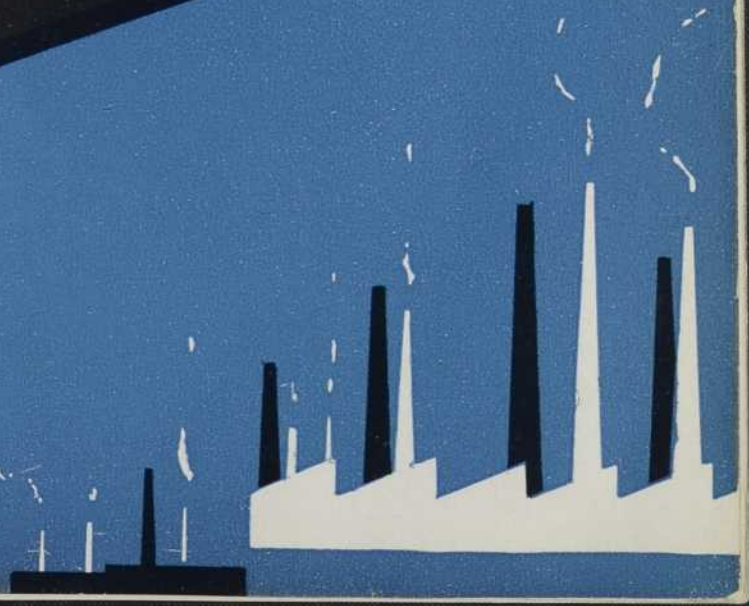


# la province de Québec

# industrial expansion



# LA PROVINCE DE QUEBEC

## INDUSTRIAL EXPANSION

BIBLIOTHÈQUE
SAINT-SULPICE

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FOR
THE DEPARTMENT OF TRADE AND COMMERCE

September 1952




# QUEBEC

Quebec, the largest Canadian province, covers an area of nearly 600,000 square miles.

Its physical structure is varied : mountains, hills, valleys, plains, lakes and rivers are widely distributed. The great artery of the Province is the St. Lawrence River.

The greater part of the population resides in the St. Lawrence lowlands but a considerable portion is spread over the Appalachian and Laurentian highlands. The vast reserves of water in these highlands, particularly in the Laurentians, constitute a factor of great importance to the industrial development of the Province. In their descent to the St. Lawrence they furnish an almost inexhaustible store of power for electrical transmission.

The population of the Province of Quebec is estimated at close to 4,055,680 or about 29% of the Canadian population. It increased by 723,799 between 1941 and 1951. Over 80% of the people are of French descent.

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# Introduction

Quebec *Barely half a century ago, a picturesque region in a vast country, over most of its extent farm lands alternated with forest, rivers, villages and freshly cleared colonization centres. A vigorous people, deeply rooted in the soil as in their faith and their traditions, worked the land and, like their forefathers, relied on it for a secure and peaceful existence. This was Quebec, little changed from pioneer days, with the old ways kept alive from one generation to the other by the rural population, who looked from afar at the few big towns where the hum of industrial life had begun to quicken.*

Quebec *Today a dominant factor in the Canadian nation, the old Province still proudly bears the features graven on it by a long line of hardy colonists and farmholders. But on its skyline the tall chimneys have increased in number and intense activity overflows from plants, factories and workshops. Cities and towns are pushing out to take in the surrounding countryside. The soil and the subsoil, the forest and the rivers are being made to yield their riches; everything which can be worked, everything which can be moulded or shaped is being turned to use. With the aid of up-to-date technical knowledge, this people descended from the pioneers, the builders of a new land, and hardworking artisans have erected, beside their rich agricultural domain, a veritable industrial stronghold. This is Quebec today.*

*The present booklet makes no claim nor is it intended to be a survey of Quebec from the economist's point of view, with figures, analyses, comparisons and theories. It is simply a manual which will inform the reader without leading him through a maze of statistical data.*

*What factors have contributed to making present-day Quebec an industrial province ?*

*Industrially how does Quebec compare with the rest of Canada ?*

*Which are its leading industries ?*

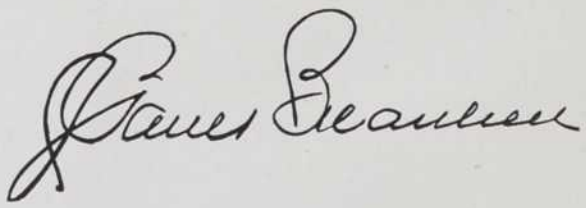
*What do these industries represent in production value and employment ?*

*What is the relative importance of the same industries compared to similar undertakings in the other provinces ?*

*To what extent do Quebec's leading industries contribute to Canadian economy ?*

*In the following pages, figures taken from official statistics, photographs, brief comments and comparisons provide an answer to the above questions. From the whole, one striking impression emerges : the Province of Quebec, at the middle of the 20th century, is an outstanding factor of prosperity in Canada's economic life. Industrial Quebec has become a powerful asset to the Canadian nation. Particularly during the past decade, its economic activity has been intensified to an enormous degree and today the Province is making prodigious strides toward even greater things. The future is rich with promise.*

*The birthplace of Canada in the days of the explorers, an essentially agricultural province through the years when a tenacious clinging to the soil was needed to assure its survival, the Province patiently accumulated vast reserves of strength and energy in the long struggle for existence. Today it is in a position to draw on these reserves to the fullest and to measure up in every respect to its title of FOREMOST CANADIAN PROVINCE: — Foremost in point of age, foremost with regard to the part it has played in North American history, foremost in the wealth and diversity of its cultural background which make it the most typically Canadian of all the provinces and, finally, foremost in the scope and strength of its economic development which is attracting worldwide interest.*



Minister of Trade and Commerce

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# Quebec Industrial Groups

*So that it may be more easily consulted and to make it conform to a definite plan, this booklet is divided into chapters according to 16 industrial groups :*

1 *Foods and Beverages*
2 *Tobacco and Tobacco Products*
3 *Rubber Goods*
4 *Leather Goods*
5 *Textiles*
6 *Clothing and Furs*
7 *Wood Products*
8 *Paper Products*
9 *Printing, Publishing and Allied Trades*
10 *Iron and Steel Products*
11 *Transportation Equipment*
12 *Non-ferrous Metal Products*
13 *Electrical Apparatus and Supplies*
14 *Non-metallic Mineral Products*
15 *Petroleum and Coal Products*
16 *Chemical Products*

*This division of our manufacturing industries into 16 groups is in no sense arbitrary, but is simply based on a classification established a few years ago by a Federal Inter-departmental Committee. It is now recognized as the "Standard Industrial Classification" in Canada and closely approximates the International Classification adopted by the Statistical Commission of the United Nations in 1948. Whether an industry or a group of industries is comprised in the 5th or the 10th is no indication of its relative importance, it simply refers to the numerical classification of the group to which it has been assigned.*

# Foods and Beverages

The production of foods and beverages is a basic industry. Once it has been industrialized, such production serves as a reliable gauge of the economic development of a region. It expands with the economy of a country or a province up to the point where the country or the province emerges from the phase of agricultural economy into one based on industry. From then on, other industrial enterprises move ahead and assume relatively greater importance than the food and beverage group.

It is easy to realize what foods and beverages mean to the Canadian economy when one considers that they represent a quarter of the gross value of the entire manufacturing production in Canada. Of the sum of $11,877,000,000, the foodstoff industry accounted for $2,840,000,000 in 1948. For the same year, the Province of Quebec's share in the latter amount was 24% or almost one fourth, with a gross value of $650,000,000, and in 1949 the figure had increased to $704,640,000.

### Our principal foodstuff industries

Among the 24 or more manufacturing industries comprised in the food and beverage group within the Province, the five leading ones in the order of importance of their gross value of production are the following: SLAUGHTERING AND MEAT PACKING — BUTTER AND CHEESE FACTORIES — BAKERIES — BREWERIES — PREPARED STOCK AND POULTRY FEED.

The gross value of production in slaughtering and meat packing plants, for instance, amounted to $147,500,000 in 1949. The same year that of butter and cheese factories was over $101,000,000, while that of bakeries reached $55,500,000. Prepared stock and poultry feed accounted for $44,110,000 and the output of breweries for $40,210,000. The predominant position of these five industries over all others in the same group can be judged from the fact they represented 72% of the total number of establishments in the entire group; employed 55% of the personnel; paid out 55% of the salaries and wages and produced 55% of the output (according to gross value).

Compared to the five same industries in all of Canada, those in Quebec represent about a quarter of the whole, except with regard to the number of establishments in which aspect Quebec accounts for a little over one third.

### Slaughtering and meat packing

Closely linked to Quebec's farming activity and to the development of manufacturing, the slaughtering and meat packing industry holds an important position in Quebec's internal economy. It ranks fifth among all Quebec industries but, in relation to the other provinces, the Province of Quebec is in second position. The leading producers are :

| | Gross value of production |
|---|---|
| 1 Ontario | $250,000,000 |
| 2 QUEBEC | 140,000,000 |
| 3 Manitoba | 106,000,000 |
| 4 Alberta | 99,000,000 |
| 5 British Columbia | 43,000,000 |

EMPLOYMENT.—It will be noted in several instances that average employment per establishment is decreasing while total employment in the same industry is increasing. There is nothing unusual in such a situation. The primary result of mechanized labour and more efficient manufacturing methods is the reduction of manpower in an establishment. On the other hand, the industry's expansion makes itself felt in an increase in the number of factories and consequently more extensive employment. What labour loses on the one hand, it retrieves on the other, to say nothing of the benefits gained from industrial progress.

Since the beginning of the century the number of slaughtering and meat packing plants in the Province of Quebec has quadrupled and production has reached an unprecedented level being 4.3 times more than in 1920. Employment is double what it was in 1920 — 1,895 employees in 16 plants as against 3,673 employees in 37 plants in 1949. The payroll now amounts to some $9,000,000 compared to $2,388,000 in 1920.

Although the largest slaughtering and meat packing plants are not in the Province of Quebec, the gross value of production per employee, estimated at $40,200 is—according to statistics—five, seven and nine thousand dollars higher than in the other provinces.

In 1949 the gross value of the output per establishment was $3,986,000. Each plant had on an average 99 employees and the average amount paid out in salaries and wages was $2,400 a year.

Of the 37 plants operating in 1949, 21 were in Montreal, 6 in Quebec and 2 in Chicoutimi. Quebec plants, unlike those in the other provinces in this respect, slaughter a large number of calves and few steers. Nevertheless, in production volume as well as value, beef constitutes the basis of the slaughtering business in Quebec. In 1949, 126,000,000 pounds of beef worth $42,000,000 were put on the market. Pork is also an important commodity as 71,000,000 pounds, worth $35,000,000, were sold in the same year.



Slaughtering and meat packing. — Part of a warehouse belonging to a large Montreal firm. Meat packing plants in the Province of Quebec are among the best equipped in the country and the gross value of their production amounts to over $147,000,000 a year.

## Butter and cheese factories

Quebec is in second place among the Canadian provinces in the butter and cheese industry, Ontario taking the lead. The two provinces alone accounted for 65% of the gross value of Canadian production in 1948. In the order of their importance as producers of butter and cheese, the provinces rank as follows : Ontario, Quebec, Alberta, Saskatchewan and Manitoba. Within Quebec the same production takes ninth place. For the whole of Canada, it stands eighth.

The production of butter and cheese has undergone great change in the course of the centuries and particularly within the last decade. From having been a home enterprise for a long time, it has now become a thoroughly modern industry, not only in the way it is organized but in production methods as well. The farmers' co-operative movement on the one hand and, on the other, the rapidly increasing industrialization of the agricultural sector of the Province have altered it radically by causing it to become more closely concentrated and by giving it greater stability and efficiency.

As a result, instead of the 1,800 small establishments in existence thirty years ago, today we have 807 up-to-date butter and cheese factories. The employment figure had risen from 2,047 in 1920 to 5,980 in 1949. Salaries and wages which formerly amounted to $1,536,000 had climbed to over $9,856,000 and, compared to $36,953,000 in 1920, gross value of production had reached $101,086,000 in 1949.

The Quebec Bureau of Statistics divides the Province into eleven agricultural districts. The most important of these with regard to the production of butter and cheese is the Quebec district,



Various stages in the making of butter and cheese at the St. Hyacinthe Dairy School. Every butter and cheese factory in the Province of Quebec is obliged to have in its employ at least one person trained in this institution.

which accounts for 31.7% of the butter and 11.7% of the cheese production. Although Quebec district leads in the production of butter, it falls behind to fourth place in cheese-making. In this instance, the Saguenay district comes first with cheese produced to the value of $2,381,000 or 31.7% of the cheese made in the Province. The Lower St. Lawrence, Quebec, Richelieu and Trois-Rivières districts are the center of the Province's butter and cheese industry. They supply nearly 70% of the value of the two products. Taken separately, the cheese industry is centred in the Saguenay and Trois-Rivières districts, where more than half of the Province of Quebec's output of this foodstuff originates.

### Bakeries

The baking business is another type of enterprise that has become highly industrialized in the Province of Quebec. Like butter and cheese-making, it has shown a marked tendency to increase the size of its establishments and to become more closely concentrated. In this industry Quebec ranks second among the provinces from every point of view save the number of establishments where it comes first *.

★

The baking industry has kept pace with the growth in population and the unremitting demand. As a result, the number of establishments has more than doubled since the beginning of the century. From 599 in 1920, it had reached 1,024 in 1949. For the same year, 9,014 persons were employed as against 3,019 in 1920. In 1949 the sum paid out in salaries and wages in the industry exceeded $15,000,000, whereas in 1920 the amount was barely $3,190,000. In relation to the gross value of production ($55,500,000 in 1949) within the Province and in the whole country, the baking industry ranks seventeenth. That such an indispensable industry should rank below so many others is a sure indication that it is operating within a highly industrialized region.

* The City of Montreal accounts for 117 of the 1,024 bakeries in the entire Province, employs a third of the manpower and supplies 40% of the output. The City of Quebec has 36 bakeries.



The chief product of the industry is bread, of which 394,000,000 pounds, worth $34,000,000, were baked in 1949. Pastry, such as pies, cakes and fine pastry, constitutes the second group in importance although it represents less than half the preceding group. Pastry turned out in 1949 was valued at $15,000,000 or 27.9% of the total value of production in the industry.

### Breweries

As is the case in the three industries already considered, Quebec holds second position in the brewing industry. Ontario is in the lead, British Columbia in third position, Alberta, fourth, Saskatchewan, fifth and Manitoba, sixth. In the remaining provinces the brewing industry is not of much importance. According to the gross value of production, breweries rank 25th among the manufacturing industries of the Province of Quebec and 28th in Canada.

The brewery is one of the oldest manufacturing institutions in the Province as the first Canadian brewery was established by the Intendant Jean Talon in Quebec. The past fifty years in the brewing industry have been marked by continuous and extensive progress. Despite the fact the number of establishments had declined from 13 in 1900 to 8 in 1949, the number of employees had risen from 633 to 2,701. The gross value of production, estimated at $1,512,000 in 1900, was $40,210,000 in 1949, which represents an average production of $4,439,000 per establishment and of $13,400 per employee, compared to $116,300 per establishment and $2,389 per employee at the beginning of the century.

Province of Quebec establishments today account for 31% of the gross value of the output of Canadian breweries. Although few in number, they are on an average the largest in the country. Employment averages around 330 persons as against 137 in Ontario, 123 in Alberta, 101 in Manitoba, 79 in Saskatchewan and 68 in British Columbia. Quebec contributes 32% of the amount paid out in salaries and wages by Canadian breweries.

### Prepared stock and poultry feed

Probably no other among the foods and beverages group provides as striking an example of the tremendous strides being made by Quebec in the industrial field, as the prepared stock and poultry feed industry. A little more than a dozen years ago, it had barely come into existence, as the figures for 1930 amply show: 3 establishments - 15 employees - $11,000 for salaries and wages - gross value of production $113,000. In 1941, 26 establishments reported 317 employees, a payroll of $372,000 and a gross value of production of $6,759,000. In the following years the industry soared ahead to reach an astounding level of activity in 1949. That year the number of prepared stock and poultry feed establishments had risen to 123 with employment at 1,240. They were paying out $2,293,000 in salaries and wages and the gross value of production had climbed to $44,110,000. The average gross value of the output per establishment was over $455,000 compared to $38,000 in 1930, while it was $35,800 per employee in 1947 compared to $7,500 in 1930.

The extraordinary development of this industry can be directly traced to the expansion and improvement that has taken place in our farming operations. The theory of a more rational working of the farm has gained the day. It is being more and more widely ac-

← The oven room such as may be seen in our scientifically equipped modern bakeries and biscuit factories.

cepted by our farmers who are making increasing use of specially prepared feeds. Unlike most of the others in this group, the industry not only gets its raw materials from the farm but sends back the product to serve as raw material for further agricultural production.

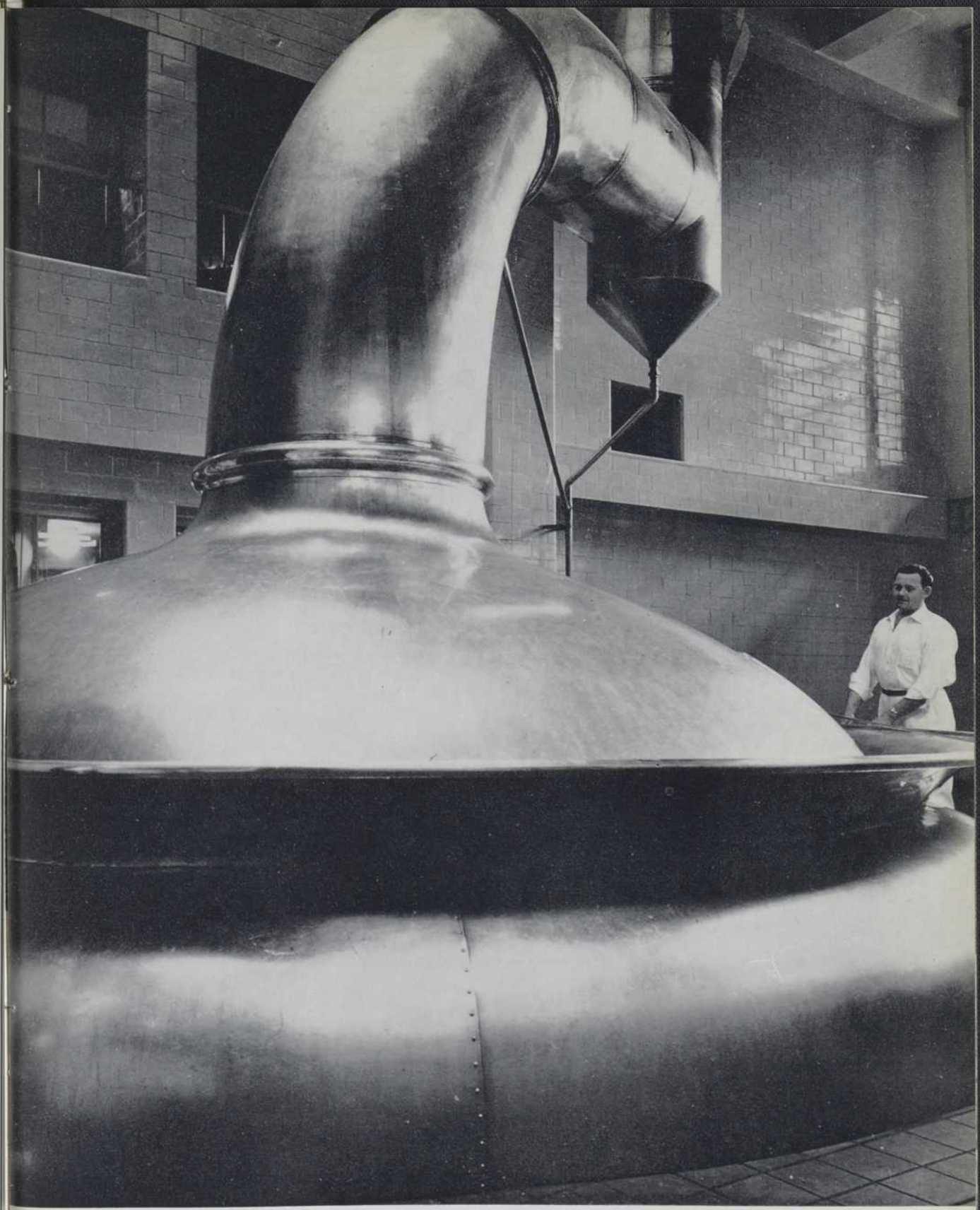
### Other industries

Apart from slaughtering and meat packing, butter and cheese factories, bakeries, breweries and prepared stock and poultry feed, the foods and beverages group comprises 19 other industries. Each has prospered to a great extent, particularly within the past ten years. Their share in Quebec's industrial growth is of some importance since together they provide employment for 18,000 persons, pay out $35,000,000 in salaries and wages and have a production valued at over $280,000,000. Each reflects the upward trend in our economic situation. To cite an instance, the carbonated beverage industry, at the turn of the century, comprised 23 establishments, employed 310 persons and had a payroll of $170,000. Its gross value of production amounted to $370,000. In 1949 the same industry comprised 171 establishments, employed 2,738 persons, who earned $5,107,000 in salaries and wages, and it had a production valued at $31,500,000. Besides, there are the distilleries where the number of employees increased from 221 in 1926 to 1,661 in 1949, and the gross value of production rose from $2,500,000 to $27,-500,000.

