

# Research Note / Note de recherche

## Mills, Factories and Craftshops of Ontario, 1870: A Machine-Readable Source for Material Historians

Historians of material culture have a new machine-readable source – a data bank derived from manuscript schedules of industrial establishments recorded for the 1871 Census of Canada. During 1985-86, the first stage of a project to facilitate access to these data has been sheltered by the Department of Geography, University of Guelph. The work has been assisted by a grant from the Social Sciences and Humanities Research Council of Canada.

The manuscript schedules on industrial establishments, recently made available on microfilm as part of the whole 1871 manuscript census by the Public Archives, constitute a uniquely valuable source.<sup>1</sup> Although similar details were collected in the censuses of 1881, 1891, 1901 and 1911, none of the manuscript schedules for those years have survived. While the 1861 census manuscripts have survived, their format is much more awkward to use, the industrial details being scattered through the household schedules.<sup>2</sup> Moreover, the 1871 schedules contain a wealth of information which was not published at the time.

The 1871 census enumerators recorded the following details of activity in 1870 for each industrial enterprise that was included: name of proprietor(s); statement of type of establishment/nature of product; values of fixed and floating (working) capital; number of working months in the year; average numbers employed, distinguished into males and females over 16 years, boys and girls under 16 years; motive power other than manual (water, steam, horse) with the nominal force stated in units of horsepower; quantities and values of specified raw materials; quantities and values of manufactured products.

Only a very limited amount of this material was published in the official census volumes of the 1870s. The industrial statistics were organized primarily by various industrial types which were defined pragmatically rather than systematically. Summary data only were published for each of the 206 census districts (90 in Ontario); no industrial data at all were published for smaller areal units. No details were made available for individual establishments, and the material collected on the use of inanimate power was not released in any form.

The summary industrial data published in the 1871 census volumes were used in important surveys of industrial activity in late nineteenth-century Canada by Chambers and Bertram<sup>3</sup> and by Gilmour.<sup>4</sup> But they had to make inferences based on totals for whole census districts (counties or portions of counties) and were limited by the definitions of industrial types employed by the 1871 census organizers. Our project now permits more finely tuned comparative analysis. We are also finding that our computer aggregations of the manuscript data are yielding totals significantly higher than those in the published volumes by as much as 15 per cent.

Since the 1871 manuscript schedules were first released in the early 1970s, several scholars have examined them to support studies of particular cities, districts or industrial types. Gregory Kealey, for example, used the Toronto data to provide a context for his study of industrial workers.<sup>5</sup> The York Social History project, directed by Michael Katz, coded data for industrial establishments in Hamilton, as part of its analysis of industrial capitalism in that city.<sup>6</sup> L.D. McCann has used the manuscript schedules for Halifax-Darmouth and for Pictou County, together with Dun credit ratings.<sup>7</sup> Eve Martel reconstituted the general patterns of industry in Montréal,<sup>8</sup> and Joanne Burgess, the organization of the shoe-making industry there.<sup>9</sup> Paul Craven and Tom Traves have drawn on census manuscript data for evidence of industrial activity in railway workshops and yards;<sup>10</sup> Jim Burant has featured the photographic studios of Saint John,<sup>11</sup> and Ian McKay the confectionery and baking industry of Halifax.<sup>12</sup>

However, these uses of the 1870 manuscript data have been specific to each researcher's limited purpose. Different systems of classification have been used, so that comparisons with other places or industrial sectors or with later periods are almost impossible. Very few of these users have transformed the data into machine-readable form, and those who have done so have been unconcerned about making their records accessible to other researchers. Scholars interested only in one category or sector of industrial activity may be daunted by the time-consuming labour of searching through the microfilmed schedules for a handful of establishments, and could easily miss some

that were slightly misplaced in storage or the micro-filming process.

The project reported here makes the unpublished data for industrial establishments accessible, in systematic, standardized, and machine-readable format, to serve the research interests of economic, business, urban and social historians, historical geographers, industrial archaeologists, and historians of material culture and technology. By coding individual establishments within the framework of census districts, sub-districts, and enumerators' divisions, by classifying each according to the Standard Industrial Classification (SIC) and by using computer methods, we can achieve accuracy, consistency, comparability, retrievability, and aggregation.

In the first major phase of the work, the manuscript details for 6,821 industrial establishments in 146 urban or proto-urban centres have been made machine-readable. These establishments constitute 44 per cent of all reported for Ontario in 1871, but 61 per cent of Ontario's total industrial employment and 64 per cent of total provincial production. They also represent 20 per cent of all industrial establishments reported for the four Canadian provinces included in the 1871 census, but 28 per cent of total industrial employment and 33 per cent of total industrial production.

Details for all industrial establishments located within Ontario urban and proto-urban centres were read from the microfilmed manuscript schedules. All data, except for volumes of raw materials and/or products, were coded in preparation for data entry. It was decided to exclude volume data because of the extreme variety of materials and of units of measurement. A SIC code was added for each establishment, as well as location details of town name, census district name, and census enumerator's division. In the early stages of the project, details were coded for data entry by keypunch operators to the main-frame computer. Procedures were later adapted when an IBM-AT microcomputer was acquired for the project.

Intensive procedures were developed for verifying the basic data and for editing the data base so that it is suitable for statistical analysis, for indexing, search, and retrieval, for on-line transmission to or copying on diskette for other users, and for printing in hard copy. Particular attention was paid to the accuracy and consistency of the SIC designations and to the verification of the numeric data for capital, employment, wages, raw materials, and value of production. Proprietors' names and types of establishment/product were also checked against lists in the Dun reference books, directories and historical atlases. In cases where the census enumerator's spelling of the proprietor's name differed significantly from that in a contemporary printed source, while clearly referring to the same establishment, the record was "corrected" if this would

result in a more plausible or conventional rendering of the name.

Every record now has the following fields in a dbase III file structure:

Structure of URBIND71.dbf

Field	Field Name	Type*	Width	Meaning
1	TOWNID	C	3	ID code - city/town/village
2	CED	C	3	Census enumerator's division
3	ESTNUM	C	3	Establishment no. - MS sequence
4	PROPRIOR	C	20	Name(s) proprietor(s)
5	TYPEST	C	20	Type establishment/product
6	MONTHS	C	2	No. working months in year
7	SIC	C	11	SIC code
8	TYPEPOW	C	5	Type motive power (other than manual)
9	FORCE	N	3	Nominal power (HP)
10	FIXCAP	N	7	Fixed capital (\$)
11	FLOCAP	N	7	Floating capital (\$)
12	EMPMEN	N	3	No. men employed
13	EMPWOM	N	3	No. women employed
14	EMPBOY	N	3	No. boys employed
15	EMPGIRL	N	3	No. girls employed
16	WAGES	N	7	Total wages (\$)
17	RAWMAT	N	7	Cost raw materials (\$)
18	PRODUCTS	N	7	Value production (\$)
19	TOTEMP	N	3	Total no. employees
20	TOWNNAME	C	15	Full name - city/town/village
21	CDISTRIC	C	23	Full name - census district
22	CDID	C	4	ID code - census district
Total			163	

\* C = Character, N = Numeric

The project procedures now enable data for any establishment to be retrieved easily: details for groups of establishments may also be aggregated by geographical unit or industrial type. Both potentialities, which are likely to interest historians of material culture, are illustrated in the tables accompanying this note.

The 1871 manuscript data capture the industrial structure for one year at a time of transition from artisanal craftshops to factories. The aggregate patterns emerging from analysis of the data bank provide a comparative context for detailed study of specific enterprises or types of enterprises. The computer's sorting and indexing capabilities allow us to group enterprises in the same line of business, wherever they were located, and to rank them in order of any of their numeric variables, as we have done in tables 2 to 5. Historians of material culture working with archives or artifacts of a particular enterprise may know how that business compared with others in the same line in 1870. In cases where particular business records have not survived, the 1870 data may be used with other fragments of routinely generated material to piece together some account of the enterprise or type of industry.

Calculation of means and ratios is possible from the primary numeric data for individual establishments or for industrial or geographical aggregations, including the following: value added in manufacturing; number of employees per establishment; added value per employee; added value per unit of fixed capital; added value as per cent of total value of production; value of production per establishment; wage rates; extent of seasonal work; wages as per cent total value of production; fixed capital invested per establishment.

One type of data of possible interest to historians of material culture but which cannot be provided routinely by our data bank is that concerned with volumes of raw materials and finished products. The manuscript schedules did allow space for enumerators to complete details of the quantities as well as the dollar values of raw materials and of products. However, we decided not to code or enter these data for two reasons. The first was the extreme variety of materials and units of measurement –

feet, bushels, yards, pounds weight, and so on – which in our judgement would have made the data bank too large and unwieldy. Secondly, we found that many enumerators did not complete the sections of the schedules relating to quantities and volumes. For example, the entry for R. Hay and Co., by far the largest cabinet-making and upholstery business in Ontario with production valued at \$500,000 in 1870, specifies for materials only “140,000 ft lumber” and for products “cabinet ware of all kinds.” Those wishing to trace details of quantities may use the precise locational references included for each establishment in our data bank (CDID, CED, and ESTNUM fields) to return to the original or microfilmed schedules (tables 4 and 5).

