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APPENDIX A  
BASIC TABLES

TABLE A-1

Indexes of Firm Concentration, Selected Canadian Manufacturing Industries, 1948

| <i>Group and Industry</i>                        | <i>Index 1:<br/>Percentage<br/>of Employ-<br/>ment Accounted<br/>for by Three<br/>Leading Firms</i> | <i>Index 2:<br/>Number of<br/>Firms Required<br/>to Account for<br/>80 Per Cent of<br/>Employment</i> | <i>Index 3:<br/>Herfindahl's<br/>Index, Mini-<br/>mum Estimate,<sup>h</sup><br/>Employment</i> | <i>Index 4:<br/>Herfindahl's<br/>Index, Mini-<br/>mum Esti-<br/>mate,<sup>h</sup> Output</i> |
|--|---|---|--|--|
| <i>Foods, beverages, tobacco</i>                 |   |   |  |  |
| Cigarettes, cigars, tobacco                      | 84.5  | 2.1   | 0.1797   | 0.1938   |
| Distilleries <sup>a</sup>                        | 84.2  | 2.5   | 0.2400   | 0.2487   |
| Sugar refineries                                 | 68.3  | 4.1   | 0.1805   | 0.1957   |
| Malt and malt products                           | 66.2  | 3.6   | 0.1111   | 0.1111   |
| Starch and glucose                               | 64.6  | 4.0   | 0.1000   | 0.1000   |
| Macaroni <sup>a</sup>                            | 59.9  | 5.6   | 0.0714   | 0.0714   |
| Tobacco processing and<br>packing                | 58.6  | 5.6   | 0.1392   | 0.1496   |
| Wine   | 57.5  | 9.1   | 0.1215   | 0.1173   |
| Slaughtering and meat<br>packing <sup>a</sup>    | 55.3  | 11.2  | 0.1052   | 0.1000   |
| Processed cheese                                 | 49.2  | 7.4   | 0.1053   | 0.1337   |
| Breweries <sup>b</sup>                           | 48.6  | 8.6   | 0.0988   | 0.1111   |
| Biscuits and crackers                            | 41.7  | 11.1  | 0.0723   | 0.0852   |
| Condensed milk <sup>a</sup>                      | 35.6  | 12.0  | 0.0377   | 0.0394   |
| Flour mills <sup>a</sup>                         | 34.9  | 22.0  | 0.0604   | 0.0641   |
| Cocoa, confectionery, etc.                       | 33.4  | 23.4  | 0.0519   | 0.0607   |
| Fruit and vegetable<br>preparations              | 32.4  | 72.3  | 0.0398   | 0.0593   |
| Soft drinks <sup>b</sup>                         | 30.9  | 149.2   | 0.0345   | 0.0582   |
| Bread and other bakery<br>products <sup>b</sup>  | 20.9  | 732.5   | 0.0194   | 0.0257   |
| Butter and cheese factories                      | 19.2  | 369.9   | 0.0172   | 0.0161   |
| Prepared stock and poultry<br>feeds <sup>b</sup> | 15.5  | 92.4  | 0.0167   | 0.0208   |
| Fish curing and packing <sup>a</sup>             | 14.9  | 132.5   | 0.0175   | 0.0266   |
| Feed mills <sup>b</sup>                          | 3.4   | 469.8   | 0.0022   | 0.0017   |
| <i>Textiles, leather, fur</i>                    |   |   |  |  |
| Cotton thread                                    | 94.3  | 1.8   | 0.2975   | 0.2963   |
| Cordage, rope, twine <sup>a</sup>                | 65.9  | 3.8   | 0.1463   | 0.1476   |
| Carpets, mats, rugs <sup>c</sup>                 | 64.0  | 4.8   | 0.1551   | 0.1807   |
| Belting, leather                                 | 62.2  | 6.5   | 0.1435   | 0.1112   |

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TABLE A-1 (cont.)

| <i>Group and Industry</i>                              | <i>Index 1:<br/>Percentage<br/>of Employ-<br/>ment Accounted<br/>for by Three<br/>Leading Firms</i> | <i>Index 2:<br/>Number of<br/>Firms Required<br/>to Account for<br/>80 Per Cent of<br/>Employment</i> | <i>Index 3:<br/>Herfindahl's<br/>Index, Mini-<br/>mum Estimate,<sup>h</sup></i> | <i>Index 4:<br/>Herfindahl's<br/>Index, Mini-<br/>mum Esti-<br/>mate,<sup>h</sup> Output</i> |
|--|---|---|---|--|
| <i>Textiles, leather, fur (cont.)</i>                  |   |   |   |  |
| Cotton yarn and cloth <sup>c</sup>                     | 59.8  | 5.1   | 0.1317  | 0.1307   |
| Narrow fabrics, laces, etc.                            | 53.8  | 10.3  | 0.1085  | 0.0931   |
| Synthetic textiles and silk                            | 48.7  | 11.3  | 0.0945  | 0.0917   |
| Fur dressing and dyeing                                | 41.1  | 9.1   | 0.0852  | 0.0913   |
| Woolen yarn <sup>c</sup>                               | 38.5  | 14.1  | 0.0659  | 0.0737   |
| Corsets and girdles                                    | 37.1  | 13.9  | 0.0654  | 0.0640   |
| Cotton and jute bags <sup>c</sup>                      | 36.7  | 12.8  | 0.0685  | 0.0734   |
| Dyeing and finishing of<br>textiles                    | 34.3  | 12.9  | 0.0635  | 0.0595   |
| Woolen cloth <sup>c</sup>                              | 28.3  | 25.2  | 0.0412  | 0.0357   |
| Leather tanneries                                      | 26.5  | 19.3  | 0.0438  | 0.0501   |
| Contractors, women's<br>clothing                       | 23.4  | 42.4  | 0.0279  | 0.0169   |
| Leather gloves and mittens                             | 20.9  | 30.5  | 0.0311  | 0.0293   |
| Canvas products  | 19.9  | 39.1  | 0.0257  | 0.0264   |
| Hosiery and knit goods                                 | 15.7  | 55.8  | 0.0205  | 0.0191   |
| Miscellaneous leather<br>products                      | 13.8  | 80.2  | 0.0145  | 0.0160   |
| Contractors, men's clothing                            | 10.8  | 78.2  | 0.0126  | 0.0101   |
| Boots and shoes, leather                               | 8.5   | 109.6   | 0.0087  | 0.0089   |
| Clothing, men's factory                                | 8.2   | 154.4   | 0.0078  | 0.0067   |
| Fur goods  | 5.6   | 282.1   | 0.0040  | 0.0046   |
| Clothing, women's factory                              | 4.0   | 517.0   | 0.0023  | 0.0022   |
| <i>Wood products</i>                                   |   |   |   |  |
| Excelsior  | 62.8  | 4.0   | 0.1000  | 0.1000   |
| Coffins and caskets                                    | 43.4  | 14.5  | 0.0759  | 0.0713   |
| Plywood and veneer <sup>a</sup>                        | 33.8  | 13.3  | 0.0526  | 0.0561   |
| Flooring, hard wood                                    | 32.0  | 12.8  | 0.0641  | 0.0638   |
| Boat building  | 17.0  | 92.7  | 0.0117  | 0.0136   |
| Furniture  | 7.4   | 277.1   | 0.0047  | 0.0055   |
| Sawmills <sup>a</sup>                                  | 7.0   | 1,843.4   | 0.0036  | 0.0069   |
| Planing mills, sash and<br>door factories <sup>b</sup> | 4.6   | 377.0   | 0.0035  | 0.0041   |
| <i>Paper products</i>                                  |   |   |   |  |
| Roofing paper  | 60.5  | 6.3   | 0.1406  | 0.1225   |
| Pulp and paper mills <sup>a</sup>                      | 27.8  | 22.5  | 0.0448  | 0.0484   |
| Paper boxes and bags                                   | 16.8  | 57.6  | 0.0196  | 0.0259   |
| <i>Iron and steel products</i>                         |   |   |   |  |
| Pig iron   | 91.9 <sup>d</sup>   | 2.6 <sup>d</sup>  | n.a.  | 0.2955 <sup>d</sup>  |
| Automobiles  | 87.5  | 1.7   | 0.2181  | 0.2126   |
| Railway rolling stock                                  | 79.2  | 3.1   | 0.2159  | 0.1659   |
| Aircraft and parts <sup>a</sup>                        | 78.2  | 3.1   | 0.2012  | 0.2030   |
| Steel ingots and castings                              | 76.3 <sup>e</sup>   | 3.4 <sup>e</sup>  | n.a.  | 0.2053 <sup>e</sup>  |
| Agricultural implements <sup>a,c</sup>                 | 63.4  | 4.4   | 0.1377  | 0.1560   |
| Bicycles <sup>c</sup>                                  | 80.6  | 2.9   | 0.1546  | 0.1526   |
| Shipbuilding <sup>a</sup>                              | 32.3  | 13.1  | 0.0626  | 0.0699   |
| Iron castings <sup>b</sup>                             | 19.8  | 45.9  | 0.0267  | 0.0314   |
| Machine shops <sup>b</sup>                             | 6.2   | 229.6   | 0.0046  | 0.0049   |

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TABLE A-1 (cont.)

| <i>Group and Industry</i>                       | <i>Index 1:<br/>Percentage<br/>of Employ-<br/>ment Accounted<br/>for by Three<br/>Leading Firms</i> | <i>Index 2:<br/>Number of<br/>Firms Required<br/>to Account for<br/>80 Per Cent of<br/>Employment</i> | <i>Index 3:<br/>Herfindahl's<br/>Index, Mini-<br/>mum Estimate,<sup>h</sup></i> | <i>Index 4:<br/>Herfindahl's<br/>Index, Mini-<br/>mum Esti-<br/>mate,<sup>h</sup> Output</i> |
|---|---|---|---|--|
| <i>Nonferrous metals</i>                        |   |   |   |  |
| Aluminum <sup>a</sup>                           | 100 (1 firm)  | 0.8   | 1.0000  | 1.0000   |
| Nickel <sup>a</sup>                             | 100 (2 firms)   | 0.9 <sup>g</sup>  | n.a.  | 0.8957 <sup>g</sup>  |
| <i>Nonmetallic minerals</i>                     |   |   |   |  |
| Cement  | 100.0   | 1.2   | 0.3333  | 0.3333   |
| Gypsum products                                 | 91.7  | 1.6   | 0.2500  | 0.2500   |
| Glass <sup>c</sup>                              | 91.7  | 1.6   | 0.2500  | 0.2500   |
| Artificial abrasives <sup>a</sup>               | 86.7  | 2.0   | 0.2000  | 0.2000   |
| Abrasives products                              | 81.9  | 2.7   | 0.1850  | 0.1923   |
| Petroleum products <sup>c</sup>                 | 80.1  | 2.99  | 0.2195  | 0.2052   |
| Asbestos products <sup>c</sup>                  | 64.0  | 4.8   | 0.1591  | 0.1349   |
| Coke products <sup>c</sup>                      | 52.7  | 5.7   | 0.1204  | 0.1307   |
| Plate, cut and ornamental<br>glass <sup>c</sup> | 40.4  | 24.6  | 0.0634  | 0.0871   |
| Cement products <sup>b</sup>                    | 11.7  | 119.2   | 0.0118  | 0.0143   |
| <i>Chemicals</i>                                |   |   |   |  |
| Hardwood distillation                           | 100 (2 firms)   | 1.0   | 0.5000  | 0.5000   |
| Matches   | 97.9 <sup>t</sup>   | 0.9 <sup>f</sup>  | n.a.  | 0.8030 <sup>f</sup>  |
| Coal tar distillation <sup>c</sup>              | 91.7  | 1.6   | 0.2500  | 0.2500   |
| Compressed gases                                | 81.4  | 2.9   | 0.2272  | 0.2513   |
| Soaps   | 74.6  | 4.1   | 0.1886  | 0.2414   |
| Boiler compounds                                | 66.7  | 3.7   | 0.1562  | 0.1819   |
| Writing inks                                    | 66.3  | 3.8   | 0.1629  | 0.1850   |
| Washing compounds                               | 56.3  | 8.2   | 0.1116  | 0.1547   |
| Printing inks                                   | 56.7  | 6.3   | 0.1121  | 0.1273   |
| Vegetable oils <sup>a</sup>                     | 53.7  | 7.0   | 0.1206  | 0.0902   |
| Polishes and dressings                          | 36.0  | 12.1  | 0.0677  | 0.0864   |
| Paints and varnishes                            | 31.5  | 22.2  | 0.0478  | 0.0436   |
| Medicinal and pharma-<br>ceutical preparations  | 19.7  | 49.4  | 0.0238  | 0.0263   |
| <i>Miscellaneous</i>                            |   |   |   |  |
| Pipes and smokers' supplies                     | 85.3  | 2.3   | 0.2451  | 0.3081   |
| Umbrellas                                       | 83.5  | 2.7   | 0.2416  | 0.2283   |
| Fountain pens and pencils                       | 67.3  | 4.4   | 0.1692  | 0.1248   |
| Buttons   | 48.9  | 8.8   | 0.0942  | 0.0962   |

<sup>a</sup> Industries classified as having high exports (see Chap. I).

<sup>b</sup> Industry classified as having regionally separated markets (see Chap. I).

<sup>c</sup> Industry classified as having high imports (see Chap. I).

<sup>d</sup> Concentration measured in terms of blast furnace capacity. *The Primary Iron and Steel Industry, 1948*, Ottawa, Dominion Bureau of Statistics, 1949, p. 8.

<sup>e</sup> Concentration measured in terms of steel furnace capacity. *The Primary Iron and Steel Industry, 1948*, p. 13.

<sup>f</sup> Concentration measured in terms of number of matches produced. *Matches*, Report of Commissioner, Combines Investigation Act, Dec. 27, 1949, Ottawa, King's Printer, 1950.

<sup>g</sup> Concentration measured in terms of value of sales of nickel producers. *Moody's Industrials, 1949*.

<sup>h</sup> See Chap. I, sec. 2, and Appendix B.

n.a. = not available.

Source: Estimated from unpublished data by firm-size groups, from returns of the Census of Manufactures, 1948, compiled by the Dominion Bureau of Statistics, Ottawa, in 1950. Method of computing indexes described in Appendix B.

APPENDIX A

TABLE A-2

Indexes of Plant Concentration and Inequality, Total Canadian Manufacturing, 1922-1948

| YEAR | NUMBER OF PLANTS REQUIRED TO<br>ACCOUNT FOR 80 PER CENT OF |                |                |                | PERCENTAGE OF PLANTS REQUIRED TO<br>ACCOUNT FOR 80 PER CENT OF |                |                |                |
|------|--|----------------|----------------|----------------|--|----------------|----------------|----------------|
|      | <i>Employment</i>  |                | <i>Output</i>  |                | <i>Employment</i>  |                | <i>Output</i>  |                |
|      | <i>Maximum</i>   | <i>Minimum</i> | <i>Maximum</i> | <i>Minimum</i> | <i>Maximum</i>   | <i>Minimum</i> | <i>Maximum</i> | <i>Minimum</i> |
| 1922 | 3,085  | 2,680          | 2,183          | 2,134          | 13.7   | 11.9           | 9.7            | 9.5            |
| 1923 | 3,319  | 2,879          | 2,228          | 2,198          | 14.7   | 12.7           | 9.8            | 9.7            |
| 1924 | n.a.   | n.a.           | n.a.           | n.a.           | n.a.   | n.a.           | n.a.           | n.a.           |
| 1925 | 3,461  | 3,000          | 2,237          | 2,235          | 15.5   | 13.4           | 10.0           | 10.0           |
| 1926 | 3,244  | 2,899          | 2,177          | 2,054          | 14.3   | 12.8           | 9.6            | 9.1            |
| 1927 | 3,611  | 3,189          | 2,221          | 2,026          | 15.7   | 13.9           | 9.7            | 8.8            |
| 1928 | 3,507  | 3,160          | 2,302          | 2,041          | 15.0   | 13.5           | 9.8            | 8.7            |
| 1929 | 3,738  | 3,347          | 2,233          | 1,938          | 15.8   | 14.2           | 9.5            | 8.2            |
| 1930 | 3,757  | 3,315          | 2,251          | 2,042          | 15.6   | 13.8           | 9.4            | 8.5            |
| 1931 | 3,469  | 3,017          | 2,361          | 2,299          | 14.2   | 12.3           | 9.6            | 9.4            |
| 1932 | 3,411  | 3,142          | 2,348          | 2,179          | 14.5   | 13.4           | 10.0           | 9.3            |
| 1933 | 3,473  | 3,263          | 2,282          | 2,102          | 14.4   | 13.5           | 9.4            | 8.7            |
| 1934 | 3,569  | 3,262          | 2,211          | 2,132          | 14.5   | 13.3           | 9.0            | 8.7            |
| 1935 | 3,510  | 3,070          | 2,132          | 2,123          | 14.4   | 12.5           | 8.7            | 8.7            |
| 1936 | 3,476  | 3,039          | 2,137          | 2,058          | 14.4   | 12.5           | 8.8            | 8.5            |
| 1937 | 3,529  | 3,152          | 2,148          | 1,927          | 14.2   | 12.7           | 8.6            | 7.8            |
| 1938 | 3,698  | 3,240          | 2,247          | 2,135          | 14.7   | 12.9           | 8.9            | 8.5            |
| 1939 | 3,718  | 3,281          | 2,271          | 2,113          | 15.0   | 13.2           | 9.2            | 8.5            |
| 1940 | 3,823  | 3,333          | 2,173          | 1,917          | 15.0   | 13.1           | 8.5            | 7.5            |
| 1941 | 3,162  | 3,141          | 2,082          | 2,014          | 12.0   | 11.9           | 7.9            | 7.7            |
| 1942 | 2,976  | 2,809          | 1,960          | 1,901          | 10.7   | 10.1           | 7.0            | 6.8            |
| 1943 | 2,818  | 2,570          | 1,848          | 1,700          | 10.2   | 9.3            | 6.7            | 6.1            |
| 1944 | 3,096  | 2,913          | 1,994          | 1,863          | 10.9   | 10.2           | 7.0            | 6.5            |
| 1945 | 3,710  | 3,677          | 2,453          | 2,433          | 12.8   | 12.7           | 8.4            | 8.4            |
| 1946 | 5,091  | 4,488          | 3,354          | 3,078          | 16.3   | 14.4           | 10.7           | 9.9            |
| 1947 | 5,079  | 4,528          | 2,942          | 2,916          | 15.5   | 13.8           | 9.0            | 8.9            |
| 1948 | 5,152  | 4,607          | 2,883          | 2,723          | 15.4   | 13.8           | 8.6            | 8.1            |

Source: Computed from *The Manufacturing Industries of Canada*, Ottawa, Dominion Bureau of Statistics, various years. For method of computation see Appendix B.

