools. Some of these scattered units were located on small tributary streams of the Speed River. As in many towns at this time, the railway had only a very limited direct influence on factory location. An oil refinery, established at Guelph Junction in the early 1860s, was employing 100 workers in the refinery and associated cooperage a few years later.⁴² By 1871 there were only two small refining units on the site employing 14 workers.

While industry in Guelph continued to be concentrated close to the city centre, as in Trois-Rivières, there were many differences in the industrial structure of the two towns. Guelph had a much more varied industrial structure; with its specializa-

tion in machinery of various kinds, it had developed some of the skills and enterprise that would continue to support a diversified base of manufacturing industry.⁴³ Differences noted between the two cities in 1871 were still apparent a century later, with Trois-Rivières still dominated by large-scale processing while Guelph had a wider range of fabricating industries.

Conclusions

Central Canada in 1871 had a diverse and extensive urban-industrial system. Despite later additions of new territory to the Confederation, the industrial zone of central Canada was already almost completely forged and is little changed a century later. Individual industries were in transition in 1871. Paper making, for example, was beginning to alter its raw material base from rags, straw and esparto grass to wood pulp. The first wood-pulp mill in Canada had been opened in 1865 at Windsor Mills, Quebec, initially as a branch of an earlier mill at Sherbrooke.⁴⁴ By 1871 the new mill was the third largest in central Canada, with 94 employed. Over the next few decades, the substitution of wood pulp as the basic raw material would transform the Canadian paper industry in size and location. Pulp and paper making would replace the export of squared logs and sawn lumber and would eventually result in the founding of many new towns on the resource frontier of Quebec and Ontario. Another transition was the shift from artisanal shops to factories: this had already taken place in several centres by 1871 and would continue as inanimate power was applied to smaller production units and as a greater share of output became controlled by larger firms.

Various processes already at work in 1871 would alter the rural-urban balance of industry. Many long-established grain mills in the countryside would become

increasingly obsolete in the later 1870s as roller milling began to replace the traditional grindstones.⁴⁵ Especially in Ontario, the incorporation of scores of rural settlements as towns and villages would result in a major definitional shift. Industrial settlements incorporated in the 1870s included East London, Merriton, Deseronto and Edwardsburg (later Cardinal) in Ontario and, in Quebec, Hull, Valleyfield, Windsor Mills, and parts of Montreal Parish beyond the city limits. The process of urbanization of industry was accompanied by some direct migration of firms from rural areas to towns. A. Harris and Son moved their agricultural implement works from the rural village of Beamsville to Brantford in 1872. Robert McLaughlin moved his small carriage works from Enniskillen to Oshawa in 1877; the reasons for this decision included the distance from a railway and the absence of a bank.⁴⁶ There is also evidence of engineering firms, particularly, relocating to larger places in the urban hierarchy. Thompson and Williams left Mitchell for Stratford in 1875⁴⁷ and, four years later, the Massey Manufacturing Company moved from Newcastle to Toronto. Both firms had been the largest employers in their respective villages and their removals left serious gaps in the local economies. In a few cases, there was a relocation down the urban hierarchy, as with the move of the Grand Trunk workshops from Brantford to Stratford during 1871.

These examples of movement and the substantial variety of sites and settings of industrial establishments in 1871 show that there was, perhaps, a greater degree of locational tolerance than is often assumed. Business enterprise, more than any specific qualities of location, was the critical element in economic and technical success. Not all industrial firms had to be in large towns and cities: some could thrive on the spatial margins. The Georgian Foundry, a manufacturer of

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turbine engines, functioned well at Meaford; together with the arrival of the railway extension from Collingwood, it was a factor in the incorporation of the town in 1874.⁴⁸