Some of the potential of the data bank may be illustrated by consideration of the use of inanimate energy in industrial establishments and of four different types of manufacturing business – flour mills, breweries, cabinet-makers and makers of agricultural implements. It would have been equally possible to consider sawmills, dis-

**Table 1 Largest industrial users of water and steam power in Ontario urban centres, 1870: the top 30 enterprises with at least 120 horse power.**

PROPRIETOR	TYPE ESTABLISHMENT	SIC CODE	POWER	FORCE	FIXCAP	FLOCAP	MEN	WOM	BOY	GIRL	TOTEMP	WAGES	RAWMAT	PRODUCTS	TOWNNAME
PERLEY WALTER	SAW MILL	251	WATER	500	150000	300000	250	0	0	0	250	70000	240000	330000	OTTAWA
HAMILTON ROLLING MILS	ROLLING MILLS	291	STEAM	400	70000	0	190	0	35	0	225	80000	410000	680000	HAMILTON
DUTTLE/DALE/RODDEN	AGRC HAND TOOLS	306	WATER	350	75000	85000	120	0	0	0	120	55000	36000	137000	ST CATHARINES
MCLAUGHLIN BROTHERS	SAW MILL	251	WATER	260	50000	150000	90	0	10	0	100	15000	90000	110000	ARNPRIOR
GORDON & MACKAY	LYBSTER COTTON MILLS	181	WATER	250	150000	30000	47	73	37	43	200	36000	66000	150000	MERRITTON
BRONSON, WESTON & CO	SAW MILL	251	WATER	250	350000	150000	300	0	0	0	300	70000	240000	360000	OTTAWA
BOOTH JAMES R	SAW MILL	251	WATER	250	400000	300000	200	0	0	0	200	60000	180000	250000	OTTAWA
BALDWIN A H	SAW MILL	251	WATER	250	90000	200000	274	0	0	0	274	50000	180000	276000	OTTAWA
GZOWSKI C & CO	ROLLING MILL	291	STEAM	250	100000	50000	180	0	20	0	200	72000	387000	500000	TORONTO
PLATT MARY ANN	TECUMSEH SALT WORKS	079	STEAM	225	21500	10000	19	0	0	0	19	7500	2500	40000	GODERICH
HESPELER GEORGE	FLOUR MILL	105	WATER	200	7500	23750	6	0	0	0	6	1000	5000	11110	HESPELER
BLACKBURN & MCLAREN	WOOLEN FACTORY	182	WATER	200	35000	50000	22	31	3	2	58	14400	60000	80000	NEW EDINBURGH
RIORDAN JOHN	PAPER MILLS	271	WATER	200	156000	105000	80	20	0	0	100	30000	70000	160000	MERRITTON
NEEDLER WILLIAM	GRIST MILL	105	WATER	180	24000	18000	7	0	0	0	7	2800	120000	139996	LINDSAY
BETHUNE ANGUS	FLOUR MILL	105	WATER	160	12000	5000	7	0	0	0	7	2950	6250	10000	CORNWALL
GOLDIE JAMES	FLOUR MILL/COOPERAGE	105/259-C	WATER	160	30000	20000	28	0	10	0	38	15000	260000	275000	GUELPH
ROSAMOND B & W & CO	WOOLEN FCY	182	WATER	160	200000	150000	74	105	17	13	209	48600	270000	350000	ALMONTE
MCDONOUGH JOHN	SAW MILL	251	WATER	160	12000	20000	20	0	0	0	20	8000	27000	42000	THOROLD
BARBER JAMES	PAPER MILL	271	WATER	160	50000	35000	25	12	5	4	46	11000	64000	90000	GEORGETOWN
NOXON S & T H	SAW MILL	251	WATER	155	5000	0	4	0	0	0	4	480	1300	3277	WALKERTON
HOTCHKISS/PECKHAM CO	SAW MILL	251	STEAM	150	30000	50000	125	0	8	0	133	26000	54000	120000	COLLINGWOOD
RATHBUN H B & SON	STEAM SAW MILL	251	STEAM	150	50000	160000	237	0	74	0	311	39250	77900	140754	DESERONTO
HAMILTON BROTHERS	SAW MILLS	251	WATER	150	100000	0	132	0	36	0	168	27000	400000	540000	HAWKESBURY
JONES FORD CO	TOOL/SHOVELS/FORKS	306	WATER	150	50000	40000	48	0	7	0	55	15000	55000	80000	GANANOQUE
BARNHART NOAH	FLOUR MILL	105	WATER	140	100000	30000	3	0	0	0	3	2000	47000	56000	COLLINGWOOD
ROBERTSON WILLIAM	FLOUR/OATMEAL MILL	105/105-0	WATER	140	40000	40000	10	0	0	0	10	4000	70000	85000	FERGUS
PLEWES DAVID	FLOUR MILL	105/106	WATER	140	20000	20000	12	1	1	0	14	5300	200000	229000	BRANTFORD
CALDWELL BOYD	SAW MILL	251	STEAM	135	40000	10000	40	0	0	0	40	8400	62500	100000	CARLETON PLACE
FLINT & YEAMANS	SAW MILL	251	STEAM	125	15000	8000	45	0	0	0	45	2000	6000	10000	BELLEVILLE
WAIT WILLIAM W	COTTON MILLS	181	WATER	120	30000	30000	15	20	20	20	75	11000	55000	75000	MERRITTON
*** Total ***					6120	2463000	2089750	2610	262	283	82	3237	789680	3742450	5430137

Source: URBIND71 databank, compiled from 1871 manuscript census schedules.

tilleries, tailors, and carriage-makers or any of about a hundred other industrial types. Each case is illustrated by output from the data bank and by discussion of particular businesses.

### Powered Establishments

To what extent was non-human energy – mainly water- and steam-, but also wind- and horse-power – used in nineteenth-century industry? This is an interesting question for historians of material culture, implying trends to mass production and standardization of manufactured articles as well as changes in the size and form of industrial buildings. Our project is revealing the 1870 evidence of non-manual energy in industry for the first time, none of the original data having been published.<sup>13</sup>

Less than a quarter (22.5 per cent) of Ontario's urban industrial establishments reported using water-, steam-, wind-, or horse-power in 1870. In rural Ontario, the proportion of powered establishments was nearly twice as high (44.2 per cent).<sup>14</sup> Powered establishments were, of course, disproportionately significant in terms of investment and production, accounting for 72 per cent of the fixed capital investment and 64.5 per cent of the total value of industrial production in Ontario urban centres.

Establishments with the largest nominal power capacity were mainly water-powered and dominated by such traditional industrial types as flour mills and sawmills. Of the 30 enterprises with over 120 horsepower capacity in Ontario urban centres (table 1), only seven used steam-power, and the industrial types were:

Type	SIC	Steam	Water
Salt works	079	1	-
Flour mills	105	-	7
Cotton mills	181	-	2
Woollen mills	182	-	2
Sawmills	251	4	8
Paper mills	271	-	2
Rolling mills	291	2	-
Hand-tool manufacturers	306	-	2
Total		7	23

Steam-power was more common in urban centres than in rural areas. If we consider only establishments reporting 25 or more horsepower capacity, nearly half of those in Ontario used steam-power, compared with only 17 per cent of the rural establishments. Steam-power was also more likely to be used by establishments with smaller power capacity, as the following summary shows:

Urban Powered Establishments by Energy Source, 1870

Size-class hp	Steam		Water		W/S*		Total no.
	no.	%	no.	%	no.	%	
Over 100	11	23	36	75	1	2	48
50-99	36	34	60	57	9	9	105
25-49	168	59	101	36	14	5	283
Total (over 25 hp)	215	49	197	45	24	5	436

\* W/S = water/steam

Steam-powered establishments were associated with a more diverse range of industrial types than those using waterpower. For example, an analysis of all urban industrial establishments reporting 20 horsepower capacity shows the following breakdown:

Type	SIC	Steam	Water
Salt works	079	2	-
Flour mills	105	10	14
Brewery	109-D	1	-
Tanning/leather works	171-179	8	1
Woollen mills	182	6	4
Flax mills	189-F	1	2
Carding mills	189-W	1	3
Knitting mill	239	1	-
Sawmills/wood working	251-259	36	18
Printing	286	1	-
Metals/machinery	301-315	17	4
Transportation equipment	328-329	5	3
Non-metallic minerals	351-359	4	1
Musical instruments	399-P	2	-
Carpentry	421-C	1	-
Total		96	50

### Flour Mills

Flour and grist mills were always powered by inanimate energy, usually waterpower. They were the most substantial industrial enterprises in 1870, having been established in the early stages of settlement and community development in most districts. The 33 flour mills in table 2, grouped because they produced at least \$100,000 worth of flour in 1870, constituted the largest single industrial type among the total number of 133 urban industrial establishments of that size in 1870. Proprietors of flour mills usually ranked among the elite in most communities, and the solid mill structures, usually of stone, were prominent landmarks.<sup>15</sup> Flour mills were remarkable for their degree of mechanization and small labour force, a result of changes in technological processes which have been thoroughly reviewed by Felicity Leung.<sup>16</sup>