TABLE A-3

Number of Plants per Firm, Selected Canadian Manufacturing Industries, 1948

| <i>Group and Industry</i>        | <i>Average Number<br/>of Plants per<br/>Firm<sup>b</sup></i> | <i>Weighted Average<br/>Number of Plants<br/>per Firm<sup>c</sup></i> |
|----------------------------------|--|---|
| <i>Foods, beverages, tobacco</i> |  |   |
| Fruit and vegetable preparations | 1.32   | 8.08  |
| Bread and other bakery products  | 1.04   | 5.02  |
| Slaughtering and meat packing    | 1.18   | 3.89  |
| Breweries                        | 1.61   | 3.70  |
| Soft drinks                      | 1.12   | 3.64  |
| Butter and cheese factories      | 1.06   | 3.61  |
| Fish curing and packing          | 1.14   | 2.74  |
| Distilleries                     | 1.50   | 2.68  |
| Cigarettes, cigars, etc.         | 1.15   | 2.52  |
| Prepared feeds                   | 1.22   | 2.13  |
| Flour mills                      | 1.07   | 1.97  |
| Biscuits, crackers               | 1.20   | 1.78  |
| Sugar refineries                 | 1.57   | 1.78  |
| Condensed milk                   | 1.23   | 1.62  |
| Wine                             | 1.22   | 1.62  |
| Cocoa, confectionery, etc.       | 1.04   | 1.55  |
| Tobacco processing and packing   | 1.31   | 1.54  |
| Malt and malt products           | 1.44   | 1.44  |
| Macaroni                         | 1.21   | 1.21  |
| Processed cheese                 | 1.11   | 1.17  |
| Feed mills                       | 1.01   | 1.03  |
| Starch and glucose               | 1.00   | 1.00  |
| <i>Textiles, leather, fur</i>    |  |   |
| Cotton yarn and cloth            | 1.81   | 3.93  |
| Hosiery and knit goods           | 1.14   | 1.74  |
| Cotton and jute bags             | 1.21   | 1.66  |
| Synthetic textiles and silk      | 1.15   | 1.41  |
| Woolen yarn                      | 1.07   | 1.37  |
| Narrow fabrics, laces, etc.      | 1.08   | 1.25  |
| Woolen cloth                     | 1.03   | 1.22  |
| Dyeing and finishing of textiles | 1.05   | 1.11  |
| Clothing, men's factory          | 1.02   | 1.10  |
| Contractors, men's clothing      | 1.02   | 1.09  |
| Clothing, women's factory        | 1.01   | 1.07  |
| Leather gloves and mittens       | 1.01   | 1.06  |
| Fur goods                        | 1.01   | 1.05  |
| Corsets and girdles              | 1.03   | 1.04  |
| Leather boots and shoes          | 1.00   | 1.01  |
| Canvas products                  | 1.00   | 1.00  |
| Belting, leather                 | 1.00   | 1.00  |
| Carpets, mats, and rugs          | 1.00   | 1.00  |
| Contractors, women's clothing    | 1.00   | 1.00  |
| Cordage, rope, and twine         | 1.00   | 1.00  |
| Cotton thread                    | 1.00   | 1.00  |
| Fur dressing and dyeing          | 1.00   | 1.00  |
| Leather tanneries                | 1.00   | 1.00  |
| Miscellaneous leather products   | 1.00   | 1.00  |

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APPENDIX A

TABLE A-3 (cont.)

| <i>Group and Industry</i>              | <i>Average Number<br/>of Plants per<br/>Firm<sup>b</sup></i> | <i>Weighted Average<br/>Number of Plants<br/>per Firm<sup>c</sup></i> |
|--|--|---|
| <i>Wood products</i>                   |  |   |
| Coffins and caskets                    | 1.12   | 1.67  |
| Sawmills                               | 1.03   | 1.39  |
| Plywood and veneer                     | 1.05   | 1.13  |
| Planing mills, sash and door factories | 1.01   | 1.12  |
| Furniture                              | 1.01   | 1.11  |
| Boat building                          | 1.00   | 1.00  |
| Flooring, hardwood                     | 1.00   | 1.00  |
| Excelsior                              | 1.00   | 1.00  |
| <i>Paper products</i>                  |  |   |
| Pulp and paper mills                   | 1.65   | 3.40  |
| Roofing paper                          | 1.53   | 2.16  |
| Paper boxes and bags                   | 1.08   | 1.38  |
| <i>Iron and steel products</i>         |  |   |
| Railway rolling stock                  | 2.11   | 5.27  |
| Agricultural implements                | 1.03   | 1.33  |
| Steel ingots and castings              | 1.03   | 1.17 <sup>d</sup>   |
| Iron castings                          | 1.03   | 1.21  |
| Aircraft and parts                     | 1.00   | 1.00  |
| Automobiles                            | 1.00   | 1.00  |
| Bicycles                               | 1.00   | 1.00  |
| Machine shop                           | 1.00   | 1.00  |
| Pig iron                               | 1.00   | 1.00  |
| Shipbuilding                           | 1.00   | 1.00  |
| <i>Nonferrous metals</i>               |  |   |
| Aluminum <sup>a</sup>                  | 5.00   | 5.00  |
| Nickel                                 | 2.00   | 2.89 <sup>e</sup>   |
| <i>Nonmetallic minerals</i>            |  |   |
| Petroleum products                     | 1.83   | 4.26  |
| Cement                                 | 2.67   | 2.67  |
| Gypsum products                        | 2.5  | 2.5   |
| Plate, cut, and ornamental glass       | 1.10   | 1.88  |
| Glass                                  | 1.75   | 1.75  |
| Artificial abrasives                   | 1.20   | 1.20  |
| Coke products                          | 1.09   | 1.13  |
| Cement products                        | 1.02   | 1.12  |
| Abrasive products                      | 1.00   | 1.00  |
| Asbestos products                      | 1.00   | 1.00  |
| <i>Chemicals</i>                       |  |   |
| Compressed gases                       | 3.21   | 8.50  |
| Matches                                | 2.50   | 6.36 <sup>e</sup>   |
| Coal tar distillation                  | 2.75   | 2.75  |
| Vegetable oils                         | 1.33   | 1.65  |
| Hardwood distillation                  | 1.50   | 1.50  |

(cont. on next page)

APPENDIX A

TABLE A-3 (cont.)

| <i>Group and Industry</i>                 | <i>Average Number of Plants per Firm<sup>b</sup></i> | <i>Weighted Average Number of Plants per Firm<sup>c</sup></i> |
|---|--|---|
| <i>Chemicals (cont.)</i>                  |  |   |
| Washing compounds                         | 1.06   | 1.45  |
| Paints and varnishes                      | 1.05   | 1.41  |
| Medicinal and pharmaceutical preparations | 1.02   | 1.28  |
| Printing inks                             | 1.05   | 1.14  |
| Soaps                                     | 1.02   | 1.02  |
| Boiler compounds                          | 1.00   | 1.00  |
| Polishes and dressings                    | 1.00   | 1.00  |
| Writing inks                              | 1.00   | 1.00  |
| <i>Miscellaneous</i>                      |  |   |
| Umbrellas                                 | 1.17   | 1.28  |
| Fountain pens and pencils                 | 1.09   | 1.22  |
| Buttons                                   | 1.00   | 1.00  |
| Pipes and smokers' supplies               | 1.00   | 1.00  |

<sup>a</sup> One company in the industry. This company has 5 reduction plants and also one alumina plant which was not included here.

<sup>b</sup> Number of plants divided by number of firms.

<sup>c</sup> Number of plants per firm in each firm-size class weighted by percentage of industry's employment in that size class.

<sup>d</sup> Percentage of total capacity used as weights.

<sup>e</sup> Sales volume used as weights.

Source: Unpublished special compilation of data by firm-size classes, Ottawa, Dominion Bureau of Statistics.

TABLE A-4

Number of Firms and Plants Required to Account for 80 Per Cent of Employment, 96 Canadian Manufacturing Industries,<sup>a</sup> 1948

| INDUSTRY   | NUMBER REQUIRED TO ACCOUNT FOR 80 PER CENT OF EMPLOYMENT |                   | TOTAL EMPLOYMENT (3) |
|--|--|-------------------|----------------------|
|  | <i>Firms</i> (1)   | <i>Plants</i> (2) |                      |
| A. Industries in which 3 firms or less are required to account for 80 per cent of employment |  |                   |                      |
| Hardwood distillation  | 1.0  | 1.2               | 167                  |
| Aluminum   | 0.8  | 2.0               | 10,000 <sup>b</sup>  |
| Nickel   | 0.9  | 1.6               |                      |
| Automobiles  | 1.7  | 1.7               | 24,703               |
| Cotton thread  | 1.8  | 1.8               | 1,036                |
| Pipes and smokers' supplies  | 2.3  | 2.3               | 333                  |
| Pig iron   | 2.6  | 2.6               | 3,837 <sup>c</sup>   |
| Abrasive products  | 2.7  | 2.7               | 822                  |
| Glass  | 1.6  | 2.8               | 4,002                |
| Bicycles   | 2.9  | 2.9               | 795                  |
| Cement   | 1.2  | 3.2               | 1,723                |

(cont. on next page)

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TABLE A-4 (cont.)

| INDUSTRY                 | NUMBER REQUIRED TO ACCOUNT<br>FOR 80 PER CENT OF EMPLOYMENT |               | TOTAL<br>EMPLOYMENT |
|--------------------------|---|---------------|---------------------|
|                          | <i>Firms</i>  | <i>Plants</i> |                     |
|                          | (1)   | (2)           |                     |
| Artificial abrasives     | 2.0   | 3.4           | 1,835               |
| Matches                  | 0.9   | 3.5           | 738                 |
| Umbrellas                | 2.7   | 3.7           | 188                 |
| Gypsum products          | 1.6   | 4.0           | 951                 |
| Coal tar distillation    | 1.6   | 4.4           | 380                 |
| Cigarettes, cigars, etc. | 2.1   | 7.1           | 8,959               |
| Distilleries             | 2.5   | 7.3           | 4,213               |
| Petroleum products       | 3.0   | 11.0          | 8,245               |
| Compressed gases         | 2.9   | 21.2          | 1,156               |

B. Industries in which more than 3 firms but not more than 6 are required to account for 80 per cent of employment

|                                |     |      |                    |
|--------------------------------|-----|------|--------------------|
| Aircraft and parts             | 3.1 | 3.1  | 8,049              |
| Steel ingots and castings      | 3.4 | 3.5  | 6,630 <sup>c</sup> |
| Boiler compounds               | 3.7 | 3.7  | 140                |
| Writing inks                   | 3.8 | 3.8  | 95                 |
| Cordage, rope, twine           | 3.8 | 3.8  | 1,470              |
| Starch and glucose             | 4.0 | 4.0  | 964                |
| Excelsior                      | 4.0 | 4.0  | 161                |
| Soaps                          | 4.1 | 4.2  | 2,589              |
| Asbestos products              | 4.8 | 4.8  | 1,020              |
| Carpets, mats, rugs            | 4.8 | 4.8  | 1,541              |
| Malt and malt products         | 3.6 | 5.2  | 676                |
| Pens and pencils               | 4.4 | 5.5  | 1,248              |
| Agricultural implements        | 4.4 | 5.7  | 19,111             |
| Sugar refineries               | 4.1 | 5.8  | 3,267              |
| Coke products                  | 5.7 | 6.6  | 3,241              |
| Macaroni                       | 5.6 | 6.8  | 676                |
| Tobacco processing and packing | 5.6 | 8.6  | 1,500              |
| Railway rolling stock          | 3.1 | 13.2 | 31,371             |
| Cotton yarn and cloth          | 5.1 | 16.3 | 24,813             |

C. Industries in which more than 6 firms but not over 12 are required to account for 80 per cent of employment

|                             |      |      |        |
|-----------------------------|------|------|--------|
| Printing inks               | 6.3  | 6.5  | 547    |
| Leather belting             | 6.5  | 6.5  | 214    |
| Processed cheese            | 7.4  | 7.8  | 813    |
| Buttons                     | 8.8  | 8.8  | 1,844  |
| Roofing paper               | 6.3  | 8.9  | 2,562  |
| Vegetable oils              | 7.0  | 9.0  | 819    |
| Fur dressing and dyeing     | 9.1  | 9.1  | 1,602  |
| Washing compounds           | 8.2  | 10.6 | 485    |
| Narrow fabrics, laces, etc. | 10.3 | 11.8 | 2,081  |
| Wine                        | 9.1  | 12.8 | 664    |
| Synthetic textiles and silk | 11.3 | 13.9 | 16,097 |
| Condensed milk              | 12.0 | 17.1 | 1,883  |

(cont. on next page)

APPENDIX A

TABLE A-4 (cont.)

| INDUSTRY                      | NUMBER REQUIRED TO ACCOUNT<br>FOR 80 PER CENT OF EMPLOYMENT |                      | TOTAL<br>EMPLOYMENT<br>(3) |
|-------------------------------|---|----------------------|----------------------------|
|                               | <i>Firms</i><br>(1)   | <i>Plants</i><br>(2) |                            |
| Biscuits and crackers         | 11.1  | 18.2                 | 5,671                      |
| Breweries                     | 8.6   | 26.9                 | 8,407                      |
| Slaughtering and meat packing | 11.2  | 29.5                 | 21,879                     |

D. Industries in which more than 12 firms  
but not more than 24 are required to  
account for 80 per cent of employment

|                                  |      |      |        |
|----------------------------------|------|------|--------|
| Polishes and dressings           | 12.1 | 12.1 | 723    |
| Hardwood flooring                | 12.8 | 12.8 | 1,536  |
| Shipbuilding                     | 13.1 | 13.1 | 18,399 |
| Corsets                          | 13.9 | 14.4 | 3,154  |
| Dyeing and finishing of textiles | 12.9 | 14.7 | 2,713  |
| Plywood and veneer               | 13.3 | 15.2 | 6,335  |
| Woolen yarn                      | 14.1 | 17.2 | 4,840  |
| Cotton and jute bags             | 12.8 | 17.9 | 1,360  |
| Leather tanning                  | 19.3 | 19.3 | 4,848  |
| Coffins and caskets              | 14.5 | 19.7 | 1,322  |
| Paints and varnishes             | 22.2 | 26.6 | 5,558  |
| Cocoa, confectionery, etc.       | 23.4 | 29.1 | 10,076 |
| Flour mills                      | 22.0 | 32.9 | 5,325  |
| Pulp and paper mills             | 22.5 | 50.3 | 51,924 |