What were the critical factors and stages in the concentration of industrial activity in urban centres? How, precisely, did industrial growth affect general urban development? To what extent was the relative growth of urban centres based on their industrial performance? Was industry really the engine of urban growth? Answers to these questions require research with a longitudinal perspective, capable of weighing the influence of various factors in change over fair periods of time. While material as systematic and detailed as the 1871 manuscript census does not survive for any earlier or later dates, it should be possible to use the precision of CANIND71 data for individual industrial establishments to trace linkages back to the earlier period and forward to 1900 or even later. The capacity to aggregate establishment records, for industry types or for geographical units such as communities or municipalities, permits the 1871 data to be related to other types of records at a more generalized level.⁴⁹

Among the possibilities for research in the pre-1871 period, the origins and early development of specific enterprises operating in 1871 might be probed. Systematic and comparative research of enterprises in different industry types and geographical areas should help to understand the process of early industrialization in relation to local agricultural economies and societies. To what extent did early industrial enterprises evolve organically and gradually from simple to complex processes, from small to larger scales of operation? How many businesses were created as instant mills or factories, using technology and methods or organization developed elsewhere?

Early enterprises may be considered in their community and regional contexts, and leading businesses may be defined around which others may have clustered and whose entrepreneurs invested in other sectors. How did central Canada's location on the New World settlement frontier affect its process of industrialization, in comparison with that recorded in Britain and Europe by scholars of proto-industrialization? Can a longitudinal approach, back from the known benchmark of 1871, substantiate the hypothetical process of diversification from consumer to producer goods, initially in well-defined regions of specialization?

For the period since 1871, it is possible to take the longitudinal view of specific enterprises or industry groups, and of industrialization in communities or regions.⁵⁰ What was the survival rate of industrial businesses operating in 1871? How many of central Canada's industrial leaders were still flourishing in 1900, or in 1930? Did the fates of such enterprises reflect their industry type or location, their management or economies of scale? It is tempting to speculate on the possibility of predicting subsequent urban-industrial growth from the industrial status and structure of cities and towns in 1871. How important was the degree of industrialization of a town's or city's population? Was specialization in a particular industry a help or a handicap in maintaining subsequent growth? How crucial in the development of a town or city in the late nineteenth and early twentieth centuries were size of urban population, good railway connections and competition, local entrepreneurship, community attitudes to industry, the early development of steam power, or the quality of urban services?

Notes

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database and thank Robert Lewis and two anonymous assessors for their comments on this paper.

1. Quoted in J.C. Weaver, *Hamilton: an illustrated history* (1982), 55.
2. A.F.J. Artibise and P.-A. Linteau, *The evolution of urban Canada: an analysis of approaches and interpretations*, Reports 4 (Winnipeg: Institute of Urban Studies, 1984).
3. A.J. Scott, "Industrialization and urbanization: a geographical agenda," *Annals, Association of American Geographers* 76,1 (1986): 35.
4. E.J. Chambers and G.W. Bertram, "Urbanization and manufacturing in central Canada, 1870--1890," in S. Ostry and T.K. Rymes, eds., *Papers on regional statistical studies* (Toronto, 1966): 225-254; J.M. Gilmour, *Spatial Evolution of Manufacturing: Southern Ontario 1851-1891* (Toronto: Department of Geography, University of Toronto, 1972) also had to use aggregated county units.
5. See for example R.C. Harris and J. Warkentin, *Canada before Confederation: a study in historical geography* (New York: Oxford University Press, 1974); W.R. Bland, "The location of manufacturing in southern Ontario in 1881," *Ontario Geography* 5 (1974): 9-39; R.L. Gentilcore, ed. *Historical Atlas of Canada, Vol. II, The land transformed 1800-1891* (Toronto: University of Toronto Press, 1993), plate 48. Scholars who have examined the 1871 manuscript industrial schedules for studies of particular cities or industries include J. Burgess, "L'industrie de la chaussure à Montréal: 1840-1870—le passage de l'artisanat à la fabrique," *Revue d'histoire de l'Amérique française* 31 (1977): 187-210; E. Martel, "L'industrie à Montréal en 1871," (Thèse de maîtrise, Université du Québec à Montréal, 1978); B. Bradbury, "The family economy in an industrial city, Montreal in the 1870s," *Historical Papers 1979* (Canadian Historical Association), 71-96; G.S. Kealey, *Toronto workers respond to industrial capitalism, 1867-1892* (Toronto: University of Toronto Press, 1980); M. Bellavance, "Les structures de l'espace montréalaise à l'époque de la Confédération," *Cahiers du géographe du Québec* 24,63 (1980): 363-384; J. Ferland, "Les Chevaliers de Saint-Crépin du Québec, 1869-71: une étude en trois tableaux," *Canadian Historical Review* 72,1 (1991): 1-38.
6. The Canadian Industry in 1871 (CANIND71) project, based at the University of Guelph since 1982, has made machine-readable all the manuscript data for over 45,000 industrial establishments recorded for the four provinces of Ontario, Quebec, New Brunswick and Nova Scotia in the first Census in Canada in April 1871. The project has been partly supported by grants from the