To complete the foods and beverages group, following is a list of industries which, with the five leading ones, give the Province of Quebec an outstanding position in the foodstuff industry as a whole.

| INDUSTRIES | Establishments | Employees | Salaries and wages | Gross value of production |
|---|---|---|---|---|
| | No. | No. | | |
| Carbonated beverages | 171 | 2,738 | $5,107,000 | $31,522,000 |
| Flour and feed mills | 139 | 902 | $2,030,000 | $31,163,000 |
| Confectionery, chewing gum, chocolate, cocoa, etc. | 52 | 2,555 | $4,308,000 | $28,727,000 |
| Distilleries | 8 | 1,661 | $4,014,000 | $27,454,000 |
| Canned and preserved fruits and vegetables | 131 | 2,437 | $3,255,000 | $21,849,000 |
| Biscuits and crackers | 17 | 2,182 | $3,258,000 | $21,190,000 |
| Concentrated milk | 10 | 548 | $ 988,000 | $17,092,000 |
| Processed cheese factories | 9 | 446 | $ 998,000 | $15,146,000 |
| Oils and fats (1948) | 3 | 176 | $ 369,000 | $13,452,000 |
| Canned and cured fish (1948) | 112 | 1,116 | $ 924,000 | $ 4,632,000 |
| Macaroni and spaghetti | 4 | 313 | $ 684,000 | $ 3,577,000 |
| Malt milling (1948) | 5 | 149 | $ 309,000 | $ 3,389,000 |
| Sausages and sausage casings | 24 | 253 | $ 443,000 | $ 3,024,000 |
| Other dairy products (1948) | 14 | 159 | $ 274,000 | $ 2,020,000 |
| Miscellaneous foods | 77 | 1,980 | $3,824,000 | $54,678,000 |
| Sugar refineries | 3 | | | |
| Prepared breakfast foods | 2 | | | |
| Wines | 1 | | | |

Note: The above figures are for 1949 unless otherwise indicated. In the last three industries, the number of establishments is too small to permit publication of data.



Brewkettle—In this 20,000 gallon giant, the brew is boiled to bring out the full qualities of the malt and the hops.

# TOBACCO

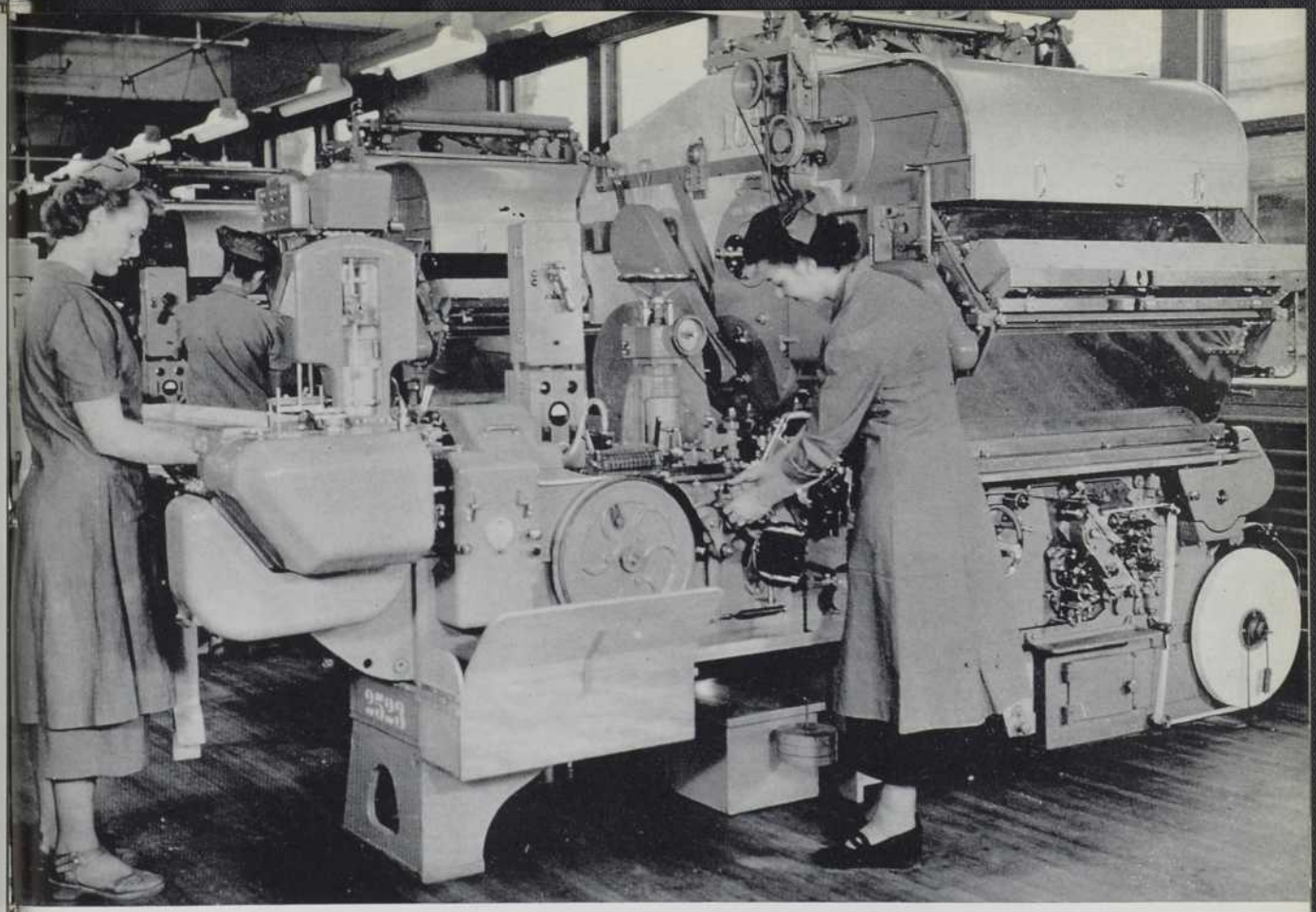
From the time the first Europeans landed on the shores of America and, having encountered the Redskins, sat down to smoke the pipe of peace with them, tobacco has entered more and more into the white man's life. Today it holds an advantageous position and has become an important social and economic factor. The use of tobacco in all its forms has spread to the ends of the earth and no country in the world is without its high percentage of smokers. It is unquestionably in the form of smoking tobacco that the pale leaf is most popular and other kinds (for snuff and chewing) are much less used. In the tobacco industry, as with the consumer, the cigarette reigns supreme : seventeen billion cigarettes were manufactured in Canada in 1949 and their total value (including excise taxes) amounted to $255,000,000 or 78.9% of the value of the tobacco manufactured in the country.

There are two distinct operations involved in preparing tobacco for consumption: PROCESSING and MANUFACTURING.

Processing is the preliminary operation and consists in drying and packing the raw leaf. Shipped to the factory it is then manufactured into cigarettes, cigars, pipe tobacco, tobacco for rolling or any other product in consumer demand.

Each of these two stages of production constitutes a separate industry and in each, one of Canada's two largest provinces is predominant.





The cigarette is the most important item of production in the tobacco industry. Province of Quebec factories turn them out on highly efficient machines like the one shown here. Out of a total of 17 billion units manufactured in Canada in 1949, 16 billion came from Quebec establishments.

### 1) Tobacco Manufacturing.

The Province of Quebec is well in the lead in this field. In 1949 its production represented the large proportion of 92.1% of the entire Canadian output. It accounted for 39 of the 57 establishments, employed 90% of the manpower and paid out 91% of the salaries and wages earned in the industry.

Although, within the past few years, the tobacco manufacturing industry has enjoyed the greatest prosperity it has ever known, it was nevertheless one of the industries that was most affected, in various ways, as a result of the financial crisis of the 1930s and the two world wars. Estimated at $75,000,000 in 1930, the gross value of production slid sharply downward to $31,000,000 in 1933 (a figure below the 1918 level). Recovery was slow and it was fourteen years before the 1930 value was exceeded. In 1949 the gross value of the output attained a record peak with the sum of $104,500,000.

Employment in the industry was at its highest level in 1943 with 9,448 workers, a number that has not been surpassed since. Employment was divided between 46 factories. Ten years earlier there were 75 plants. From that time the number declined fairly steadily and in 1949 it had dropped to 39 with a total of 8,153 employees. On the other hand, the 1949 payroll amounting to over

←— Blending tobacco in a cigarette factory. The majority of the employees in these manufactures are women. In the wage-earner group the proportion of female employment is as high as 65.6%.

$17,500,000 was the largest ever recorded in the industry. In 1929, salaries and wages amounted to $7,000,000 but the figure had fallen to a little over $5,500,000 in 1933. Average earnings of an employee in the tobacco manufacturing industry in 1949 amounted to $2,119, the highest figure yet reached.

The financial crisis of the '30s sharply affected consumer demand. The change was particularly noticeable in the lowered sale of cigars. With the beginning of the depression, cigar smokers gave up expensive brands to take to smaller and cheaper cigars when they did not turn to manufactured or hand rolled cigarettes or pipe smoking. It was only in 1941 that the quantity of cigars manufactured exceeded the number produced in 1929.

★

The cigarette has long been and still is the most important product of tobacco factories. In 1949, 16 billion units, worth $235,971,000 (including excise taxes), were manufactured. The second most important item is cigarette tobacco (tobacco for rolling), and the 20,000,000 pounds produced had a value of over $236,000,000. The cigar comes third with a production value of $14,000,000.

The tobacco manufacturing industry in Canada belongs almost exclusively to the Province of Quebec, particularly to the cities of Montreal and Quebec. Though it may not be of very great importance in relation to Canadian and Province of Quebec manufacturing as a whole, it exerts considerable influence in the cities in which the plants are located. Montreal and Quebec share nearly 80% of the gross value of the output. The Metropolis alone accounts for 69.6% of Canadian production and Quebec's portion is 9.3%. Comparing the production in the two cities with that of the entire Province, one finds that 75.5% of the output originates in Montreal and 10.1% in Quebec City.

### 2) Tobacco Processing

While tobacco manufacturing belongs almost exclusively to Quebec, tobacco processing, on the other hand, is almost exclusive to Ontario. The industry, necessarily confined to districts where tobacco is grown, has much less importance in Canada than the manufacturing of the product. The Province of Quebec, however, has made great progress in the short time tobacco growing has been established on a commercial basis. The greater portion of the tobacco manufactured here was formerly imported, whereas today the raw leaf comes chiefly from Ontario and Quebec.

The tobacco processing industry comprised 5 establishments in the Province of Quebec in 1949. They employed 568 hands, paid out $813,000 in salaries and wages and the gross value of their output amounted to the sum of $4,239,000. Among the establishments referred to there were three co-operative societies which are, in the order of their importance: "La Coopérative des Tabacs Laurentiens", "La Coopérative agricole de Tabac du district de Joliette" and "La Coopérative de la Vallée de l'Yamaska". These three co-operative societies grouped together more than 1,200 tobacco producers and their aggregate turnover in 1949 amounted to $2,692,000, of which more than half represented sale of tobacco.

A technician weighs tobacco to determine the moisture content. It is one phase in the work carried out in the large Province of Quebec factories which supply over 92% of the output of the Canadian tobacco manufacturing industry. ⇒→



# RUBBER GOODS

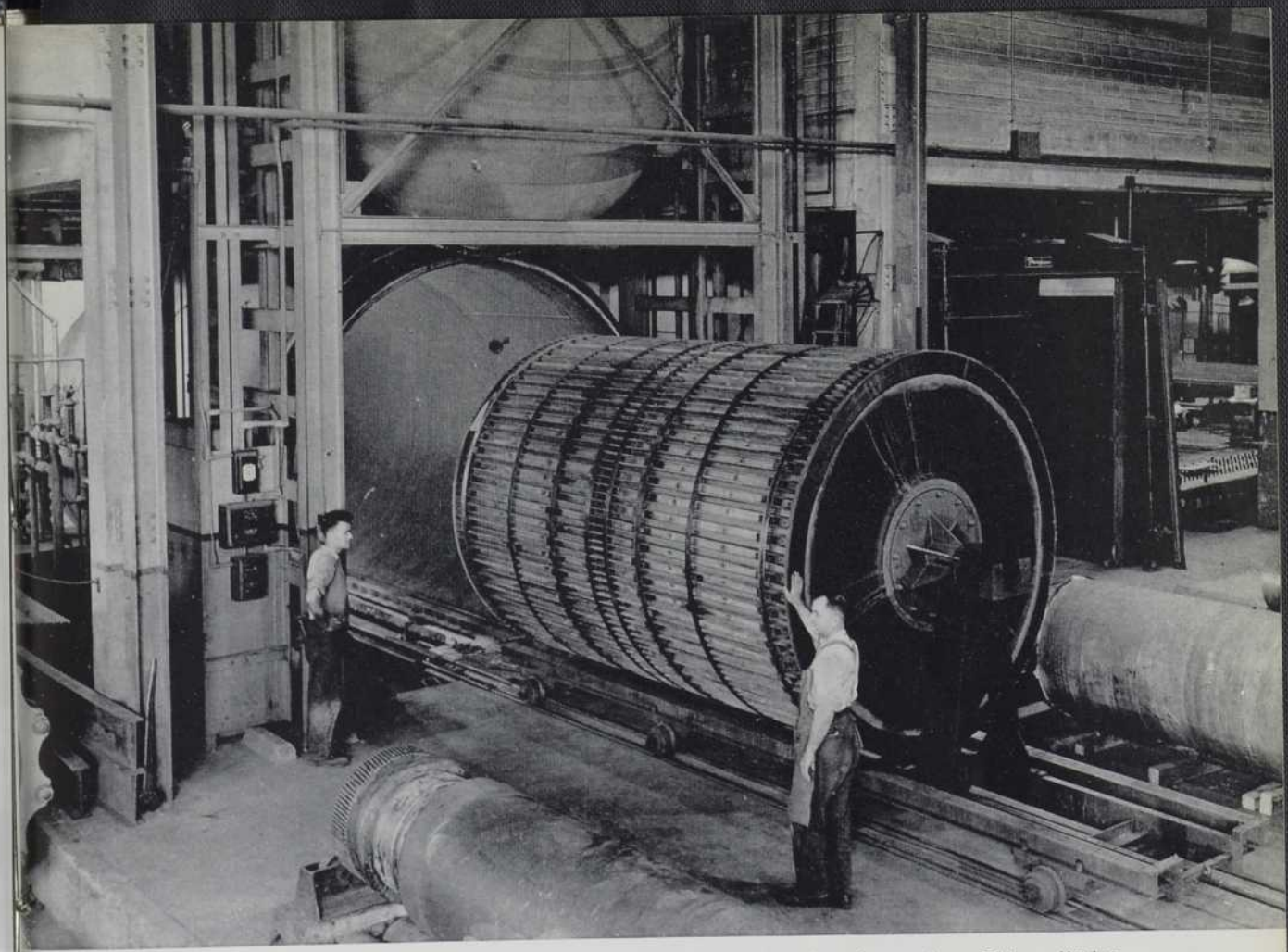
Rubber is one of the essentials of modern civilization. It is easy to realize its importance when one recalls with what feverish anxiety the laboratories of the world set about finding a synthetic substitute during the last war, so urgent was the need for rubber not only for the armed forces but to meet the requirements of every-day life as well. Official statistics list more than seventy-five groups of products of widely different kinds in which rubber is used. However, natural rubber is still far more extensively used than the synthetic substitute.

★

The manufacturing of rubber goods has become an important industry in Canada and the gross value of production is around $182,000,000 a year. As in the case of most of the larger industries, it is almost wholly centred in the provinces of Ontario and Quebec, which in fact supply 99.9% of the output. Quebec's share is close to 20%.

Taking as basis for comparison the gross value of production which is around $34,000,000, the industry ranks twenty-fourth among the 40 leading industries of the Province of Quebec. It comprises 24 establishments, the greater number situated in Montreal and the Eastern Townships. In 1949 these factories paid out $12,944,000 in salaries and wages to 6,130 employees, that is, an average of $500,000 per factory.





An operator runs a large rubber covered cylinder into a vulcanizer for curing. This cylinder is typical of those used for a number of purposes in the pulp and paper industry.

Thirty years ago the rubber goods industry in the Province of Quebec comprised only 6 establishments. At that time, 3,138 employees earned $2,500,000. In 1949 the number of factories was four times what it was in 1922 but the employment figure had only doubled. The more modern equipment used today has altered conditions in this respect. There was a time when as many as 600 persons found employment in a single establishment. In 1949 the average number of persons employed per factory was 255. On the other hand, salaries and wages have increased to a great extent. The average amount earned by a single employee which was $1,000 in 1941 had risen to $2,100 in 1949.

The rubber goods industry is among those which are a very real asset in the Province's economy. With the almost daily discovery of new uses and new possibilities for natural or synthetic rubber, resulting from scientific research, the industry cannot do otherwise than continue to progress.

←≪ Inside one of the biggest establishments producing rubber goods in Montreal. Of the 20 manufactures in existence in 1948, the Metropolis accounted for 5 which alone supplied nearly a third of the Quebec production.

# LEATHER

Of all Canadian manufacturing the leather industry is probably the one most typical of Quebec. Its beginnings can be said to have coincided with the founding of New France. It is part of Quebec's history and its growth can be traced back to the days of the likable and energetic Intendant Talon. With the country to which it was transplanted, the leather industry has progressed steadily to take its present position among the forty leading industries in this Province.

Since leather lends itself to a great many uses, the manufacturing activities with which it is linked are numerous and varied. They can be classified into six main divisions, of which the chief comprise the production of footwear, the manufacturing of trunks and hand luggage, tanning and glove-making.

### Footwear

Just as the manufacturing of footwear is the most important of the leather industries from the point of view of activity, it is the one which evokes the keenest interest historically. Early records show that, at the very outset, New France could boast of several craftsmen capable of making a fine shoe as well as a strong boot. The Jesuit Relations of 1667 mention shoemaking among the crafts deserving of royal favour. And, at the time Quebec was known as Lower Canada it was already predominant in the industry. Other references indicate that the Province has always led in the production of factory made boots and shoes. As early as 1828 we find such factories mentioned. In 1850 the use of the steam boiler helped to expand production. By 1870 Quebec and Montreal were well to the fore as producing centres. At the turn of the century about a hundred factories were operating and employing ten thousand workers.

Statistics for 1949 show that at the present time six out of ten pair of shoes produced in Canada come from the Province of Quebec. With its 180 factories Quebec accounts for 65% of all the Canadian establishments comprised in the industry and it employs between 60 and 70% of all shoe factory employees in Canada. These figures are clearly indicative that the Canadian production of footwear is primarily a Quebec undertaking.

### Rapid strides

The industry has made enormous strides. The number of boot and shoe factories has nearly doubled in the past twenty-five years. From 109 in 1926 it increased to 195 in 1946, to level off at 179 in 1949 as a result of the closing down of a few smaller concerns in the postwar period.

The medium-size factory employing from 50 to 150 persons is typical of this Quebec industry. Women represent between 40 and 45% of the personnel.

In 1949 there were 22,290 shoe factory employees in Canada. Employment in

Some 200 are employed in the fitting room of this modern shoe factory. Steel shelving and binds for storing materials and lasts induce tidiness.



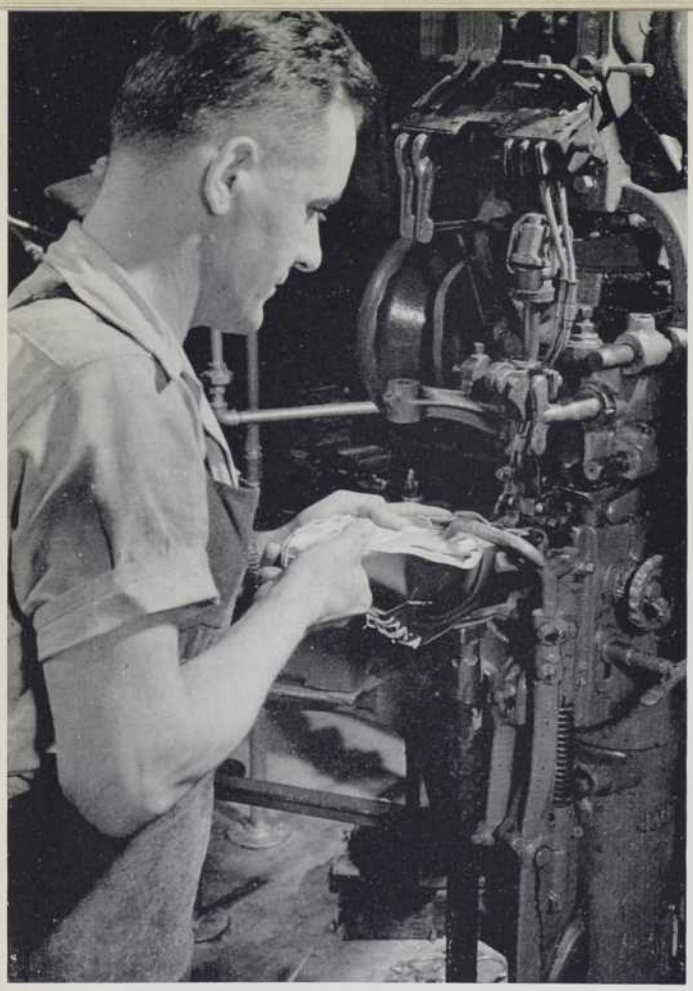
the Province of Quebec accounted for 13,927 of the number. A record figure was reached here in 1946 with 14,700 employees.

Since 1933 salaries and wages have soared to an extent that is unequalled in Quebec's industrial history. From $6,000,000 in 1933, the payroll increased to $8,000,000 in 1939, $14,000,000 in 1943, $18,000,000 in 1946 and $22,000,000 in 1949. During the same period the average income of the employee rose successively from $670, $740, $1,100 and $1,240 to attain $1,580 in 1949.

The year salaries and wages climbed to the peak figure of $22,000,000 production also reached a record value of $70,000,000. This was almost three times the 1939 value of $24,638,000.

←« Some of the most highly skilled employees are employed in the cutting room of the shoe factory.