E. Industries in which more than 24 firms  
but not over 100 are required to account  
for 80 per cent of employment

|  |      |       |        |
|--|------|-------|--------|
| Woolen cloth                                 | 25.2 | 28.2  | 9,895  |
| Plate, cut, and ornamental glass             | 24.6 | 31.2  | 1,916  |
| Leather gloves and mittens                   | 30.5 | 31.5  | 2,415  |
| Canvas products                              | 39.1 | 39.1  | 1,365  |
| Contractors, women's clothing                | 42.4 | 42.4  | 1,572  |
| Iron castings                                | 45.9 | 49.5  | 19,354 |
| Medicinal and pharmaceutical<br>preparations | 49.4 | 53.0  | 7,641  |
| Paper boxes and bags                         | 57.6 | 67.4  | 12,357 |
| Hosiery and knit goods                       | 55.8 | 75.6  | 27,634 |
| Miscellaneous leather products               | 80.2 | 80.2  | 4,936  |
| Men's clothing contractors                   | 78.2 | 81.2  | 4,345  |
| Boat building                                | 92.7 | 92.7  | 1,569  |
| Prepared stock and poultry feeds             | 92.4 | 134.1 | 4,324  |
| Fruit and vegetable preparations             | 72.3 | 155.0 | 16,644 |

F. Industries in which over 100 firms are  
required to account for 80 per cent of  
employment

|                          |       |       |        |
|--------------------------|-------|-------|--------|
| Cement products          | 119.2 | 125.6 | 3,760  |
| Boots and shoes, leather | 109.6 | 110.7 | 21,265 |
| Clothing, men's factory  | 154.4 | 161.0 | 31,092 |

(cont. on next page)

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TABLE A-4 (cont.)

| INDUSTRY                           | NUMBER REQUIRED TO ACCOUNT<br>FOR 80 PER CENT OF EMPLOYMENT |                      | TOTAL<br>EMPLOYMENT<br>(3) |
|------------------------------------|---|----------------------|----------------------------|
|                                    | <i>Firms</i><br>(1)   | <i>Plants</i><br>(2) |                            |
| Fish curing and packing            | 132.5   | 173.9                | 12,243                     |
| Soft drinks                        | 149.2   | 191.8                | 6,683                      |
| Machine shops                      | 229.6   | 229.6                | 5,739                      |
| Fur goods                          | 282.1   | 286.2                | 6,443                      |
| Furniture                          | 277.1   | 287.2                | 25,893                     |
| Planing mills, etc.                | 377.0   | 391.5                | 17,794                     |
| Butter and cheese factories        | 369.9   | 442.0                | 21,824                     |
| Feed mills                         | 469.8   | 478.6                | 1,799                      |
| Clothing, women's factory          | 517.0   | 529.0                | 33,416                     |
| Bread and other bakery<br>products | 732.5   | 836.7                | 31,543                     |
| Sawmills                           | 1,843.4   | 1,993.7              | 56,756                     |

<sup>a</sup> This table includes all the industries in Table A-1.

<sup>b</sup> Rough estimate based on output. Total employment in Nonferrous Metal Smelting and Refining is 19,701.

<sup>c</sup> Estimated by dividing total employment for Primary Iron and Steel among its component groups in proportion to value added, which was computed from data in *The Primary Iron and Steel Industry, 1948*, Ottawa, Dominion Bureau of Statistics, December 1949.

| Column | Source   |
|--------|--|
| 1      | Table A-1, Index 2.  |
| 2      | Plant-size distributions, supplied by Dominion Bureau of Statistics. Method of computing as for col. 1 (see Appendix B). |
| 3      | Same source as col. 2.   |

TABLE A-5

Basic Series, Canadian Manufacturing Industries, 1917-1948

| Year | Number<br>of Estab-<br>lishments<br>(1) | Total Power<br>Equipment<br>(h.p.)<br>(2) | Em-<br>ployees<br>(thousands)<br>(3) | Gross Value<br>of Products<br>(\$ millions)<br>(4) | Number of<br>Employees<br>per Estab-<br>lishment<br>(3) ÷ (1)<br>(5) | Horsepower<br>per Estab-<br>lishment<br>(2) ÷ (1)<br>(6) | Horsepower<br>per<br>Employee<br>(2) ÷ (3)<br>(7) |
|------|---|---|--------------------------------------|--|--|--|---|
| 1917 | 21,845                                  | 1,658                                     | 606.5                                | 2,821  | 27.76  | 75.92  | 2.73  |
| 1918 | 21,777                                  |   | 602.2                                | 3,227  | 27.65  |  |   |
| 1919 | 22,083                                  |   | 594.1                                | 3,221  | 26.90  |  |   |
| 1920 | 22,532                                  | 2,069                                     | 598.9                                | 3,707  | 26.58  | 91.82  | 3.45  |
| 1921 | 20,848                                  |   | 438.6                                | 2,489  | 21.04  |  |   |
| 1922 | 21,016                                  |   | 456.3                                | 2,375  | 21.71  |  |   |
| 1923 | 21,080                                  | 2,147                                     | 506.2                                | 2,663  | 24.01  | 101.85   | 4.24  |
| 1924 | 20,709                                  | 2,527                                     | 487.6                                | 2,571  | 23.55  | 122.04   | 5.18  |
| 1925 | 20,981                                  | 2,877                                     | 522.9                                | 2,817  | 24.92  | 137.14   | 5.50  |
| 1926 | 21,301                                  | 3,122                                     | 559.2                                | 3,101  | 26.25  | 146.58   | 5.58  |

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TABLE A-5 (cont.)

| Year | Number of Establishments<br>(1) | Total Power Equipment (h.p.)<br>(2) | Employees (thousands)<br>(3) | Gross Value of Products (\$ millions)<br>(4) | Number of Employees per Establishment<br>(3) ÷ (1)<br>(5) | Horsepower per Establishment<br>(2) ÷ (1)<br>(6) | Horsepower per Employee<br>(2) ÷ (3)<br>(7) |
|------|---------------------------------|-------------------------------------|------------------------------|--|---|--|---|
| 1927 | 21,501                          | 3,277                               | 595.1                        | 3,257  | 27.68   | 152.43   | 5.51  |
| 1928 | 21,973                          | 3,580                               | 631.4                        | 3,582  | 28.74   | 162.95   | 5.67  |
| 1929 | 22,216                          | 3,856                               | 666.5                        | 3,883  | 30.00   | 173.55   | 5.78  |
| 1930 | 22,618                          | 4,039                               | 614.7                        | 3,280  | 27.18   | 178.57   | 6.57  |
| 1931 | 23,083                          | 4,100                               | 528.6                        | 2,555  | 22.90   | 177.62   | 7.76  |
| 1932 | 23,102                          | 4,143                               | 468.8                        | 1,980  | 20.29   | 179.32   | 8.84  |
| 1933 | 23,780                          | 4,135                               | 468.7                        | 1,954  | 19.71   | 173.89   | 8.82  |
| 1934 | 24,209                          | 4,229                               | 519.8                        | 2,394  | 21.47   | 174.71   | 8.14  |
| 1935 | 24,034                          | 4,331                               | 556.7                        | 2,654  | 23.16   | 180.22   | 7.78  |
| 1936 | 24,202                          | 4,462                               | 594.4                        | 3,002  | 24.56   | 184.36   | 7.51  |
| 1937 | 24,834                          | 4,712                               | 660.5                        | 3,625  | 26.59   | 189.75   | 7.13  |
| 1938 | 25,200                          | 4,970                               | 642.0                        | 3,338  | 25.48   | 197.21   | 7.74  |
| 1939 | 24,805                          | 5,045                               | 658.1                        | 3,475  | 26.53   | 203.40   | 7.67  |
| 1940 | 25,513                          | 5,291                               | 762.2                        | 4,529  | 29.88   | 207.38   | 6.94  |
| 1941 | 26,293                          | 5,850                               | 961.2                        | 6,076  | 36.56   | 222.50   | 6.09  |
| 1942 | 27,862                          | 6,062                               | 1,152.1                      | 7,554  | 41.35   | 217.57   | 5.26  |
| 1943 | 27,652                          | 6,416                               | 1,241.1                      | 8,733  | 44.88   | 232.02   | 5.17  |
| 1944 | 28,483                          | 6,468                               | 1,222.9                      | 9,074  | 42.93   | 227.10   | 5.29  |
| 1945 | 29,050                          | 6,607                               | 1,119.4                      | 8,250  | 38.53   | 227.42   | 5.90  |
| 1946 | 31,249                          | 6,784                               | 1,053.2                      | 8,036  | 33.86   | 217.09   | 6.41  |
| 1947 | 32,734                          | 7,399                               | 1,131.8                      | 10,081                                       | 34.57   | 226.04   | 6.54  |
| 1948 | 33,447                          | 8,159                               | 1,156.0                      | 11,877                                       | 34.56   | 243.95   | 7.06  |

Source: Cols. 1, 3, 4: *The Manufacturing Industries of Canada, 1948*, Ottawa, Dominion Bureau of Statistics, p. 7. Col. 2: *Ibid.*, pp. 12, 83 and *The Manufacturing Industries of Canada, 1939*, p. 56.

TABLE A-6

Concentration and Related Time Series, 16 Canadian Manufacturing Industries, 1932-1948

| YEAR                          | INDUSTRY'S<br>EMPLOYMENT | CONCENTRATION INDEX <sup>a</sup> |            | INEQUALITY INDEX <sup>b</sup> |            | NUMBER OF<br>PLANTS |
|-------------------------------|--------------------------|----------------------------------|------------|-------------------------------|------------|---------------------|
|                               |                          | Output                           | Employment | Output                        | Employment |                     |
| Slaughtering and Meat Packing |                          |                                  |            |                               |            |                     |
| 1933                          | 9,289                    | 19.5                             | 22.0       | 14.4                          | 16.3       | 135                 |
| 1934                          | 10,119                   | 20.7                             | 23.0       | 14.1                          | 15.6       | 147                 |
| 1935                          | 10,674                   | 22.6                             | 22.4       | 16.3                          | 16.1       | 139                 |
| 1936                          | 11,776                   | 23.4                             | 23.3       | 16.5                          | 16.4       | 142                 |
| 1937                          | 13,070                   | 22.9                             |            | 16.6                          |            | 138                 |
| 1938                          | 12,503                   | 24.9                             |            | 17.1                          |            | 145                 |
| 1939                          | 12,765                   | 28.6                             |            | 19.0                          |            | 150                 |

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TABLE A-6 (cont.)

| YEAR   | INDUSTRY'S<br>EMPLOYMENT | CONCENTRATION INDEX <sup>a</sup> |            | INEQUALITY INDEX <sup>b</sup> |            | NUMBER OF<br>PLANTS |
|--|--------------------------|----------------------------------|------------|-------------------------------|------------|---------------------|
|  |                          | Output                           | Employment | Output                        | Employment |                     |
| Slaughtering and Meat Packing (cont.)        |                          |                                  |            |                               |            |                     |
| 1940   | 14,301                   |                                  |            |                               |            |                     |
| 1941   | 16,260                   |                                  | 25.4       |                               | 17.4       | 146                 |
| 1942   | 17,397                   |                                  | 25.0       |                               | 16.9       | 148                 |
| 1943   | 18,775                   |                                  | 25.2       |                               | 16.5       | 153                 |
| 1944   | 23,867                   |                                  | 24.0       |                               | 15.7       | 153                 |
| 1945   | 23,215                   |                                  | 25.9       |                               | 17.1       | 152                 |
| 1946   | 22,536                   |                                  | 26.9       |                               | 18.3       | 147                 |
| 1947   | 21,726                   |                                  | 30.2       |                               | 20.0       | 151                 |
| 1948   | 21,879                   |                                  | 31.2       |                               | 22.0       | 142                 |
| Cotton Yarn and Cloth                        |                          |                                  |            |                               |            |                     |
| 1932   | 15,092                   | 15.5                             | 15.7       | 44.2                          | 44.9       | 35                  |
| 1933   | 16,095                   | 17.2                             | 13.6       | 46.4                          | 36.9       | 37                  |
| 1934   | 18,106                   | 16.8                             | 16.4       | 46.7                          | 45.6       | 36                  |
| 1935   | 18,121                   |                                  |            |                               |            | 35                  |
| 1936   | 17,910                   | 15.7                             | 15.4       | 45.0                          | 43.9       | 35                  |
| 1937   | 19,160                   | 17.2                             |            | 47.9                          |            | 36                  |
| 1938   | 18,049                   | 15.8                             |            | 42.6                          |            | 37                  |
| 1939   | 19,723                   | 15.2                             |            | 42.2                          |            | 36                  |
| 1940   | 23,616                   |                                  |            |                               |            | 37                  |
| 1941   | 26,375                   |                                  | 15.9       |                               | 40.9       | 39                  |
| 1942   | 25,796                   |                                  | 15.7       |                               | 39.2       | 40                  |
| 1943   | 23,526                   |                                  | 14.9       |                               | 37.3       | 40                  |
| 1944   | 21,900                   |                                  | 15.8       |                               | 38.4       | 41                  |
| 1945   | 21,646                   |                                  | 15.8       |                               | 38.6       | 41                  |
| 1946   | 20,662                   |                                  | 16.4       |                               | 39.9       | 41                  |
| 1947   | 24,089                   |                                  | 15.6       |                               | 34.6       | 45                  |
| 1948   | 24,813                   |                                  | 16.3       |                               | 34.8       | 47                  |
| Silk and Rayon (Synthetic Textiles and Silk) |                          |                                  |            |                               |            |                     |
| 1932   | 7,036                    | 6.9                              |            | 28.8                          |            | 24                  |
| 1937   | 10,246                   | 7.9                              |            | 27.2                          |            | 29                  |
| 1938   | 8,922                    | 7.9                              |            | 28.2                          |            | 28                  |
| 1939   | 8,221                    |                                  |            |                               |            | 26                  |
| 1940   | 8,512                    | 6.8                              |            | 25.3                          |            | 27                  |
| 1941   | 10,140                   | 7.6                              |            | 25.3                          |            | 30                  |
| 1942   | 11,088                   | 9.4                              |            | 28.4                          |            | 33                  |
| 1943   | 10,920                   | 9.2                              | 10.1       | 27.7                          | 30.7       | 33                  |
| 1944   | 11,315                   |                                  | 10.1       |                               | 31.6       | 32                  |
| 1945   | 11,950                   |                                  | 10.3       |                               | 31.3       | 33                  |
| 1946   | 13,100                   |                                  | 11.3       |                               | 31.4       | 36                  |
| 1947   | 14,728                   |                                  | 11.7       |                               | 29.3       | 40                  |
| 1948   | 16,097                   |                                  | 13.8       |                               | 30.8       | 45                  |

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TABLE A-6 (cont.)

| YEAR                                  | INDUSTRY'S<br>EMPLOYMENT | CONCENTRATION INDEX <sup>a</sup> |            | INEQUALITY INDEX <sup>b</sup> |            | NUMBER OF<br>PLANTS |
|---------------------------------------|--------------------------|----------------------------------|------------|-------------------------------|------------|---------------------|
|                                       |                          | Output                           | Employment | Output                        | Employment |                     |
| Women's Factory Clothing <sup>c</sup> |                          |                                  |            |                               |            |                     |
| 1932                                  | 14,276                   | 171                              | 183        | 37.0                          | 39.8       | 461                 |
| 1933                                  | 15,264                   | 190                              | 220        | 35.2                          | 40.6       | 540                 |
| 1934                                  | 17,000                   | 211                              | 231        | 36.6                          | 40.0       | 577                 |
| 1935                                  | 17,894                   |                                  |            |                               |            | 591                 |
| 1936                                  | 18,924                   |                                  |            |                               |            | 583                 |
| 1937                                  | 19,981                   | 226                              |            | 38.1                          |            | 593                 |
| 1938                                  | 19,909                   | 223                              |            | 36.8                          |            | 605                 |
| 1939                                  | 20,270                   | 228                              |            | 37.1                          |            | 615                 |
| 1940                                  | 20,549                   |                                  |            |                               |            | 604                 |
| 1941                                  | 24,545                   |                                  | 276        |                               | 41.1       | 671                 |
| 1942                                  | 26,328                   |                                  | 326        |                               | 42.0       | 775                 |
| 1943                                  | 25,752                   |                                  | 346        |                               | 44.3       | 781                 |
| 1944                                  | 25,810                   |                                  | 373        |                               | 44.7       | 835                 |
| 1945                                  | 27,975                   |                                  | 446        |                               | 45.1       | 989                 |
| 1946                                  | 29,963                   |                                  | 493        |                               | 44.5       | 1,108               |
| 1947                                  | 30,969                   |                                  | 532        |                               | 45.5       | 1,169               |
| 1948                                  | 33,416                   |                                  | 529        |                               | 45.6       | 1,160               |
| Leather Tanning                       |                          |                                  |            |                               |            |                     |
| 1937                                  | 4,382                    | 16.9                             |            | 20.3                          |            | 83                  |
| 1938                                  | 3,940                    | 17.0                             |            | 19.3                          |            | 88                  |
| 1939                                  | 4,312                    |                                  |            |                               |            | 84                  |
| 1940                                  | 4,166                    | 14.5                             |            | 18.6                          |            | 78                  |
| 1941                                  | 4,640                    | 15.9                             |            | 20.5                          |            | 78                  |
| 1942                                  | 4,770                    | 15.0                             |            | 18.8                          |            | 80                  |
| 1943                                  | 4,596                    | 15.1                             | 18.4       | 19.4                          | 23.5       | 78                  |
| 1944                                  | 4,472                    |                                  | 18.9       |                               | 25.2       | 75                  |
| 1945                                  | 4,834                    |                                  | 19.3       |                               | 26.1       | 74                  |
| 1946                                  | 5,400                    |                                  | 19.4       |                               | 24.9       | 78                  |
| 1947                                  | 5,574                    |                                  | 19.6       |                               | 24.3       | 81                  |
| 1948                                  | 4,848                    |                                  | 19.3       |                               | 26.5       | 73                  |
| Leather Boots and Shoes               |                          |                                  |            |                               |            |                     |
| 1937                                  | 16,773                   | 77.7                             |            | 35.2                          |            | 221                 |
| 1938                                  | 15,932                   | 78.1                             |            | 36.7                          |            | 213                 |
| 1939                                  | 16,957                   |                                  |            |                               |            | 222                 |
| 1940                                  | 17,149                   | 74.8                             |            | 34.5                          |            | 217                 |
| 1941                                  | 18,841                   | 79.5                             |            | 37.9                          |            | 210                 |
| 1942                                  | 19,113                   | 80.0                             |            | 36.2                          |            | 221                 |
| 1943                                  | 18,665                   | 84.6                             | 92.5       | 38.1                          | 41.7       | 222                 |
| 1944                                  | 18,638                   |                                  | 94.5       |                               | 41.5       | 228                 |