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Social Sciences and Humanities Research Council and the University of Guelph. For each establishment, there are up to 125 variables. All information for all establishments in the 1871 manuscript schedules has been transcribed in the natural language used by the enumerator. Precise geographical references and Standard Industrial Classification codes added to all records permit both the retrieval of details for individual businesses and their systematic aggregation and analysis by industry type or geographical area. The entire CANIND71 database is offered to researchers on tapes in flat files with some choices as to labelling, mode, and control command files and with basic documentation provided in the 200-page CANIND71 Manual in both French and English versions. As well, users may request smaller datasets on diskette for particular regions or industry types. The project team has produced 14 research reports which describe project procedures and/or present preliminary analyses and interpretations of selected topics or regions. Examples include G.T. Bloomfield and E. Bloomfield, *Standard industrial classifications applied to historical data: the case of the 1871 industrial census* (CANIND71 Research Report #8, 1989) and G.T. Bloomfield, *Boundaries of Canadian census units in 1871* (CANIND71 Research Report #10, 1990). There is also a series of 36 Ontario county reports.

7. The 1871 census recorded 9 cities, 51 towns and 124 villages.
8. New Brunswick and Nova Scotia accounted for only 6.6 per cent and 5.7 per cent of the total national value of industrial output in 1871. The Ontario and Quebec proportions were 52.6 per cent and 35.1 per cent respectively. Only Fredericton (\$0.6 million industrial output), Saint John (\$5 million) and Halifax (\$3 million) were distinguished in the 1871 census. Unfortunately, the manuscript schedules for the important King's Ward of Saint John (with an estimated 210 establishments, 1,000 employees and \$1.35 million value of output) were lost.
9. See, for example, M. Bliss, *Northern enterprise: five centuries of Canadian business* (Toronto: McClelland and Stewart, 1987), Chapter 9; H.C. Pentland, "The transformation of Canada's economic structure," in P. Phillips, ed., *Labour and capital in Canada, 1650-1860* (1981), reprinted in G. Laxer, ed., *Perspectives on Canadian economic development: class, staples, gender and elites* (Toronto: Oxford University Press, 1991), pp. 193-226.
10. D.R. Meyer, "Emergence of the American manufacturing belt: an interpretation," *Journal of Historical Geography* 9,1 (1983) 145-174; D.R. Meyer, "The new industrial order," in M. Conzen, ed., *The making of the American landscape* (London: Harper Collins, 1990), Chapter 13; J. McCallum, *Unequal beginnings: agriculture and economic development in Quebec and Ontario until 1870* (Toronto: University of Toronto Press, 1980); I.M. Drummond, *Progress without planning: the economic history of Ontario from Confederation to the Second World War* (Toronto: University of Toronto Press, 1987), Chapter 7; D. McCalla, *Planting the province: the economic history of Upper Canada, 1784-1870* (Toronto: University of Toronto, 1993), Chapter 12.
11. P. Craven and T. Traves, "Canadian railways as manufacturers, 1850-1880," *Historical Papers* 1983 (Canadian Historical Association), 254-281.
12. D. Swainson, *Garden Island: a shipping empire* (Kingston: Marine Museum of the Great Lakes, 1984). The island was incorporated as a village in 1870.