The assembling of a welt on a modern machine in a shoe factory.

After the first world war the manufacturing of footwear slumped for several years. However, recovery set in and by 1928 the gross value of production had reached a peak with $30,000,000. The industry fared badly in the financial crisis which followed and by 1933 production had dropped to $18,000,000.

Leather boots and shoes are the chief product of the industry. Close to 17,000,000 pairs, valued at $62,000,000, were manufactured in the Province in 1949. This represents 57% of the Canadian output.

The second most important item is the house slipper with a total of 3,000,000 pairs worth $4,500,000. This represents almost the entire Canadian production of 3,500,000 pairs. The Indian slipper ranks third and in 1949 Quebec factories produced 2,000,000 pairs or 90% of the total quantity and 92% of the value of the Canadian output. The three kinds of footwear mentioned constitute 98% of the Quebec industry's production of 21,500,000 pairs and is equivalent to 60% of the quantity manufactured in Canadian factories.

### Montreal and Quebec's share of the footwear industry

The footwear industry is centred mainly in Quebec and Ontario. Taken together, the two provinces account for 92% of the establishments, employ 96% of the manpower engaged in the industry and provide 96% of the output.

Montreal and Quebec are the leading producing centres. They account for 40% of the factories, 50% of employment and close to 50% of the total production of the entire Canadian footwear industry. The Metropolis alone has 50% of the Province of Quebec's concerns, employs 55% of Quebec shoe factory personnel, pays over 60% of their earnings and supplies 58% of the Province's production with a value of $37,000,000.

However, the footwear industry holds a relatively unimportant position in the industrial life of the Metropolis. Its share in the aggregate industrial production is only a little over 2%. The situation is quite different in Quebec City as 15% of the labour force in the Ancient Capital earn their living in the industry. Footwear accounts for 12% of the value of manufacturing production in the City where there are in all 48 factories producing leather goods. Of that number 33 are footwear factories. The City of Quebec's share in the industry on the provincial level is as follows: 18% of the factories, 22% of the employees and 22% of the production.

### Trunks, hand luggage and miscellaneous articles

The manufacturing of trunks, hand luggage and miscellaneous articles, which comprises the production of some sixty or more different items—trunks, hand luggage, purses, billfolds, brief cases, etc.—is much less important than the footwear industry. Here the value of the output amounts to barely $11,000,000. It is of interest though because 41% of the products come from Quebec and it provides another instance of an industry in a flourishing condition.

In 1933 the manufacturing of trunks, hand luggage and miscellaneous leather goods comprised 55 establishments with 526 employees who earned $400,000 in salaries and wages. In 1949 there were 118 factories which paid out nearly $4,000,000 as earnings to 2,500 employees. The value of production had risen from a million to eleven million dollars.

The many and varied products this industry turns out can be divided into five categories. The most important, that of trunks and luggage, represents more than 70% of the total value with a production worth $7,320,000. Next comes the leather clothing group which accounts for about 10% of the value of production.



Pulling over a welt, a worker in a shoe factory fits an upper to a last.

Final operation on footwear is polishing.



The typical concern in the trunk, hand luggage and miscellaneous leather goods industry is the small, individually or family owned workshop. Half the establishments have less than ten employees and a fifth have less than three. Besides, a quarter of the factories have an output valued at less than $10,000. Out of 118 establishments, 101 are located in Montreal or its outskirts.

*

In the leather group, other industries that need only be mentioned, because of their relatively lesser importance, are tanning, the manufacturing of gloves and mittens, boot and shoe findings and belting of all kinds. They constitute a group of widely varied enterprises which contribute to a certain extent to Quebec's tremendous industrial activity.

# TEXTILES

Before reviewing this group, a glance at the value of production of our leading industries will help to show the relative importance of the textile industries in Quebec's economy.

According to statistics for 1949—the most complete available at the moment —pulp and paper followed by the smelting and refining of non-ferrous metals head the list of the Province's industries, the first with a production value of $374,150,000 and the second, $222,-250,000. Slaughtering and meat packing, with a production value of $147,475,000, rank third followed by petroleum products. The gross value of production of the latter is $144,000,000. An output worth $138,705,000 places the cotton yarn and cloth industries in fifth position.

Classified by industrial groups, according to the gross value of production, the relative importance is as follows:

| | |
|---|---|
| Foods and beverages | $704,640,000 |
| Paper products | 454,560,000 |
| Clothing | 410,750,000 |
| Textiles (clothing excepted) | 348,495,000 |
| Non-ferrous metals | 313,325,000 |

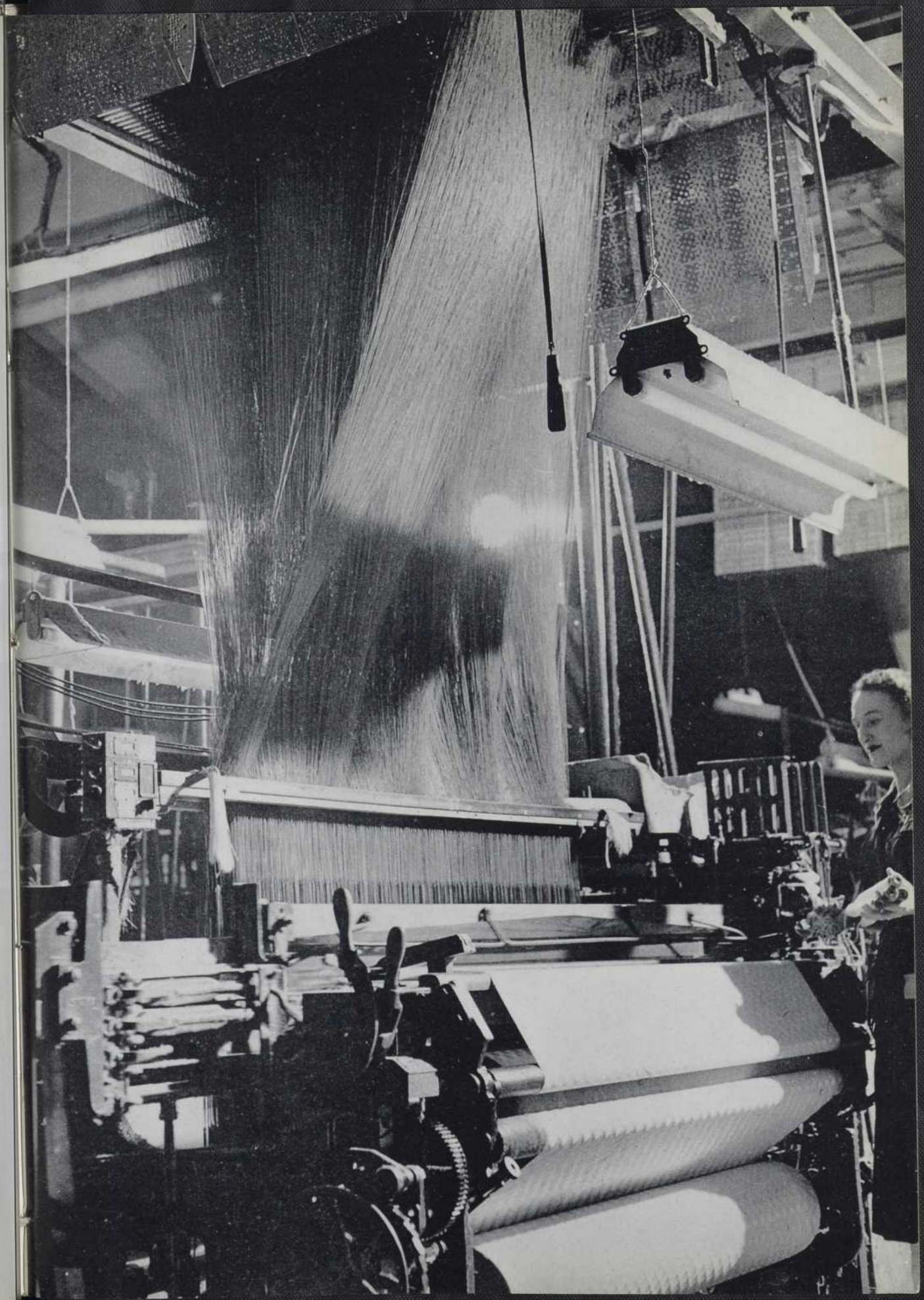
The importance of textiles in Quebec's industrial activity, already shown in the above figures, can be more amply seen when one considers that the 389 establishments they represent (leaving aside clothing and furs) account for a production value of $348,495,000 or over 10% of the entire manufacturing output in the Province.

★

The textile industry is one of the most interesting and complex of all industrial undertakings. Its interest lies in the immense variety of its products that range all the way from the most gossamer of threads to the richest and most intricately designed fabrics. Its complexity results from the manifold manufacturing operations involved, the quantity and intricacy of the machinery used and the many factors which exert an influence on it. To realize the extent to which some of the latter condition the textile industry, one need only mention: the weather, the consumer's income and the instability of world markets for raw materials.

Fashion reigns arbitrarily over the manufacturing of textiles and imposes all its whims that vary from one season to another. The buying power of the consumer is another factor and the necessity of supplying an almost unlimited range of materials to suit the wide variety of factory-made clothing adds to the uncertainties that continually confront the textile manufacturer. Besides, as cotton cannot be grown in our climate and sheep raising is not undertaken on a sufficiently large scale, the Quebec textile industry must look to foreign markets for natural fibres. Consequently, it is influenced by conditions prevailing on these markets. But in spite of uncertainties and difficulties, the textile industry remains one of the most extensive, flourishing and progressive in the Province of Quebec.

**Textiles.—The Jacquard loom, which owes its name to the famous French mechanician, is in use today in the big textile mills of the Province of Quebec. It is still looked upon as one of the finest inventions of industrial mechanics.**



Official statistics deviate somewhat from the two main divisions usually adopted with regard to textiles, namely primary and secondary industries. (The first comprise all the operations from the arrival of the raw fibre at the factory to the point where it is turned out as yarn or cloth. The second cover all the other operations prior to placing the finished product on the market: clothing, awnings, house linen, etc.). Because of its importance, the clothing industry is considered separately and all the other textile industries are grouped together. Of the latter, the more important in this Province are the following:

| | |
|---|---|
| Cotton yarn and cloth | $141,000,000 |
| Synthetic textiles and silk | 76,000,000 |
| Woollen cloth | 25,000,000 |
| Cotton and jute bags | 12,000,000 |
| Dyeing and finishing of textiles | 9,000,000 |
| Narrow fabrics, braid | 8,000,000 |

In 1948 the value of production in this group amounted to $275,000,000.

### Cotton Yarn and Cloth

The Canadian cotton industry originated in Sherbrooke in 1845. Since then, using raw material imported mainly from the United States and Brazil, Quebec has become the leading cotton goods producer in Canada.

The cotton yarn and cloth group in 1910 comprised 11 establishments in Quebec and employed 8,100 persons. Salaries and wages amounted to $2,857,000 and the gross value of production was $16,741,000. The 19 factories in the same group in 1949 employed 16,262 persons, paid out $31,495,000 in salaries and wages and had a gross production value of $138,702,000.

The last figure is indicative of the enormous development that took place during the preceding ten years as the gross value of production only amounted to $49,176,000 in 1939. There is a difference of $134,000,000 between production now and fifty years ago. These figures leave no doubt as to the flourishing condition of a Quebec industry that supplies 69% of the total output of the Canadian cotton yarn and cloth industry.

The extensive scale on which manufacturing of cotton yarn and cloth is carried out can be accounted for by the fact that it requires a wide range of operations and consequently, the outlay of considerable capital. Besides, Quebec cotton mills are the largest in Canada. In 1949, the average value of production per establishment was $7,300,000 compared to $2,138,000 in the other provinces.

The average employment is also much higher in Quebec mills: 850 persons against barely 265 elsewhere in Canada. The total number of employees now seems to have levelled off at around 16,000 after having fluctuated between 13,000 and 18,000 during and immediately following the war. On the subject of employment, we find: A) in Quebec cotton mills male employees are in the majority: 10,623 men and 5,639 women in 1949; B) wage-earners far outnumber salaried employees: 14,755 against 1,507 in 1949; C) the proportion of male workers in Quebec mills is somewhat higher than in the other provinces; D) the Province of Quebec, with 19 out of 54 establishments, has never employed less than 63% of all the manpower in cotton mills throughout the country; E) of the

**The Spinning Frame.—This machine ⟹ does a job of further lengthening and twisting which, for thousands of years, women did by hand, first against their thighs, later on spinning wheels.**

sum of $31,000,000 paid out each year, $4,000,000 go to salaried employees and $27,000,000 to wage-earners; the wage-earner today with an income of $1,937, gets nearly three times what he earned in 1935.

★

Much less important than cotton yarn and cloth, the cotton thread and miscellaneous cotton goods industries are nevertheless deserving of mention. Together with cotton yarn and cloth, the two last named groups comprise 28 establishments situated in 14 cities and villages of the Province. There are 12 in Montreal, 2 in Magog, 2 in Sherbrooke and 2 in Trois-Rivières.

### Synthetic Textiles and Silk

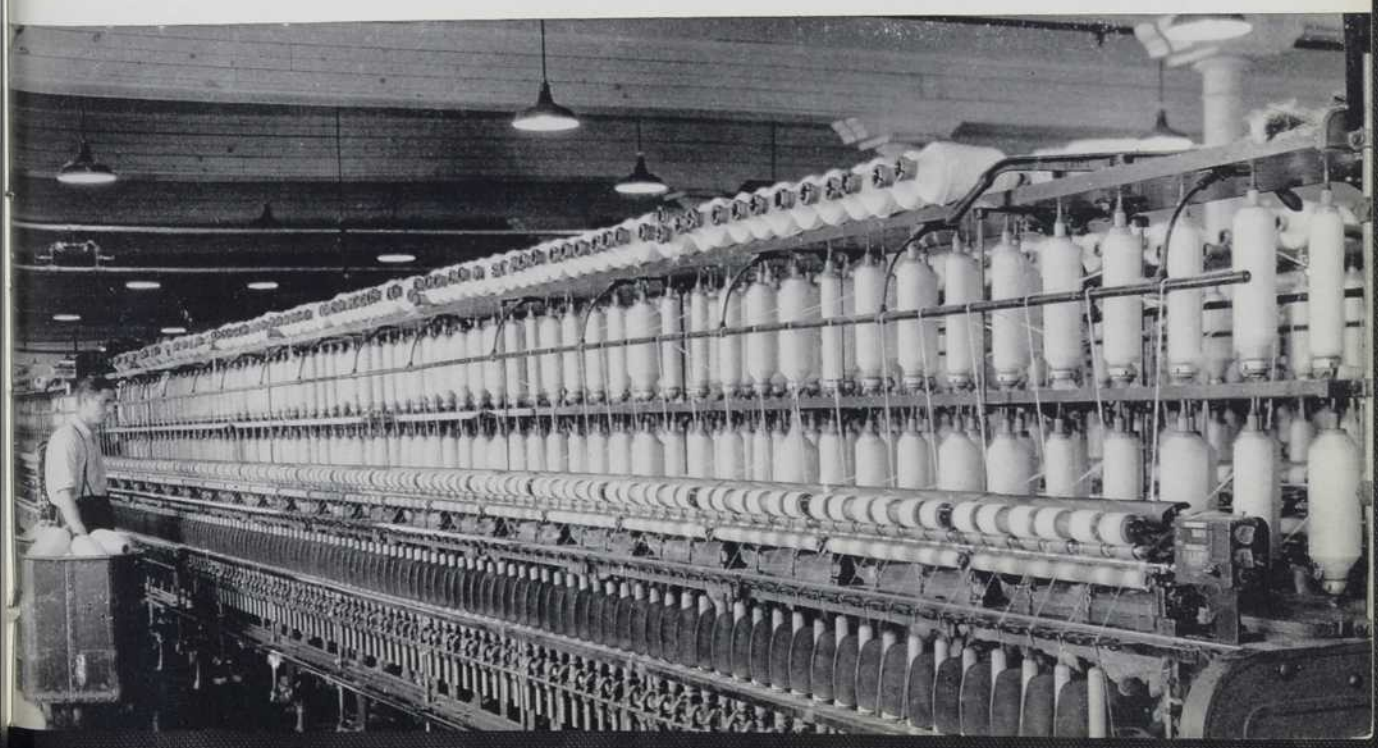
The coming into use of rayon and nylon revolutionized the Canadian textile industry.

European in origin, rayon made its first appearance on the North American continent in 1910. Rayon is of two kinds, acetate and viscose, and both are by-products of the wood in our forests. Nylon is much newer than rayon. It was only perfected in the Dupont de Nemours laboratories in 1935. Today it goes into nearly all textiles.

Among the advantages attributed to these synthetic fibres, which are now used throughout Canada, are the following: better resistance to wear, the facility with which they can be cleaned and their low cost. The great popularity they have gained in the short space of time in which they have been on the domestic market is not to be wondered at. In fact, the expansion of the synthetic textile industry in the Province of Quebec has been spectacular: 36 establishments; 12,400 employees, a $25,000,000 payroll and a gross value of production of $88,935,000 in *1949*, compared to 3 establishments, 650 employees and production valued at $968,000 in *1910*.

★

As in the other textile industries, Quebec dominates the synthetic fibre and silk industry with 78% of the establishments, 73% of the employees, 71% of salaries and wages and 83% of the value of the output.



A remarkable feature of the growth of the synthetic textile and silk industry is that, unlike so many others, it suffered little or no ill effects from the depression of the '30s. But in the continuous upswing we find the synthetic fibres steadily crowding out real silk which at one time was the principal raw material. In 1947 only 24,000 pounds of silk were used compared to 18,000,000 pounds of rayon and 356,000 pounds of nylon. Obviously, rayon dominates this division of the textile industry. It represents nearly half the value of the raw materials used and accounts for the same proportion of the production. The most important product in the industry is the fabric made entirely from synthetic fibre. Next in order of importance is thread manufactured from synthetic fibre, representing 20% of the production.

We have already seen that the production of synthetic textiles and silk had reached a value of $88,935,000 in 1949, that the employment figure was 12,400 and the amount paid out in salaries and wages, $25,000,000. Comparison with statistics for 1941 ($29,790,000 production value, 7,287 employees and $7,617,000 employee earnings) shows clearly that the industry made its greatest strides in the last decade and that it contributes to Quebec's industrial progress in a remarkable degree.

### Woollen cloth

The woollen industry, which from the very first was of prime necessity in New France, had attained considerable importance as far back as one hundred and twenty-five years ago. At that time there were 91 carding-houses and 70 fulling mills in Quebec. With the connected industries—woollen cloth, woollen yarns, carpets and various other woollen goods—it is now concentrated in the provinces of Quebec and Ontario.

The production of woollen fabrics, the leading branch of the industry, comprises 71 out of the 89 factories and employs 9,000 of the 10,000 employees. The 71 establishments account for 91% of the production value of $69,000,000.

The Province of Quebec's share in this production amounts to $26,715,000 with 35 establishments and 3,260 employees. In 1921 the manufacturing of woollen fabrics, which up to then had been of secondary importance, moved into the ranks of the Province's leading industries. In spite of a number of difficulties, notably, reduced demand in the postwar period, keen competition from synthetic textiles and the high cost of raw material, the woollen industry has continued to prosper and to turn out goods of fine quality.

The Quebec woollen mill is usually located in a small town or village, for instance, St. Pascal de Kamouraska, Princeville, L'Ile Verte, Cap St. Ignace, Pointe au Pic, Warwick. The 35 Quebec establishments are spread throughout the Province in 25 localities, none of which has more than 4 concerns. The number of establishments for some years fluctuated between 8 and 15 to reach a peak of 41 in 1946.

Figures for employment, salaries and wages, average output per factory and gross value of production show steady and marked increase—even the financial depression failed to interrupt the upward trend—and make it plain that the industry is among our most prosperous.

With a production of $26,715,000 in 1949, the manufacturing of woollen

Warping yarn. ⟹→

cloth ranks among the leading industries of the Province, a group which comprises the 40 industries with the highest gross value of production. Ten years earlier, the output of woollen fabrics was worth $5,476,000.

In 1939 the woollen cloth industry employed 1,523 persons; in 1949 the number had risen to 3,260 with men representing 63% of the employees.

Total salaries and wages paid out amounted to $1,247,000 in 1939 and a decade later, to $6,355,000.