(cont. on next page)

APPENDIX A

TABLE A-6 (cont.)

| YEAR                            | INDUSTRY'S<br>EMPLOYMENT | CONCENTRATION INDEX <sup>a</sup> |            | INEQUALITY INDEX <sup>b</sup> |            | NUMBER OF<br>PLANTS |
|---------------------------------|--------------------------|----------------------------------|------------|-------------------------------|------------|---------------------|
|                                 |                          | Output                           | Employment | Output                        | Employment |                     |
| Leather Boots and Shoes (cont.) |                          |                                  |            |                               |            |                     |
| 1945                            | 20,096                   |                                  | 103.0      |                               | 39.2       | 263                 |
| 1946                            | 22,334                   |                                  | 113.2      |                               | 38.5       | 294                 |
| 1947                            | 21,433                   |                                  | 98.0       |                               | 33.2       | 295                 |
| 1948                            | 21,265                   |                                  | 110.7      |                               | 37.9       | 292                 |
| Furniture                       |                          |                                  |            |                               |            |                     |
| 1937                            | 10,804                   | 92.7                             |            | 21.2                          |            | 434                 |
| 1938                            | 10,284                   | 98.6                             |            | 25.1                          |            | 392                 |
| 1939                            | 10,572                   |                                  |            |                               |            | 378                 |
| 1940                            | 11,541                   | 96.8                             |            | 25.6                          |            | 378                 |
| 1941                            | 13,355                   | 98.2                             |            | 23.9                          |            | 411                 |
| 1942                            | 13,223                   | 104.2                            |            | 23.7                          |            | 440                 |
| 1943                            | 13,440                   | 114.1                            | 120.6      | 25.4                          | 26.9       | 449                 |
| 1944                            | 14,046                   |                                  | 130.6      |                               | 27.7       | 472                 |
| 1945                            | 15,729                   |                                  | 157.7      |                               | 25.3       | 623                 |
| 1946                            | 19,217                   |                                  | 212.7      |                               | 25.8       | 824                 |
| 1947                            | 24,781 <sup>d</sup>      |                                  | 259.3      |                               | 24.8       | 1,046 <sup>e</sup>  |
| 1948                            | 25,893 <sup>d</sup>      |                                  | 287.2      |                               | 25.5       | 1,128 <sup>e</sup>  |
| Automobiles                     |                          |                                  |            |                               |            |                     |
| 1935                            | 13,095                   | 1.8                              | 1.8        | 8.9                           | 9.2        | 20                  |
| 1936                            | 12,933                   | 1.9                              | 1.8        | 12.1                          | 11.5       | 16                  |
| 1937                            | 14,946                   | 1.5                              |            | 9.8                           |            | 15                  |
| 1938                            | 14,872                   | 2.1                              |            | 17.6                          |            | 12                  |
| 1939                            | 14,427                   | 1.7                              |            | 14.5                          |            | 12                  |
| 1940                            | 16,798                   | 1.9                              |            | 19.0                          |            | 10                  |
| 1941                            | 22,401                   |                                  | 1.3        |                               | 12.8       | 10                  |
| 1942                            | 24,403                   |                                  | 1.3        |                               | 21.3       | 6                   |
| 1943                            | 24,265                   |                                  | 1.5        |                               | 29.1       | 5                   |
| 1944                            | 22,499                   |                                  | 1.2        |                               | 24.8       | 5                   |
| 1945                            | 17,915                   |                                  | 1.4        |                               | 23.9       | 6                   |
| 1946                            | 21,647                   |                                  | 1.9        |                               | 21.2       | 9                   |
| 1947                            | 23,837                   |                                  | 2.1        |                               | 23.6       | 9                   |
| 1948                            | 24,703                   |                                  | 1.7        |                               | 15.6       | 11                  |
| Petroleum Products              |                          |                                  |            |                               |            |                     |
| 1933                            | 4,628                    | 9.3                              | 7.7        | 19.7                          | 16.4       | 47                  |
| 1934                            | 4,957                    | 10.7                             | 7.9        | 21.0                          | 15.5       | 51                  |
| 1935                            | 4,856                    | 10.3                             | 9.4        | 17.8                          | 16.2       | 58                  |
| 1936                            | 5,019                    | 10.2                             | 10.8       | 16.1                          | 17.1       | 63                  |
| 1937                            | 5,137                    | 9.1                              |            | 16.0                          |            | 57                  |
| 1938                            | 4,675                    | 9.4                              |            | 16.0                          |            | 59                  |
| 1939                            | 4,766                    | 10.4                             |            | 19.8                          |            | 53                  |

(cont. on next page)

APPENDIX A

TABLE A-6 (cont.)

| YEAR                                    | INDUSTRY'S<br>EMPLOYMENT | CONCENTRATION INDEX <sup>a</sup> |            | INEQUALITY INDEX <sup>b</sup> |            | NUMBER OF<br>PLANTS |
|---|--------------------------|----------------------------------|------------|-------------------------------|------------|---------------------|
|   |                          | Output                           | Employment | Output                        | Employment |                     |
| Petroleum Products (cont.)              |                          |                                  |            |                               |            |                     |
| 1940                                    | 5,156                    |                                  |            |                               |            | 49                  |
| 1941                                    | 5,406                    |                                  | 10.8       |                               | 22.1       | 49                  |
| 1942                                    | 5,920                    |                                  | 11.9       |                               | 22.8       | 52                  |
| 1943                                    | 6,085                    |                                  | 11.3       |                               | 21.7       | 52                  |
| 1944                                    | 6,809                    |                                  | 11.2       |                               | 23.4       | 48                  |
| 1945                                    | 6,775                    |                                  | 10.9       |                               | 23.7       | 46                  |
| 1946                                    | 7,145                    |                                  | 10.8       |                               | 25.2       | 43                  |
| 1947                                    | 7,760                    |                                  | 10.9       |                               | 23.6       | 46                  |
| 1948                                    | 8,495                    |                                  | 11.8       |                               | 26.9       | 44                  |
| Paints and Varnishes                    |                          |                                  |            |                               |            |                     |
| 1937                                    | 3,324                    | 20.0                             |            | 24.4                          |            | 82                  |
| 1938                                    | 3,412                    | 20.7                             |            | 23.8                          |            | 87                  |
| 1939                                    | 3,540                    |                                  |            |                               |            | 93                  |
| 1940                                    | 3,750                    | 22.6                             |            | 24.3                          |            | 93                  |
| 1941                                    | 4,225                    | 21.7                             |            | 23.1                          |            | 94                  |
| 1942                                    | 4,507                    | 21.3                             |            | 22.2                          |            | 96                  |
| 1943                                    | 4,589                    | 22.4                             | 24.7       | 23.3                          | 25.7       | 96                  |
| 1944                                    | 4,821                    |                                  | 25.1       |                               | 25.9       | 97                  |
| 1945                                    | 4,979                    |                                  | 24.0       |                               | 26.7       | 90                  |
| 1946                                    | 5,006                    |                                  | 25.2       |                               | 28.6       | 88                  |
| 1947                                    | 5,428                    |                                  | 26.1       |                               | 23.9       | 109                 |
| 1948                                    | 5,558                    |                                  | 26.6       |                               | 23.4       | 114                 |
| Nonferrous Metals Smelting and Refining |                          |                                  |            |                               |            |                     |
| 1934                                    | 8,298                    | 6.1                              | 8.0        | 40.7                          | 53.3       | 15                  |
| 1935                                    | 8,944                    | 6.3                              | 6.8        | 42.0                          | 45.3       | 15                  |
| 1936                                    | 10,015                   | 3.7                              | 4.1        | 24.7                          | 27.2       | 15                  |
| 1937                                    | 11,570                   | 3.7                              |            | 26.4                          |            | 14                  |
| 1938                                    | 12,788                   | 4.5                              |            | 32.1                          |            | 14                  |
| 1939                                    | 12,449                   | 5.5                              |            | 39.3                          |            | 14                  |
| 1940                                    | 13,466                   |                                  |            |                               |            | 14                  |
| 1941                                    | 16,014                   |                                  | 5.8        |                               | 41.4       | 14                  |
| 1942                                    | 21,162                   |                                  | 5.2        |                               | 32.5       | 16                  |
| 1943                                    | 26,749                   |                                  | 6.1        |                               | 38.4       | 16                  |
| 1944                                    | 23,927                   |                                  | 6.3        |                               | 39.4       | 16                  |
| 1945                                    | 16,771                   |                                  | 7.0        |                               | 41.2       | 17                  |
| 1946                                    | 14,546                   |                                  | 6.0        |                               | 40.0       | 15                  |
| 1947                                    | 17,449                   |                                  | 5.5        |                               | 34.4       | 16                  |
| 1948                                    | 19,701                   |                                  | 5.4        |                               | 32.0       | 17                  |
| Butter and Cheese                       |                          |                                  |            |                               |            |                     |
| 1934                                    | 14,389                   | 684.2                            | 918.4      | 26.0                          | 34.9       | 2,632               |
| 1935                                    | 14,786                   | 713.7                            | 940.7      | 27.6                          | 36.3       | 2,589               |

(cont. on next page)

TABLE A-6 (cont.)

| YEAR                      | INDUSTRY'S<br>EMPLOYMENT | CONCENTRATION INDEX <sup>a</sup> |            | INEQUALITY INDEX <sup>b</sup> |            | NUMBER OF<br>PLANTS |
|---------------------------|--------------------------|----------------------------------|------------|-------------------------------|------------|---------------------|
|                           |                          | Output                           | Employment | Output                        | Employment |                     |
| Butter and Cheese (cont.) |                          |                                  |            |                               |            |                     |
| 1936                      | 15,545                   | 800.3                            | 894.5      | 31.1                          | 34.8       | 2,573               |
| 1937                      | 16,583                   | 842.6                            |            | 32.8                          |            | 2,568               |
| 1938                      | 17,336                   | 794.4                            |            | 31.4                          |            | 2,528               |
| 1939                      | 17,448                   | 728.9                            |            | 28.8                          |            | 2,528               |
| 1940                      | 18,039                   |                                  |            |                               |            | 2,484               |
| 1941                      | 18,922                   |                                  | 796.7      |                               | 32.8       | 2,427               |
| 1942                      | 19,465                   |                                  | 765.5      |                               | 32.2       | 2,378               |
| 1943                      | 19,181                   |                                  | 645.2      |                               | 27.9       | 2,314               |
| 1944                      | 18,622                   |                                  | 628.5      |                               | 27.5       | 2,282               |
| 1945                      | 19,435                   |                                  | 611.9      |                               | 30.0       | 2,241               |
| 1946                      | 19,659                   |                                  | 539.7      |                               | 25.0       | 2,161               |
| 1947                      | 20,757                   |                                  | 536.2      |                               | 26.3       | 2,037               |
| 1948                      | 21,824                   |                                  | 442.0      |                               | 22.7       | 1,951               |
| Pulp and Paper            |                          |                                  |            |                               |            |                     |
| 1934                      | 26,993                   | 36.6                             | 39.0       | 38.6                          | 41.1       | 95                  |
| 1935                      | 27,836                   | 37.7                             | 39.8       | 39.7                          | 41.9       | 95                  |
| 1936                      | 30,054                   | 37.5                             | 40.1       | 41.5                          | 43.1       | 93                  |
| 1937                      | 33,205                   | 39.0                             |            | 39.8                          |            | 98                  |
| 1938                      | 30,943                   | 40.6                             |            | 41.0                          |            | 99                  |
| 1939                      | 31,016                   | 39.3                             |            | 39.3                          |            | 100                 |
| 1940                      | 34,719                   |                                  |            |                               |            | 103                 |
| 1941                      | 37,154                   |                                  | 43.5       |                               | 41.0       | 106                 |
| 1942                      | 38,007                   |                                  | 43.6       |                               | 41.5       | 105                 |
| 1943                      | 37,020                   |                                  | 44.8       |                               | 42.2       | 106                 |
| 1944                      | 37,896                   |                                  | 44.6       |                               | 42.9       | 104                 |
| 1945                      | 39,996                   |                                  | 46.5       |                               | 42.7       | 109                 |
| 1946                      | 44,967                   |                                  | 47.1       |                               | 41.7       | 113                 |
| 1947                      | 49,946                   |                                  | 48.7       |                               | 42.3       | 115                 |
| 1948                      | 51,924                   |                                  | 49.1       |                               | 42.0       | 117                 |
| Electrical Apparatus      |                          |                                  |            |                               |            |                     |
| 1935                      | 15,549                   | 34.8                             | 31.4       | 19.1                          | 17.3       | 182                 |
| 1936                      | 17,037                   | 34.8                             | 31.9       | 18.7                          | 17.1       | 186                 |
| 1937                      | 21,706                   | 31.6                             |            | 16.5                          |            | 191                 |
| 1938                      | 20,353                   | 32.1                             |            | 17.1                          |            | 188                 |
| 1939                      | 20,261                   | 33.0                             |            | 17.4                          |            | 190                 |
| 1940                      | 25,120                   |                                  |            |                               |            | 194                 |
| 1941                      | 33,086                   |                                  | 32.1       |                               | 15.2       | 211                 |
| 1942                      | 39,676                   |                                  | 34.4       |                               | 15.3       | 225                 |
| 1943                      | 46,928                   |                                  | 34.0       |                               | 15.2       | 223                 |
| 1944                      | 48,834                   |                                  | 35.2       |                               | 12.0       | 234                 |
| 1945                      | 44,129                   |                                  | 38.5       |                               | 15.6       | 247                 |
| 1946                      | 43,998                   |                                  | 32.0       |                               | 12.0       | 266                 |

(cont. on next page)

TABLE A-6 (cont.)