13. Readers should note that significantly more industrial activity was recorded in the manuscript schedules of the 1871 census than was reported in the published tables at the time—with variance of up to 20 per cent for whole provinces in the totals for employees, wages, costs of raw materials and value of output. For individual census districts or municipalities, the percentage variance could be higher. For example, 22,164 industrial workers were counted for Montreal from the manuscript evidence (only 21,187 in the published census); for Toronto the data were 10,585 (9,400); for Hamilton 5,775 (4,456). For Quebec City on the other hand, the compilers of the published tables erroneously included areas outside the city and returned a total of 7,250, compared with only 5,970 derived from the manuscript schedules. Problems of variance between the manuscript schedules and the published tables are addressed in *Creating CANIND71: procedures for making the 1871 census machine-readable* (CANIND71 Research Report 4, 1989).
14. E. Bloomfield and G.T. Bloomfield, *Patterns of Canadian industry in 1871: an overview based on the first census of Canada* (CANIND71 Research Report 12, 1990) and *Industrial leaders: the largest manufacturing firms* (CANIND71 Research Report 8, 1990).
15. D. Kerr, "The emergence of the industrial heartland c1750-1950," in L.D. McCann, ed., *Heartland and hinterland: a geography of Canada* (Toronto: Prentice-Hall, 1982), Chapter 3. Figures 3.2 and 3.3 show, respectively, the distribution of urban places and the value of manufactured products in urban places of at least 1,500 population.
16. D. McCalla, *The Upper Canada trade, 1834-1872: a study of the Buchanans' business* (Toronto: University of Toronto Press, 1979).
17. A more elaborate typology might draw upon the concepts and measures of I. Adelman and C.T. Morris, "Patterns of industrialization in the nineteenth and early twentieth centuries: a cross-sectional quantitative study," in Paul Uselding, ed., *Research in Economic History: A Research Annual* 5 (1980): 1-84.
18. In their analysis of specialized industrial cities in the United States, Perksy and Moses used the very similar criterion of 15 per cent of the city population employed in manufacturing, together with a concentration of at least 25 per cent of industrial workers in a single industry. See J. Perksy and R. Moses, "Specialized industrial cities of the United States, 1860-1930," *Journal of Historical Geography* 10 (1984): 37-51. This classification complements Spell's classification, based on central-place functions for the south-central region of Ontario in the later nineteenth century, in *Urban development in south-central Ontario* (Assen, 1955; reprinted Carleton Library, 1972).
19. *Lovell's Canadian Dominion Directory for 1871* (Montreal: John Lovell, 1871), 1250-1251.
20. The large distillery of Hiram Walker was located in Sandwich East Township, well beyond the town boundary of Windsor.
21. Maxine Berg, ed., *Manufacture in town and country before the factory* (Cambridge University Press, 1983): 1-59; P.K. O'Brien, "Do we have a typology for the study of European industrialisation in the XIXth century?" *Journal of European Economic History* 15,2 (1986): 297-304.
22. For discussion of these ideas, including their implications for understanding the process of industrialization and the work experience of labour in various phases and settings, see R. Samuel, "The workshop of the world: steam power and hand technology in mid-Victorian Britain," *History Workshop Journal* 3 (1977): 6-72; H.G. Gutman, "Work, culture and society in industrializing America, 1815-1919," *American Historical Review* 78 (1973): 531-588; I. McKay, "Capital and labour in the Halifax baking and confectionery industry during the last half of the nineteenth century," *Labour/Le Travailleur* 3 (1978): 63-70; B. Laurie and M. Schmitz, "Manufacture and productivity: the making of an industrial base, Philadelphia, 1850-1880," in T. Hershberg, ed., *Philadelphia: work, space, family, and group experience in the nineteenth century*, (New York, 1981): 43-92; and K.L. Sokoloff, "Was the transition from the artisanal shop to the non-mechanized factory associated with gains in efficiency?