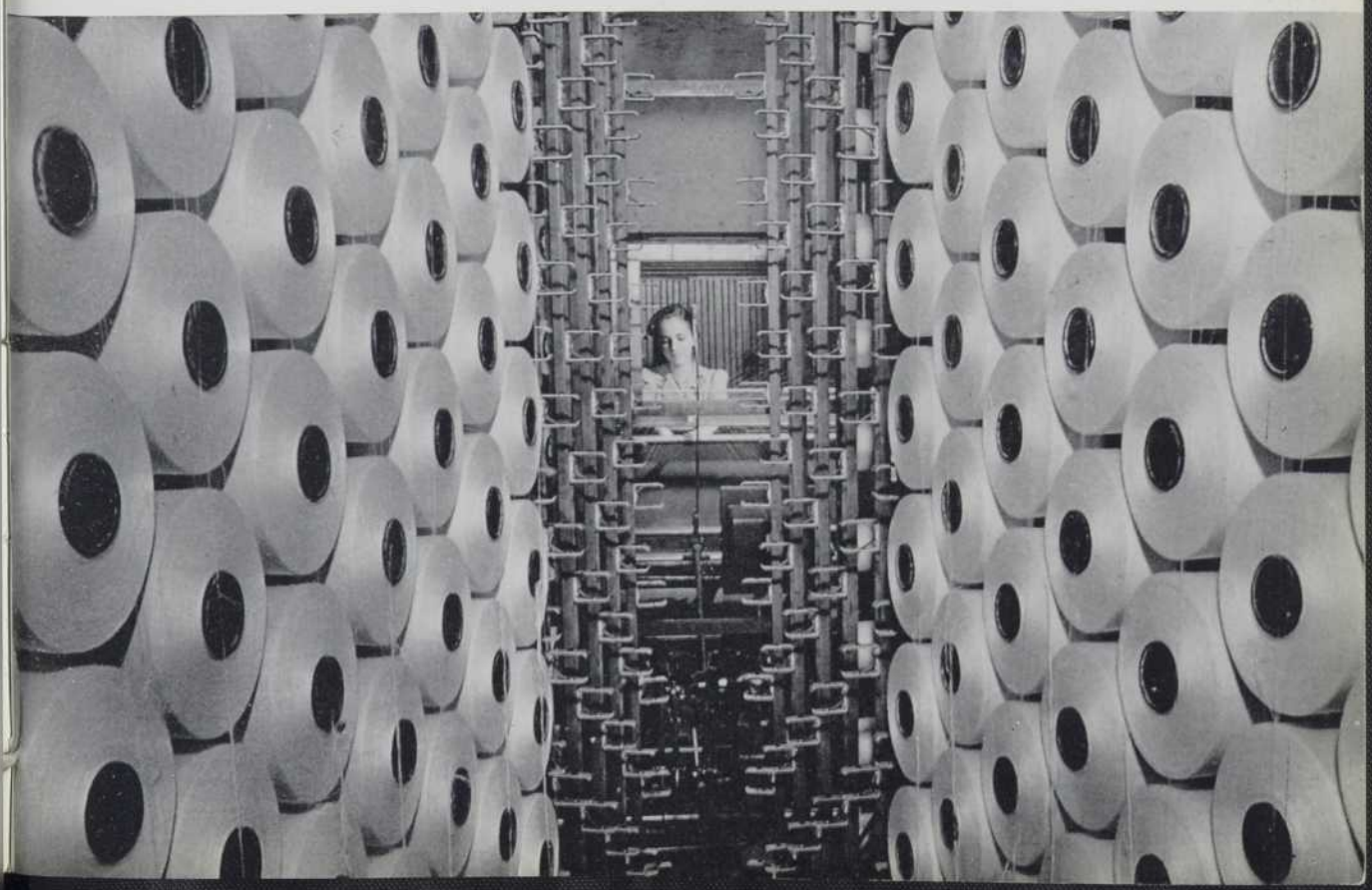
The average output per factory, which was in the neighbourhood of $300,000 in 1939, had soared to $770,000 in 1949.

These increases clearly show to what extent the manufacturing of woollen materials has prospered and become an industry producing on a large scale. By force of circumstances it has had to make very heavy capital investments in order to survive, with the result that it is now one of the most modernly equipped industries in the world, an advantage it shares, in fact, with most of the other textile industries in the Province.

### Dyeing and finishing of textile goods

Although it is not of outstanding importance in relation to Quebec's manufacturing activity as a whole, the dyeing and finishing of textiles deserves notice here since it is essentially a Quebec industry. The Province accounts for 32 of the 46 establishments the industry comprises and furnishes $9,518,000, that is 79% of the value of the Canadian production. The 1,918 employees in the 32 establishments constitute 78% of the personnel engaged in the dyeing and finishing of textiles in Canada.

A number of factories producing textiles of all kinds have their own dyeing department but the establishments re-

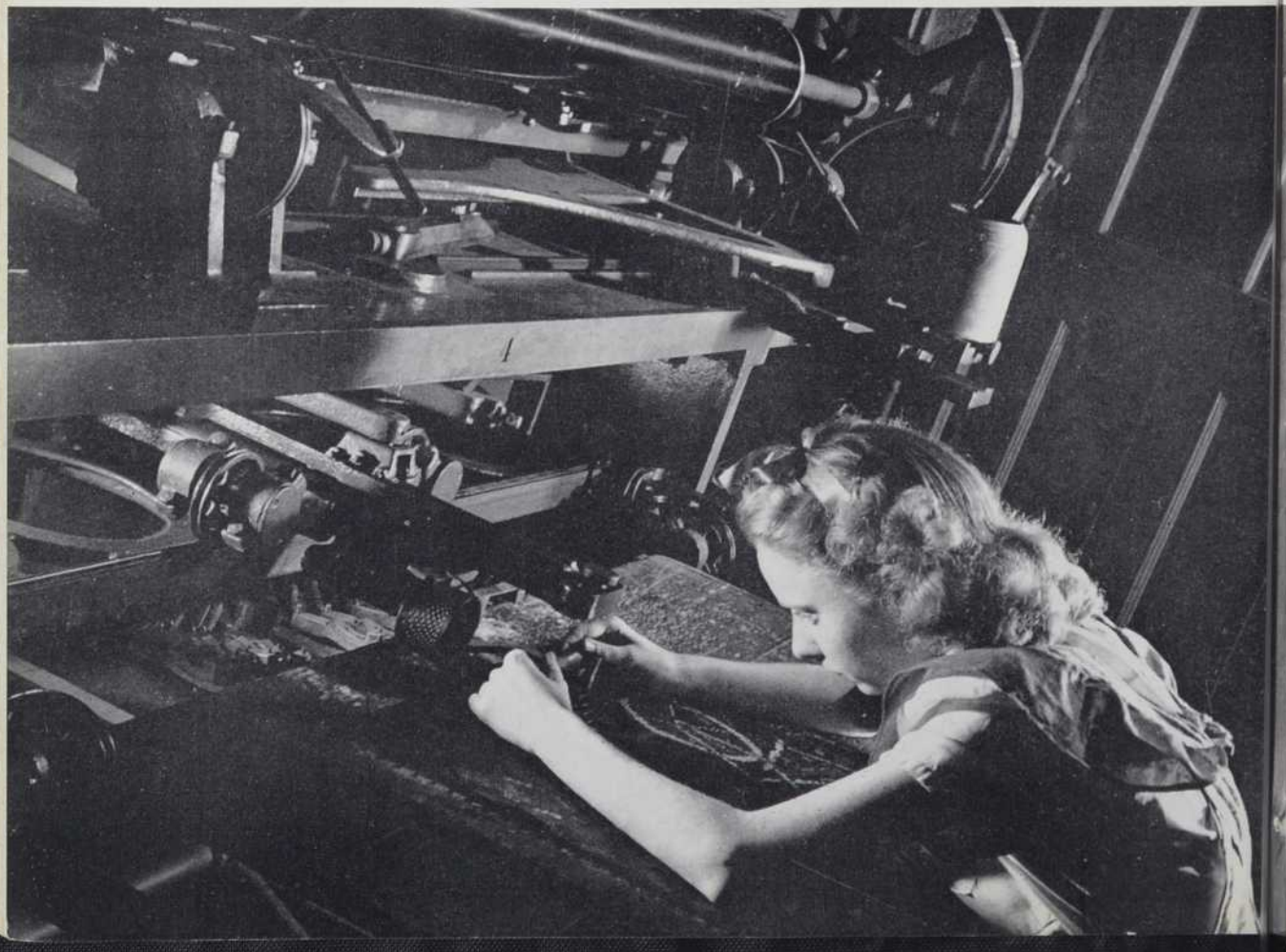


ferred to here are those engaged exclusively in the dyeing and finishing of textiles. There were only 6 of these establishments in 1927 and the increase since then has resulted in a corresponding rise in employment: from 345 twenty years ago, the number had increased to 1,918 in 1950.

It is noteworthy that the majority of employees in this industry are men. This can be attributed to the fact dyeing and finishing of textiles require technologists and specially trained workers with years of experience. It also explains the somewhat higher level of salaries and wages than in most of the other textile industries. Average employee earnings in 1949 and 1950 were $2,120 and $2,240 respectively. The average is 12 times that of 1930.

Like all the other branches of the textile industry, dyeing and finishing has made great strides. In 12 years the gross value of production has multiplied by 8 to reach a yearly output of nearly $10,000,000. To conclude, nearly all the establishments are to be found in or around Montreal.

Despite the fact that the textile industry is a highly mechanized one and amazingly intricate machinery has been introduced to improve the manufacture of cloth, employee's skill is essential to the successful creation of fine fabrics. Nimble fingers, keen eyes and the technical knowledge of fabric production are essential. This illustration shows a girl transferring a print pattern from a flat drawing to a cylindrical copper print roller.



# CLOTHING AND FURS

As has already been noted, in official statistics, the clothing industry is divided from the textile group because of its tremendous importance in relation to the country's manufacturing activity as a whole. This industry, whose products are worth some $700,000,000, is one of the very largest in Canada.

On the provincial level it is also of very great importance since its production in Quebec represents $400,000,000 of the $700,000,000 mentioned. That the Province dominates in the manufacturing of clothing is obvious. In addition to the extent and value of its output, which place it in the forefront, its aspects are too numerous and varied to permit of anything like a detailed scrutiny being made in this booklet. Information has had to be abridged in order to give the reader a broad idea of the industry, supported here and there with a few detailed statistics.

The following pertinent facts provide a summary view of the clothing industry as a whole:

1—Gross value of production in Canada: over $700,000,000.

2—Gross value of production in Quebec: around $400,000,000.

3—Principal divisions of the industry and gross value of respective production in Quebec:

| | |
|---|---|
| Women's clothing: | $147,400,000 |
| Men's clothing | $122,200,000 |
| Hosiery and knitted goods | $ 60,000,000 |
| Fur goods and fur dressing | $ 36,000,000 |
| Corsets: | $ 9,800,000 |

4—Quebec's share of the Canadian clothing industry represents:

66% of women's clothing
60% of men's clothing
49% of fur goods
41% of hosiery and knitted goods
63% of the corsets manufactured

5—More than 60,000 persons are employed in Quebec clothing factories and their earnings amount to at least $100,000,000.

6—Montreal leads all other cities in the country with 1,515 establishments and 60% of the Canadian production.

7—Montreal is unquestionably the greatest producing centre of the clothing industry in Canada.

8—The various divisions of the clothing industry, considered as a whole, constitute the second most important industry in Montreal. With a $300,000,000 output they come immediately after the food and beverage group.

9—The clothing industry is another manufacturing enterprise that must continually adapt itself to changing conditions and to facing a number of problems that arise from such uncontrollable factors as fashion, individual tastes and whims, the weather, the seasons, buying power of the consumer, etc.

### Women's clothing

The manufacturing of women's clothing alone was valued at more than $225,000,000 in 1948, which places it among the 20 leading industries in the country. In Quebec the industry, comprising clothing for misses and children as well, is now the third most important. It includes 720 factories, employs 22,000 persons and its production is worth $148,000,000.

Fifty years ago, there were only 7 establishments, 1,000 employees and an output of $1,000,000.

Of the 1,160 Canadian factories making women's clothing, 719 (nearly two-thirds) are in the Province of Quebec. Between 1927 and 1948, the number increased from 193 to 719, and nearly all are located in Montreal and its outskirts.

★

The very heavy concentration of the Montreal workshops within the heart of the city is worth pointing out. The more important concerns established on a few of the main arteries really constitute the nerve centre of the Canadian women's clothing industry. There are no less than 120 on St. Catherine Street and 114 on St. Lawrence Boulevard. This concentric feature is particularly noticeable with regard to the manufacturing of dresses, coats and suits since this branch of the industry is distributed on 44 streets.

Women's clothing manufacturers employ 33,000 persons in Canada, of whom 22,000 are in the Province of Quebec. Of the latter figure, over 21,000 work in Montreal factories. Toronto, the only other large centre of the women's clothing industry, employs only 8,000 persons. At the beginning of the century the industry employed barely a thousand hands and the average workshop had between 140 and 150 employees. Today employment per establishment averages a little less than 30. In 1910, the payroll in women's clothing factories was $800,000 whereas in 1948 it amounted to $37,300,000.

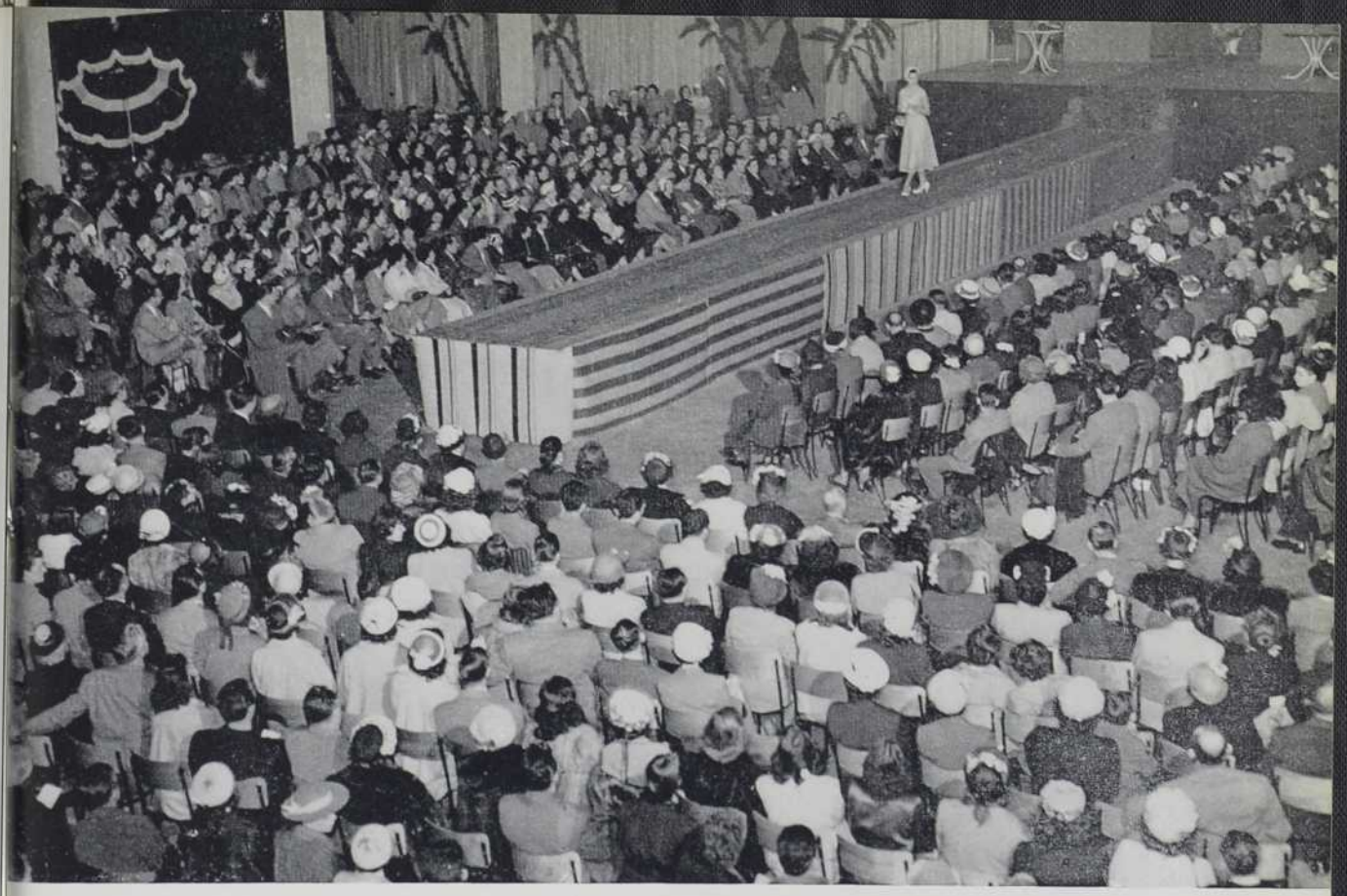
The majority of the Montreal workers are in the dress industry, that is 8,140 persons; 6,162 are in the underwear division and 2,898 in that of children's clothing. The personnel is largely feminine as women account for over 80%.

To conclude these remarks about the women's clothing industry, the following details concern the industry's chief products.

Women's and misses' dresses are the main item of production. In 1948, over 14,000,000 were manufactured in Canada of which 8,000,000 were made of rayon and 6,000,000 of cotton; their value at the factory amounted to $74,150,000.

The manufacturing of coats comes next in importance: 2,400,000 units worth $47,800,000. Wool is the material chiefly used.





Montreal is the centre of the Canadian clothing industry and fashion shows always attract a large attendance as can be seen from this photograph taken at the Show Mart. Women's clothing factories employ over 21,000 persons in Montreal alone.

Tailored suits rank third: 1,000,000 units worth $17,000,000. Other items, given in the order of their importance, are:

| | |
|---|---|
| Blouses: 466 dozen, | $11,468,000 |
| Slips: 420,000 dozen, | $ 8,764,000 |
| Skirts: 2,030,000 units, | $ 6,641,000 |
| Underwear: 1,304,000 dozen, | $ 6,410,000 |

With a 65% share in this output, Montreal is undoubtedly the centre of fashion and of the women's clothing industry in Canada.

### Men's clothing

The men's clothing industry is in many ways analogous to that of women's. Here again Montreal dominates Canadian production and is the centre of the men's clothing business and, as a result, the Province leads in this field. Production is almost as large as in the preceding industry. The following figures illustrate this:

| | |
|---|---|
| Canada | $220,701,000 |
| Province of Quebec | $125,686,000 |
| Montreal | $88,256,000 |

There is, however, a marked difference between the two branches. While the women's clothing industry is almost entirely concentrated in Montreal, that of men's clothing is more widely dispersed in the Province and Canada. For instance, Montreal accounts for 98% of Quebec establishments and 60% of Canadian manufactures in the women's

branch but, has only 82% of the Quebec factories and 49% of the Canadian ones engaged in making men's clothes.

★

The manufacturing of men's clothing comprises 339 establishments in Quebec Province, of which number 277 are in Montreal. The following list shows the various divisions and emphasizes Montreal's major contribution:

| | Number of manufactures | |
|---|---|---|
| | In Montreal | Outside of Montreal |
| Suits and overcoats | 132 | 22 in 13 municipalities |
| Separate jackets and trousers | 39 | 6 " 6 " |
| Shirts | 32 | 12 " 11 " |
| Work clothes | 25 | 20 " 16 " |
| Neckwear | 22 | 0 |
| Miscellaneous clothing | 15 | 1 |

The financial depression, the war and the postwar period caused the number of men's factory clothing establishments to fluctuate sharply: 60 in 1900 and 215 in 1918; — 176 in 1932, 214 in 1937 and 266 in 1945; — 360 in 1947 and 339 in 1949. The following data, taken from the latest statistics, gives a general outline of conditions in the industry and the progress it has made in this Province.

The average Quebec factory employs 51 persons. In 1900 the employment figure was 130. This is a normal feature resulting from increased mechanization and more up-to-date production methods. It does not prevent an increase in employment since the latter grows with the expanding of the industry, as can be seen from the following figures:

In 1949 total employment, 20,964 (17,-881 in men's clothing factories and 3,083 in clothing contractors), was double that of 1930 and three times that of 1921.

Female employment predominates in this industry, particularly in shirt, neckwear and work clothes factories. Two out of three of the jobs are held by women. Nevertheless, in the men's suits and overcoats division, the man's tailor has retained his prestige.

In relation to employment the chief divisions of the industry are: suits and overcoats, fine shirts, overalls and work shirts, windbreakers and work pants. These four sections employ 85% of the industry's personnel.

In the suit and overcoat division Montreal dominates with 5,202 employees who earn $12,000,000. This represents half the employment in the men's clothing industry in the Metropolis. In the corresponding division Quebec City employs 500 persons whose salaries and wages amount to $700,000.

The manufacturing of shirts provides employment for 2,058 persons or 19% of the personnel in the men's clothing industry in the Metropolis.

Montreal is also predominant with 2,008 employees engaged in making separate garments, neckwear and miscellaneous men's wear but falls behind in the windbreaker and work pants divisions.

Salaries and wages paid out by the industry amounted to $30,980,000 in 1949.







Selecting skins, the cutting out and finishing of fur coats. The Province of Quebec ranks first in Canada in the fur manufacturing industry. The most important item of production is the woman's fur coat. About 100,000 are made every year and represent nearly ¾ of the production of the Quebec fur industry.

The gross value of production in the Province of Quebec reached the peak figure of $215,700,000 the same year. The sum is equivalent to 57% of Canadian production.

Montreal is the leading producing centre. Its 277 establishments turned out goods valued at $88,255,646 in 1949, that is, 70% of Quebec's output and 40% of Canadian production.

### Hosiery and knitted goods

This industry employs 11,000 persons in 114 establishments (on an average 96 per factory) and its production amounts to some $60,000,000. This again is an important field of enterprise although Quebec ranks only second with 42% of the establishments. Ontario leads with 51%.

The hosiery and knitted goods industry had small beginnings in Quebec but it has progressed very extensively as can be seen from the following:

9 establishments in 1900 — 60 in 1940 — 114 in 1948.

934 employees in 1900 — 10,988 in 1948.

$114,000 expended in salaries and wages in 1900 — $16,886,000 in 1948.

$397,000 production value in 1900 — $60,632,000 in 1948.

This industry is usually divided into two main categories comprising respectively stockings and socks, underwear and lingerie. The first represents about 42% of the total output. Incidentally, the manufacturing division in which nylon is making the greatest headway against rayon is in the production of women's stockings.

### Furs

The fur industry as it exists today is the direct successor of the very old undertaking known as the fur trade. In bygone centuries, the "coureurs de bois" used to adventure into the depths of the forest to bring back the pelts that sold for high prices on the European markets. At present the industry is not dependent on fur trappers alone as a large number of animals, whose rich pelts are in demand, are bred on fur farms. That the demand is heavy can be judged from the fact that the number of Canadian women who buy fur coats is estimated at 200,000 a year.

Fur dressing and the manufacturing of fur goods constitute two distinct divisions of the industry.