Although the largest numbers of flour mills were located in rural Ontario, the most productive mills were

in the urban centres. The following summary table, in which "large" mills mean those with a production value of at least \$100,000, illustrates this point:

Size-class	Estabs. no.	Production \$	Mean \$	Per cent
Urban – large	33	6,564,134	198,913	24.2
Urban – remainder	195	5,425,328	27,822	20.0
Rural – large	12	2,166,872	180,573	8.0
Rural – remainder	711	12,959,462	18,227	47.8
Total	951	27,115,796	28,513	100.0

To complement the details presented in table 2, the 12 "large" flour mills in rural districts are summarized below:

Proprietor	Township	Power* hp	Production \$
W. T. Benson	Edwardsburg	W 34	460,000
McQuarrie & Thorburn	Oneida	W 400	266,500
Gooderham & Worts	Toronto	W 80	254,000
Hilliard & Tawnby	London	W 60	192,000
William Lee	Goderich	W NA	150,000
Alfred Gooderham	Vaughan	W 25	138,000
Plewes & Clow	London	W 30	137,772
David Goldie	North Dumfries	W 80	131,000
M. K. Dickison	North Gower	W 60	120,000
Whitlaw & Gay	Nichol	W 40	115,000
W. Howland	East Flamborough	W/S 50	109,000
P. & F.A. Howland	West York	W 75	103,600

\* W = water, S = steam

A map of the spatial distribution of the large flour mills in Ontario in 1870 shows that the majority – 24 urban and 10 rural of the total 45 – were concentrated in the zone between Goderich and London in the west and Toronto and St. Catharines in the east. Within that zone, 11 urban and 3 rural mills were located in the three counties of the Middle Grand Valley – Wellington, Waterloo and Brant.

## Breweries

Breweries provide a contrast to flour mills in location and scale of operation. Because of the perishable and bulky nature of their product, these establishments were concentrated in urban centres, especially the large ones. Of Ontario's 105 breweries, 74 were in urban centres. The 34 breweries with a production of at least \$7,500 are listed in table 3: Toronto had eight and Kingston and Hamilton four each, and London, Port Hope and Cobourg two each. An interesting detail was the distinctive family name of "Calcutt" for the proprietors of the breweries in Port Hope, Ashburnham (Peterborough), and Cobourg. None of the 1870 breweries was large, in relation to the enormous scale of distilleries, for example. Only three had a production value over \$50,000; the urban breweries had a mean production value of \$12,645, compared with the mean for rural breweries of only \$8,489. Steam-power was characteristic of the somewhat larger establishments, while the smaller breweries used horsepower and sometimes only manual power.

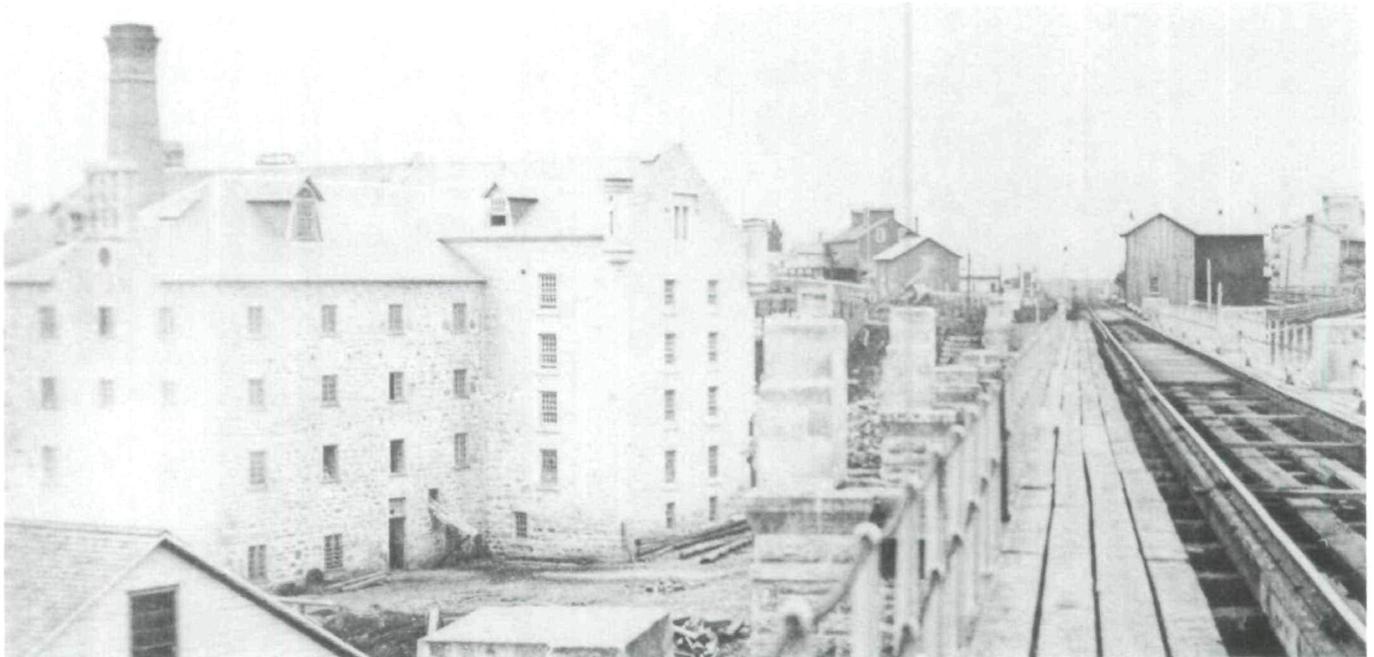


Fig. 1. Allan's Flour Mill, Guelph, Ont., c. 1870. A view west along the Grand Trunk Railway's viaduct over the Speed River. William Allan (a cousin of Hugh Allan, the Montréal shipping magnate) bought the Guelph mill from the Canada Company in 1833. The view shows the mill as rebuilt in stone during the early 1850s and with an auxiliary steam plant added a decade later. (Courtesy: Guelph Civic Museum)

Table 2 Flour mills in Ontario urban centres, 1870: the top 33 mills, with at least \$100,000 production

PROPRIETOR	TYPE ESTABLISHMENT	SIC CODE	POWER	FORCE	FIXCAPITAL	FLOCAPITAL	EMP MEN	EMP WOM	EMP BOY	EMP GIRL	TOTEMP	WAGES	RAWMAT	PRODUCTS	TOWNAME
NORRIS JAMES	FLOUR MILLS	105	WATER	20	45000	150000	25	0	0	0	25	10000	575000	640000	ST CATHARINES
PARKYN JAMES	GRIST/FLOUR MILL	105	W/S	75	15000	10000	8	0	0	0	8	2650	465654	488731	GODERICH
NEELON SYLVESTER	FLOUR MILL	105	WATER	50	25000	80000	15	0	5	0	20	8000	385000	447120	ST CATHARINES
GIBBS & GIBBS	FLOUR MILL	105	WATER	70	60000	200000	20	0	0	0	20	6000	300000	325000	OSHAWA
WHITLAW CHARLES	FLOUR MILL	105	WATER	53	40000	120000	40	2	0	0	42	13000	270000	300000	PARIS
FRASER J & CO	FLOUR MILL/DISTILLER	105/109-D	WATER	70	30000	60000	9	0	0	0	9	3000	270000	300000	ELORA
GOLDIE JAMES	FLOUR MILL/COOPERAGE	105/259-C	WATER	160	30000	20000	28	0	10	0	38	15000	260000	275000	GUELPH
BOULTON HENRY J	FLOUR MILL	105	STEAM	80	30000	0	6	0	0	0	6	2500	200000	250000	TORONTO
PLEWES DAVID	FLOUR MILL	105/106	WATER	140	20000	20000	12	1	1	0	14	5300	200000	229000	BRANTFORD
GIBSON WILLIAM	GRIST MILL	105	WATER	52	18000	10000	8	0	0	0	8	2800	200000	225000	MORRISBURG
KING J G	FLOUR MILL	105	WATER	80	4000	30000	6	0	1	0	7	3000	175000	200000	PORT HOPE
MCKAY THOMAS	FLOUR MILL	105	WATER	40	40000	30000	16	0	0	0	16	5000	178880	194854	OTTAWA
ALLAN DAVID	FLOUR MILL	105	W/S	70	40000	60000	14	2	0	0	16	6000	106000	189000	GUELPH
WATTS ALFRED	BRANT MILLS/FLOUR	105	WATER	50	10000	4000	5	0	0	0	5	2000	160000	180000	BRANTFORD
NORRIS & CO	FLOUR MILLS	105	WATER	50	10000	25000	9	0	0	0	9	2000	140600	150000	ST CATHARINES
MC CLEMONT W & CO	FLOUR/OATMEAL MILL	105/105-D	WATER	75	40000	10000	10	0	0	0	10	2500	100000	150000	NEW EDINBURGH
NEEDLER WILLIAM	GRIST MILL	105	WATER	180	24000	18000	7	0	0	0	7	2800	120000	139996	LINDSAY
BLAIN RICHARD	FLOUR/GRIST MILL	105	WATER	60	24000	110000	7	0	0	0	7	2500	116000	137000	GALT
YOUNG, BRONSON & CO	FLOUR MILL	105	WATER	100	20000	6000	6	0	0	0	6	3000	118500	130000	OTTAWA
SNIDER ELIAS	FLOUR MILL	105	W/S	35	20000	20000	6	0	0	0	6	2250	100000	127500	WATERLOO
COLEMAN JAMES	FLOUR/FEED MILL	105/106	WATER	100	20000	20000	4	0	0	0	4	1600	102250	127400	DUNDAS
STEWART THOMAS	FLOUR MILL	105	WATER	50	20000	75000	4	0	0	0	4	1500	100000	125000	GALT
WILSON JAMES	FLOUR/OATMEAL MILL	105/105-D	WATER	100	19000	24000	8	0	0	0	8	4400	115000	121000	FERGUS
MORGAN BROS	FLOUR/GRIST MILL	105	STEAM	40	17000	10000	8	0	0	0	8	3000	100000	120000	HAMILTON
LUKES WILLIAM	FLOUR MILL	105	STEAM	50	15000	15000	7	0	0	0	7	2500	112500	120000	NEWMARKET
HAMILTON NORMAN	FLOUR MILL	105	WATER	25	10000	0	4	0	0	0	4	1450	80000	120000	PARIS
BAND & MCARTHUR	FLOUR MILL	105	WATER	40	8000	40000	8	0	2	0	10	2000	110000	115000	THOROLD
SHEARSON WILLIAM	FLOUR MILL	105	STEAM	40	20000	40000	10	0	0	0	10	4400	100000	110000	SEAFORTH
GOULD H & J	GRIST MILL	105	WATER	100	10000	1200	2	0	0	0	2	700	100000	108333	SMITHS FALLS
HOWLAND W P & CO	FLOUR MILL	105	STEAM	60	27000	36000	13	0	0	0	13	5300	100000	108000	TORONTO
ROSE LAWRENCE	GRIST MILL	105	WATER	40	6000	8000	5	0	1	0	6	1800	100000	106200	GEORGETOWN
MCDUGALL JOHN	GRIST MILL	105	WATER	75	0	5000	6	0	1	0	7	2200	100000	105000	BOWMANVILLE
PARKER & WILSON	GRIST MILL	105	WATER	30	6000	10000	3	0	0	0	3	980	95000	100000	NEW HAMBURG
*** Total ***				2260	723000	1267200	339	5	21	0	365	131130	5755384	6564134	