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- evidence from the U.S. manufacturing censuses of 1820 and 1850," *Explorations in Economic History* 21 (1984): 351-382.
23. Our typology of work environments owes most to the Philadelphia work of Laurie and Schmitz in "Manufacture and productivity," 50-66. Ian McKay uses size of output in classifying workplaces in "Capital and labour in the Halifax baking and confectionery industry," 63-70. For applications of the typology of work environments to Canada in 1871, see E. Bloomfield and G. Bloomfield, *The Ontario urban system at the onset of the industrial era* (CANIND71 Research Report #3, 1989), as well as CANIND71 Research Reports #9, #11 and #12.
24. See G. Bloomfield and E. Bloomfield, "Water-wheels and steam engines in Ontario: industrial power reported in the 1871 manuscript census," *Scientia Canadensis* 13,1 (1989): 3-38.
25. Larry McNally, *Water power on the Lachine Canal, 1846-1900* (Ottawa: Parks Canada, 1982).
26. The CANIND71 database preserves the natural language used by the census enumerators to describe the types of establishments that they found on their rounds in April 1871. The rationale is explained in *CANIND71 Manual/Manuel* (1991). For guides to the natural language used in the census, see *Glossary of industrial language* (CANIND71 Research Report #5, 1989) and *French-English dictionary of industrial language* (Research Report #6, 1989).
27. The proportion of Toronto workers employed in large establishments in 1871 was almost exactly the same as reported for Philadelphia (Laurie and Schmitz, "Manufacture and productivity" 52). Kealey discusses the size of industrial workplace in *Toronto workers* (28-30, 299-306).
28. P.G. Goheen, *Victorian Toronto, 1850-1900: pattern and process of growth* (Department of Geography, University of Chicago, 1970); M.J. Doucet, "Working class housing in a small nineteenth century Canadian city: Hamilton, Ontario 1852-1881," in G.S. Kealey and P. Warrian, eds., *Essays in Canadian working class history* (Toronto, 1976): 83-105; R.D. Lewis, "The segregated city: class, residential patterns and the development of industrial districts, 1861 and 1901," *Journal of Urban History* 17,2 (1991): 123-152.
29. Even a location on a major river such as the Richelieu did not necessarily mean significant development of water-power: St Jean and St-Ours, for example, each had under five per cent of their workers employed in powered establishments. Until the massive investment of the hydro-electric power era from 1900, tapping the power potential of most of the largest rivers of central Canada was virtually impossible.
30. For a detailed analysis of female industrial workers in 1871, see E. Bloomfield and G. Bloomfield, *Canadian women in workshops, mills and factories: the evidence of the 1871 census manuscripts* (CANIND71 Research Report #11, 1991).
31. E.K. Muller and P.A. Groves, "The emergence of industrial districts in mid-nineteenth-century Baltimore," *Geographical Review* 69,2 (1979): 159-178; R.D. Lewis, "The development of an early suburban residential district: the Montreal ward of Saint-Ann 1851-1871," *Urban History Review* 19, 3 (1991): 166-180. These authors review the pertinent North American literature but the significance of detailed European work should not be overlooked. See for example: P.G. Hall, *The industries of London since 1861* (London: Hutchinson, 1962); J.E. Martin, *Greater London: an industrial geography* (London: Bell, 1966); L. Bergeron, ed., *Paris: g  n  se d'un paysage* (Paris: Picard, 1989); A. Fourcault, ed., *Un si  cle de banlieue parisienne 1859-1964: guide de recherche* (Paris: L'Harmattan, 1988).