The first comprises all operations from tanning to dyeing. It includes 11 establishments that employ a great many workers. The second is chiefly concerned with the making of ladies' fur coats which account for 70% of production. It consists of a great many small establishments (on an average 11 employees), located for the most part in the larger cities, and selling directly to the consumer.

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The main points worth noting with regard to this industry are as follows:

The Province of Quebec ranks first in the manufacturing of fur goods in Canada.

With an output valued at $30,000,000 in 1949, the Province of Quebec accounted for half of the Canadian production.

The manufacturing of fur goods is carried on in Quebec in 298 workshops distributed in 10 localities.

The City of Montreal accounts for 255 of the establishments and Quebec City, 31.

The Metropolis contributes 92% to the Province's output and 45% of the entire Canadian production. Quebec City's share amounts to 7%.

Montreal employs 84% of the personnel in the industry and Quebec City, 12%.

Two of the great fur markets of the world are Montreal and New York.

The most important item of production is the woman's fur coat. The 97,000 coats produced represent 72% of the value of the Province's output ($21,562,000 out of $29,751,000).

Fur dressing does not rank among the leading industries with regard to the number of establishments — only 11 — or the value of production. Nonetheless it plays an important part in the manufacturing of fur goods. Nearly all fur dressing is done in the 11 establishments (10 in Montreal — 1 in Quebec) located in the Province of Quebec. Several of these concerns have acquired renown outside the Province and have contributed to making it, and in particular Montreal, one of the great fur centres of the world.

### The corset industry

The Province of Quebec, and especially the City of Quebec, is of outstanding importance in this industry. The 17 establishments it comprises are distributed among five municipalities. There are 4 in Quebec City and 10 in Montreal.

In 1948 the 4 Quebec City factories employed 1,170 persons, of whom 952 were women, that is, 37% of the employment in Canada and 62% of the employment in the Province.

The gross value of products of the 4 factories — $5,908,000 — was equal to 60% of the provincial production and 38% of the Canadian output.

The corset industry in Quebec City employs, on an average, 295 persons and turns out about $1,477,031 worth of goods, that is, a higher average than the same factories in Montreal ($263,383) or Toronto ($261,735). In relation to the value of their output, the three cities rank as follows:

| | |
|---|---|
| Quebec: | $5,908,000 |
| Toronto: | $4,188,000 |
| Montreal | $2,364,000 |

Quebec City alone accounts for 60% of the Province's production. It can justly be called the Canadian centre of the corset industry. On the whole the industry contributes a production value of some $11,000,000 to Quebec's economy.

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Taking together in conclusion the closely linked textile and clothing industries, in both of which Quebec is predominant, we find the enormous extent to which these two manufacturing groups influence not only Quebec's internal economy but the entire Canadian economy as well. Their value of production adds up to $760,000,000, equivalent to 20% of manufacturing production of the Province and to 58% of the production of the two same groups in Canada. Their combined employment figure of 109,000, that is, 29% of employment in Quebec manufactures and 56% of employment in the same two groups in Canada, shows them to be the leaders in the employment field.

Fur-bearing animals in Canada can be classified into three groups according to their dollar value:
1) Mink, muskrat, fox, beaver and squirrel;
2) Ermine, marten, otter, lynx, rabbit and coyote;
3) Fitch, wild cat, wolf, bear and badger.

# WOOD PRODUCTS

Wood and its products head the list of Quebec manufacturing production. Of a total value of $3,600,000,000, wood and paper products alone accounted for the sum of $737,000,000 in 1948. The Quebec industry employs 78,000 persons who earn $162,000,000 in salaries and wages. They represent the employment required for the cutting, transportation and manufacturing of 1,147,000,000 cubic feet of wood.

Before considering the various divisions of this huge industry, it is as well to cast a quick glance over the vast Canadian forest domain which constitutes its primary source of supply. In this way it will be easy to realize the enormous importance of the forest as an economic factor for Canada as a whole and for the Province of Quebec in particular.

The forest extends over more than a third of the country's entire area, that is, 1,275,000 square miles. About 574,000 square miles (a little less than half) are written off as non-productive. Of the remaining area, it is estimated that 473,000 square miles of timberlands are accessible and can be exploited commercially.

A typical logging camp on the edge of the forest. Everything has been done to provide comfortable living conditions for the men engaged in forestry operations. In the Province of Quebec the industry employs 78,000 workers in the cutting, transportation and milling of 1,147,000,000 cubic feet of wood.



Total Canadian forest resources are estimated as equal to 191,347,000,000 cubic feet. Expressed in commercial terms, the available timber would comprise 242,072,000,000 feet board measure of sufficient size for sawmill products and 1,687,000,000 cords of smaller growth suitable for use as pulpwood, fuel and various other commercial purposes.

The production of forestry operations (the direct exploitation of the forest, a primary industry) in 1948 had a total net value of $461,000,000, or 11% of the net value of all primary production in Canada.

The secondary industries (or manufacturing)—lumber, pulp and paper, wood products and paper products—had a net value of production of $916,000,000 or 18% of the net value of Canadian secondary production. The sum of $1,377,000,000 resulting from the primary and secondary industries that exploit the forest is equivalent to almost 15% of the net value of all Canadian production.

Moreover, in 1948, 350,000 men and women were provided with employment in the lumber industries. The figure represents 7% of the Canadian labour force. These employees' salaries and wages amounted to $762,000,000.

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The Province of Quebec has the most extensive forest domain with timberlands covering 264,200 square miles, without taking into account the wooded area of New Quebec. Usable timber covers a superfiicies of 190,700 square miles. It is estimated that this domain represents 64,000,000,000 cubic feet of wood or 34% of the Canadian resources. Ontario has 30% and British Columbia, 19%.*

★

About 46,000,000,000 cubic feet are softwoods and 18,000,000,000 cubic feet, hardwoods. Spruce and balsam fir are the species mainly used for sawn lumber. Other important kinds are birch, white pine, jack pine, white birch, hemlock, cedar and maple.

Quebec's timberlands comprise 54,000,000 board measure feet of timber suitable for sawn lumber and 627,000,000 cords of smaller growth that can be used for pulp or other commercial purposes.

It can readily be seen that the forest domain is an enormous source of supply for the country's manufacturing activity. It is not surprising then that Quebec, holding such a large share, has used it as the basis on which to build the Province's greatest industry. In fact, Quebec leads all the provinces in the wood industries with 30% of the establishments, 30% of employment, 30% of salaries and wages and 33% of the gross value of the output.

### Sawmills

Quebec's yearly cut of some 1,147,000,000 cubic feet of wood is divided into the following categories:

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* The greater portion of Quebec's forest domain belongs to the Province and cutting rights are granted to private concerns. Such concessions comprise 79,000 square miles; 26,700 square miles belong to individual concerns and 151,900 square miles are kept vacant. The remainder includes special reserves, colonization lots and Crown lands under federal jurisdiction.

| | | |
|---|---|---|
| Pulpwood ..... | 623,000,000 | cubic feet |
| Lumber, ties, poles shingles, etc. .... | 256,000,000 | " " |
| Firewood ..... | 256,000,000 | " " |
| Undressed logs exported ... ..... | 11,000,000 | " " |
| Charcoal wood ... | 1,000,000 | " " |

Once it has been cut down and removed from the forest, wood finds its way leading in many directions according to the use for which it is intended. Since pulpwood calls for individual consideration, attention is here given to four of the principal secondary industries: sawmills, furniture factories, sash and door and planing mills, veneer and plywood mills.

Besides building lumber, the output of sawmills comprises various products such as shingles, laths, railroad ties, box shooks, etc. Some mills also cross-cut and bark a certain quantity of pulpwood.

Quebec is the leading producer of spoolwood, laths, staves and barked pulpwood. It ranks second in the production of sawn lumber and shingles.

The gross value of production in Canadian sawmills amounts to $409,000,000. The Province of Quebec is in second position with $70,000,000. First place is held by British Columbia which the year round exploits its timber of huge girth that is better adapted to the production of lumber than pulpwood. British Columbia alone accounts for more than half the value of the lumber sawn in Canada. Ontario ranks third with $59,000,000.

In the Province of Quebec 1,951 sawmills are spread through 64 counties. They are for the most part in rural districts, villages or colonization centres. The average number of workers varies between 5 and 10 employees depending upon whether the mill is a small one or a large enterprise operating throughout the year. The average worker's earnings are calculated to be $1,275 a year. However, this does not represent earnings for a full twelve months. With few exceptions, sawmilling is a seasonal business operating from Spring until mid-Summer and a great many of the 10,400 sawmill workers find their livelihood elsewhere once the season is over.

As has happened with a number of others, the sawmill industry has been through difficult times but like other industrial undertakings it has expanded considerably within the past few years. In ten years, employment has more than doubled and its output which amounted to $30,000,000 in 1941 had climbed to $70,000,000 in 1948. Sawmilling is now one of Canada's major industries.

### The furniture industry

Among Quebec's secondary industries using wood as raw material, the manufacturing of furniture is the one that gives employment to the greatest number of people and has the highest production value. It comprises the production of various kinds of furniture, which fall into the following main categories: bedroom, livingroom, kitchen, office and school; buffets, chairs, bed frames, cabinets and luxury articles; upholstering

Stamping lumber.—The transportation and distribution of lumber when it leaves the sawmills is one of the interesting aspects of this industry. Most of the lumber finds its way to points within the Province but a considerable quantity is shipped to other provinces or to foreign countries.



and a number of items for domestic or public needs. Various species of hard and soft wood, with in addition veneers, metals and, recently, plastics and several by-products of wood are the chief materials used in the furniture industry.

A small industry in the Province of Quebec until 1940, the manufacturing of furniture has since then expanded to become a leading industry, ranking seventeenth according to value of products. In 1938 the output was valued at $10,476,000; by 1949 it had reached $49,675,000. In the same interval employment had risen from 3,758 to 8,912 and salaries and wages, from $3,476,000 to $16,804,000.

It is in the Province of Quebec that furniture manufacturing has progressed to the greatest extent. In ten years the number of establishments increased by 300%, whereas in the country as a whole the increase was only equivalent to 150%. Indirectly, the Government of the Province of Quebec contributed extensively to the industry's development by the foundation, in 1930, of the School of Furniture-making in Montreal. This School has since gained a wide reputation. Cabinet-making, wood-finishing, wood-carving, design, analysis of styles, ceramics and weaving are taught in the School, which provides the Quebec furniture manufacturing industry with highly skilled craftsmen.

### Sash, door and planing mills

Included under this heading are the establishments principally engaged in manufacturing doors, sashes, frames, moldings, planed and matched lumber. They are to be found in all sections of the Province and particularly in the districts where lumbering operations are carried out.

In 1948, 633 mills in this group provided employment to over 5,400 persons and paid out $8,404,000 in salaries and wages. The gross value of the output was reported as $33,221,000. Compared to these figures, we have 353 mills, 2,424 employees, $1,815,000 in salaries and wages and $6,102,000 for the gross value of the output in 1938.

With half the number of sash, door and planing mills in the country and a third of the employment, Quebec accounts for only a quarter of the value of Canadian production in this branch of the wood industry. It may seem rather surprising that 633 mills out of 1,391 should produce only a quarter of the value of the entire output. But the majority of Quebec mills of this kind are very small enterprises working for local consumers and often for only a few months in the year.

### Veneers and plywoods

Veneers are thin sheets of better quality wood laid over wood of inferior quality. Plywoods consist of several layers of veneers glued together to form an extensive surface without the usual defects and limitations of wood.

The many and varied uses that have been found for veneers and plywoods have resulted in the building up of a new and important branch of industry.

Canadian statistics on veneers and plywoods only date from 1944, the year the industry began to take on importance.

In 1948 Quebec and British Columbia were producing 85% of the total value of the industry. The British Columbia mills are naturally by far the larger as



Opening a road through the forest to facilitate bringing out the wood to be cut down during the logging season.

the raw material available West of the Rockies lends itself particularly well to the production of veneers and plywoods on an extensive scale.

The Province of Quebec accounts for 20 of the 44 Canadian establishments comprised in this industry. Employees number 2,200 and the payroll amounts to $3,920,000. The gross value of products amounting to $14,770,000 in 1948 was twice as much as in 1944.

### Other wood products

The four groups of industries considered here are really those which contribute most to making wood and its products of such outstanding economic importance in the Province of Quebec. There are, besides, a great many other enterprises which make use of wood as a basic material and which are worth mentioning even though they are not nearly as important or as large as the others. For instance, the box and crate industry — (49 workshops — 1,300 employees — $6,283,000 production value) — the hardwood flooring industry — (12 plants — 635 employees — $4,762,000 production value).

Various other products valued at $14,000,000 also have wood for basic material. Salaries and wages amounting to

$5,500,000 are paid out to 3,500 persons employed in 218 establishments in this category which includes wood-turning, lasts, pegs, coffins, cooperage, etc. These, together with the enterprises mentioned in the preceding paragraph, give a total of 280 establishments with a production figure of over $24,000,000. Salaries and wages paid out to 5,360 employees amount to more than $8,000,000.

Moreover, there is the growing industrial use of wood refuse. What was formerly looked upon as waste is now being used for manufacturing corrugated cardboards, wallboards, etc. and is taking on increasing importance in the huge industry resulting from the exploitation of our forest resources.

Loading logs in the woods of Temiscouata.



# PULP AND PAPER

According to some authorities, the art of making paper from fibrous substances goes back to the second century B. C. The Chinese appear to have been the pioneers in this field, as they were with regard to printing. Toward the middle of the 8th century the Arab world had learnt the process. The Spanish Moors introduced the making of paper into Europe and, in the second half of the 14th century, the use of writing paper had spread throughout Western Europe. In the following century parchment was gradually and definitely replaced by paper.

In North America the first paper mill was built in Germantown, Pa., in 1690. At the end of the American Revolution, the United States already had 80 paper mills. By 1810, the number had grown to 200, producing $2,000,000 worth of paper a year.

At about the same time, or to be more exact, in 1803, the first paper mill was opened in this country in Argenteuil, in Lower Canada. Straw and rags were the materials used. In 1810, a second mill was established in Portneuf and the 1861 census reports the existence of six paper mills.

The first paper mill to use wood as raw material was installed in Valleyfield in 1866 by an American named Alexander Buntin. Three years later, at Windsor Mills, in the Eastern Townships, John Thompson opened a mill for making paper with pulp extracted from wood by means of the caustic soda process. By the end of 19th century, the Province of Quebec was producing 80% of Canadian pulp, a great quantity of which was sold in the United States.

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Today, as a result of its paper industry, Canada is among the greatest exporting countries of the world. The following data provide the best proof of what the manufacturing of paper is worth to us.

Canada has 123 pulp and paper mills, the sum total of whose value of production is $954,000,000.

According to its value of production the paper industry leads all the manufacturing industries in the country.

The paper industry heads the list of our exporting industries as Canada consumes only a small part of the production.

Our exports of newsprint and pulp represent 24% of all Canadian exports and 36% of our sales in the United States.

Canadian exports of newsprint, the most important product of our paper industry, meet 60% of the world demand.

The United States absorbs 90% of the production of Canadian newsprint.

Indirectly, the paper industry is responsible to a tremendous extent for prosperous conditions in trade and industry. It increases the turnover of transportation services by approximately $130,000,000, buys $65,000,000's worth of electricity and fuel and uses over $250,000,000's worth of wood. The industry itself employs 52,000 persons to

whom it pays out $169,000,000 in salaries and wages but it is estimated that, indirectly, it provides a means of livelihood for 250,000 persons.

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From the view point of the Province of Quebec, the picture is even more impressive.

The pulp and paper industry employs more people than any other industry in the Province.

It is Quebec's leading manufacturing industry in respect to production, capital investment and exportation.

The paper industry has provided the greatest stimulus to Quebec's economic expansion.

It has attracted a considerable amount of capital to the Province and has contributed extensively to opening up regions heretofore economically inaccessible.

In recent years, 45% of the pulp and paper manufactured in Canada has been turned out by Quebec mills and 52% of Canadian newsprint has come from Quebec.

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Log pond and storage piles—Here, cut into four-feet lengths, the logs are fed into barking drums which strip the bark, leaving just the smooth inner wood. They are then stored in huge piles, ready for the long chain of careful processes which transform them from rough forest wood into fine papers.



The manufacturing of chemical pulp by means of the Kraft process was introduced at East Angus, in the Eastern Townships, in 1907 and the year 1910 marks a definite turning-point in the Quebec pulp and paper industry. The question of cutting rights and trade barriers in the form of custom duties, embargoes and tariffs had for net result the stimulating of fresh enterprise in the Province of Quebec. New companies disposing of large capital were formed and those already in existence expanded considerably.

Quebec produced 515,409 tons of pulp in 1914 — 1,088,205 in 1922 and 2,174,805 in 1929. The financial crisis which followed sharply reduced activity. Up to as late as 1940, paper mills were only running at 60% capacity. But the situation has changed completely since then. From $56,000,000 in 1933, the net value of production of pulp and paper had soared to $393,000,000 in 1948. This represented 1,833,000 tons of pulp in 1933, 3,880,000 tons in 1948 and 3,920,000 tons in 1950. The increase in the quantity of paper was as great: 1,536,000 tons in 1930 as against 3,200,000 tons in 1948.

This production is divided now between 12 pulp mills, 33 pulp and paper mills and 10 paper mills in the Province



Various types of pulp are mixed in this oval vat and mechanically treated by knife blades carried on a revolving wheel. This operation develops in them the required degree of strength, and at this point the proper chemicals and colors are added.



Paper mills like this one at the mouth of the St. Charles River, Quebec, play an important part in the Province's economy. 52% of Canadian newsprint comes from Province of Quebec mills.

of Quebec. (1) The 55 establishments are distributed in 8 districts where swiftly running rivers furnish power for electric stations, provide access to the forest and floatage for logs (2)

In 1948 employment and salaries and wages reached a record peak in these mills: 23,894 employees (compared to 17,387 in 1940) and $69,148,000 in earnings (compared to $27,218,000 in 1940).

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To manufacture pulp and paper there are three essentials: wood, hydro-electric power and chemicals. The wealth of our resources, forest and streams, together with technical progress and the proximity to the United States, the biggest consumer of paper, have been the dominating factors in the expansion of this enormous Quebec industry.

From the point of view of timberlands, Quebec has the advantage over the other provinces. Quebec's forest

[1] The pulp mills only produce pulp for the paper mills, other plants using pulp, or for export. The pulp and paper mills manufacture paper from pulp produced in their own mills. Paper mills make paper from pulp purchased from other producers.

[2] For example, the Saguenay, the St. Maurice, the Gatineau and the Ottawa rivers. The St. Maurice Valley alone produces approximately 40% of Quebec pulp.

covers 264,200 square miles of which 190,700 square miles are accessible. The wooded regions, notably those of the St. Maurice, Saguenay and Lake St. John, are irrigated by rivers that facilitate the floating of logs from the lumber camps to the mills and supply abundant water power. The pulp and paper concerns that operate the forest limits leased to them by the Quebec government (3) procure about 70% of the wood they need from these limits. More than half this wood is cut down in the wooded areas of the St. Maurice Valley, Lake St. John and the North Shore. The amount of wood used to manufacture pulp and paper in Quebec mills in 1950 is estimated at 5,000,000 cords (valued at $118,000,000). (4)

The countless rivers, falls and streams that are part of the St. Lawrence River system constitute one of the Province of Quebec's richest natural resources. The gradual harnessing of these water power resources has resulted in making a huge quantity of hydro-electric power available to mills and factories that without electricity could not exist, much less thrive.

It is to availability of hydro-electric power that one must attribute, generally speaking, the astounding development that has taken place in Quebec's industry and particularly the colossal expansion in the paper industry in the last few years. Since 1940, Quebec pulp and paper mills have consumed an average of 8,000,000,000 kwh. a year or the electric power produced by generators of some 1,200,000 h.p.

Finally, chemical research has succeeded in turning to further advantage and profit the raw material found in our forests. Years ago wood was used only for building or as fuel. Science has found many and varied new uses for it in the production of synthetic substances — textiles, plastics, etc., while modern techniques have facilitated and speeded up their use. Nevertheless, the greater portion of the pulp produced is still used to make paper. Happily enough the Province of Quebec has as a next-door neighbor the greatest consumer of paper in the world, the United States, so that the output of the huge pulp and paper industry finds a ready market. As has already been noted our exports of newsprint and pulp represent 36% of all our sales in the United States.

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Beside other Quebec entreprises, that of pulp and paper might be compared to an industrial giant supporting Quebec's economy. Its gross value of production, amounting to $393,347,430 in 1948, is twice as high as that of non-ferrous metals, our second industry in order of importance. It is also equivalent to 25% of the gross value of the combined production of the Province's ten leading industries and 11% of the value of production of all its manufacturing.

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[3] See Wood Products, group No. 7.

[4] Two different methods are used in making pulp: the mechanical process and the chemical process. Depending upon the method employed groundwood pulp or chemical pulp is obtained.

The mechanical process consists in defibrating the wood in a grinding mill; the wood loses very little of its bulk in this process whereas in the chemical process the wood loses about half its bulk. In the latter method, wood is put through a chipper and then cooked in a digester in a chemical solution under pressure. After a few hours' cooking, all the elements in the wood are dissolved except the cellulose or wood fibre.

There are three kinds of chemical pulp: sulphate, sulphite and soda which derive their names from the acids or alkalis used during cooking.

On the other hand, the net value of production of the pulp and paper industry (after deduction of cost of raw materials, equipment, electricity and fuel) is only $191,547,782. This shows that the expenditures exceed the net value of products. It indicates in particular the extent to which the money spent by the pulp and paper industry finds its way into the various arteries of Quebec's economic system. For instance, in 1948, the industry spent $17,960,225 for fuel, $15,046,389 for electricity; $168,793,034 for raw materials, equipment, etc.