Source: URBIND71 databank, compiled from 1871 manuscript census schedules.

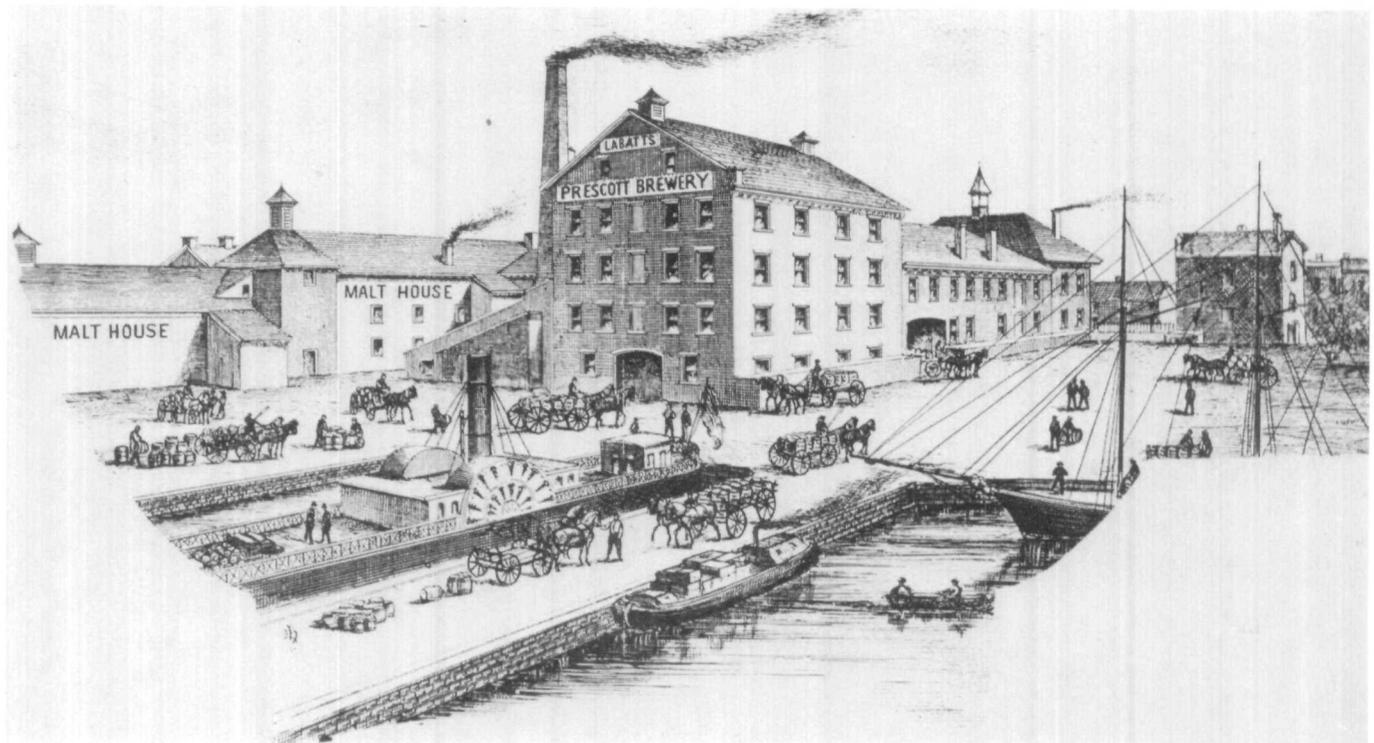


Fig. 2. Robert P. Labatt's Brewery, Prescott, Ont. A typical small urban brewery with integrated maltings. The steam-powered brewery was nicely located on the riverfront for transportation. (Source: *Leeds and Grenville County Atlas*, Mika edition, 1973, p. 50)

Though their product was ephemeral, breweries have interest for the material historian in several ways. The bottles in which beer (or other drinks, such as whisky, soft drinks and cordials) were transported and sold have fascinated the professional and amateur.<sup>17</sup> Only two of the St. Thomas breweries considered in Herr's study appear in our data bank, that of Rich and Geary in table 3, and the smaller Reiser establishment, which produced \$3,500 worth of beer in 1870. There was only one glass manufacturer operating in Ontario in 1870, H. Rutherford and Co. of Hamilton, which employed 83 workers and produced \$85,000 worth of glass products.<sup>18</sup> Glass bottles were at a premium and had to be constantly reused.

A significant number of the brewery businesses operating in Ontario in 1870 endured beyond the nineteenth century. Of the 34 "large" breweries listed in table 3, 11 survived until Ontario's declaration of prohibition in September 1916 under the same name. These were O'Keefe of Toronto, Carling of London, Cosgrave of Toronto, Copeland of Toronto, Grant of Hamilton, Labatt of London, Taylor and Bate of St. Catharines, Halliday of Guelph, Fisher of Portsmouth, Calcutt of Ashburnham, and Rau of New Hamburg. Seven of these 11 breweries reopened at the end of prohibition in 1927,

five of them being acquired by Canadian Breweries in 1930-34. Only one of the breweries still operates, however — John Labatt of London.<sup>19</sup>

### Cabinet and Furniture Makers

Cabinet-making establishments in 1870 ranged in size from the smallest one-man craftshops to a handful of the largest industrial enterprises of any type. Urban businesses were the largest and most productive, notably those with a production valued at over \$10,000, which are listed in table 4, and especially the first four:

Size-class	Estabs. no.	Employees no.	Production \$	Mean \$
Large urban	4	864	950,000	237,800
Medium urban	30	588	498,670	16,622
Small urban	248	786	563,361	2,273
Rural	254	531	293,775	1,157
Total	536	2,769	2,306,076	4,302

The four large urban enterprises, which form a class of their own, made over two-fifths of the total value of all

Table 3 Breweries in Ontario urban centres, 1870, listed by value of production.