| YEAR                 | INDUSTRY'S<br>EMPLOYMENT | CONCENTRATION INDEX <sup>a</sup> |            | INEQUALITY INDEX <sup>b</sup> |            | NUMBER OF<br>PLANTS |
|----------------------|--------------------------|----------------------------------|------------|-------------------------------|------------|---------------------|
|                      |                          | Output                           | Employment | Output                        | Employment |                     |
| 1947                 | 52,736                   |                                  | 45.3       |                               | 15.3       | 296                 |
| 1948                 | 53,873                   |                                  | 47.3       |                               | 15.1       | 314                 |
| Sawmills             |                          |                                  |            |                               |            |                     |
| 1935                 | 25,727                   | 257.8                            | 645.2      | 7.0                           | 17.4       | 3,698               |
| 1936                 | 28,786                   | 219.8                            | 553.9      | 6.0                           | 15.2       | 3,638               |
| 1937                 | 33,917                   | 287.7                            |            | 7.5                           |            | 3,836               |
| 1938                 | 31,182                   | 317.0                            |            | 8.2                           |            | 3,873               |
| 1939                 | 32,399                   | 307.4                            |            | 7.8                           |            | 3,941               |
| 1940                 | 39,501                   |                                  |            |                               |            | 4,675               |
| 1941                 | 45,104                   |                                  | 1,085.6    |                               | 23.3       | 4,655               |
| 1942                 | 47,765                   |                                  | 1,360.3    |                               | 25.8       | 5,277               |
| 1943                 | 43,954                   |                                  | 1,418.1    |                               | 27.6       | 5,140               |
| 1944                 | 43,516                   |                                  | 1,821.6    |                               | 33.1       | 5,506               |
| 1945                 | 44,040                   |                                  | 1,660.5    |                               | 31.4       | 5,295               |
| 1946                 | 49,352                   |                                  | 2,001.0    |                               | 33.3       | 6,001               |
| 1947                 | 55,425                   |                                  | 2,059.0    |                               | 31.8       | 6,481               |
| 1948                 | 56,756                   |                                  | 1,993.7    |                               | 28.3       | 7,035               |
| Flour and Feed Mills |                          |                                  |            |                               |            |                     |
| 1934                 | 5,633                    | 108.8                            | 396.3      | 8.3                           | 30.3       | 1,310               |
| 1935                 | 5,454                    | 91.7                             | 312.2      | 8.1                           | 27.7       | 1,127               |
| 1936                 | 5,685                    | 104.2                            | 283.9      | 9.3                           | 25.4       | 1,118               |
| 1937                 | 5,803                    | 65.5                             |            | 6.0                           |            | 1,086               |
| 1938                 | 5,778                    | 52.3                             |            | 4.8                           |            | 1,080               |
| 1939                 | 5,898                    | 118.0                            |            | 11.2                          |            | 1,050               |
| 1940                 | 6,215                    |                                  |            |                               |            | 1,027               |
| 1941                 | 6,528                    |                                  | 266.7      |                               | 23.6       | 1,129               |
| 1942                 | 6,720                    |                                  | 290.4      |                               | 24.8       | 1,171               |
| 1943                 | 7,163                    |                                  | 226.5      |                               | 20.0       | 1,131               |
| 1944                 | 7,289                    |                                  | 206.5      |                               | 19.0       | 1,087               |
| 1945                 | 7,511                    |                                  | 174.6      |                               | 17.1       | 1,023               |
| 1946                 | 8,036                    |                                  | 176.9      |                               | 18.2       | 974                 |
| 1947                 | 8,285                    |                                  | 181.6      |                               | 19.0       | 961                 |
| 1948                 | 7,124                    |                                  | 184.4      |                               | 20.0       | 924                 |

<sup>a</sup> Number of largest plants accounting for 80 per cent of employment.

<sup>b</sup> Percentage of plants accounting for 80 per cent of employment.

<sup>c</sup> Includes laces, tapes, and bindings up to 1938.

<sup>d</sup> Figures include employment of the Mattresses and Springs industry which had 3,485 employees in 1946.

<sup>e</sup> Figures include plants of the Mattresses and Springs industry which had 77 establishments in 1946.

Source: Employment and number of plants: *The Manufacturing Industries of Canada*, Ottawa, Dominion Bureau of Statistics, various years. Concentration and inequality indexes computed from plant-size distributions, some published in *Manufacturing Industries of Canada*, and some unpublished, obtained from Dominion Bureau of Statistics. Size distributions for Cotton Yarn and Cloth, Silk and Rayon, Women's Clothing, 1932, from *Textile Industries of Canada, 1931-32*.

TABLE A-7  
Miscellaneous Basic Data, Selected Canadian Manufacturing Industries, 1948

| Industry and Group                      | Number of Firms (1) | Number of Plants (2) | Employment per Firm (3) | Employment per Plant (4) | Horsepower of Equipment in Use per Wage Earner (h.p.) (5) | Adjusted Index of Mechanization (k.w.h.) (6) | Percentage of Firms Required to Account for 80 Per Cent of Employment in the Industry (7) |
|---|---------------------|----------------------|-------------------------|--------------------------|---|--|---|
| <i>Food, beverages, tobacco</i>         |                     |                      |                         |                          |   |  |   |
| Cigarettes, cigars, tobacco             | 54                  | 62                   | 166.9                   | 144.5                    | .7  | 1,291.1                                      | 3.9   |
| Distilleries                            | 12                  | 18                   | 351.1                   | 234.1                    | 3.7   | 6,338.4                                      | 20.7  |
| Sugar refining                          | 7                   | 11                   | 466.7                   | 297.0                    | 11.2  | 13,751.6                                     | 58.9  |
| Malt and malt products                  | 9                   | 13                   | 75.1                    | 52.0                     | 24.9  | 46,748.7                                     | 40.0  |
| Starch and glucose                      | 10                  | 10                   | 96.4                    | 96.4                     | 9.3   | 6,395.9                                      | 40.0  |
| Macaroni                                | 14                  | 17                   | 48.3                    | 39.8                     | 3.9   | 9,293.0                                      | 40.0  |
| Tobacco processing and packing          | 13                  | 17                   | 115.4                   | 88.2                     | 1.4   | 1,306.9                                      | 42.9  |
| Wine                                    | 23                  | 28                   | 28.9                    | 23.7                     | 3.7   | 4,584.8                                      | 39.5  |
| <i>Slaughtering and meat packing</i>    |                     |                      |                         |                          |   |  |   |
| Processed cheese                        | 19                  | 21                   | 42.8                    | 38.7                     | 2.7   | 3,731.4                                      | 9.4   |
| Breweries                               | 38                  | 61                   | 221.2                   | 137.8                    | 4.9   | 12,180.6                                     | 38.9  |
| Biscuits and crackers                   | 41                  | 49                   | 138.3                   | 115.7                    | 1.6   | 1,653.0                                      | 22.7  |
| Condensed milk                          | 30                  | 37                   | 62.8                    | 50.9                     | 6.7   | 8,866.1                                      | 27.0  |
| Flour mills                             | 156                 | 167                  | 34.1                    | 31.9                     | 19.2  | 42,408.9                                     | 40.1  |
| Cocoa, confectionery, etc.              | 188                 | 196                  | 53.6                    | 51.4                     | 2.4   | 1,966.4                                      | 14.1  |
| <i>Fruit and vegetable preparations</i> |                     |                      |                         |                          |   |  |   |
| Soft drinks                             | 378                 | 499                  | 44.0                    | 33.4                     | 3.3   | 2,545.8                                      | 19.1  |
|   | 408                 | 458                  | 16.4                    | 14.6                     | 1.6   | 2,629.9                                      | 36.6  |

(cont. on next page)

APPENDIX A

TABLE A-7 (cont.)

| Industry and Group                       | Number of Firms (1) | Number of Plants (2) | Employment per Firm (3) | Employment per Plant (4) | Horsepower of Equipment in Use per Wage Earner (h.p.) (5) | Adjusted Index of Mechanization (k.w.h.) (6) | Percentage of Firms Required to Account for 80 Per Cent of Employment in the Industry (7) |
|--|---------------------|----------------------|-------------------------|--------------------------|---|--|---|
| <i>Foods, beverages, tobacco (cont.)</i> |                     |                      |                         |                          |   |  |   |
| Bread and other bakery products          | 2,748               | 2,859                | 11.5                    | 11.0                     | .8  | 1,851.2                                      | 26.7  |
| Butter and cheese factories              | 1,848               | 1,951                | 11.8                    | 11.2                     | 3.7   | 4,553.4                                      | 20.0  |
| Prepared stock and poultry feeds         | 260                 | 318                  | 16.6                    | 13.6                     | 14.0  | 15,262.8                                     | 35.5  |
| Fish curing and packing                  | 527                 | 600                  | 23.2                    | 20.4                     | 2.8   | 4,054.3                                      | 25.1  |
| Feed mills                               | 748                 | 757                  | 2.4                     | 2.4                      | 44.8  | 28,502.2                                     | 62.8  |
| <i>Textiles, leather, fur</i>            |                     |                      |                         |                          |   |  |   |
| Cotton thread                            | 6                   | 6                    | 172.7                   | 172.7                    | 2.5   | 4,717.8                                      | 29.9  |
| Cordage, rope, twine                     | 10                  | 10                   | 147.0                   | 147.0                    | 6.1   | 8,587.4                                      | 38.0  |
| Carpets, mats, rugs                      | 18                  | 18                   | 85.6                    | 85.6                     | 2.7   | 3,258.4                                      | 26.8  |
| Belting, leather                         | 14                  | 14                   | 15.3                    | 15.3                     | 1.8   | 3,310.2                                      | 46.4  |
| Cotton yarn and cloth                    | 26                  | 47                   | 954.3                   | 527.9                    | 5.1   | 12,592.7                                     | 19.5  |
| Narrow fabrics, laces, etc.              | 38                  | 41                   | 54.8                    | 50.8                     | 1.6   | 2,017.3                                      | 27.2  |
| Synthetic textiles and silk              | 39                  | 45                   | 412.7                   | 357.7                    | 4.0   | 15,160.4                                     | 28.9  |
| Fur dressing and dyeing                  | 21                  | 21                   | 76.3                    | 76.3                     | 2.5   | 2,762.8                                      | 43.3  |
| Woolen yarn                              | 54                  | 58                   | 89.6                    | 83.4                     | 2.9   | 4,509.0                                      | 26.0  |
| Corsets and girdles                      | 36                  | 37                   | 87.6                    | 85.2                     | .3  | 527.7  | 38.7  |
| Cotton and jute bags                     | 29                  | 35                   | 46.9                    | 38.9                     | 1.7   | 1,340.7                                      | 44.2  |
| Dyeing and finishing of textiles         | 43                  | 45                   | 63.1                    | 60.3                     | 3.5   | 4,705.5                                      | 30.0  |

(cont. on next page)

APPENDIX A

TABLE A-7 (cont.)

| Industry and Group                     | Number of Firms (1) | Number of Plants (2) | Employment per Firm (3) | Employment per Plant (4) | Horsepower of Equipment in Use per Wage Earner (h.p.) (5) | Adjusted Index of Mechanization (k.w.h.) (6) | Percentage of Firms Required to Account for 80 Per Cent of Employment in the Industry (7) |
|--|---------------------|----------------------|-------------------------|--------------------------|---|--|---|
| <i>Textiles, leather, fur (cont.)</i>  |                     |                      |                         |                          |   |  |   |
| Woolen cloth                           | 87                  | 90                   | 113.7                   | 109.9                    | 3.0   | 5,888.6                                      | 28.9  |
| Leather tanneries                      | 73                  | 73                   | 66.4                    | 66.4                     | 5.6   | 5,511.8                                      | 26.5  |
| Contractors, women's clothing-         | 85                  | 85                   | 18.5                    | 18.5                     | .2  | 577.4  | 49.9  |
| Leather gloves and mittens             | 80                  | 81                   | 30.2                    | 29.8                     | .4  | 507.1  | 38.2  |
| Canvas products                        | 101                 | 101                  | 13.5                    | 13.5                     | .6  | 1,540.8                                      | 38.7  |
| Hosiery and knit goods                 | 237                 | 271                  | 116.6                   | 102.0                    | 1.0   | 1,868.4                                      | 23.6  |
| Miscellaneous leather products         | 273                 | 273                  | 18.1                    | 18.1                     | .7  | 849.6  | 29.4  |
| Contractors, men's clothing            | 154                 | 157                  | 28.2                    | 27.7                     | .2  | 312.6  | 50.7  |
| Leather boots and shoes                | 291                 | 292                  | 73.1                    | 72.8                     | .6  | 842.5  | 37.7  |
| Clothing, men's factory                | 553                 | 563                  | 56.2                    | 55.2                     | .2  | 475.8  | 27.9  |
| Fur goods                              | 611                 | 615                  | 10.5                    | 10.5                     | .2  | 988.5  | 46.2  |
| Clothing, women's factory              | 1,148               | 1,160                | 29.1                    | 28.8                     | .2  | 520.4  | 45.0  |
| <i>Wood products</i>                   |                     |                      |                         |                          |   |  |   |
| Excelsior                              | 10                  | 10                   | 16.1                    | 16.1                     | ...   | ...  | 40.0  |
| Coffins and caskets                    | 49                  | 55                   | 27.0                    | 24.0                     | 3.9   | 2,061.3                                      | 29.6  |
| Plywood and veneer                     | 42                  | 44                   | 150.8                   | 144.0                    | 4.5   | 6,286.5                                      | 31.6  |
| Flooring, hardwood                     | 25                  | 25                   | 61.4                    | 61.4                     | 5.5   | 7,131.8                                      | 51.2  |
| Boat building                          | 238                 | 238                  | 6.6                     | 6.6                      | 4.7   | 2,487.1                                      | 39.0  |
| Furniture                              | 1,117               | 1,128                | 23.2                    | 23.0                     | 2.7   | 2,109.8                                      | 24.8  |
| Sawmills                               | 6,843               | 7,035                | 8.3                     | 8.1                      | 14.9  | 14,324.6                                     | 26.9  |
| Planing mills, sash and door factories | 1,372               | 1,391                | 13.0                    | 12.8                     | 6.7   | 4,616.9                                      | 27.5  |

(cont. on next page)

APPENDIX A

TABLE A-7 (cont.)

| Industry and Group                | Number of Firms (1) | Number of Plants (2) | Employment per Firm (3) | Employment per Plant (4) | Horsepower of Equipment in Use per Wage Earner (h.p.) (5) | Adjusted Index of Mechanization (k.w.h.) (6) | Percentage of Firms Required to Account for 80 Per Cent of Employment in the Industry (7) |
|-----------------------------------|---------------------|----------------------|-------------------------|--------------------------|---|--|---|
| <i>Paper products</i>             |                     |                      |                         |                          |   |  |   |
| Roofing paper                     | 15                  | 23                   | 170.8                   | 111.4                    | 3.4   | 6,370.0                                      | 41.9  |
| Pulp and paper industry           | 71                  | 117                  | 731.3                   | 443.8                    | 57.3 <sup>b</sup>   | 242,092.7 <sup>b</sup>                       | 31.7  |
| Pulp mills <sup>a</sup>           |                     |                      |                         | 282.6                    | 29.2  | 98,844.0                                     | ...   |
| Paper mills <sup>a</sup>          |                     |                      |                         | 146.3                    | 19.3  | 57,113.2                                     | ...   |
| Pulp and paper mills <sup>a</sup> |                     |                      |                         | 640.8                    | 66.4  | 286,357.9                                    | ...   |
| Paper boxes and bags              | 159                 | 172                  | 77.7                    | 71.8                     | 1.7   | 2,337.9                                      | 36.2  |
| <i>Iron and steel products</i>    |                     |                      |                         |                          |   |  |   |
| Pig iron                          | 4                   | 4                    | 959.3                   | 959.3                    | 13.7 <sup>c</sup>   | 23,215.9 <sup>c</sup>                        | 63.8 <sup>e</sup>   |
| Automobiles                       | 11                  | 11                   | 2,245.7                 | 2,245.7                  | 3.5   | 4,734.7                                      | 15.6  |
| Railway rolling stock             | 18                  | 38                   | 1,742.8                 | 825.6                    | 4.8   | 4,579.8                                      | 17.5  |
| Aircraft                          | 11                  | 11                   | 731.7                   | 731.7                    | 2.3   | 2,503.5                                      | 27.9  |
| Steel ingots and castings         | 32                  | 33                   | 207.2                   | 200.9                    | 13.7 <sup>c</sup>   | 23,215.9 <sup>c</sup>                        | 10.5 <sup>e</sup>   |
| Agricultural implements           | 67                  | 69                   | 285.2                   | 277.0                    | 2.9   | 3,774.1                                      | 6.6   |
| Bicycles                          | 12                  | 12                   | 66.2                    | 66.2                     | 4.2   | 4,478.6                                      | 24.1  |
| Shipbuilding                      | 76                  | 76                   | 242.1                   | 242.1                    | 5.3   | 4,081.5                                      | 17.3  |
| Iron castings                     | 219                 | 225                  | 88.4                    | 86.0                     | 3.8   | 4,848.0                                      | 21.0  |
| Machine shops                     | 514                 | 514                  | 11.2                    | 11.2                     | 3.6   | 3,092.8                                      | 44.7  |
| <i>Nonferrous metals</i>          |                     |                      |                         |                          |   |  |   |
| Aluminum <sup>b</sup>             | 1                   | 5                    | ...                     | ...                      | ...   | ...  | 80.0 <sup>f</sup>   |
| Nickel <sup>b</sup>               | 2                   | 4                    | ...                     | ...                      | ...   | ...  | 42.5 <sup>f</sup>   |

(cont. on next page)

TABLE A-7 (cont.)