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In the course of the last few years a new aspect has developed in the pulp industry and has had as a result the widening of its scope. The production of newsprint has not increased as quickly as the output of pulp. This can be accounted for by the fact the latter is not restricted, as formerly, solely to the market for paper. Manufacturers of building materials such as wallboards, insulating boards, synthetic products and plastics are creating a growing demand for chemical pulp. Consequently, the pulp and paper industry has had to adjust its output to meet the particular requirements of its new customers. The production of chemical pulp has, therefore, increased in greater proportion than that of mechanical pulp (38% compared to from 45 to 50%) in order to supply these markets, and the immense pulp and paper industry is becoming more and more widely linked to a variety of enterprises. This is its latest contribution to Quebec's economic expansion, an expansion to which it had already given such a strong impetus.

Before bringing this section to a close, attention must be drawn to the fact that modern techniques have made possible the production of widely varied papers and paper boards resulting in a correspondingly wide range of enterprises dependent on the pulp mills for their material. This branch is known as the paper products industry (not including paper boxes and bags or roofing papers). In 1949 there were 72 establishments of this category in Quebec. They provided work for 2,576 persons and paid out $4,901,517 in salaries and wages. The net value of their annual output amounted to $6,769,570. At the same time there were 8 factories making roofing papers and 49 making paper boxes and paper bags. They paid out $10,000,000 in earnings to 4,558 employees and had a net value of production of $23,274,486.

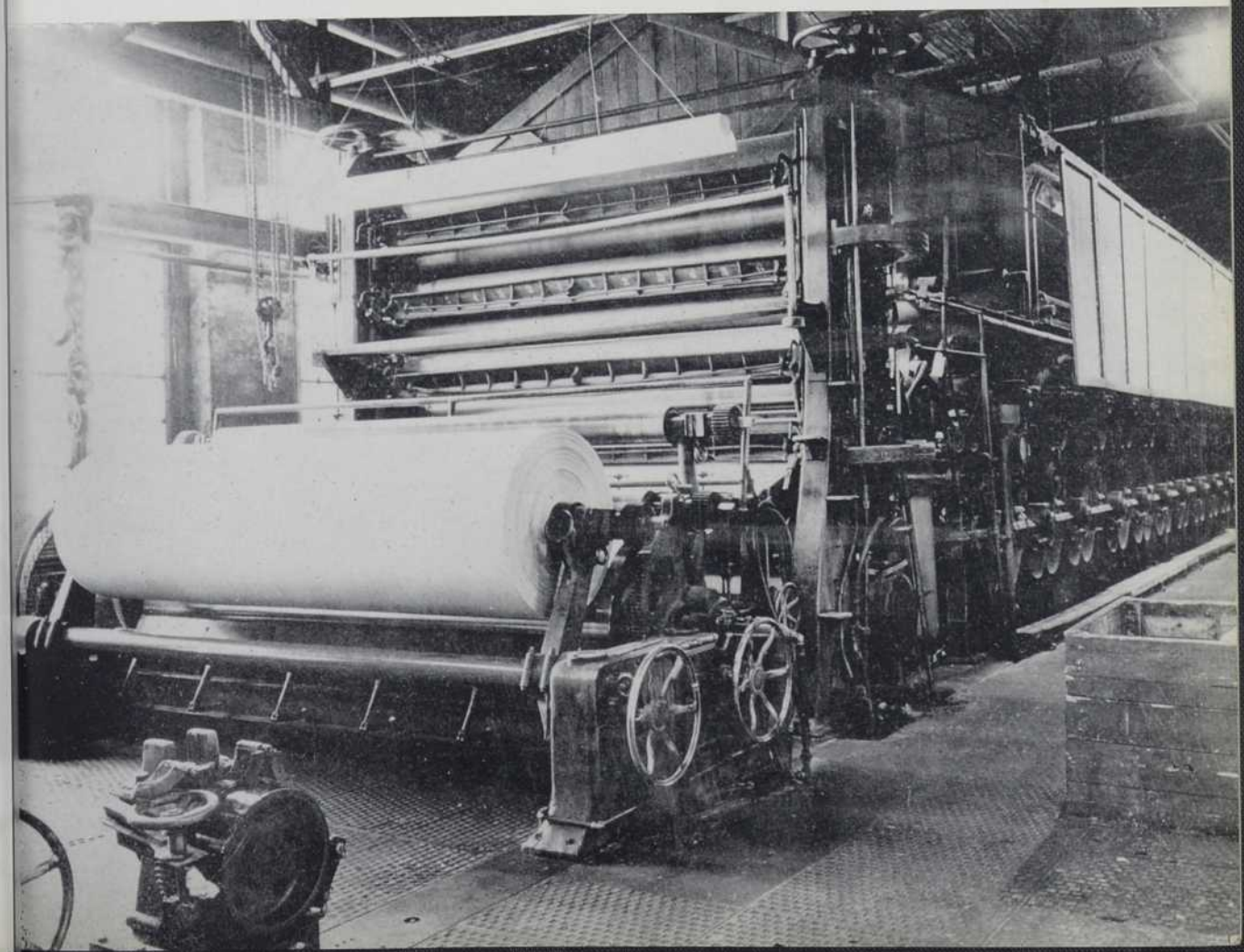
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In short, it can be said that the pulp and paper industry has exercised an economic influence in the Province of Quebec that has been little short of miraculous. By pushing back the boundaries of the forest it has opened up new centres to civilization. Uninhabited regions have been peopled, new parishes founded, towns have mushroomed around it. Large centres owe their existence and their development to the pulp and paper industry and to the many workers who earn their livelihood either directly or indirectly by its means. The pulp and paper industry has imprinted a distinctive character on Quebec's economic life and there is every indication that it will long continue to exert an outstanding influence. Sylviculturists, physicists, chemists, engineers, a whole army of scientists, employed either by the government or by private enterprise, are constantly on the alert in la-

boratories, in the depth of the forest, in the lumber yards or in the mill. They are engaged in studying wood, superintending the exploitation of the forest domain, waging war on the pests that threaten it, studying reforestration, seeking new uses for forest products in order to maintain and extend if possible the benefits of the pulp and paper industry in our midst. The Province of Quebec is participating in this task in a very constructive way by maintaining in Trois-Rivières, the centre of the paper industry, a school of paper-making that has the reputation of being the most modern in the world.

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Fourdrinier Paper Machine—Into this machine pours thin, milky pulp from the beaters. The fibres are tangled and matted and this mat of paper is pressed flat and thin and is given a smooth surface. The paper then passes through a series of heavy, highly polished steel rollers, called calender stacks, giving it the fine surface and quality for which papers from the Province of Quebec are known all over the world.



# Printing and Publishing

History credits the printing press with having played an important part in the renewal of letters, arts and sciences known as the Renaissance, which swept through Europe in the 15th and 16th centuries. The coming into use of printing and the deep and lasting impact it was to exert, in so many different ways, marks the opening of a new era in Western civilization. It unlocked and threw wide the doors which until then had been closed to the common man in countless spheres; it spread knowledge to every walk of life, previously available only to the privileged few, and it was through printing that what we call public opinion was formed and diffused.

Because it supplied one of man's most urgent needs, the invention Gutenberg completed in Strasburg in 1436 spread through Europe like wild fire. By the beginning of the sixteenth century there were so many printers, the Corporation or Guild of Paris Copyists petitioned Parliament to restrict the industry which they claimed was threatening established order. Happily the master printers found clearsighted and powerful protectors in Louis XI, Louis XII and later Francis 1. Less than fifty years after Columbus discovered America, the New World saw its first printing establishment set up in Mexico in 1539 by Giovanni Paoli, acting as agent for John Kromberger of Seville, Spain. In 1752 the first Canadian printing office was established in Halifax and twelve years later one was founded in Montreal.

Today, printed matter in all its forms, books, newspapers, magazines, etc., has become an essential of everyday life. It is part and parcel of every human activity and it is hard to imagine what modern individual or community life would be like without it.

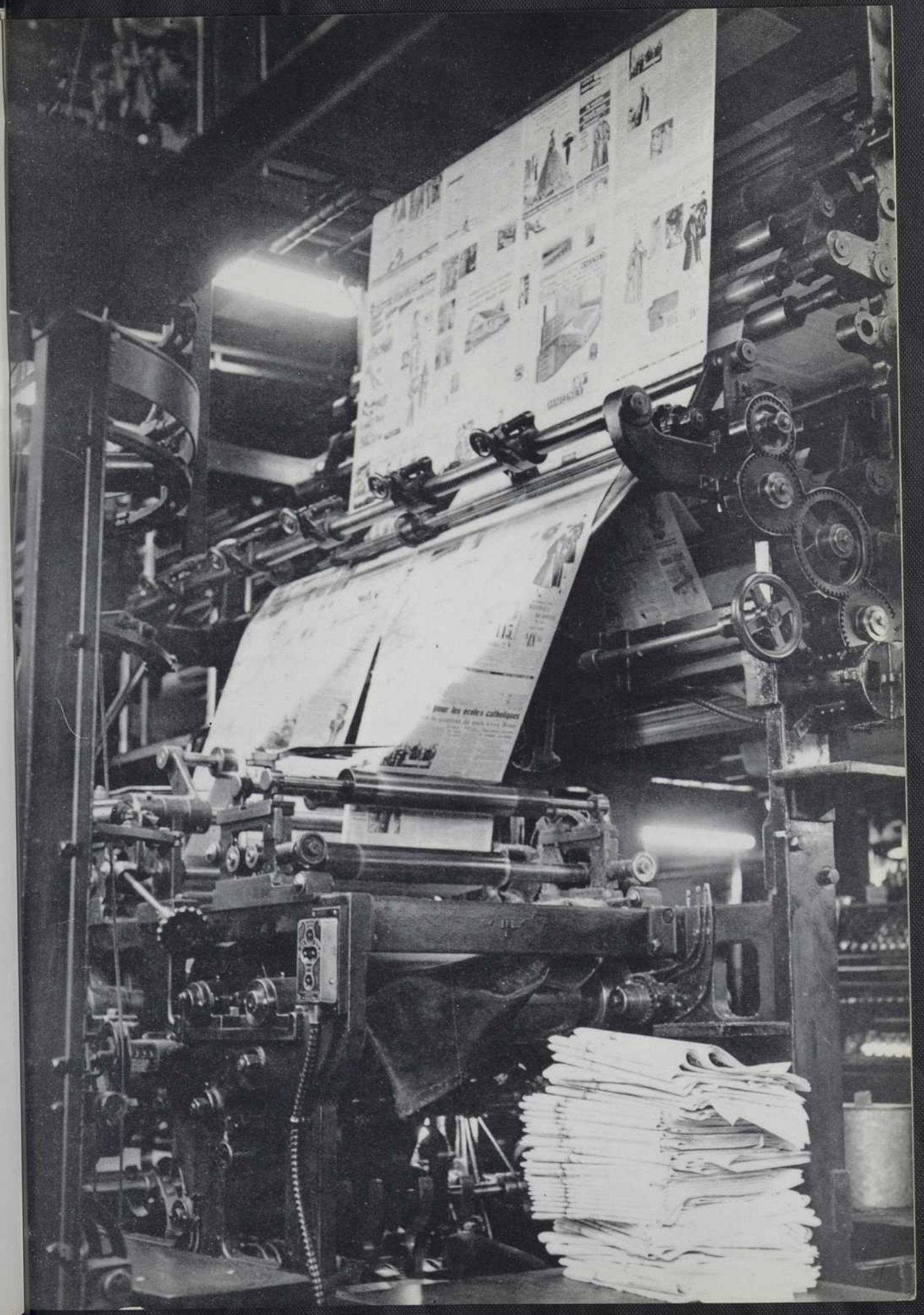
It is, therefore, not surprising the printing trades now constitute an industry of importance, especially in a province such as ours, where papermaking holds a leading position in manufacturing production. Our paper industry, in fact, finds its chief outlet in the printing trades which furnish some $85,000,000 in gross value to Quebec manufacturing production.

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Although printing establishments of all kinds are to be found from one end of Canada to the other, they are mainly concentrated in Quebec and Ontario. Quebec ranks second in this field (coming immediately after Ontario), and the output of its establishments, numbering around 600, represents 24.5% of the production of all the Canadian printing trades.

The kinds of printing in most common use are typography and offset. Typography is the oldest method but is still very widely used. It consists in printing with moveable characters. Offset is a printing process whereby the lithographic principle is applied to metal.

**The printing press of a large daily newspaper. Montreal and Quebec firms publishing books, newspapers or magazines, are the backbone of the printing industry in the Province of Quebec.**


pour les écoles catholiques

The various types of workshops comprised in the industry are usually divided into the following five categories :

1) Publishing and printing, consisting of publishers who operate their own printing plants; newspapers belong to this category.

2) Printing and bookbinding, composed of printers, not included in the first group, and bookbinders.

3) Lithography.

4) Engraving, stereotyping, electrotyping and photo-engraving.

5) Trade composition, comprising workshops specializing in preliminary type-setting.

More than half (354) the concerns in the Province are located in Montreal while the City of Quebec accounts for approximately a tenth (56). About a hundred printing and bookbinding establishments are distributed in almost as many municipalities. The relative importance of the Montreal and Quebec City establishments can be judged from the table below which shows the value of production in the printing trades in the eight principal cities of Canada :

| | |
|---|---|
| Toronto, Ont. | $110,350,000 |
| Montreal, Que. | 59,580,000 |
| Winnipeg, Man. | 17,060,000 |
| Vancouver, B.C. | 15,550,000 |
| Ottawa, Ont. | 10,700,000 |
| Hamilton, Ont. | 9,100,000 |
| London, Ont. | 7,720,000 |
| Quebec, Que. | 6,420,000 |

By provinces, the production of the printing trades was divided as follows in 1948 :

| | |
|---|---|
| Ontario | $184,687,000 |
| Quebec | 84,358,000 |
| Prairie provinces | 38,135,000 |
| British Columbia and Yukon | 23,949,000 |
| The Maritimes | 12,075,000 |

A payroll of $35,000,000, 15,000 employees and an output worth around $60,000,000 in 1947, which climbed to $85,000,000 two years later, clearly indicate the importance of Quebec's printing industry.

### Publishing and Printing

This, the most important of the printing trades, in 1948 comprised 76 establishments (23 in Montreal, 4 in Quebec and 49 in other towns in the Province) and accounted for 50% of the value of the output in all Quebec printing concerns. Publishing firms — book, newspaper or magazine publishers —in the Metropolis and the Ancient Capital are the backbone of the industry in this Province. They employ over 6,000 persons and salaries and wages amounted to $15,176,000 in 1949 (compared to $7,287,000 in 1943). As for production, the value increased from $14,782,000 in 1939 to $41,345,000 in 1949.

### Printing and Bookbinding

This second industry comprises some 496 concerns which print a great deal of material (books, prospectuses, pamphlets) without the publisher being the printer. In 1939 there were 389 of these establishments. A number of these concerns also have bookbinding shops. They are, in general, small enterprises employing on an average 13 persons. They are spread throughout the Province but the greatest number are in Montreal, where 286 are located, while Quebec City accounts for 47.

In Montreal the average establishment in the Publishing and Printing category has fewer employees and a

The type-setting room.—In printing plants, setting type by hand is the oldest but still very widely used method.

smaller output than the same enterprise in Quebec City — 208 employees in Quebec City as against 170 Montreal and $1,153,447 production value in Quebec compared to $1,040,655 in Montreal — . But on the other hand in the Printing and Bookbinding group, the average Montreal concern tops the Quebec establishment of the same kind. In fact, it employs 16 persons, has a payroll of $22,600 and the value of its output is $81,300, whereas in Quebec City the average workshop employs 10 persons, pays out $15,900 in salaries and wages and has a production valued at $33,000.

Of the 6,243 employees in the Printing and Bookbinding trade in 1948, (4,000 in 1942) — 4,462 worked in Montreal shops and 449 in those in Quebec City. The total payroll which amounted to $5,000,000 in 1941 had grown to $13,700,000 in 1949.

## Other Trades

In conclusion, the following facts are worth noting with regard to workshops engaged in doing lithographing, engraving, photo-engraving, stereotyping, electrotyping and trade composition.

Lithographing provides employment for over 700 persons and the value of the output is close to $6,000,000. Of the 10 establishments in this Province, 9 are in Montreal, and one is in Quebec.

Quebec's 29 engraving and stereotyping shops are distributed as follows: 26 in Montreal, 2 in Quebec, 1 in Mont-Joli. They do over $4,000,000 's worth of business and employ about 800 persons. Workshops engaged in "trade composition" do $1,000,000's worth of business.

Also worth mentioning is the publication of a certain class of periodicals, usually issued by societies, associations



or by commercial firms for free distribution. The publishers consign the printing of these periodicals to printing shops.

In 1949, there were 1,300 publishers of this kind, of which 400 were in Quebec. The latter employed nearly 2,000 persons, 70% of the number being employed the year round. Salaries and wages amounted to $3,658,000.

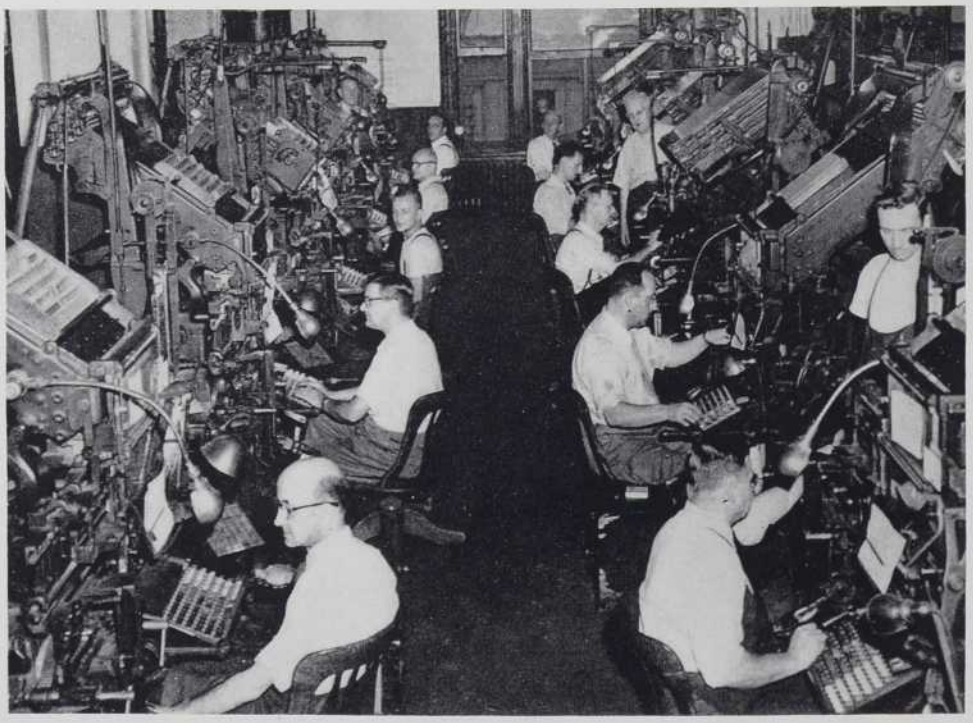
Although the Province of Quebec has not the greatest number of publishers of this type, it has the highest output in the field, namely $17,000,000. The sum represents more than half Canadian production in the business. The Province has the largest publishing houses engaged in issuing periodicals. The average yearly receipts of a Quebec publisher amount to $43,000, while in the remainder of the country they are approximately $17,000.

★

Considered as a whole, the contribution of the printing and allied trades to Quebec's industrial activity can be summarized as follows :

| | |
|---|---|
| Number of establishments | 600 |
| Number of employees | 15,000 |
| Salaries and wages | $35,000,000 |
| Value of production | $85,000,000 |

Combining certain elements of artistic endeavour with industrial technology, printing plays an outstanding role in cultural life by reason of the nature of the services it renders. Besides, it plainly constitutes an economic factor of no small value.



The linotype room in a large publishing firm. The various divisions of the printing industry are worth some $85,000,000 a year to the Province of Quebec in value of production.

# IRON AND STEEL

Although iron and steel already hold an outstanding place in Quebec's manufacturing industry, many believe the putting into operation of the iron ore deposits in New Quebec will result in a new era of prosperity in this field. If expectations are realized, future developments are likely to be as spectacular and far-reaching as some the Province has experienced in the past.