PROPRIETOR	TYPE ESTABLISHMENT	SIC CODE	POWER	FORCE	FIXCAP	FLOCAP	MEN	WOM	BOY	GIRL	TOTEMP	WAGES	RAUMAT	PRODUCTS	TOWNNAME
O'KEEFE & COMPANY	BREWERY	109-B	STEAM	52	70000	15000	15	0	0	0	15	5500	28840	89000	TORONTO
CARLING WM & JOHN	BREWERY	109-B	STEAM	10	50000	30000	20	0	0	0	20	6000	31500	70000	LONDON
COSGRAVE & CO	BREWERY	109-B	STEAM	12	50000	0	14	0	0	0	14	8000	17000	55000	TORONTO
COPELAND WILLIAM	BREWERY	109-B	STEAM	10	20000	10000	15	0	0	0	15	5300	16820	46000	TORONTO
GRANT P & R	BREWERY	109-B	STEAM	16	27000	0	24	0	0	0	24	7600	27300	44000	HAMILTON
LABATT ROBERT P	BREWERY	109-B	STEAM	10	40000	10000	12	0	0	0	12	6000	15000	40000	PRESCOTT
LABATT JOHN	BREWERY/MALTHOUSE	109-B	STEAM	8	25000	0	14	0	0	0	14	4722	25300	39655	LONDON
SEVERN JOHN	BREWERY	109-B	STEAM	15	40000	15000	12	0	0	0	12	5000	15000	33750	YORKVILLE
LIVINGSTON A	BREWERY	109-B	STEAM	10	15000	5000	5	0	1	0	6	2700	13940	26200	KINGSTON
ALDWELL & COMPANY	BREWERY	109-B	STEAM	25	120000	150000	8	0	0	0	8	3400	9500	25000	TORONTO
TAYLOR & BATE	BREWERY	109-B	0	10000	10000	12	0	0	0	0	12	4080	12500	22000	ST CATHARINES
WALLIS & CORNELL	BREWERY	109-B	HORSE	2	10000	5000	6	0	0	0	6	2220	10000	22000	TORONTO
DAVIES THOMAS	BREWERY	109-B	STEAM	12	10000	10000	9	0	0	0	9	3600	7200	22000	TORONTO
HALLIDAY THOMAS	BREWERY	109-B	WATER	6	6000	10000	6	0	0	0	6	1900	8400	18000	GUELPH
BAJUS JACOB	BREWERY	109-B	STEAM	6	16000	4500	5	0	0	0	5	2028	6750	14000	KINGSTON
MCKECHNIE H	BREWERY	109-B	STEAM	12	12000	3000	5	0	2	0	7	3500	6350	13700	COBOURG
BIXEL M & B	BREWERY	109-B	0	1500	5000	4	0	0	0	0	4	1500	3750	13600	INGERSOLL
FISHER JAMES/SON	BREWERY	109-B	STEAM	6	10000	8000	4	0	0	0	4	1400	4700	13600	PORTSMOUTH
BELL JOHN	BURLINGTON BREWERY	109-B	HORSE	1	6000	1000	5	0	0	0	5	2000	2500	12000	HAMILTON
SIMPSON ROBERT	BREWERY	109-B	0	10000	5000	9	0	0	0	0	9	2800	6200	12000	BARRIE
WINSLOW & ALLEN	BREWERY	109-B	HORSE	2	3000	5000	3	0	0	0	3	1000	5550	12000	PORT HOPE
DOWNING/WELLS/JEWEL	BREWERY	109-B	0	1000	2000	4	0	0	0	0	4	1600	6223	12000	KINGSTON
BAUER LEOPOLD	BREWERY	109-B	STEAM	6	10000	2000	3	0	0	0	3	720	4550	10520	HAMILTON
SEACE GEORGE	BREWERY	109-B	WATER	4	4000	1000	3	0	0	0	3	1200	5000	10000	QUINDAS
CALCUTT JAMES	BREWERY	109-B	HORSE	2	6000	5500	6	0	0	0	6	2000	3250	10000	PORT HOPE
CLMATHIE SAMUEL	BREWERY	109-B	0	3000	1000	6	0	0	0	0	6	2500	5000	10000	OTTAWA
CALCUTT HENRY	BREWERY	109-B	STEAM	16	10000	3000	5	0	0	0	5	1700	5000	9900	ASHBURNHAM
RICH & GEARY	BREWERY	109-B	HORSE	2	6000	3000	5	0	0	0	5	1800	2900	9800	ST THOMAS
ALLEN THOMAS	BREWERY	109-B	STEAM	10	1900	8000	4	0	0	0	4	1000	3450	9800	TORONTO
RAU J & J	BREWERY	109-B	STEAM	20	6000	800	6	0	0	0	6	1000	4000	9600	NEW HAMBURG
CALCUTT KINGSLEY	BREWERY	109-B	HORSE	4	10000	2000	6	0	0	0	6	1450	2500	8250	COBOURG
GARNER JOHN	BREWERY	109-B	HORSE	1	3000	4000	3	1	0	0	4	600	3500	8000	CHATHAM
RIDDELL JOHN	BREWERY	109-B	HORSE	1	2500	10000	4	0	0	0	4	1700	2180	8000	OWEN SOUND
RUSSELL GEORGE	BREWERY	109-B	STEAM	8	10000	5000	7	0	0	0	7	1500	2000	7950	SARNIA
*** Total ***															
					289	624900	348800	269	1	3	0	273	99020	323653	767325

Source: URBIND71 databank, compiled from 1871 manuscript census schedules.

Table 4 Cabinet-makers in Ontario urban centres, 1870: the top 34, with at least \$10,000 production.

PROPRIETOR	TYPE ESTABLISHMENT	SIC CODE	POWER	FORCE	FIXCAP	FLOCAP	MEN	WOM	BOY	GIRL	TOTEMP	WAGES	RAWMAT	PRODUCTS	TOWNNAME	COID	CEO	ESTNUM
HAY R & CO	CABINETS	261	STEAM	40	400000	500000	380	50	0	0	430	120000	350000	500000	TORONTO	0046	A-1	451
GIBBS WM H	CABINETS	261	STEAM	50	60000	120000	160	15	6	0	181	55000	100000	165000	OSHAWA	0048	E-2	29
MOORHEAD GEORGE	CABINET MAKER	261	STEAM	10	100000	80000	58	3	7	0	68	30000	40000	150000	LONDON	0010	3-A	104
MCARTHUR F	FURNITURE	261	STEAM	10	50000	50000	135	30	20	0	185	58000	50000	135000	BOUWANVILLE	0050	B-1	035
FERGUSON JOHN	FURNITURE	261	STEAM	12	7000	10000	20	0	3	0	23	18000	9450	50000	LONDON	0010	3-A	107
MCKAY, WHITE & CO	FURNITURE	261	STEAM	50	10000	4000	30	0	0	0	30	9000	20000	35000	WOODSTOCK	0014	E-2	56
BORNICK LEWIS	CABINET FCY	261	WATER	30	3000	700	25	5	2	0	32	3500	6000	25000	BELLEVILLE	0060	C-2	33
SIMPSON & ALDOUS	CABINETS	261	STEAM	40	15000	4000	41	0	3	0	44	13000	2670	25000	BERLIN	0032	D-2	36
GREEN F C	CABINETS	261	STEAM	12	6000	2000	15	0	1	0	16	4000	12000	25000	NAPANEE	0063	E-2	040
GIBBARD JOHN & SON	FURNITURE	261	WATER	25	7000	10000	25	0	1	0	26	5000	10000	20000	NAPANEE	0063	E-2	054
JACKSON GEORGE	FURNITURE/SASHES	261/254	STEAM	15	6000	8000	16	0	5	0	21	10000	6000	20000	SIMCOE	0012	D	017
REID JAMES	CABINET MAKER	261		0	10000	10000	24	1	0	0	25	8000	2000	18000	HAMILTON	0024	A-1	13
HAY JAMES	CABINETS	261	STEAM	40	10000	1200	30	2	1	0	33	5000	7500	16150	WOODSTOCK	0014	E-1	49
LUKE & BROTHER	CABINETS	261	STEAM	25	8000	7000	19	0	1	0	20	5000	5750	16000	OSHAWA	0048	E-1	17
RUSSELL H C	CABINETS	261		0	8000	500	6	0	0	0	6	3600	8000	15500	PORT HOPE	0051	B-3	072
SMITH ROBERT	CABINETS	261	STEAM	16	10000	5000	33	1	0	0	34	8300	3125	15220	CHATHAM	0002	F-1	41
HOODLESS JOSEPH	CABINET MAKER	261	STEAM	6	1000	2000	15	0	2	0	17	5500	5000	15000	HAMILTON	0024	E-2	309
EAKINS SAMUEL A	FURNITURE/COFFINS	261/258	STEAM	16	10000	5000	15	0	0	0	15	4000	5000	15000	STRATHROY	0007	F	024
BUILDER JOHN	CABINETS	261	STEAM	8	4000	1000	12	0	2	0	14	4500	2960	15000	CALEDONIA	0017	H	007
MCGUIRE JOHN	FURNITURE	261	WATER	15	6000	5000	16	0	1	0	17	5000	5000	14000	ALMONTE	0080	B	015
MCINTYRE JAMES	FURNITURE	261	STEAM	12	10000	1000	17	1	0	0	18	5200	3200	14000	INGERSOLL	0013	F-2	046
MORREY & ROTHWELL	FURNITURE	261	STEAM	10	6000	1200	27	0	1	0	28	6000	14000	13500	INGERSOLL	0013	F-1	021
HILL & MURDOCH	CABINET WARE	261	STEAM	16	2500	4600	15	0	0	0	15	2600	2000	12000	HAMILTON	0024	B-2	114
OLIVER & AMABLE	CABINETS	261	WATER	50	3000	4000	20	0	2	0	22	6500	4240	12000	OTTAWA	0077	B-2	059
CHATWIN & COMELY	FURNITURE	261	WATER	20	2900	5000	22	0	0	0	22	6500	2505	12000	OWEN SOUND	0037	G-3	051
GUGGISBERG FREDK	CABINETS/CHAIRS	261	W/S	10	5000	9000	20	0	0	0	20	5000	4000	12000	PRESTON	0031	F	4
MCINTYRE & SON	CABINETS/UNDERTAKER	261/877	WATER	0	1000	2500	12	4	1	0	17	5200	1500	12000	ST CATHARINES	0021	B-2	81
BELL THOMAS	CABINETS	261	STEAM	4	3000	500	8	0	0	0	8	2500	7000	10800	SEAFORTH	0026	I	006
BARBOUR JOHN	CABINETS/UNDERTAKER	261/877	STEAM	6	3000	6000	8	0	1	0	9	2600	3600	10500	GALT	0031	D-1	20
HESS & CO	FURNITURE FACTORY	261	STEAM	10	6000	4000	12	0	1	0	13	2500	3000	10000	LISTOWEL	0030	H	018
MILLARD JOSEPH	FURNITURE	261	STEAM	10	2500	3000	8	0	3	0	11	2600	1000	10000	NEWMARKET	0043	D	039
WHITESIDES H	FURNITURE	261		0	1000	3000	7	2	0	0	9	3350	2800	10000	OTTAWA	0077	C-1	079
WALKER JOHN	CABINETS	261	WATER	4	6000	500	13	0	0	0	13	6000	2000	10000	PORT HOPE	0051	B-3	051
JOHNSON ABRAHAM	CABINETS	261		0	3000	3000	10	0	0	0	10	4000	4000	10000	STRATFORD	0030	C-5	62