| Industry and Group               | Number of Firms (1) | Number of Plants (2) | Employment per Firm (3) | Employment per Plant (4) | Horsepower of Equipment in Use per Wage Earner (h.p.) (5) | Adjusted Index of Mechanization (k.w.h.) (6) | Percentage of Firms Required to Account for 80 Per Cent of Employment in the Industry (7) |
|----------------------------------|---------------------|----------------------|-------------------------|--------------------------|---|--|---|
| <i>Nonmetallic minerals</i>      |                     |                      |                         |                          |   |  |   |
| Cement                           | 3                   | 8                    | 574.3                   | 215.4                    | 54.7  | 167,353.2                                    | 40.0  |
| Gypsum products                  | 4                   | 10                   | 237.8                   | 95.1                     | 8.5   | 11,944.0                                     | 40.0  |
| Glass                            | 4                   | 7                    | 1,000.5                 | 571.7                    | 3.6   | 15,859.7                                     | 40.0  |
| Artificial abrasives             | 5                   | 6                    | 367.0                   | 305.8                    | 8.9   | 12,235.5                                     | 40.0  |
| Abrasive products                | 10                  | 10                   | 82.2                    | 82.2                     | 4.7   | 4,474.7                                      | 27.4  |
| Petroleum products               | 18                  | 33                   | 458.1                   | 249.8                    | 12.3  | 38,760.4                                     | 16.6  |
| Asbestos products                | 15                  | 15                   | 68.0                    | 68.0                     | 9.8   | 9,383.9                                      | 31.7  |
| Coke products                    | 11                  | 12                   | 294.6                   | 270.1                    | ...   | ...  | 51.7  |
| Plate, cut, and ornamental glass | 80                  | 88                   | 24.0                    | 21.8                     | 2.2   | 5,698.2                                      | 30.8  |
| Cement products                  | 361                 | 369                  | 10.4                    | 10.2                     | 3.8   | 2,497.5                                      | 33.0  |
| <i>Chemicals</i>                 |                     |                      |                         |                          |   |  |   |
| Hardwood distillation            | 2                   | 3                    | 83.5                    | 55.7                     | 1.7   | 4,272.3                                      | 50.   |
| Matches                          | 4                   | 10                   | 184.5                   | 73.8                     | 2.2   | 2,981.2                                      | 22.4 <sup>g</sup>   |
| Coal tar distillation            | 4                   | 11                   | 95.0                    | 34.5                     | 6.3   | 15,596.4                                     | 40.0  |
| Compressed gases                 | 14                  | 45                   | 82.6                    | 25.7                     | 15.8  | 60,137.9                                     | 20.7  |
| Soaps                            | 48                  | 49                   | 53.9                    | 52.8                     | 6.6 <sup>d</sup>  | 8,725.6 <sup>d</sup>                         | 8.5   |
| Boiler compounds                 | 13                  | 13                   | 10.8                    | 10.8                     | 6.9   | 2,071.0                                      | 28.3  |
| Writing inks                     | 9                   | 9                    | 10.6                    | 10.6                     | 1.1   | 1,306.7                                      | 42.2  |
| Washing compounds                | 51                  | 54                   | 9.5                     | 9.0                      | 2.2 <sup>d</sup>  | 3,011.4 <sup>d</sup>                         | 16.0  |
| Printing inks                    | 22                  | 23                   | 24.9                    | 23.8                     | 7.6   | 6,467.5                                      | 28.7  |
| Vegetable oils                   | 12                  | 16                   | 68.2                    | 51.2                     | 20.4  | 34,387.0                                     | 58.3  |
| Polishes and dressings           | 53                  | 53                   | 13.6                    | 13.6                     | 1.8   | 2,702.8                                      | 22.7  |
| Paints and varnishes             | 109                 | 114                  | 51.0                    | 48.8                     | 4.4   | 4,436.9                                      | 20.4  |

(cont. on next page)

TABLE A-7 (cont.)

| Industry and Group                        | Number of Firms (1) | Number of Plants (2) | Employment per Firm (3) | Employment per Plant (4) | Horsepower of Equipment in Use per Wage Earner (h.p.) (5) | Adjusted Index of Mechanization (k.w.h.) (6) | Percentage of Firms Required to Account for 80 Per Cent of Employment in the Industry (7) |
|---|---------------------|----------------------|-------------------------|--------------------------|---|--|---|
| <i>Chemicals (cont.)</i>                  |                     |                      |                         |                          |   |  |   |
| Medicinal and pharmaceutical preparations | 211                 | 215                  | 36.2                    | 35.5                     | 1.8   | 2,925.5                                      | 23.4  |
| <i>Miscellaneous</i>                      |                     |                      |                         |                          |   |  |   |
| Pipes and smokers' supplies               | 12                  | 12                   | 27.7                    | 27.7                     | 1.1   | 789.8  | 19.3  |
| Fountain pens and pencils                 | 11                  | 12                   | 113.5                   | 104.0                    | 1.4   | 2,072.0                                      | 39.7  |
| Buttons                                   | 31                  | 31                   | 59.5                    | 59.5                     | 1.2   | 1,731.5                                      | 28.4  |
| Umbrellas                                 | 6                   | 7                    | 31.3                    | 26.9                     | .1  | 555.5  | 45.3  |

<sup>a</sup> These industries are either combinations or components of industries included in Table A-1. Basic data for cols. 5 and 6 are for these industries.

<sup>b</sup> Weighted average of corresponding figure for pulp mills, paper mills, and pulp and paper mills.

<sup>c</sup> Assumed equal to corresponding figure for Primary Iron and Steel.

<sup>d</sup> Horsepower for combined industry, "soaps, washing compounds and cleaning preparations" allocated to components in proportion to cost of fuel and electricity. Adjustment factor (for col. 6) assumed the same for component industries as for combined industry.

<sup>e</sup> Based on capacity of equipment. *Primary Iron and Steel Industry, 1948*, Ottawa, Dominion Bureau of Statistics, 1949.

<sup>f</sup> Based on value of sales. *Moody's Industrials, 1949*.

<sup>g</sup> Based on number of matches produced. *Matches*, Report of Commissioner, Combines Investigation Commission, Dec. 27, 1949, Ottawa, King's Printer, 1950.

<sup>h</sup> No data on employment or horsepower available. Average

firm size estimated roughly at 3,333 employees for summary tables in Chapter II. See Table A-4, note b.

Column 1-4,7

Source

Computed from special tabulation of data by firm-size groups, compiled by Dominion Bureau of Statistics, 1950.

7 For method of computation see Appendix B.

5,6 Computed from tabulations of horsepower in use and electricity purchased for power and lighting, obtained from Dominion Bureau of Statistics. The index used in col. 6 is discussed in Chap. II, sec. 6. It is obtained by multiplying col. 5 by the amount of electricity purchased for power and lighting (in kilowatt-hours) and dividing by the horsepower capacity of electric motors operated by purchased power. The result is a figure representing kilowatt-hours per wage earner which can be regarded as an estimate of energy used per wage earner.

TABLE A-8

Value of Capital Employed, Selected Canadian Manufacturing Industries,  
1943 and 1938

| <i>Industry and Group</i>         | <i>Fixed Capital<br/>per<br/>Wage Earner</i> |             | <i>Fixed Capital<br/>per Plant</i> |             | <i>Total Capital<br/>per<br/>Wage Earner<br/>1943<br/>(dollars)</i> |
|-----------------------------------|--|-------------|------------------------------------|-------------|---|
|                                   | <i>1943</i>                                  | <i>1938</i> | <i>1943</i>                        | <i>1938</i> |   |
|                                   | <i>(dollars)</i>                             |             | <i>(thousands of<br/>dollars)</i>  |             |   |
| <i>Foods</i>                      |  |             |                                    |             |   |
| Cigarettes, cigars, tobacco       | 1,480  | 2,156       | 179.3                              | 146.5       | 9,238   |
| Sugar refineries                  | 11,744                                       | 9,221       | 2,172.7                            | 1,745.6     | 23,862  |
| Malt and malt products            | 19,676                                       | 14,450      | 608.2                              | 276.8       | 32,918  |
| Starch and glucose                | 2,998  | 4,358       | 306.5                              | 299.6       | 8,356   |
| Macaroni                          | 4,317  | 5,652       | 134.6                              | 96.4        | 5,924   |
| Tobacco processing and<br>packing | 1,983  | 1,085       | 195.1                              | 136.1       | 9,412   |
| Wine                              | 5,329  | 6,876       | 82.1                               | 66.1        | 19,476  |
| Distilleries                      | 5,111  | 7,222       | 666.3                              | 669.7       | 22,294  |
| Slaughtering and meat<br>packing  | 2,333  | 3,140       | 226.2                              | 203.3       | 6,939   |
| Condensed milk                    | 3,948  | 4,953       | 157.0                              | 139.7       | 6,899   |
| Processed cheese                  | 1,782  | 2,007       | 56.9                               | 25.6        | 7,141   |
| Fish curing and packing           | 1,811  | 2,284       | 26.2                               | 18.5        | 4,071   |
| <i>Textiles</i>                   |  |             |                                    |             |   |
| Cotton thread                     | 1,378  | 2,161       | 134.3                              | 241.6       | 5,466   |
| Cordage, rope, twine              | 3,264  | 6,060       | 409.8                              | 466.6       | 9,814   |
| Carpets, mats, rugs               | 3,138  | 3,280       | 177.4                              | 192.2       | 7,809   |
| Belting, leather                  | 2,152  | 4,226       | 30.9                               | 32.8        | 6,303   |
| Cotton yarn and cloth             | 2,204  | 2,290       | 1,231.6                            | 1,075.4     | 3,806   |
| Synthetic textiles and silk       | 2,720  | 2,575       | 809.8                              | 744.5       | 5,127   |
| Fur dressing and dyeing           | 1,221  | 984         | 75.0                               | 45.4        | 2,081   |
| Wool yarn                         | 2,235  | 2,063       | 158.6                              | 159.6       | 4,705   |
| Corsets                           | 823  | 1,178       | 52.9                               | 63.7        | 2,754   |
| Cotton and jute bags              | 2,093  | 3,145       | 87.0                               | 85.0        | 7,939   |
| Textile dyeing and<br>finishing   | 3,049  | 5,348       | 101.3                              | 176.9       | 5,942   |
| Wool cloth                        | 1,487  | 2,268       | 161.1                              | 195.4       | 3,741   |
| Leather tanneries                 | 2,069  | 2,180       | 108.9                              | 87.5        | 6,358   |
| Clothing, women's factory         | 639  | 637         | 17.6                               | 17.7        | 2,064   |
| Gloves, leather                   | 424  | 638         | 15.7                               | 17.7        | 1,478   |
| Canvas products                   | 788  | 2,176       | 16.3                               | 13.3        | 2,579   |
| Hosiery and knit goods            | 1,296  | 2,534       | 136.6                              | 162.0       | 2,883   |
| Miscellaneous leather<br>products | 833  | 1,286       | 13.5                               | 13.0        | 2,383   |
| Clothing, men's factory           | 558  | 631         | 36.5                               | 29.2        | 2,270   |
| Boots and shoes, leather          | 816  | 824         | 60.5                               | 55.0        | 2,119   |
| Fur goods                         | 1,620  | 1,787       | 11.5                               | 12.5        | 6,180   |
| <i>Wood products</i>              |  |             |                                    |             |   |
| Excelsior                         | 1,687  | 3,181       | 21.6                               | 23.0        | 2,635   |
| Coffins and caskets               | 2,347  | 2,640       | 37.8                               | 41.7        | 4,794   |
| Flooring, hardwood                | 1,568  | 2,346       | 93.2                               | 96.1        | 3,828   |
| Boat building                     | 1,746  | 2,924       | 12.1                               | 9.9         | 3,383   |
| Furniture                         | 1,331  | 1,632       | 34.5                               | 36.4        | 2,760   |

(cont. on next page)

TABLE A-8 (cont.)

| <i>Industry and Group</i>                 | <i>Fixed Capital per Wage Earner</i> |             | <i>Fixed Capital per Plant</i> |             | <i>Total Capital per Wage Earner</i> |
|---|--------------------------------------|-------------|--------------------------------|-------------|--------------------------------------|
|   | <i>1943</i>                          | <i>1938</i> | <i>1943</i>                    | <i>1938</i> |                                      |
|   | <i>(dollars)</i>                     |             | <i>(thousands of dollars)</i>  |             | <i>(dollars)</i>                     |
| <i>Paper products</i>                     |                                      |             |                                |             |                                      |
| Roofing paper                             | 2,298                                | 4,061       | 101.6                          | 152.9       | 7,305                                |
| Pulp and paper industry                   | 14,881                               | 18,696      | 4,441.4                        | 5,038.4     | 21,098                               |
| Paper boxes and bags                      | 1,606                                | 2,736       | 88.9                           | 96.8        | 3,288                                |
| <i>Metals</i>                             |                                      |             |                                |             |                                      |
| Automobiles                               | 1,151                                | 1,896       | 4,809.6                        | 2,008.3     | 6,680                                |
| Railway rolling stock                     | 2,602                                | 3,937       | 2,160.5                        | 1,905.4     | 4,434                                |
| Aircraft and parts                        | 684                                  | 3,573       | 906.3                          | 372.2       | 3,836                                |
| Primary iron and steel                    | 4,735                                | 5,499       | 2,369.7                        | 1,199.7     | 7,465                                |
| Agricultural implements                   | 1,714                                | 3,172       | 463.2                          | 447.3       | 5,090                                |
| Bicycles                                  | 3,444                                | 3,371       | 266.5                          | 340.5       | 6,567                                |
| Shipbuilding                              | 931                                  | 7,544       | 754.7                          | 574.8       | 3,432                                |
| Electrical apparatus and supplies         | 1,102                                | 2,805       | 186.9                          | 218.8       | 4,264                                |
| Nonferrous metals smelting and refining   | 11,176                               | 26,106      | 16,326.4                       | 8,811.0     | 16,780                               |
| <i>Nonmetallic minerals</i>               |                                      |             |                                |             |                                      |
| Cement                                    | 35,547                               | 49,467      | 4,967.7                        | 5,775.2     | 45,115                               |
| Gypsum products                           | 3,849                                | 8,236       | 164.7                          | 194.0       | 10,629                               |
| Abrasives and abrasive products           | 1,827                                | 3,877       | 347.2                          | 210.6       | 4,622                                |
| Petroleum products                        | 9,147                                | 8,965       | 833.3                          | 570.4       | 19,041                               |
| Asbestos products                         | 1,083                                | 4,734       | 68.1                           | 115.1       | 7,097                                |
| Cement products                           | 2,985                                | 3,480       | 20.0                           | 18.9        | 4,747                                |
| <i>Chemicals</i>                          |                                      |             |                                |             |                                      |
| Hardwood distillation                     | 5,971                                | 8,662       | 277.7                          | 272.0       | 6,943                                |
| Coal tar distillation                     | 10,364                               | 11,307      | 335.8                          | 243.1       | 15,704                               |
| Compressed gases                          | 6,325                                | 9,973       | 105.5                          | 98.7        | 11,860                               |
| Soap and washing compounds                | 4,213                                | 4,603       | 62.6                           | 59.2        | 11,434                               |
| Printing and writing inks                 | 3,274                                | 4,717       | 35.8                           | 48.8        | 8,689                                |
| Vegetable oils                            | 6,965                                | 8,975       | 200.1                          | 131.4       | 13,449                               |
| Polishes and dressings                    | 2,507                                | 3,868       | 20.8                           | 17.0        | 8,782                                |
| Paints and varnishes                      | 4,240                                | 5,903       | 118.7                          | 128.4       | 12,405                               |
| Medicinal and pharmaceutical preparations | 2,656                                | 3,324       | 50.8                           | 46.5        | 10,664                               |
| <i>Miscellaneous</i>                      |                                      |             |                                |             |                                      |
| Pipes and smokers' supplies               | 838                                  | 368         | 6.2                            | 3.5         | 2,027                                |
| Umbrellas                                 | 1,256                                | 697         | 18.8                           | 8.6         | 3,667                                |
| Pens and pencils                          | 1,395                                | 1,565       | 66.7                           | 75.1        | 6,521                                |
| Buttons                                   | 1,219                                | 1,229       | 42.4                           | 35.8        | 2,709                                |

*Source:* Computed from statistics of fixed capital made available by Dominion Bureau of Statistics, and from other data in *The Manufacturing Industries of Canada, 1943 and 1938*, Ottawa, Dominion Bureau of Statistics.