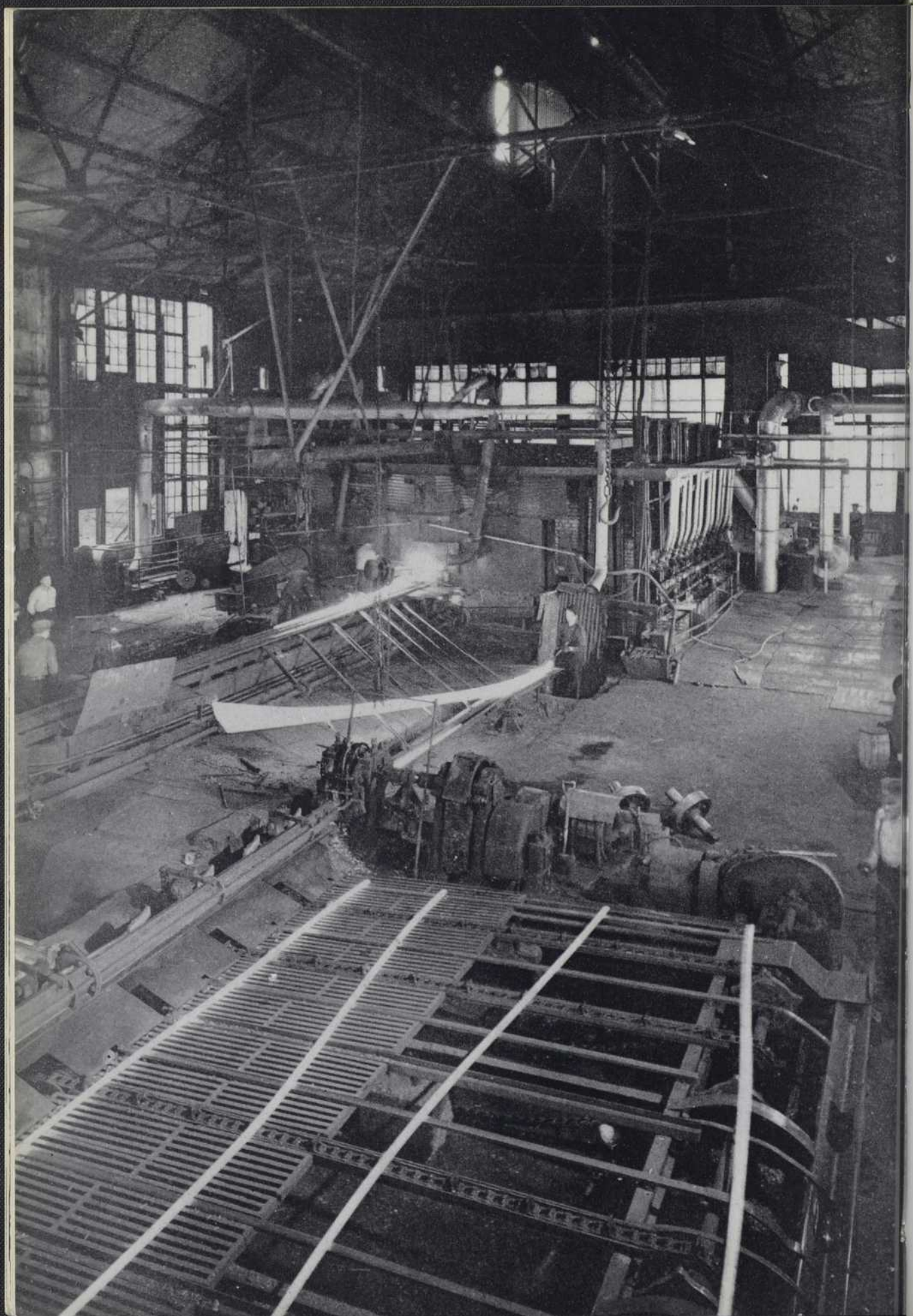
The existence of iron ore in Northern Quebec had long been known, but it required the preliminary work of the past few years to prove the extent of the deposits and reach a decision concerning the possibility of exploiting them. Up to now, our iron and steel industries have had to depend almost entirely on imported raw materials.

It was in the Province of Quebec, a little north of the City of Trois-Rivières, that the first smelting of Canadian ore was undertaken. As early as 1737 a group of business associates established the famous St. Maurice Forges in order to work the iron deposits in the region. In the Forges the ore found in the boggy soil was smelted with the aid of charcoal from the neighboring forest. For more than fifty years the St. Maurice Forges were a busy centre of activity and an important factor in the economic life of New France. Finally they dropped out of existence, as did other small undertakings of the same kind which came into being at later dates, because of the meagreness of the deposits and the rapidity with which they were exhausted.

In short, these were thought to be the only iron ore deposits in the Province of Quebec. To organize and develop Quebec iron and steel industries, the importing of raw material was essential. Today there are a great many of these industries of various kinds and, considered in their entirety, their share in Quebec's manufacturing production amounts to several hundred million dollars.

Dividing this industrial group into the categories of primary and secondary industries, we find the latter have far greater importance in our economy than the first and this is easily understood. The primary industries produce iron and steel from iron ore, in other words, they are engaged in extracting metal from the native mineral and as up to now Quebec lacked raw material, the primary iron and steel industry could not expand to any great extent. This situation is likely to undergo a radical change once the iron ore deposits of New Quebec are producing.

The secondary industries in this group, that is, those using iron and steel supplied by the primary industries, are, on the other hand, numerous and considerably more important in our manufacturing activity. They manufacture a



wide range of products. The principal ones with the gross value of their production in 1949 are the following :

| | |
|---|---|
| Machinery | $62,000,000 |
| Sheet metal | 40,000,000 |
| Iron castings and iron and steel pipe and tubing | 30,000,000 |
| Fabricated and structural steel | 24,000,000 |
| Hardware, tools and cutlery | 20,000,000 |

With a few other enterprises of lesser importance — concerns producing wire and wire goods, heating and cooking apparatus, boilers, tanks and steel plates, agricultural implements, etc. — the secondary industries account for 86% of the entire output of the Quebec iron and steel industries.

### The Industry's Progress

Three distinct stages can be discerned in the development and progress of the iron and steel industries within our Province. First, there is the period before 1920 during which the heavy industries were established in Montreal to supply the needs created by the building of railroads. Structural steel for bridges, and rolling stock were manufactured in the Metropolis. As far back as 1915, the miscellaneous iron and steel products industry ranked ninth among the leading manufacturing industries in Quebec, while bridge building and foundry products were respectively in fourteenth and fifteenth place. The demand for munitions and shipbuilding during the First World War were new stimulants and the production figures for 1919 show a 50% increase in several branches of the industry.

The second phase covers another twenty years: 1920-1940. The period from 1921 to 1929 was one of expansion in mining and hydro-edectric power as well as in the pulp and paper business. The iron and steel manufacturing industry shared in the general prosperity and Quebec plants took advantage of the market created by the need of equipment for other industries. Stimulated by the demand for industrial tools, the iron castings division's production rose from $1,000,000 in 1921 to $9,800,000 in 1926 and to $11,600,000 in 1929, while the output of machinery increased from $3,-700,000 to $8,500,000 then to $11,000,000 for the same years.

The Second World War and the years immediately following comprise the third stage in the development of the iron and steel industries in the Province. Although several branches of the industry attained their peak in 1943, the primary iron and steel industry only reached its highest figure in 1945. On the other hand, in the case of boilers, tanks and steel plates and fabricated and structural steel, maximum production was recorded as early as 1941. The top figure for machinery production was attained in 1942. During the war the value of the output of machinery shot up from $14,400,000 to $49,100,000, but from having been in first place it fell back to second. The manufacturing of small munitions, comprised in the miscellaneous iron and steel products industry, resulted in the latter moving into the leading position with a production value which rose from $1,200,000 in 1938 to $161,750,000 in 1943.

← Iron castings, iron and steel pipe. The Province of Quebec accounts for 58 establishments in this division of the iron and steel industry.

Now that several years have elapsed since the end of hostilities, it is apparent the iron and steel industry has been able to make the transition from a wartime economy to a peacetime one without undue dislocation, as is too often the case when civilian needs replace military requirements. Here recovery was swift. Some of the fundamental industries like primary iron and steel plants and manufactures of industrial equipment even increased their output in the years immediately following the end of the war. For instance, production in the iron casting industry reached a record peak of $31,000,000 en 1948. The growth in the average value of production, which was 75% to 200% per establishment, and the increase in the average production per employee, which was 6% to 55%, are reliable indications of the progress made by the iron and steel industries between 1938 and 1948. They also point to Quebec's growing industrialization and to the use of more efficient methods of production.

## THE SECONDARY INDUSTRIES

### Machinery

As already noted, the secondary iron and steel industries are more important than the primary ones in relation to Quebec's manufacturing output. Of the secondary industries, the foremost by far is the manufacturing of machinery which alone is considerably more important than the primary industry. It has the highest employment figure with a personnel of 9,330; it comprises 72 establishments and the value of its output is over $60,000,000.

The production of machinery is divided into three main categories : household, office and store machinery; machine tools; other machinery not comprised in the preceding categories. The first is represented by 15 establishments and the third by 57. There is no factory making machine tools in the Province of Quebec.

The centre of machinery production is unquestionably Montreal which, with its outskirts, accounts for 46 of the 72 establishments. In 1922 there were only about 20 of these workshops whose aggregate employment amounted to 1,440 persons. At that time salaries and wages totalled $1,900,000 whereas in 1949 they reached the sum of $22,000,000. The gross value of production also shows the strides made by this industry : $61,788,000 in 1949 compared to $5,471,000 in 1933.

### Sheet metal products

The sheet metal products industry ranks second among the secondary iron and steel industries in this Province. In 1949 it was 24th among the manufacturing industries in Quebec with a production value of $39,000,000.

In 1922 the sheet metal industry comprised 17 establishments employing 1,954 persons. In 1949 there were 66 with a total manpower of 4,500 persons. Total salaries and wages had risen from $1,500,000 in 1922 to $10,475,000 in 1949.

Like the machinery industry the production of sheet metal is for the most part concentrated in Montreal, 54 of the 66 plants being located in the Metropolis or the surrounding area. Its output is varied : food cans, barrels, metal sashes, bottle caps, pipe, kitchenware, galvanized sheets, etc. In 1949, these products represented the sum of $38,958,-



The huge Quebec iron and steel plants turn out all kinds of boilers, tanks and mechanical requisites of every shape and size. The gross value of production amounts to over $200,000,000, a year.



000 and Quebec ranked 2nd, preceded by Ontario. Compared to this figure we find the gross value of the output in 1922 amounted to $5,525,000 and in 1937, to $12,569,0000. Montreal accounted for 68% of the production and employed 75% of the personnel.

### Iron castings

This industry comprises establishments engaged chiefly in making iron castings and iron and steel pipe and tubing. In 1949 Quebec had 58 establishments of this kind, distributed in 42 municipalities. Although there is less concentration than in the two preceding groups, and even though Montreal accounts for less than a seventh of these foundries, 53% of the industry's personnel are employed in that city. Total employment in the 58 establishments amounts to 4,000 persons and the gross value of the output is $29,464,000 or over a fifth of the Canadian production.

### Fabricated and structural steel

The first plants for the production of fabricated and structural steel were established at the outset to meet the huge demand created by the building of the transcontinental railroads. There are now 9 of these establishments in the Province : 5 are in Montreal itself and 2 in its suburban area. Quebec and Sherbrooke have one each. The 9 establishments employ 2,474 persons whose earnings amount to $6,496,000.

The fabricated and structural steel turned out by these plants is used for the framework of large buildings, girders for bridges and towers for electric transmission wires, etc. In 1949 production reached a record peak with a value of $23,857,000. In 1932 the 4 plants in existence at that time produced $2,380,-000's worth of material.

### Hardware

The production of hardware, tools and cutlery ranks fifth among the secondary iron and steel industries. It took on considerable importance as a result of war contracts and although it had to reduce its activity at the end of the war, its output has since remained far greater than it was prior to 1942.

After having comprised as many as 62 establishments, there are now 54 which, generally speaking, are the largest in the country. Employment was almost 3,000 and the production figure close to $20,000,000 in 1949.

### Producing centres

The City of Montreal, to say nothing of its outskirts which are highly industrialized, accounts for 263 out of 528 establishments representing the iron and steel industry in the Province. The City supplies 41% of the personnel with employment amounting to 15,000 persons, 42% of production with an output valued at $111,000,000 and pays out $35,000,000 in salaries and wages. In the same industrial group, the City of Quebec has 33 establishments which employ 717 persons and the value of production is not over $5,000,000. These figures clearly indicate the predominant share the Metropolis has in our iron and steel industry.

## PRIMARY IRON AND STEEL

Sorel provides a typical example of a town that has built up its wealth and prosperity on the iron and steel indus-

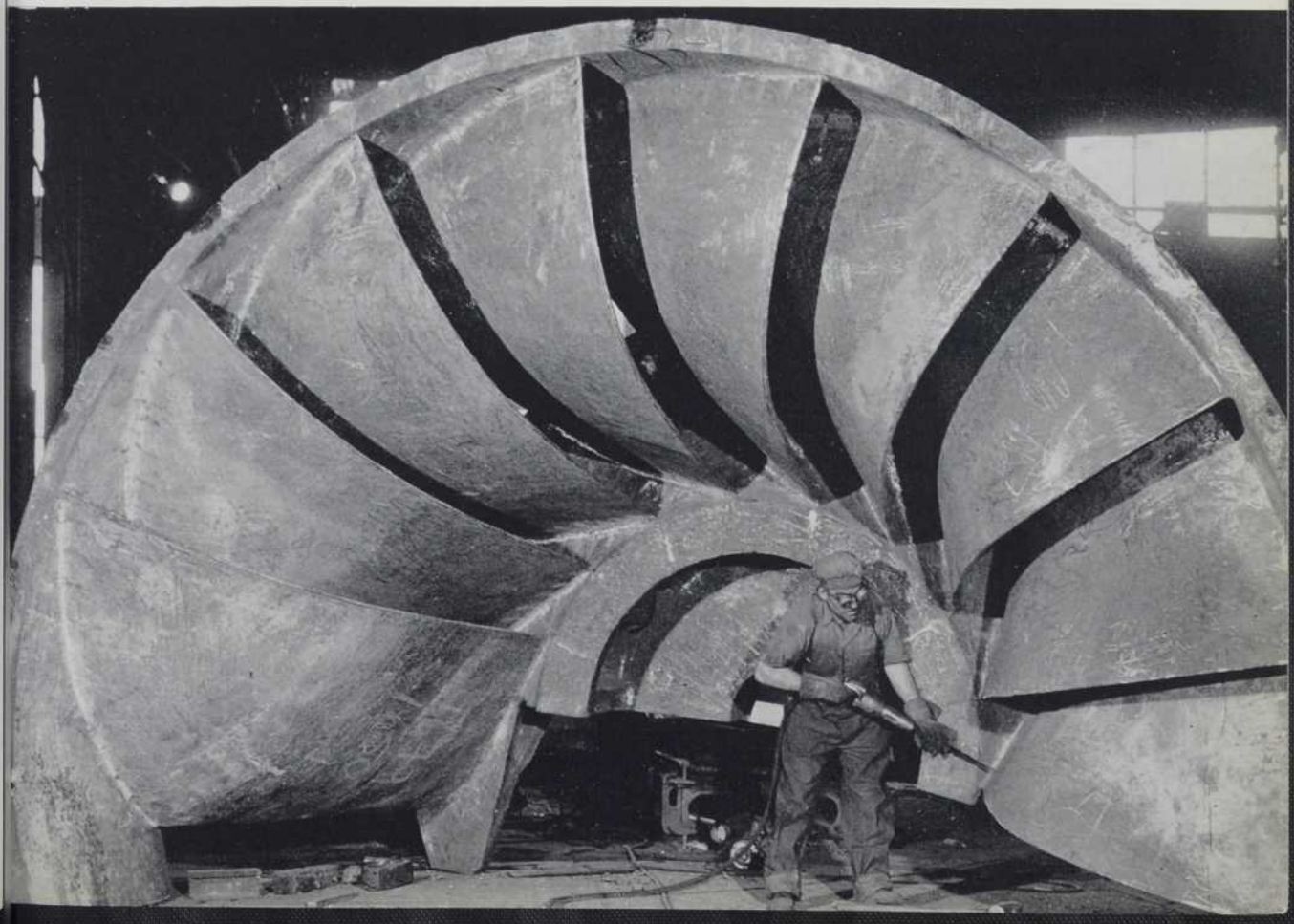
try. From the very beginning of the colony the town has been a shipbuilding centre and a port. When iron ships replaced wooden vessels, around 1875, a foundry and a machine shop were constructed in connection with the shipyards.

Today Sorel has, besides, a big metallurgical plant whose output of navy guns during the war was outstanding, and an electric furnace for smelting titanium oxide was installed in 1951. When four other furnaces are added shortly, it will be possible to produce 250,000 tons of titanium oxide and 175,000 tons of pig iron annually. These developments will probably mark the beginning of a new era in primary iron and steel production in this Province.

The primary operations in the production of iron and steel, normally should have been considered at the very beginning of this chapter. They have, however, been left to the end for the purpose of laying greater stress on what is in prospect than what they have amounted to so far.

We have seen that the Province of Quebec up to now lacked the raw material — in this case iron ore — with which to build up a large primary iron and steel industry. Until fairly recently the titaniferous desposits near Lake Allard and the rich layer of iron ore in Ungava were unknown and, consequently, it was the secondary iron and steel industries which took on greater importance with us. Nevertheless, the

Called upon to supply the country's other industries with essential materials and equipment, the iron and steel industry has kept pace with the Province of Quebec's development. Seen in the photograph is a section of a turbine, a great number of which have been turned out by Quebec plants to meet the needs of power-stations.



primary industry has been developed to a certain extent and as, in 1949, its value of production represented some $37,000,000 in the sum total of Quebec's industrial activity, it is worth considering.

Iron metallurgy consists in extracting the metal from the iron ore. However, a great deal more than a single operation is included under the heading. All establishments that treat the ore in one way or another and even those that make pig iron from scrap are included. The principal divisions of the primary industry are: a) the production of pig iron; b) ferro-alloys; c) steel ingots; d) hot rolling; e) cold rolling and f) cold drawn steel.

Three of these divisions are represented in the Province of Quebec, namely: steel ingots (9 plants); hot rolled iron and steel (2 plants); ferro-alloys (1 plant). The 12 establishments are located in the St. Lawrence Valley, mostly in and around Montreal. The only plant producing ferro-alloys is in Beauharnois and the two hot rolling mills are in the Metropolis. All the other establishments are engaged chiefly in producing steel ingots. There are 21 steel furnaces which together can produce 269,700 tons of steel annually; 19 of the furnaces are electric, one is an open hearth and the other a converter.

The Quebec primary iron and steel industry employed 4,000 persons, to whom it paid out $10,500,000 in salaries and wages, in 1949. Its value of production amounted to $37,000,000. These figures are lower than they were during the war. They are, however, higher than at any time prior to the outbreak of hostilities but they will most certainly be exceeded in a few years' time, as a result of the bringing into production of the iron ore from New Quebec.

### Titanium ore and iron ore*

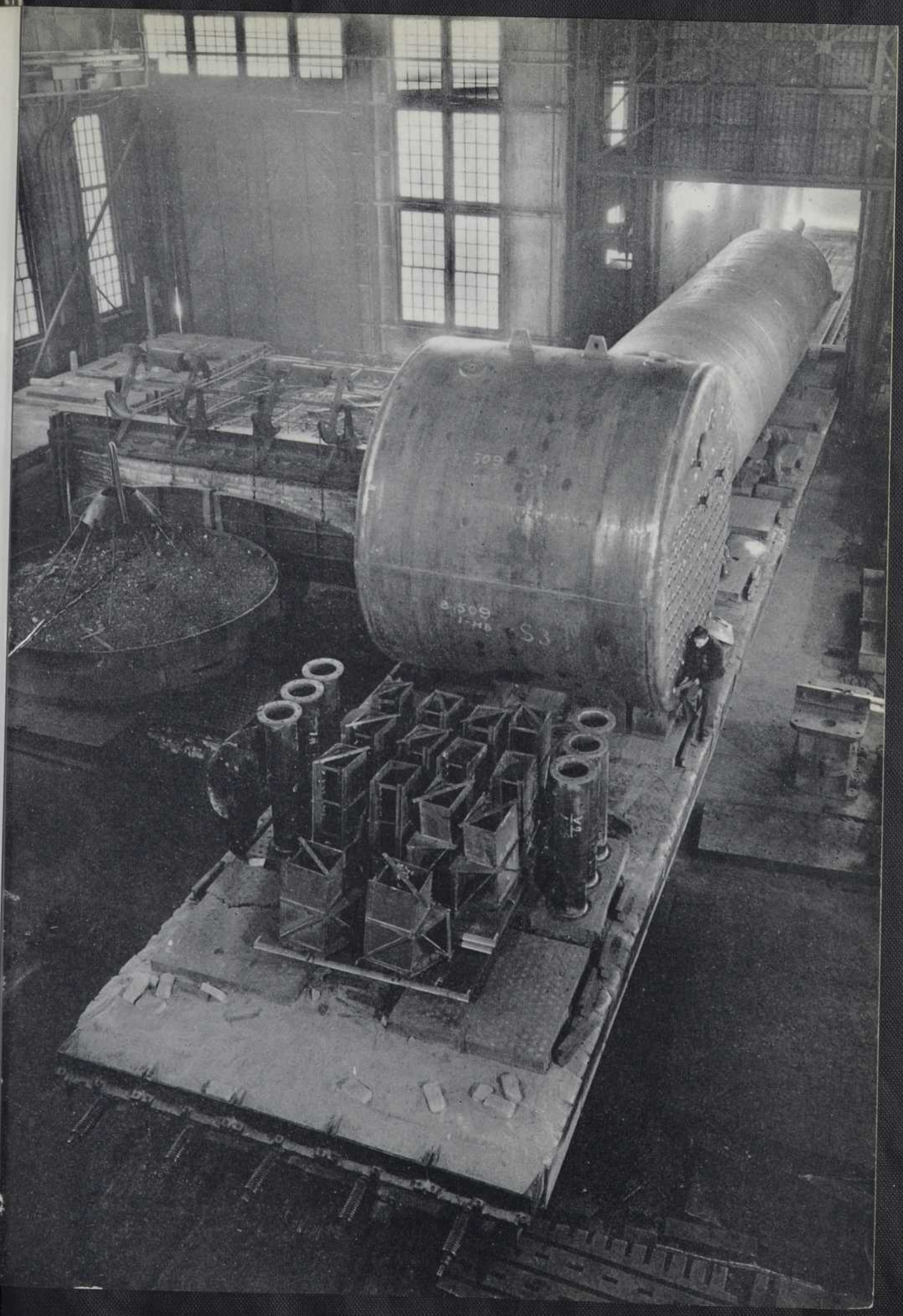
"The bringing into production of the large ilmenite deposit (to quote the 1950 edition of the Quebec Statistical Year Book) in the Lake Allard region was the most noteworthy event in the Province of Quebec mining industry in 1950. The Quebec Iron and Titanium Corporation constructed a railway, covering a distance of twenty-five miles, to its property from Havre St. Pierre, where a wharf and mechanical loading facilities were also completed. From September to November 1950, about 100,000 tons of the ore were shipped to the corporation's metallurgical plant at Sorel, on the St. Lawrence River. This plant treats the ore in large electric furnaces of 300 tons daily capacity. It yields grey pig iron and the slag is shipped to the United States for the production of titanium white.