\*\*\* Total \*\*\*

572 785900 872700 1274 114 64 0 1452 434950 705300 1448670

Source: URBIND71 databank, compiled from 1871 manuscript census schedules



Fig. 3. Gibbard's Furniture Factory, Napanee. The firm was established in 1835 and is still in operation. In 1870 waterpower was in use – the plant backs on to the river. (Source: the authors)

Ontario furniture, and the medium-sized urban businesses contributed more than another one-fifth. The rural establishments, only three of which had a total output worth between \$5,000 and \$10,000, produced less than 13 per cent of the total Ontario value. The mean value of production per establishment (right-hand column) declined systematically through the four size-classes, as did the mean value of production per worker, from \$1,099 in the four largest enterprises to only \$553 in the small rural shops.

Virtually all the establishments producing over \$10,000 used steam-power; for the small businesses with under \$5,000 output, the proportion with non-manual energy declines to between one-quarter and one-third. Many cabinet-makers found it necessary to combine the making of wooden furniture with other activities, one of the most common being coffin-making and general undertaking services; another was the repair of furniture.

The cabinet-making and furniture industry has received a good deal of attention from historians of Canadian material culture; one factor in this interest is probably the

collectable value of the artifacts. Only one of the several studies that have been traced has reported using the 1871 manuscript census data.<sup>20</sup> Although Gibbard of Napanee may have been the only firm listed in table 4 to have lasted under the same name to the present, records for several other enterprises have survived, including those of Thomas McIntyre of St. Catharines<sup>21</sup> and those of the leading furniture manufacturer, described below.

R. Hay and Company was not only the largest furniture factory in Ontario, but also the third largest industrial employer, and ranked seventh among all establishments in value of production. Until 1870, this business had been Jacques and Hay (familiarily known as "Jakesenhay"); it had started in Toronto in 1835 and was the largest factory of any kind in that city by 1856.<sup>22</sup> It continued to expand in the 1860s, practically doubling its value of fixed capital, number of male workers and value of production between the 1861 and 1871 censuses. Along with the other three large furniture factories, it was notable for the employment of women. In 1870, John Jacques retired, and Robert Hay took Charles Rogers (chief carver) and George Craig (head turner) into a partnership that lasted

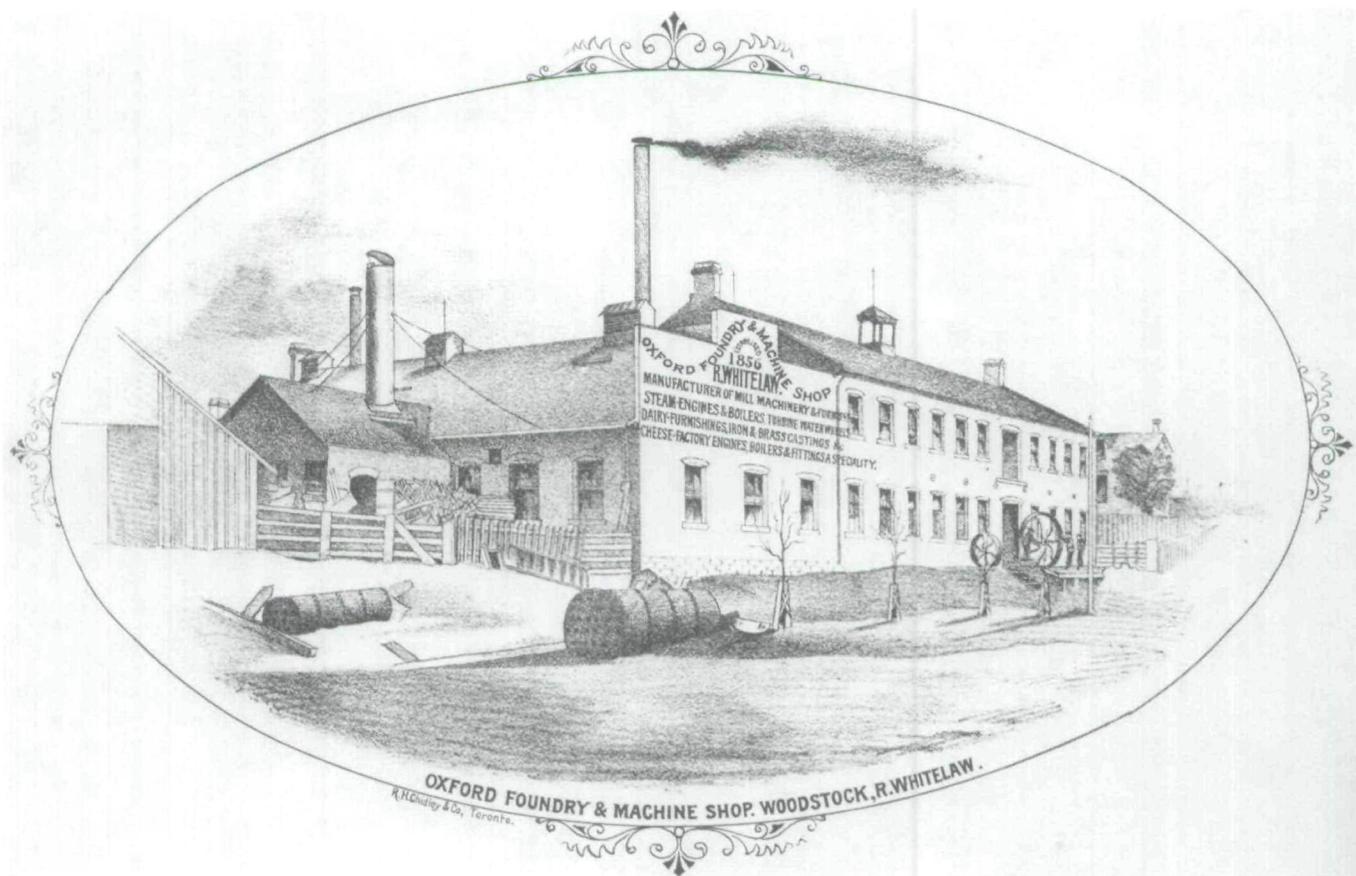


Fig. 4. Robert Whitelaw's Oxford Foundry & Machine Shop, outskirts of Woodstock. The plant was a typical general-purpose engineering shop as shown by the boilers and flywheels displayed outside. The list of work undertaken by the business covers every type of local trade: "Manufacturers of mill machinery and furnishings, steam engines, boilers, turbine water-wheels, dairy furnishings, iron and brass castings, etc. Cheese factory engines, boilers and fittings a speciality." (Source: *Oxford County Atlas*, Walker and Miles 1876, Cumming 1972, p. 44)

till 1885, when Hay himself retired. The business was then reorganized as Charles Rogers and Sons Co. which continued to operate until 1922.