32. Lewis *Urban History Review* (1991) 167; Lewis *Journal of Urban History* (1991) 132-7.
33. T. McIlwraith, "Digging out and filling in: making land on the Toronto waterfront in the 1850s," *Urban History Review* 20, 1(1991) 15-33; R.L. Gentilcore, ed. *Historical atlas of Canada, Vol II* (1993), Plate 47; B.S. Osborne and D. Swainson, *Kingston: building on the past* (Westport: Butter-nut Press, 1988).
34. McNally (1982); R.L. Gentilcore, ed. *Historical atlas of Canada, Vol II* (1993), Plate 47 which shows the location of establishments at the Saint-Gabriel Lock and Basin No. 2 on the canal.
35. The Ottawa industrial areas are captured in contemporary views reprinted in J.H. Taylor, *Ottawa: an illustrated history* (Toronto: Lorimer, 1986).
36. J.C. Weaver, *Hamilton: an illustrated history* (Toronto: Lorimer, 1982) 61. The Sawyer agricultural implement factory moved to a new site close to the railway as early as 1857.
37. F.H. Armstrong, *The forest city: an illustrated history of London, Canada* (Burlington: Windsor Publications, 1986), 121.
38. D. Newell, *Technology on the frontier: mining in Old Ontario* (Vancouver: UBC Press, 1986), 131-134; J.T.H. Connor, "A note on sulphuric acid production in Victorian Ontario," *Ontario History* 55, 3 (1983), 290-298; H.M. Grant, "The 'mysterious' Jacob I. Englehart and the early petroleum industry," *Ontario History* 85, 1 (1991): 65-76.
39. *Lovell's Canadian Dominion Directory 1871*, 1501.
40. L. Trottier, *Les forges: historiographie des Forges de Saint-Maurice* (Montreal: Boreal Express, 1980).
41. See for example: Y. Th  riault, *Trois-Rivi  res: ville de reflet* (Trois-Rivi  res: Bien Public, 1954); R. Rudin, "Boosting the French Canadian town: municipal government and urban growth in Quebec, 1850-1900," *Urban History Review* 11, (1982): 1-10; Statistics Canada, *Trois-Rivi  res: a metropolitan profile* (Ottawa, 1984).
42. *Gazetteer and Directory of the City of Guelph 1867* (Toronto: Irwin and Burnham, 1867). 119.
43. For general context, see L.A. Johnson, *History of Guelph 1827-1927* (Guelph: Guelph Historical Society, 1977). For an interpretation of the 1871 census evidence for Guelph and its hinterland, see E. Bloomfield and G.T. Bloomfield *The hum of industry: millers, manufacturers and artisans of Wellington County* (CANIND71 Research Report #9, 1989).
44. G. Carruthers, *Paper in the making* (Toronto: Garden City Press, 1947), 463-368.
45. F.L. Leung, *Grist and flour mills in Ontario: from millstones to rollers, 1780s-1880s*, History and Archaeology 52 (Ottawa: Parks Canada, 1981).
46. M.M. Hood, *Oshawa: Canada's motor city* (Oshawa: Oshawa Public Library Board, 1968), 118.
47. A. Leitch, *Floodtides of fortune: the story of Stratford* (Stratford: City of Stratford, 1980), 91.
48. J.D. Lindsey, "Water and blood: the Georgian Foundry, hydraulic technology and the rise and fall of a family firm in small town Ontario," *Ontario History* 75, 3 (1983): 244-265.
49. E. Bloomfield, *Urban-industrial growth processes in southern Ontario 1870-1930*, Research and Working Papers 24 (Winnipeg: Institute of Urban Studies, 1986).
50. For a model study of a major region, see B. Page and R. Walker, "From settlement to Fordism: the agro-industrial revolution in the American Midwest," *Economic Geography* 67 (1991): 281-315.