APPENDIX A

TABLE A-9  
Industry Size, Number of Firms, and Firm Size, United States and Canada, 1947

| Industry   | Employment, <sup>b</sup> | Number of                     | (1) ÷ (2) | Employment, <sup>b</sup> | Number of                   | (4) ÷ (5) |
|--|--------------------------|-------------------------------|-----------|--------------------------|-----------------------------|-----------|
|  | Canada, 1947<br>(1)      | Firms,<br>Canada, 1948<br>(2) | (3)       | U.S., 1947<br>(4)        | Firms,<br>U.S., 1947<br>(5) | (6)       |
| <i>Foods, beverages, tobacco</i>                   |                          |                               |           |                          |                             |           |
| Malt and malt products                             | 599                      | 9                             | 66.56     | 2,534                    | 41                          | 61.80     |
| Distilleries                                       | 4,088                    | 12                            | 340.67    | 30,471                   | 144                         | 211.60    |
| Macaroni   | 703                      | 14                            | 50.21     | 8,260                    | 219                         | 37.72     |
| <i>Sugar refining</i>                              |                          |                               |           |                          |                             |           |
| Cane   | ...                      | ...                           | ...       | 17,376                   | 17                          | 1,022.12  |
| Beet   | ...                      | ...                           | ...       | 13,412                   | 17                          | 788.94    |
| Total  | 3,003                    | 7                             | 429.00    | 30,788                   | ...                         | ...       |
| <i>Meat packing, wholesale</i>                     |                          |                               |           |                          |                             |           |
| Poultry dressing                                   | ...                      | ...                           | ...       | 210,427                  | 1,999                       | 105.27    |
| Total, slaughtering and meat packing               | 21,726                   | 120                           | 181.05    | 22,049                   | 330                         | 66.82     |
| <i>Breweries (malt liquors)</i>                    |                          |                               |           |                          |                             |           |
| Wine   | 9,378                    | 38                            | 246.79    | 82,571                   | 404                         | 204.38    |
|  | 722                      | 23                            | 31.39     | 8,034                    | 379                         | 21.20     |
| <i>Canning and preserving fruit and vegetables</i> |                          |                               |           |                          |                             |           |
| Dehydrated fruits and vegetables                   | ...                      | ...                           | ...       | 137,519                  | 1,856                       | 74.09     |
| Pickles and sauces                                 | ...                      | ...                           | ...       | 4,112                    | 120                         | 34.27     |
| Total, fruit and vegetable preparations            | 17,036                   | 378                           | 45.07     | 22,340                   | 637                         | 35.07     |
| <i>Soft drinks</i>                                 |                          |                               |           |                          |                             |           |
| Bread and other bakery products                    | 5,827                    | 408                           | 14.28     | 84,569                   | 5,169                       | 16.36     |
| Condensed milk                                     | 31,501                   | 2,748                         | 11.46     | 240,173                  | 5,985                       | 40.13     |
| Biscuits and crackers                              | 1,569                    | 30                            | 52.30     | 16,713                   | 182                         | 91.83     |
| Tobacco processing                                 | 4,932                    | 41                            | 120.29    | 46,249                   | 249                         | 310.40    |
| Starch and glucose (corn products)                 | 1,509                    | 13                            | 116.08    | 25,954                   | 93                          | 279.08    |
| Prepared animal feeds                              | 1,082                    | 10                            | 108.20    | 12,341                   | 47                          | 262.57    |
|  | 4,436                    | 260                           | 17.06     | 57,710                   | 2,372                       | 24.33     |

(cont. on next page)

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TABLE A-9 (cont.)

| Industry                    | Employment, <sup>b</sup> |                     | Number of        |                   | Employment, <sup>b</sup><br>U.S., 1947<br>(4) | Number of<br>Firms,<br>U.S., 1947<br>(5) | (4) ÷ (5)<br>(6) |
|-----------------------------|--------------------------|---------------------|------------------|-------------------|---|--|------------------|
|                             | Canada, 1947<br>(1)      | Canada, 1948<br>(2) | (1) ÷ (2)<br>(3) | U.S., 1947<br>(4) |   |  |                  |
| <i>Textiles and leather</i> |                          |                     |                  |                   |   |  |                  |
| Cordage, rope, and twine    | 1,607                    | 10                  | 160.70           | 16,002            | 132   | 121.23                                   |                  |
| Cotton yarn                 | ...                      | ...                 | ...              | 92,368            | 317   | 291.38                                   |                  |
| Cotton cloth                | ...                      | ...                 | ...              | 357,411           | 422   | 846.95                                   |                  |
| Total                       | 24,089                   | 26                  | 926.50           | 449,779           | ...   | ...                                      |                  |
| Carpets and rugs, wool      | ...                      | ...                 | ...              | 40,147            | 85  | 472.32                                   |                  |
| Carpets and rugs, other     | ...                      | ...                 | ...              | 7,203             | 182   | 39.58                                    |                  |
| Total                       | 1,347                    | 18                  | 74.83            | 47,350            | ...   | ...                                      |                  |
| Leather belting             | 248                      | 14                  | 17.71            | 5,129             | 178   | 28.81                                    |                  |
| Narrow fabrics              | 2,164                    | 38                  | 56.95            | 27,939            | 445   | 62.78                                    |                  |
| Woolen fabrics              | 10,189                   | 87                  | 117.11           | 132,482           | 427   | 310.26                                   |                  |
| Woolen yarn                 | 4,816                    | 54                  | 89.19            | 33,257            | 181   | 183.74                                   |                  |
| Corsets                     | 3,259                    | 36                  | 90.53            | 37,588            | 493   | 76.24                                    |                  |
| Fur dressing and dyeing     | 1,359                    | 21                  | 64.71            | 6,974             | 171   | 40.78                                    |                  |
| Canvas products             | 1,392                    | 101                 | 13.78            | 11,426            | 889   | 12.85                                    |                  |
| Leather tanneries           | 5,574                    | 73                  | 76.36            | 53,435            | 500   | 106.87                                   |                  |
| Fur goods                   | 6,094                    | 611                 | 9.97             | 18,813            | 2,227   | 8.45                                     |                  |
| Textile bags                | 1,571                    | 29                  | 54.17            | 14,024            | 198   | 70.83                                    |                  |
| Boots and shoes, leather    | ...                      | ...                 | ...              | 229,652           | 1,077   | 213.23                                   |                  |
| House slippers              | ...                      | ...                 | ...              | 11,129            | 207   | 53.76                                    |                  |
| Total                       | 21,433                   | 291                 | 73.65            | 240,781           | ...   | ...                                      |                  |
| <i>Wood and paper</i>       |                          |                     |                  |                   |   |  |                  |
| Veneer mills                | ...                      | ...                 | ...              | 10,546            | 136   | 77.54                                    |                  |
| Plywood plants              | ...                      | ...                 | ...              | 26,570            | 142   | 187.11                                   |                  |
| Total                       | 5,990                    | 42                  | 142.62           | 37,116            | ...   | ...                                      |                  |

(cont. on next page)

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TABLE A-9 (cont.)

| Industry                            | Employment, <sup>b</sup> | Number of                     | (1) ÷ (2) | Employment, <sup>b</sup> | Number of                   | (4) ÷ (5) |
|-------------------------------------|--------------------------|-------------------------------|-----------|--------------------------|-----------------------------|-----------|
|                                     | Canada, 1947<br>(1)      | Firms,<br>Canada, 1948<br>(2) |           | U.S., 1947<br>(4)        | Firms,<br>U.S., 1947<br>(5) |           |
| <i>Wood and paper (cont.)</i>       |                          |                               |           |                          |                             |           |
| Roofing paper                       | 2,183                    | 15                            | 145.53    | 16,615                   | 104                         | 159.76    |
| Excelsior                           | 172                      | 10                            | 17.20     | 1,218                    | 48                          | 25.37     |
| Boat building                       | 1,807                    | 238                           | 7.59      | 20,232                   | 798                         | 25.35     |
| <i>Metals</i>                       |                          |                               |           |                          |                             |           |
| Pig iron <sup>a</sup>               | 3,837                    | 4                             | 959.25    | 36,937                   | 33                          | 1,119.30  |
| Aluminum                            | n.a.                     | 1                             | n.a.      | 8,919                    | 3                           | 2,973.00  |
| Railroad and street cars            | ...                      | ...                           | ...       | 60,788                   | 68                          | 893.94    |
| Locomotives                         | ...                      | ...                           | ...       | 30,348                   | 33                          | 919.64    |
| Total, railway rolling stock        | 28,526                   | 18                            | 1,584.78  | 91,136                   | ...                         | ...       |
| Agricultural machinery              | ...                      | ...                           | ...       | 94,848                   | 955                         | 99.32     |
| Tractors                            | ...                      | ...                           | ...       | 77,361                   | 86                          | 899.54    |
| Total, agricultural implements      | 16,013                   | 67                            | 239.00    | 172,209                  | ...                         | ...       |
| Shipbuilding                        | 21,119                   | 76                            | 277.88    | 130,307                  | 272                         | 479.07    |
| <i>Minerals</i>                     |                          |                               |           |                          |                             |           |
| Gypsum products                     | 905                      | 4                             | 226.25    | 7,479                    | 33                          | 226.64    |
| Flat glass                          | ...                      | ...                           | ...       | 27,241                   | 15                          | 1,816.07  |
| Glass containers                    | ...                      | ...                           | ...       | 47,140                   | 41                          | 1,149.76  |
| Pressed and blown glassware, n.e.c. | ...                      | ...                           | ...       | 42,224                   | 107                         | 394.62    |
| Total, glass                        | 4,002                    | 4                             | 1,000.50  | 116,605                  | ...                         | ...       |
| Abrasive products                   | 722                      | 10                            | 72.20     | 20,881                   | 236                         | 88.48     |
| Petroleum refining                  | 7,760                    | 18                            | 431.11    | 145,909                  | 277                         | 526.75    |

(cont. on next page)

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TABLE A-9 (cont.)

| Industry                    | Employment, <sup>b</sup> | Number of           | (1) ÷ (2) | Employment, <sup>b</sup> | Number of         | (4) ÷ (5) |
|-----------------------------|--------------------------|---------------------|-----------|--------------------------|-------------------|-----------|
|                             | Canada, 1947             | Firms, Canada, 1948 |           | U.S., 1947               | Firms, U.S., 1947 |           |
|                             | (1)                      | (2)                 | (3)       | (4)                      | (5)               | (6)       |
| <i>Minerals (cont.)</i>     |                          |                     |           |                          |                   |           |
| Coke by-product ovens       | ...                      | ...                 | ...       | 35,898                   | 49                | 731.99    |
| Beehive ovens               | ...                      | ...                 | ...       | 8,162                    | 53                | 59.66     |
| Total                       | 3,116                    | 11                  | 283.27    | 39,000                   | ...               | ...       |
| Asbestos products           | 966                      | 15                  | 64.40     | 21,487                   | 85                | 252.79    |
| <i>Chemicals</i>            |                          |                     |           |                          |                   |           |
| Matches                     | 906                      | 4                   | 226.50    | 7,351                    | 18                | 408.39    |
| Printing inks               | 614                      | 22                  | 27.91     | 6,078                    | 151               | 40.25     |
| Paints and varnishes        | 5,428                    | 109                 | 49.80     | 53,907                   | 1,154             | 46.71     |
| Soaps                       | 2,472                    | 48                  | 51.50     | 27,766                   | 223               | 124.51    |
| Compressed gases            | 1,089                    | 14                  | 77.79     | 9,000                    | 69                | 130.43    |
| Hardwood distillation       | 171                      | 2                   | 85.50     | 1,885                    | 22                | 85.68     |
| <i>Miscellaneous</i>        |                          |                     |           |                          |                   |           |
| Pens and mechanical pencils | ...                      | ...                 | ...       | 15,666                   | 180               | 87.03     |
| Lead pencils                | ...                      | ...                 | ...       | 6,301                    | 46                | 136.98    |
| Total                       | 1,426                    | 11                  | 129.64    | 21,967                   | ...               | ...       |
| Buttons                     | 1,966                    | 31                  | 63.42     | 10,875                   | 412               | 26.40     |
| Umbrellas                   | 188                      | 6                   | 31.33     | 3,764                    | 162               | 23.23     |

<sup>a</sup> See Table A-4, note c.

<sup>b</sup> Includes proprietors and firm members.

n.a. = not available.

n.e.c. = not elsewhere classified.

Column

2

4

5

Source

Dominion Bureau of Statistics, Ottawa, unpublished special compilation of data by firm size from returns of the Census of Manufactures, 1948.

Census of Manufactures, 1947, Bureau of the Census, Vol. I, Table 2.

Concentration of Industry Report, Dept. of Commerce, December 1949.

Source

1 The Manufacturing Industries of Canada, 1947, Ottawa, Dominion Bureau of Statistics, 1950.

## APPENDIX B

### THE ESTIMATION OF CONCENTRATION INDEXES FROM GROUPED DATA

Our statistical data are grouped in size classes, since information on individual firms cannot be divulged. For this reason, concentration indexes must be estimated. To ensure that the results would not be significantly influenced by errors of estimation, we computed upper and lower limits for each type of index, as well as an interpolated average. The derivation of the formulas for these computations is outlined below.

#### *The Percentage Controlled by the $x$ Largest Firms*

For each size class, the upper and lower limits of the class interval are given, as well as the number of firms and the sum of their sizes. We first locate the size class which includes the  $x$ th firm. The problem is then to estimate the sum of sizes of this firm and those larger than it in the same size class. This sum, added to the sum of sizes in the larger size classes (if any), and expressed as a percentage of total industry size, will be the required index.

Let  $U$  and  $L$  be the upper and lower limits respectively of the size class which includes the  $x$ th firm; let  $A$  be the sum of sizes of the  $x$ th firm and those larger in the same size class, and  $S$  the sum of sizes of all firms in that size class.  $U$ ,  $L$ ,  $A$ , and  $S$  are expressed as percentages of total industry size. The problem is to estimate  $A$ . Let  $n$  be the number of firms in that size class and  $r$  the rank, in that size class, of the  $x$ th firm, so that there are  $(n - r)$  firms smaller than the  $x$ th firm in the size class ( $r$  is, of course, obtained simply by subtracting the number of firms in larger size classes from  $x$ . If there are no larger size classes,  $r = x$ ).

The minimum possible value of  $A$  is obtained when the average size of the  $r$  leading firms in our size class is as small as possible. This average, cannot, however, be less than the average size of the remaining  $(n - r)$  firms in the class since firms are arranged in decreasing order of size. Hence,  $A$  reaches its minimum when these two averages are equal, and in that case both must be equal to the average size of

## APPENDIX B

all firms in the class, that is,  $S/n$ . Hence, the minimum value of  $A$  is  $rS/n$ .

Derivation of the maximum value of  $A$  is more complicated and involves the use of the limits of the class interval. Clearly,  $A$  will reach a maximum if the  $r$  leading firms are all crowded at the upper class limit, so that  $rU$  is a possible maximum value. This situation may not, however, be consistent with the other conditions given by the data. If the  $r$  leading firms are all at the upper limit, the remaining  $(n - r)$  firms may have to be smaller than the lower limit (in fact they may have to be negative) in order to satisfy the condition that the sum of all firm sizes should not exceed  $S$ . Hence,  $A$  cannot exceed the value it would have if the remaining  $(n - r)$  firms were crowded at the lower limit of the class intervals; this value is  $S - (n - r)L$ . There are thus two maxima, neither of which can be exceeded by  $A$ . Hence, the maximum value of  $A$  is the *lower* of:

$$rU \quad \text{or} \quad S - (n - r)L$$

In most cases the class interval concerned is the leading class interval of the whole distribution, and its upper limit is often not given. In such a case the expression:  $S - (n - r)L$  must be used.

### *The Number of Firms Required to Account for $y$ Per Cent of an Industry*

The problem of finding maximum and minimum limits for this index is essentially the same as the previous one, with the roles of maxima and minima reversed.

We first locate the class interval in which the smallest of the firms required to account for the  $y$  per cent is located. The problem then is to estimate the rank of this firm in the class interval. This figure, added to the number of firms in the larger classes (if any), is the required index.

Let the symbols  $U$ ,  $L$ ,  $S$ ,  $n$  have the same meaning as in the previous example.  $A$  is now the part of  $S$  that is required to complete the  $y$  per cent which is the base of the index. In other words,  $A$  is the difference between  $y$  and the sum of firm sizes (expressed as percentages of industry size) in the larger size groups;  $r$  is the rank, within its size class, of the last firm required to complete  $A$ . The problem is to find upper and lower limits for  $r$ .