Company records reveal the magnitude of orders, public and private, which were fulfilled by the company. In 1866, the *Globe* wrote:

The furniture made by [Jacques and Hay] is distributed throughout the length and breadth of the land so completely that there is scarcely a house in the whole of Canada which has not some article the product of their workshops. [They] make weekly from 2,000 to 2,500 chairs and 200 bedsteads.<sup>23</sup>

The firm's records also document the subsidiary operations developed from 1854 at New Lowell, in Sunnidale Township, along the line of the Northern Railway near Barrie.<sup>24</sup> Valuable hardwood forests there were transformed into parts for the Toronto factory, under the less-than-efficient management of Peter Paton, who was Hay's brother-in-law. According to the 1871 census, Hay and Paton's sawmill and furniture enterprise employed 32 men and used a 50-horsepower steam engine to perform the primary processes in furniture making.<sup>25</sup> Chair backs,

stretchers, top rails, legs, spindles, and bedposts were turned at New Lowell and shipped in huge quantities to Toronto, and animal hair was prepared for upholstery.

### Manufacturers of Agricultural Implements

As Phillips has asserted, many of the establishments in this sector were "little more than blacksmith shops which supplied a variety of rudimentary implements for a local demand... the typical small Canadian manufacturer diversified his output."<sup>26</sup> Consequently, there are greater difficulties of definition and categorization with this industrial type than with others. We have tried to identify all businesses in this sector from the lists of their manufactured products as well as from the stated type of establishment, using compound SIC designations when necessary. A large number of the smaller enterprises combined a foundry and machine shop with the making of agricultural implements, a practice well illustrated in the print of Robert Whitelaw's Oxford Foundry. Even the very largest manufacturers also diversified, producing a large variety of small tools and implements, perhaps in combination with boilers, steam engines and large mill machinery. The Joseph Hall Company, established in Oshawa in 1857 as a

Table 5 - Agricultural implements manufacturers in Ontario urban centres, 1870: the top 34, with at least \$20,000 production.

PROPRIETOR	TYPE ESTABLISHMENT	SIC CODE	POWER	FORCE	FIXCAP	FLOCAP	MEN	WOM	BOY	GIRL	TOTEMP	WAGES	RAUMAT	PRODUCTS	TOWNNAME	COID	CEID	ESTNUM
HALL JOSEPH	ENGINES/AGRC IMPL	315-E/311	STEAM	50	200000	250000	250	0	16	0	266	125000	56600	300000	OSHAWA	0048	E-2	27
THOMPSON & WILLIAMS	AG IMPL/ENGINES	311/315-E	STEAM	30	25000	100000	104	0	2	0	106	40000	50000	150000	MITCHELL	0029	E-3	037
SAWYER L D & CO	AGRC IMPLEMENTS	311	STEAM	22	10000	65000	86	0	4	0	90	45000	73000	125000	HAMILTON	0024	D-2	267
FROST & WOOD	FOUNDRY/AGRC IMPL	294/311	STEAM	30	28000	50000	65	0	9	0	74	26000	55000	115000	SMITHS FALLS	0079	B	42
NOXON BROS	FOUNDRY/AGRC IMPL	294/311	STEAM	60	70000	40000	100	0	3	0	103	42000	50500	111400	INGERSOLL	0013	F-2	039
COSSITT & BROTHER	FOUNDRY/AGRC IMPL	294/311	WATER	60	50000	30000	65	0	0	0	65	25000	27700	107000	SMITHS FALLS	0079	B	43
HAGGERT BROTHERS	AGRC IMPLEMENTS	311	STEAM	20	30000	60000	90	0	3	0	93	31500	50500	103500	BRAMPTON	0039	E-2	025
EASTWOOD & CO	AGRC IMPLEMENTS	311	STEAM	16	30000	130000	60	10	0	0	70	28000	51860	101000	INGERSOLL	0013	F-2	069
MASSEY MFG CO	AGRC IMPLEMENTS	311	STEAM	30	20000	50000	60	0	1	0	61	20000	18845	80000	NEWCASTLE	0050	E	020
HENRY JOSEPH	AGRC IMPLEMENTS	311	STEAM	20	12000	30000	55	0	0	0	55	18000	28760	63280	AURORA	0043	C	018
ELLIOTT JOHN	AGRC IMPL	311	STEAM	12	12000	80000	33	0	1	0	34	16000	6500	56000	LONDON	0010	3-B	154
COLLARD HENRY	AGRC IMPLEMENTS	311	WATER	20	5000	25000	16	0	8	0	24	4000	12000	45000	GANANOQUE	0067	B	040
BATTERFIELD/LONSON	AGRC IMPLEMENTS	311		0	20000	17000	28	0	0	0	28	9000	5500	37800	BRADFORD	0041	C	031
FORSYTHE JOHN	AGRC IMPLEMENTS	311	STEAM	16	16000	5000	15	0	0	0	15	7000	10150	36000	DUNDAS	0023	C-2	049
HAGGERT W & T	FOUNDRY/AGRC IMPL	294/311	STEAM	12	8000	20000	25	0	3	0	28	9000	6350	31400	ST MARYS	0029	B-4	062
LEONARD ELIJAH	FOUNDRY/AG IMPL	294/311	STEAM	30	40000	18000	25	0	0	0	25	6000	14650	31000	LONDON	0010	5	191
WALLBRIDGE W H	FOUNDRY/AG IMPL	294/311	STEAM	45	25000	20000	25	0	0	0	25	10000	5000	30000	BELLEVILLE	0060	C-2	14
WALKER JAMES & CO	FOUNDRY/AGRC IMPL	294/311	STEAM	15	10000	2500	31	0	0	0	31	10000	6500	30000	BELLEVILLE	0060	C-2	28
HERRING JOHN	AGRC IMPLEMENTS	311	WATER	20	8000	20000	30	0	0	0	30	10000	10000	30000	NAPANEE	0063	E-1	027
STEWART, BRUCE & CO	CITY AGRC WORKS	311	STEAM	14	13000	24000	24	0	1	0	25	7000	3000	27000	LONDON	0010	F	063
ELLIOTT JOHN & CO	FOUNDRY/AGRC IMPL	294/311	STEAM	16	6000	15000	20	0	0	0	20	7500	7000	26000	STRATHROY	0007	F	062
MERNER SAMUEL	FOUNDRY/AG IMPL	294/311	STEAM	25	10000	15000	24	0	0	0	24	4000	8120	25600	NEW HAMBURG	0031	B	014
BRICKER JACOB	FOUNDRY/AG IMPL	294/311	STEAM	15	15000	8000	20	0	0	0	20	11200	5400	25000	WATERLOO	0032	E-2	34
MCCULLOGH WILLIAM	AGRC IMPLEMENTS	311	STEAM	15	12000	3000	25	0	2	0	27	10000	10000	25000	BROCKVILLE	0068	E	96
MARTIN JOHN	WOOD IMPLEMENTS	311	STEAM	6	1000	1000	2	0	0	0	2	500	5000	25000	SEAFORTH	0026	I	040
BROTHERS JOSEPH	FOUNDRY/AG IMPL	294/311	STEAM	25	10000	10000	20	0	0	0	20	6000	6430	22700	MILTON	0038	D	013
LUTZ & CO	GALT FOUNDRY/AGRC IM	294/311	WATER	10	20000	20000	26	0	0	0	26	12000	5500	22000	GALT	0031	D-1	25
GLASGOW MCPHERSON CO	FOUNDRY/AGRC IMPL	294/311	STEAM	18	3500	3000	24	0	0	0	24	9000	0	21700	CLINTON	0026	F-2	023
SCOTT JOHN & CO	IRON FOUNDRY/AG IMPL	294/311	STEAM	21	8000	4000	27	0	5	0	32	12000	5600	21200	CALEDONIA	0017	H	027
CRAWFORD/ROBINSON CO	IRON FOUNDRY/AG IMPL	294/311	STEAM	20	15000	5000	20	0	2	0	22	5000	6000	20000	LONDON	0010	F	188
HYSLOP & RONALD	AGRC IMPLEMENTS	311	STEAM	50	10000	10000	20	0	0	0	20	9000	4000	20000	CHATHAM	0002	F-2	71
KIMBALL & MAKINS	AGRC EQUIPMENT	311	STEAM	18	11000	11000	19	0	0	0	19	5000	6000	20000	LINDSAY	0052	C-3	074
DENHAM DAVID	RAKES/CRADLES/PLANG	311		0	3000	1000	8	0	6	0	14	4000	3000	20000	LONDON	0010	5	193
COLLIER HENRY	AGRC IMPLEMENTS	311	STEAM	15	10000	25000	20	0	0	0	20	7200	7200	20000	ST CATHARINES	0021	B-3	142

\*\*\* Total \*\*\*

776 752100 1167500 1462 10 66 0 1538 590900 621665 1924580

Source: URBIND71 databank, compiled from 1871 manuscript census schedules.

branch plant of the parent enterprise in Rochester, New York, was chiefly noted for steam engines and boilers but also produced mill machinery, printing presses, turbine waterwheels, and agricultural implements.<sup>27</sup>

Compared with the furniture industry, the making of agricultural implements was less concentrated in urban areas and characterized by more producers in the medium range, with output of between \$25,000 and \$100,000. While the most substantial producers of implements were located in urban centres in 1870, these tended to be smaller and middle-sized towns rather than the large cities (table 5). Based on our URBIND71 and RURIND71 data banks, we have summarized the general structure of the industry in the following table, in which "large" denotes establishments producing over \$100,000 worth, and "medium" those producing between \$20,000 and \$100,000 worth:

Size-class	Estabs. no.	Employees no.	Production \$	Mean \$
Large urban	8	867	1,112,900	139,112
Medium urban	26	761	811,680	31,218
Small urban	74	491	398,535	5,386
Large rural	3	265	332,600	110,875
Medium rural	6	175	196,370	32,728

There were, in addition, some 56 rural establishments using non-manual power, but producing under \$20,000 worth of implements in 1870.

A notable number of the larger and middle-range manufacturers were in rural areas, appropriately close to their main markets. To complement the urban establishments in table 5, we present a list of the 13 rural businesses that had an output of more than \$10,000 in 1870:

Proprietor	SIC	Township	Power	Men no.	Output \$
Abell	311/105	Vaughan	S 80	90	119,000
Patterson	311	Vaughan	W/S 30	125	113,600
Whiting/ Cowan	311	E Whitby	W 70	50	100,000
Watson	294/311	N Dumfries	W 30	55	55,870
Harris	311	Clinton	S 15	18	50,000
Bell	294/311	S Dumfries	S 12	25	30,000
McPherson Glasgow	294/311	Southwold	S 20	25	20,500
Jackson	294/311	Biddulph	S 12	20	20,000
Green	294/308/311	Townsend	S 15	32	20,000
Lawrance	294/311	Trafalgar	S 20	20	18,600
Whitelaw	294/311	N Oxford	S 20	22	14,000
Fleury	294/311	Markham	W 8	6	10,000
Grout	311	Grimsby	S 8	12	10,000



Fig. 5. L.D. Sawyer & Co.'s Agricultural Works, Hamilton. This plant was the third largest agricultural implement manufacturer in 1870, when 90 workers were employed to produce work valued at \$125,000. Although originally formed in 1836, the buildings shown in the sketch were probably erected in 1857, when the firm relocated adjacent to the Great Western Railway at the north end of Hamilton. (Source: *Wentworth County Atlas*, Page and Smith 1875; Dundas School of Art reprint 1971, p. 12)

In 1870, the Ontario agricultural implements industry reflected a period of prosperity in the 1850s and 1860s, when local entrepreneurs had adopted American inventions to supply local markets. Communities took pride in "agricultural works," many of which are illustrated in the county atlases of the 1870s. The 1871 manuscript census evidence also suggests the instability of businesses in this period. Massey and Harris, which would become the giants of the Canadian industry, were only middle sized in 1870. Their greatest growth would occur after they relocated, Harris from Beamsville to Brantford in 1872 and Massey from Newcastle to Toronto in 1880.

For historians of material culture, our URBIND71 and RURIND71 data bases constitute a valuable systematic, standardized resource, which can complement other sources to provide context for studies of particular enterprises, communities or industrial types.

## Future Directions

The "1871 project" is now taking two directions. One is to explore the feasibility of extension to rural Ontario and to the other three provinces recorded in 1871: Quebec, New Brunswick and Nova Scotia. The other is to apply statistical analysis techniques to the records in the data bank, in order to explore various questions in the history of Canadian social and economic development.

A report is available describing the objectives and project procedures and outlining the research potential of URBIND71: Elizabeth Bloomfield, Gerald Bloomfield and Janine Grant, with Peter McCaskell, *Industry in Ontario Urban Centres, 1870: Accessing the Manuscript Census* (1986), 60 pp. It may be ordered from Publications, Department of Geography, University of Guelph, Guelph, Ontario, N1G 2W1, for \$7.00 (cheque with order, please).

## NOTES

1. T. A. Hillman, *Catalogue of Census Returns on Microfilm, 1666-1881* (Ottawa: Public Archives of Canada, 1981).
2. A. A. Brookes, "Doing the Best I Can: The Taking of the 1861 New Brunswick Census," *Histoire sociale IX* (novembre-November 1976): 73-77.
3. 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 Historical Statistics* (Toronto: University of Toronto Press, 1966).
4. J. M. Gilmour, *Spatial Evolution of Manufacturing, Southern Ontario 1851-1891* (University of Toronto, Department of Geography Research Publications, 1972).
5. G. S. Kealey, *Toronto Workers Respond to Industrial Capitalism* (Toronto: University of Toronto Press, 1980).
6. M. B. Katz, M. J. Doucet, and M. J. Stern, *The Social Organization of Early Industrial Capitalism* (Cambridge: Harvard University Press, 1982).
7. L. D. McCann, "The Mercantile-Industrial Transition in the Metals Towns of Picou County, 1857-1931" *Acadiensis* 10, 2 (1981): 29-64.
8. E. Martel, "L'industrie à Montréal en 1871" (M.A. thesis, Université du Québec à Montréal, 1978).
9. J. Burgess, "L'industrie de la chaussure," *Revue d'histoire de l'Amérique française* 31 (1977): 187-210.
10. P. Craven and T. Traves, "Canadian Railways as Manufacturers, 1850-1880," *Canadian Historical Association Historical Papers* (1983): 254-81.
11. J. Burant, "A Written Portrait: Saint John Photographers and Their Studios in the 1871 Census," *Archivaria* 17 (1983-84): 275-77.
12. I. McKay, "Capital and Labour in the Halifax Baking and Confectionery Industry During the Last Half of the Nineteenth Century," *Labour/Le Travail* 3 (1978): 63-108.
13. Our data on industrial uses of water- and steam-power will eventually help in the publication of Canadian studies to complement the definitive works on industrial power in the United States. See: L. C. Hunter, *A History of Industrial Power in the United States, 1780-1930*, vol. 1: *Waterpower in the Century of the Steam Engine*; vol. 2: *Steam Power* (Charlottesville, Va.: University Press of Virginia for the Eleutherian Mills-Hagley Foundation, 1979 and 1985).
14. Data for 3,861 rural powered establishments are held in our similar RURIND71 data bank. There were 26 rural establishments with 120 horsepower or more, of which only 7 were steam-powered.
15. C. A. Priamo, "A Study of the Early Grist Mills of Southern Ontario, 1783-1867" (M. Museol. thesis, University of Toronto, 1975).
16. F. L. Leung, *Grist and Flour Mills in Ontario: From Millstones to Rollers, 1780s-1880s* (Ottawa: Parks Canada, 1981).
17. J. H. Toulouse, "High on the Hawg or How the Western Miner Lived as Told by the Bottles He Left Behind," *Historical Archaeology* 4 (1970): 59-69; J. H. Toulouse, *Bottle Makers and Their Marks* (New York: Thomas Nelson, 1971); J. A. Herr, *Breweries and Soda Works of St. Thomas, 1833-1933: An Illustrated History for Bottle Collectors* (St. Thomas: The Author, 1974); W. H. Adams, "Trade Networks and Interaction Spheres - A View from Silcott (Washington)," *Historical Archaeology* 10 (1976): 99-112.
18. There were also two manufacturers of stained glass in Ontario in 1871, in Toronto and London.
19. G. T. Bloomfield, "Industrial Re-organization in the Depression: The Ontario Brewing Industry, 1930-1940" (Research Report to the Historical Atlas of Canada Project, vol. III, July 1984).
20. L. G. Pennachio and L. B. Pogue, "Inventory of Ontario Cabinet-makers, 1840-ca.1900: Work in Progress," *Material History Bulletin* 18 (1983): 39-44. See also: J. MacKinnon, *A Checklist of*

- Toronto Cabinet and Chair Makers, 1800-1865*, National Museum of Man Mercury Series no. 11 (Ottawa: National Museums of Canada, 1975); J. McIntyre, "From Workshop to Factory: The Furniture Maker," *Material History Bulletin* 19 (1984): 25-35; W. Yeager, *Cabinet Makers of Norfolk County* (Simcoe, Ont.: Norfolk History Society, 1975).
21. McIntyre, "Workshop to Factory," pp. 30-31.
  22. R. Cathcart, *Jacques & Hay: 19th Century Toronto Furniture Makers* (Erin, Ont.: Boston Mills Press, 1986). The firm is also discussed in MacKinnon, *Checklist*, pp. 79-97, and in McIntyre, "Workshop to Factory," pp. 31-34. The 1871 manuscript census record provides evidence that the change in the firm's name occurred during 1870, rather than later.
  23. Quoted in Cathcart, *Jacques & Hay*, p. 31.
  24. The New Lowell operation is discussed by MacKinnon (p. 91), McIntyre (p. 32) and Cathcart (pp. 15-18), on the basis of letters between Hay and Paton for the years 1854-72, which are preserved in the Simcoe County Archives.
  25. Data for the New Lowell enterprise from our RURIND71 data bank.
  26. W.G. Phillips, *The Agricultural Implement Industry in Canada* (Toronto: University of Toronto Press, 1956), p. 38.
  27. M.M. Hood, *Oshawa: A History of Canada's Motor City* (Oshawa: Public Library Board, 1968), pp. 70-72; L. Johnson, *History of the County of Ontario, 1615-1875* (Whitby: Corporation of the County of Ontario, 1973), pp. 250-52.

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