The solution is along the same lines as that given above. The maximum value of  $r$  is obtained, given  $A$ , when the average size of the  $r$  firms is as small as possible, that is, when it is equal to the average

## APPENDIX B

size of all firms in the interval (see above). In that case  $A = rS/n$ , therefore  $r = An/S$ . A minimum value of  $r$  is obtained when the  $r$  firms are as large as possible. There are, for the reasons explained above, two alternative conditions for this:

$$A = rU$$

$$A = S - (n - r)L$$

The minimum value of  $r$ , therefore, is the *higher* of:

$$A/U, \text{ or } \frac{A + nL - S}{L}$$

### *The Index Employed by Herfindahl*

This index is the sum of squares of sizes of the individual firms expressed as a percentage of industry size. For any given class interval this sum is a minimum if the firms are all of the same size, and a maximum when the firm sizes are dispersed as widely as possible, that is, when each firm is either at the upper or the lower class limit. The index as a whole, therefore, is at its maximum or minimum value according as one or the other condition is satisfied in all the class intervals.<sup>1</sup>

<sup>1</sup> In each class interval let  $X_i$  represent the size of the  $i$ th firm, other symbols having the same meaning as in the text, so that

$$\sum X_i = S, \quad L \leq X_i \leq U.$$

It is evident that the variance of the  $X_i$  attains its minimum value when  $X_i = S/n$  for all  $i$ . Since  $S$  and  $n$  are fixed by the conditions of our problem, the sum of squares of the  $X_i$  is simply a linear increasing function of the variance, so that it, too, is minimized by the condition that minimizes the variance (I am indebted to Mr. Hastay for this proof).

The condition that maximizes the sum of squares of the  $X_i$  is more difficult to demonstrate. It is shown in the text (below) that, given the conditions of our problem, the  $X_i$  can be distributed to the class limits,  $L$  and  $U$ , in only one way. We will now show that any deviation from this distribution will lower the sum of squares of the  $X_i$ .

Suppose that firm  $i$  decreases in size from  $X_i = U$  to  $X_i'$ , and there is a compensating change in firm  $j$  from  $X_j = L$  to  $X_j'$ . It follows that

$$|X_i' - X_j'| < |X_i - X_j|$$

while  $X_i' + X_j' = X_i + X_j$

Squaring of both the inequality and the equation yields

$$X_i'^2 + X_j'^2 - 2X_i'X_j' < X_i^2 + X_j^2 - 2X_iX_j$$

$$X_i'^2 + X_j'^2 + 2X_i'X_j' = X_i^2 + X_j^2 + 2X_iX_j$$

Adding the resulting inequality and equation we have  $X_i'^2 + X_j'^2 < X_i^2 + X_j^2$ , so that the change has reduced the contribution of firm  $i$  and firm  $j$  to the sum of squares and has thus reduced the sum of squares.

## APPENDIX B

For the minimum value, therefore, we assume that the contribution from each class interval is  $n.S^2/n^2 = S^2/n$ . For a maximum we must assume that for each class interval there are  $r$  firms at the upper limit and  $(n - r)$  firms at the lower limit,  $r$  being determined by the equation

$$rU + (n - r)L = S$$

Hence 
$$r = \frac{S - nL}{U - L}$$

The contribution from each class interval is

$$rU^2 + (n - r)L^2$$

substituting for  $r$  and simplifying, this becomes:

$$S(U + L) - nLU$$

For a leading class interval with no upper limit the maximum contribution to the index is obtained if we assume that all firms but one are concentrated at the lower class limit so that a single firm attains the maximum size consistent with the data. The size of this firm is then:

$$S - (N - 1)L$$

and the contribution of this interval to the index is

$$[S - (N - 1)L]^2 + (N - 1)L^2$$

In the actual computation of the maximum limit it was found that the contribution of the leading class interval is so great that the contributions of the other class intervals can safely be left at their minimum value, which is very much simpler to compute.

### *Interpolation*

If we wish to compare different concentration indexes and to relate them to other factors, it is convenient to have a single estimate instead of the range between upper and lower limits, which in some cases is quite wide. We used for this purpose a simple average of the upper and the lower limits.

This is a fairly rough procedure. The justification for it is that we

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It can be shown that *any* change from the situation in which the firms are distributed to the class limits can be decomposed into a series of changes of the type analyzed above, in which only two firms are involved and the sum of squares is reduced. This proves that the sum of squares is maximized when the firms are distributed to the class limits.

## APPENDIX B

know so little about the distribution of firms within the size class that there is no assurance that a more refined method of interpolation would produce a more correct result.<sup>2</sup>

### *Correlation Between Maximum and Minimum Limits of the Indexes*

In order to judge whether the estimates of concentration obtained as described above are sufficiently accurate to permit their use in analysis, we studied the correlation between the rankings based on the upper and lower limit, using the firm size distributions for 1948. This correlation was examined for the following indexes:

1. The percentage of employment accounted for by the leading three firms
2. The number of firms required to account for 80 per cent of employment
3. Herfindahl's index

<sup>2</sup> For each class interval we are given the upper and lower limit as well as the total of firm sizes.

Very little, however, can be guessed as to the actual distribution of firms in this interval, particularly as, in most cases, their number is small.

The general shape of the size distribution suggests that in the class intervals with which we are mostly concerned—the leading or second largest size group—the distribution of firms will involve decreasing frequency with increasing size, or, in other words, when firms are ranked in order of increasing size their sizes, as a function of rank, will form a curve of increasing slope. There is no reason to believe, however, that the smallest firm will be near the lower limit of the class interval or the largest firm near the upper limit.

Linear interpolation cannot take into account all three of the given conditions (upper and lower limits and sum of sizes) but only two of them. It does not, moreover, conform to even the little we can guess about the size distribution.

To take all three data into account we would have to interpolate on a quadratic curve, which would involve a considerable amount of calculation. In view of the uncertainty as to the true range of the distribution of firms in the interval, this is hardly worth while.

A straight average of the limits is therefore adopted as the simplest method that involves no known bias.

In a few industries with very high concentration, however, a different procedure was employed for the index measuring the percentage of employment concentrated in the leading three firms. A straight average of the limits would have yielded an estimate so low as to be inconsistent with that for the index measuring the number of firms required to account for 80 per cent of employment; for example, in the cigarette and tobacco industry the latter is 2.11 while the former would have been 73 per cent on the basis of a straight average of the limits. In these industries, therefore, the estimate for the percentage accounted for by the three leading firms was the lowest figure consistent with the estimate of the number of firms required to account for 80 per cent and the other known facts about the size distribution. The industries involved are: cigarettes and tobacco, automobiles, glass, gypsum products, aircraft, coal-tar distillation, abrasives, abrasive products, bicycles.

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1. The correlation between the upper and lower limit of the percentage of employment concentrated in the three leading firms was computed for 59 industries, omitting those having exactly three firms in the leading size class and those with less than three firms altogether. The value of Spearman's coefficient of rank correlation was 0.872.<sup>3</sup>

The array of all 59 industries indicates that the difference in rankings based on upper and lower limits is considerably greater for the industries with high concentration than for those with low concentration. This suggests that the reliability of our estimates of concentration tends to increase as concentration decreases.

The reason for this relationship is that the gap between the upper and lower limits of the concentration index depends on the difference between the upper and lower class limits (or, if the upper class limit is not used in the computation, on the difference between the mean size in the class interval and the lower class limit) as well as on the number of firms in the class. Since, for this calculation, all sizes and class limits must be expressed as percentages of total industry size (see above), the difference between upper and lower class limits (or mean size and lower class limit) tends to be smaller where a larger part of total employment in the industry is in the other (smaller) size group, i.e. where concentration is lower.

2. Upper and lower limits for the number of firms required to account for 80 per cent of employment were computed for a sample of 45 industries, selected by systematic sampling from the larger group of 96 industries included in the study.<sup>4</sup>

The Spearman coefficient for this group was 0.988. For the 22 industries with highest concentration the coefficient was 0.902 and for the 23 industries with lower concentration it was 0.995.

The high values of these coefficients, as against those for the index of concentration in three leading firms, are due partly to the fact

<sup>3</sup> The industries included in this correlation are those shown in Appendix A, Table A-1, with the exception of distilleries, sugar refining, ornamental and cut glass, wine, flour mills, fruit and vegetable canning, butter and cheese, cotton thread, belting, narrow fabrics, synthetic textiles, carpets, corsets, cotton and jute bags, dyeing and finishing of textiles, woolen cloth, contractors of women's clothing, miscellaneous leather products, shoes, fur goods, roofing paper, paper boxes, aluminum, nickel, cement, pig iron, petroleum products, railway rolling stocks, steel ingots, asbestos products, hardwood distillation, compressed gases, soap, pipes, umbrellas, pens and pencils.

<sup>4</sup> The selected sample from Table A-1 by picking, with a random start, every 3rd industry in the foods group, every 2nd industry in textiles, wood products, nonmetallic minerals, and chemicals, 2 of the 3 industries in the paper group, and all the industries in the metals and miscellaneous groups.

This process of selection resulted in a sample of 52 industries. In 5 of these, information on individual firms was available, so that no estimation was necessary, and in 2 industries no positive minimum estimate could be computed. The remaining 45 industries were used in the correlation.

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that only one of the three industries that contributed most to the deviations in the previous experiment was included in this group.<sup>5</sup> There is, however, the further significant difference that in many cases the size class in which the last of the firms required to account for 80 per cent of employment is located is not the leading size class, so that the difference between upper and lower class limit is less than in the leading size class. Hence, in general, the reliability of estimates of concentration based on the number of firms required to account for 80 per cent of employment is greater than for those based on the percentage controlled by the three leading firms.

3. Upper and lower limits for the index used by Herfindahl were computed for 17 industries in the food group.<sup>6</sup> The correlation coefficient for these 17 industries was 0.907. The correlation coefficient for the index of concentration in three leading firms, for 13 of these industries (excluding 4 in which the leading size group contained exactly three firms) was 0.956. The poorer correlation for the Herfindahl index reflects the more extreme variation in the upper limit of this index. In some cases no upper limit is available for the leading class interval, and the extreme assumption is made that all firms but one are crowded at the lower class limit. In general, the gap between upper and lower limit of this index appears to be greater than for the index measuring concentration in three leading firms.

This survey indicates that the ranking of industries based on concentration indexes, estimated as described here, is probably quite close to that based on the correct values, particularly when the index measuring the number of firms required to account for 80 per cent of employment is used.

<sup>5</sup> The three industries are malt, starch, and macaroni. The industry included in the second correlation is macaroni.

<sup>6</sup> The industries omitted are malt, starch, macaroni, flour mills, and fruit and vegetable canning.

## APPENDIX C

### QUALITY OF THE SAMPLE

The sample of 96 industries used for the cross-section studies accounts for 52 per cent of all manufacturing industries and for 72 per cent of the value of output of manufactures. Its coverage in each industry group is shown in the following tabulation:

| INDUSTRY GROUP           | PERCENTAGE OF TOTAL MANUFACTURING<br>INCLUDED IN SAMPLE, 1948 |                                 |
|--------------------------|---|---------------------------------|
|                          | <i>Value of<br/>Output</i>                                    | <i>Number of<br/>Industries</i> |
| Food, beverages, tobacco | 95%   | 79%                             |
| Textiles and leather     | 82  | 63                              |
| Wood products            | 88  | 44                              |
| Paper products           | 71  | 30                              |
| Metal products           | 47  | 38                              |
| Nonmetallic minerals     | 86  | 67                              |
| Chemical products        | 56  | 54                              |
| Miscellaneous industries | 15  | 20                              |
| Total                    | 72  | 52                              |

In Chapter II, section I, it was shown that the sample reveals significant differences in concentration level among the industry groups. This Appendix will investigate whether, in this respect, the sample is representative of manufacturing as a whole.

The industries omitted from the sample are those which do not coincide with a homogeneous product group (Chapter I). It is therefore necessary to investigate whether the differences in concentration observed among *industry groups* in the sample are applicable to *product groups* in the omitted sector.

The coverage of the sample is poorest in the *metals*, *chemicals*, and "*miscellaneous*" groups. In the *metals* group the leading omitted industries are the following (the percentage of the group's total output represented by each industry is given):

|   | <i>Per Cent</i> |
|---|-----------------|
| Electrical apparatus and supplies   | 12.1            |
| Nonferrous metals smelting and refining<br>(other than aluminum and nickel) | 8.0             |
| Machinery   | 6.6             |

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These industries have been excluded because of the heterogeneity of their output. In *electrical apparatus and supplies*, four firms account for 50 per cent of employment. There are 301 firms in the industry but the number producing a particular article is generally much smaller. For example, there are only seven manufacturers of vacuum cleaners. There is little doubt, therefore, that the general level of product concentration is high.

In the smelting and refining of *nonferrous metals* the largest three firms account for 90 per cent of employment of the industry as a whole, and the total number of firms is only ten. Hence, in the sector excluded from the sample, concentration is sure to be high.

In the *household, office, and store machinery* branch of the machinery industry, the largest five firms account for 66 per cent of employment, but in the *industrial machinery* branch, the largest four firms account for only 19 per cent of employment.

In both branches there is a great deal of specialization of firms by products, but there is also a considerable output of machinery in other industries. The published statistics therefore do not permit a judgment as to the average level of product concentration. The same problem is encountered in many of the other metal fabricating industries excluded from the sample.

It can be concluded that while there is no doubt about the high level of concentration in primary iron and steel and transportation equipment (included in the sample) and in primary nonferrous metals and electrical apparatus (reviewed above), the statistics do not provide reliable information on concentration in the output of many of the fabricated metal products.

The leading *chemical* industries omitted from the sample are:

|                           | Per Cent |
|---------------------------|----------|
| Acids, alkalis, and salts | 12       |
| Fertilizer                | 11       |
| Miscellaneous chemicals   | 12       |

In the first of these, three firms account for 65 per cent of employment. Concentration in the production of particular chemicals is even higher, as indicated by the following note in the statistical bulletin on this industry: "Except for sulphuric acid, separate figures for the production of chemicals in this group are not published, as many of the individual items were made by only one or two concerns."<sup>1</sup>

In the *fertilizer* industry as a whole, the leading three firms account for 76 per cent of employment. Fertilizer materials are produced by

<sup>1</sup> *The Acids, Alkalis and Salts Industry in Canada, 1948*, Ottawa, Dominion Bureau of Statistics, December 1949, p. 1.

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only three companies in Canada (except for about 17 per cent of the output of ammonium sulphate produced as a by-product by five coke producers). Many small firms are engaged in the production of mixed fertilizer from these materials, but even in this branch of the industry the leading three producers account for 75 per cent of sales (year ended June 1947). The leading firms are integrated, each producing both certain materials and mixed fertilizer.<sup>2</sup>

The *miscellaneous chemical products* group produces synthetic rubber, explosives, oils, dyes, and many other products. The largest seven firms account for 71 per cent of employment, but concentration of output of many individual products is higher, as is indicated by the fact that nearly half the value of output is not itemized in the published statistics. Synthetic rubber, which accounts for nearly 25 per cent of the industry's output, is produced by only one firm.<sup>3</sup> This survey leaves little doubt that the chemicals field as a whole is one of high concentration, as the sample indicated.

The group of "*miscellaneous*" industries accounts for only 1 per cent of total manufacturing output and between 2 and 3 per cent of the number of plants, but has 11 per cent of the industries. This group is therefore extremely small in relation to total manufacturing, and its industries are on the average much smaller than the others. These figures suggest that high concentration based on small industry size is likely to be as characteristic of the omitted sector as it is of the four industries included in the sample.

In the *wood* and *paper* groups the coverage of the sample is high in terms of output but low in terms of the number of industries. Most of the omitted industries classified under *paper* are in the printing and publishing field; there is no doubt that these are predominantly areas of low concentration on a national basis, although concentration in separate regional markets is high for newspaper publishing and probably some branches of commercial printing. While industries in this group have a variety of products, there is also a great deal of overlapping, and each major product is produced by a large number of firms. In the printing and publishing of newspapers and periodicals the eleven largest firms account for only 37 per cent of employment.

Some of the omitted *wood* products industries are small and each puts out a variety of products.<sup>4</sup> Others, however, have a large number

<sup>2</sup> For above facts on the structure of the industry see *Report of the Royal Commission on Prices*, Ottawa, King's Printer, 1949, Vol. III, pp. 161-164.

<sup>3</sup> *The Miscellaneous Chemical Products Industry, 1948*, Ottawa, Dominion Bureau of Statistics, 1950.

<sup>4</sup> E.g. "beekeepers . . ." and "poultrymen's supplies," "lasts, trees and wooden shoe findings," "wooden ware."

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of firms <sup>5</sup> and most overlap considerably in the major products. It is probable therefore that most major products in the group as a whole are produced under conditions of low concentration.

In the remaining sectors the sample is large enough to make it fairly certain that the results are applicable to the whole group. The differences in concentration among product groups found in the sample therefore most probably apply to manufacturing as a whole, with the possible exception of fabricated metal products.

<sup>5</sup> E.g., cooperage, wooden boxes.

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