"For the past few years the only production of ilmenite has been from the St. Urbain, (Que.) deposits. The largest potential source of ilmenite was discovered recently at Lake Allard, situated twelve miles north of Havre St. Pierre on the North Shore. These deposits are very large, though their full extent is

*Titanium-bearing ores found in Canada are of two classes: ilmenite and titaniferous magnetite. Ilmenite contains 30 to 40 per cent of titanium oxide. The only known deposits in Canada are in the Province of Quebec. They are located in the three following places: St-Urbain, in Charlevoix County, Ivry, in Terrebonne County, and Lake Allard, in Saguenay County.

Titaniferous magnetite is composed of ilmenite and magnetite mixed intimately in varying proportions and contains 5 per cent or more titanium oxide. This ore occurs more widely in Canada than does ilmenite but is not used in this country as a source of titanium.

Largest stress relieving oven in Canada, ⟹ at Lachine, near Montreal, P.Q.



not known; the ore as exposed in hills and ridges contains several million tons above ground level. It averages about 35 per cent titanium oxide, 37 per cent iron and 3 per cent silica.

"Furthermore, by the end of 1946, after ten years of prospecting in New Quebec, 36 iron ore deposits and one base-metal deposit were known to exist in the territory prospected by the Hollinger North Shore Exploration Company. In 1947 heavy diamond drilling was undertaken and by the end of 1948 the existence of 323,828,000 gross tons of ore was proven.

"All the deposits found lie within a zone ninety miles in length by three miles in width, stretching along the height of land between the Bay of Ungava and the Atlantic coast.

"The name of the more important deposits in the central area are: Fleming, Ferriman, Burnt Creek, Ruth Lake and Wishart Lake. The principal camp is located at Burnt Creek and the hydroplane base is at Knob Lake.

"The most important deposit found is the one known as Goodwood, situated 25 miles northeast of Burnt Creek. It contains 45 million tons of ore. The Eclipse, the most northerly deposit so far discovered, contains 29 million tons of iron ore and is situated about 50 miles northwest of Burnt Creek.

"It is generally admitted that the ore reserves exceed 400 million tons and this quantity is considered sufficient to justify the building of a railroad and, besides, there is no doubt but that additional reserves will be found. It is expected that the railway will be completed in 1954 and that the first shipments of iron ore will be made in 1955. After the first couple of years in operation, it is thought, about 10 million tons of ore will be shipped yearly.

"These developments will have considerable effect not only on the Province of Quebec's economy but on that of Canada." *

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The Quebec primary iron and steel industry, which had to depend on outside markets for material, practically overnight finds itself with a huge source of supply on its own doorstep. A new era is opening up for it as well as for the secondary iron and steel industries and the widespread effect this will have on our industrial and commercial activity may well surpass even the most optimistic predictions.

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The principal industrial use made of ilmenite is as a pigment. It is also used as an alloying agent to strengthen the tensile force and resistance of iron and steel.

* Mineral production is of considerable importance in the Province of Quebec's internal economy. In 1950, the production (including all products extracted from the Province's mines and quarries) was worth $217,700,000 compared to $92,800,000 in 1946. Canadian mineral production has now exceeded the impressive figure of more than a billion dollars. In 1950 the production of mines and quarries in Quebec represented nearly 21% of that total. (Quebec 1950 Year Book).

# Specialized Professional Training Schools in the Province

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The Quebec Government maintains a number of schools, in various places throughout the Province, which provide technical and professional training. Apart from the Central School of Arts and Crafts in Montreal, the only institution of its kind on the North American continent, there are about forty other schools of arts and crafts distributed throughout the length and breadth of the Province. In these schools young people can learn a trade or craft or take the first years of a technical course.

The technical schools, five in number, train students for higher employment in industry. They are situated in Hull, Montreal, Quebec, Shawinigan Falls and Trois-Rivières. The Montreal Technical School is considered the most important and the best equipped in the British Commonwealth.

Besides, there is a group of highly specialized schools which train students in such particular techniques as cabinet-making, graphic arts, paper-making and the production of textiles, etc. Mention should also be made of the School of Refrigeration, the School of Fisheries, the Marine School, the Automobile School, the School of Forestry at Duchesnay, etc.

In general the Specialized Professional Training Schools hold classes in both daytime and evening and in some cases courses are also given by correspondence. Situated in key centres, these schools turn out skilled workmen and expert technicians trained in the most up-to-date methods, ready to meet the growing demand created by the Province's economic development.



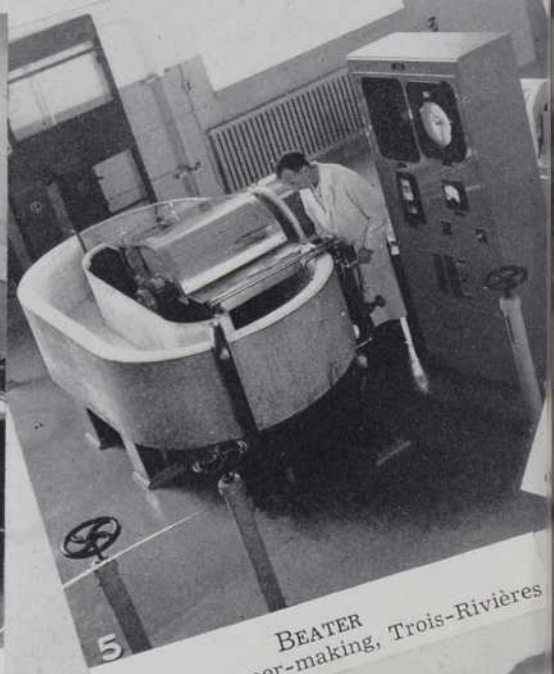
STUDYING A SPINNING LOOM
Textile School — St. Hyacinthe



THE
The Montre



BOOKBINDING SHOP
School of Graphic Arts — Montreal



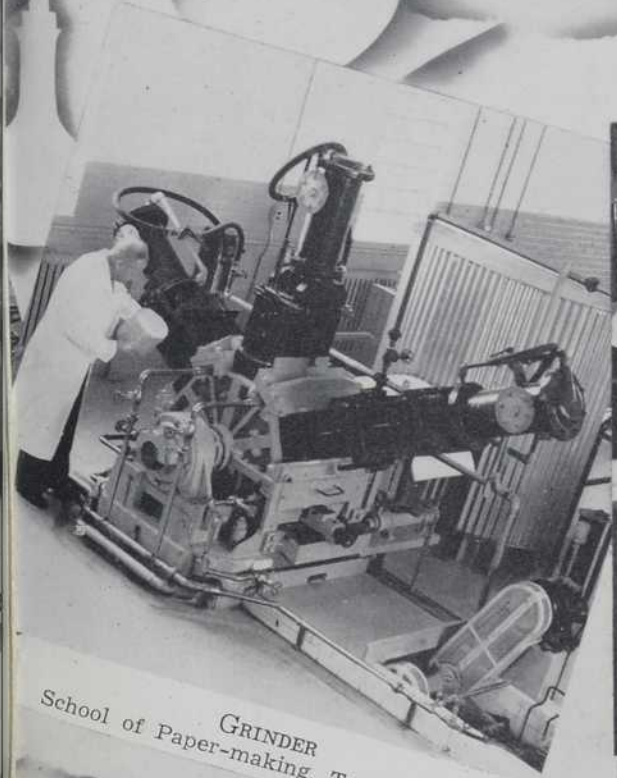
BEATER
School of Paper-making, Trois-Rivières



OL SHOP
Technical School



STUDENTS ARE GIVEN A PRACTICAL DEMONSTRATION
Forestry School — Duchesnay



GRINDER
School of Paper-making, Trois-Rivières



PRINTING SHOP
School of Graphic Arts — Montreal

# Transportation Equipment

No other period in history has been characterized by as far-reaching progress in means of transportation and communication as our own. The coming of the locomotive, the ocean liner, the automobile and aircraft has changed the world. Distance no longer counts and mankind has a practically limitless field for social, economic and intellectual pursuits.

The many and varied means of transportation known today have necessitated the creation of enterprises to supply essential equipment. The Province of Quebec numbers several which hold an important place in its industrial activity while a few others, less extensive, complete the group.

On the one hand, there are industries of major importance producing transportation equipment and on the other, undertakings on a smaller scale turning out bicycles, motor vehicles and parts, boats, carriages and sleighs. The major industries comprise railway rolling stock, shipbuilding and aircraft production. In Quebec, these three totally eclipse the second category of lesser enterprises, since together they account for 94% of the production of transportation equipment.

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**Railway rolling stock**

The first shops making railway stock came into existence in Canada about the middle of the last century. At that time the great Canadian railroads were being built. It was the era of the construction of the transcontinental line which was to link Moncton to the Pacific coast. At about the same time the industrialization of the country was beginning to take shape. As early as 1900 the production of railway rolling stock had become one of our leading industries. It can be said to have grown with the Province and to have kept pace with Canada's progress.

The most important in Quebec's group of industries producing transportation equipment, these establishments are also the largest in Canada. They account for nearly half of the locomotives and railway cars built in the country and the value of their production amounted to $121,000,000 in 1949. This was as much as all the other provinces together and twice Ontario's production. For the same year, the value of railway rolling stock manufactured in Canada was $247,000,000.

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Throughout its entire history this industry has been characterized by remarkable stability in the Province of

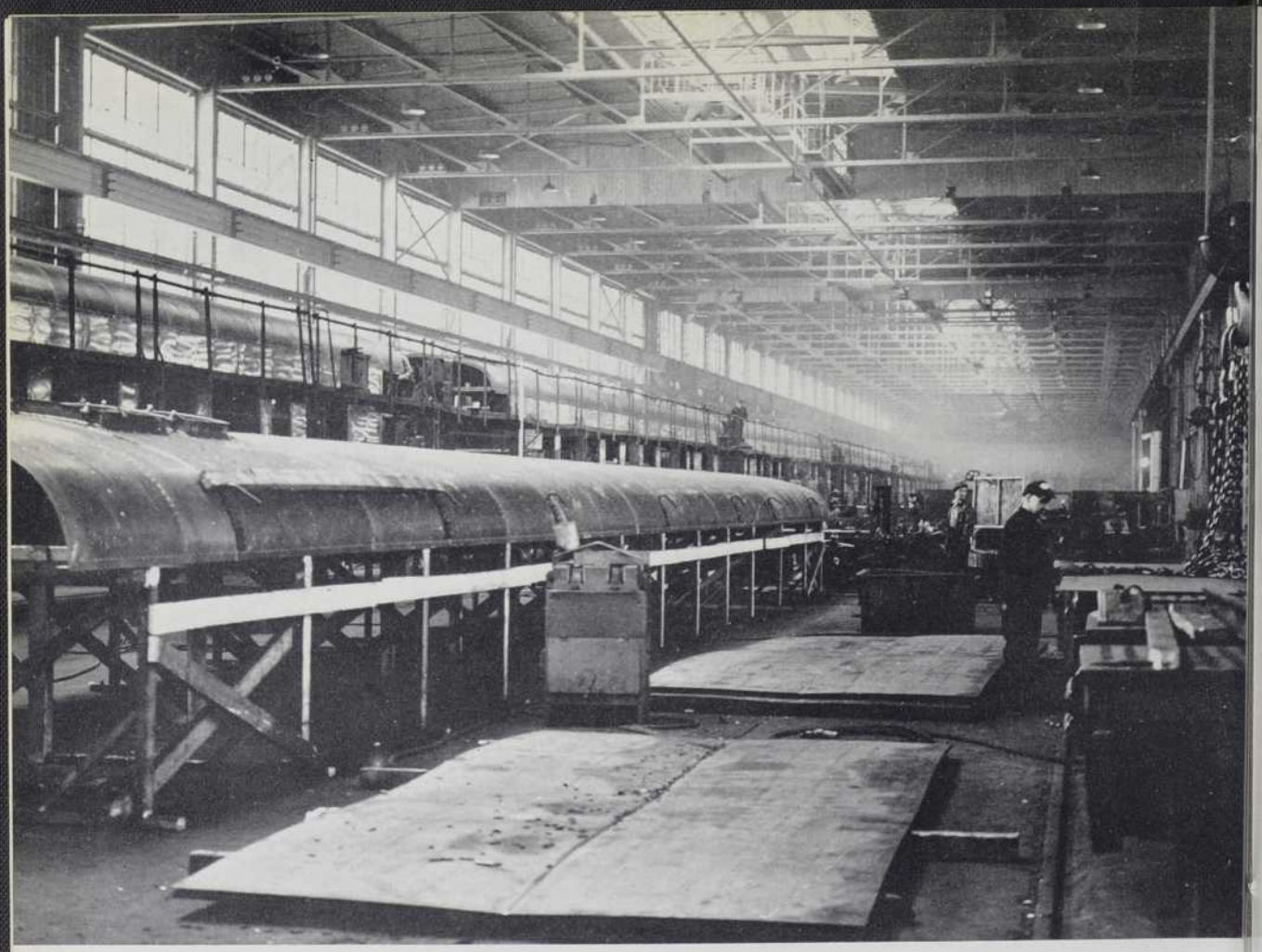
Quebec. It has experienced none of the ups and downs usually noted in an extensive economic cycle. Even during the worst years of the depression in the '30s, its level of activity was much higher than the average manufacture and reacted favourably on a number of industrial divisions. One realizes the extent to which this industry constitutes a source of employment and of prosperity when one stops to consider that, to build a single locomotive, 50 to 100 tons of steel and 6 tons of copper are needed. Considerable quantities of tin, aluminum, lead and nickel are used in the manufacturing of railway rolling stock; a great quantity of the raw materials used come from the mines, yards, workshops and plants of the Province.

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There are now 12 establishments producing railway rolling stock in the Province of Quebec. Eleven are in Montreal and one in Rivière du Loup. Employment has always been relatively high. The minimum number recorded was 3,300 in 1918. From 1920 to 1930, average employment was nearly 10,000 and even reached 13,206 in 1929. During the depression, there was a drop in the number employed in the plants of this branch of the industry but in 1942 it had climbed again to 16,200. Today

Our plants engaged in manufacturing rolling stock have undertaken large scale production of diesel-electric engines like the one seen nearing completion here. A locomotive of this kind costs more than $113,000 and represents the very latest in railroad equipment.





Preparing steel tops for first class coaches. The immense plants where the work is done are located at Ville St. Pierre and cover over 65 acres of ground.

nearly 20,000 persons earn their living in this Quebec industry.

The payroll at the present time is ten times what it was in 1916. It amounts to $40,800,000 compared to $13,700,000 in 1940.

As to the sum of $121,000,000 representing the value of production in 1949, it constitutes an all-time record in the railway rolling stock industry. This production represents the output of 12 establishments and shows the size of the undertaking since each plant has an average production worth $10,133,000. Such an output per establishment can only be accounted for by the value of the units produced which is as follows:

| | |
|---|---|
| Locomotive, steam | $121,100 |
| Locomotive, diesel-electric | 113,800 |
| Car, passenger | 34,900 |
| Tramcar | 29,700 |
| Car, freight | 16,200 |
| Car, refrigerator | 12,200 |

From the figures quoted above it can be seen that the railway rolling stock industry is the 5th in importance with regard to employment in the Province; 2nd in relation to the amount paid out in salaries and wages and 8th among

Quebec's manufacturing industries in so far as the value of production is concerned.

Closely linked to the country's economic life, the industry has had occasion to show the strength of its organization and its adaptability to urgent circumstances as well as to the pressing needs of progress. A striking example of this is to be found in the way in which the industry converted some of its shops for the production of army tanks while, at the same time it continued to turn out enormous quantities of railway rolling stock required for the transport of troops and war material.

In the postwar period, large orders were received from the European countries for the reconstruction of railways whose equipment had been destroyed, while production on the domestic market was being pushed ahead to meet the need for better and more up-to-date equipment. The steam locomotive and the car built of wood were for a long time the standard equipment of our railroads. Now the diesel-electric engine is replacing the first, while cars made of steel or aluminum are gradually taking the place of the wooden cars. Since 1947, almost the entire output of the industry in this Province has consisted of diesel-electric engines. Tramcars, locomotives for freight yards and parts for repairing rolling stock are also manufactured. The normal outlet for all this equipment is represented by the Canadian railroads. However, a sufficient quantity is exported to foreign countries for it to be said that Quebec-built locomotives and railway cars are now in use on every continent of the globe.

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## Shipbuilding

This is an industry which has gone through periods of great prosperity and decline in our Province and though, at times, the outlook was gloomy indeed, there was a day when Quebec shipyards placed Canada among the four great shipbuilding countries of the world. It is true this brings us back to the era when sailing vessels were in their heyday and linked all the ports of the seven seas, but it does not mean that Quebec may not yet recapture her vanished glory as a shipbuilding centre.

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The beginnings of our shipbuilding industry go back to the early days of the colony. Old documents relate that in 1672 over 350 persons were employed in building ships of from 400 to 500 tons. The plentiful supply of wood, its good quality and low cost made shipbuilding a profitable business and the shipyards were intensely active both during the French and the English régimes.

In 1808 the first steam vessel was built in Montreal and in 1831, the first vessel to cross the Atlantic entirely under steam, the famous Royal William, was launched in Quebec. In 1867, Canada was one of the four great shipbuilders of the world. That same year 50 vessels of 1,000 to 2,000 tons were launched in its shipyards. Then came the decline. Wooden vessels were to be quickly replaced by iron ships and, lacking the necessary material, our shipyards no longer prospered.

It took two world wars to bring about a recovery and both times the level of activity was unprecedented. In 1918-19, over 6,500 workers were employed in



Montreal is the great Canadian producing centre of rolling stock. Nearly 15,000 workers are employed in manufacturing railway coaches, streetcars, locomotives or luxurious cars built of steel and aluminum. The production value of plants manufacturing railway rolling stock amounts to more than $120,000,000 a year in the Province of Quebec.

Quebec shipyards. During the financial crisis the number fluctuated around 1,300 and in 1943 it shot up to 24,700 persons. Although the figure has considerably decreased since then, over 8,000 workers were employed in the shipyards in 1947 and 1948. At that time the demand from foreign countries provided a stimulus but the difficulty of international trading created complications which resulted in a new slowing down. However, the shipbuilding program for naval defence has helped to keep up a certain level of activity in Quebec yards and contracts given out for this purpose in 1951 represent a production value of some $62,000,000.

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In short, shipbuilding in the Province of Quebec has known fairly sharp ups and downs. If it is not a major industry with us, it has at least brought Quebec to the fore. For instance, the gross value of production in 1948 ($49,000,000), represented about 43% of all Canadian shipbuilding. In 1949 Quebec shipyards turned out three times as much as those in Ontario, nearly four times as much as those in Nova Scotia and New Bruns-

wick together and almost twice as much as those in British Columbia. Quebec's shipyards are, besides, the largest in Canada. There were 12 in 1949, nearly all situated along the St. Lawrence. In 1948 our shipyards (at the time numbering 13) employed 8,131 persons and paid out $19,700,000 in salaries and wages. They ranked first in the country in relation to employment, payroll and value of production.

It is still too soon to make any estimate of the future value of this Quebec industry under normal conditions. One thing has been amply proven, however, that is the ease with which Quebec shipbuilders have been able to adapt themselves to the construction of the most widely varied types of vessels. Totally different kinds of ships have been known to be built at the same time and according to different techniques. Our builders have shown themselves capable of meeting any emergency and leave no doubt but that they are equipped to turn out ships according to the most modern requirements.

### The aircraft industry

Although a few aeroplanes had been built in Canada before 1917, the building of aircraft can be considered the most recent of our major industries. It really had its beginnings as late as 1938. The war and then the constantly increasing needs of civil and commercial



aviation, as well as the expansion of the air routes gave it a spectacular impetus. The following data illustrate its progress.

Up to 1937 the building of aircraft throughout Canada amounted to only a few units: 18 aircraft worth $117,689 in 1934; 110, worth $1,461,000 in 1937.

In 1938, 282 aircraft with an aggregate value of $4,000,000 were turned out by Canadian factories. The Province of Quebec was responsible for half this output. It accounted for 3 factories which employed 665 workers and paid out $867,000 in salaries and wages. From then on the aircraft industry became an important part of our manufacturing activity and the war was to make it forge quickly ahead to take a foremost place among our leading industries. Statistics for 1944 indicate its position at that time: 15 establishments, 32,621 employees, a production valued at $160,000,000 and a payroll of $64,000,000.

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It was to be expected that after the tremendous effort necessitated by the war, our aircraft factories should slacken their activities. Employment, which had been reduced by half in 1945, only amounted to 5,800 in 5 factories in 1949; salaries and wages totalled $14,875,000 and the value of production was $39,163,000.

These figures are far below those for 1944, but they are away beyond those for 1938. The level of prosperity of the Quebec aircraft industry is no longer to be compared with that of the prewar years and the most recent developments in the field of air transport hold out bright prospects. The great number of training and combat planes built in Quebec factories and used in Canada and in Europe during the last war established a world-wide reputation for our aircraft concerns. Today the great airline companies are flying Quebec built aircraft over all the air lanes of the world. Our factories are also speeding up the production of jet-propelled planes to meet the needs of national defence. The success they have achieved in this field is another indication of the expansion of the aircraft industry in the Province of Quebec.

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### Other industries

As stated at the beginning of this chapter, the smaller industries comprised in the transportation equipment group are in no way comparable to the ones already reviewed. The production of bicycles, boats, motor vehicles, carriages and sleighs is negligible in relation to the other industries. They are, however, not without importance and usefulness.

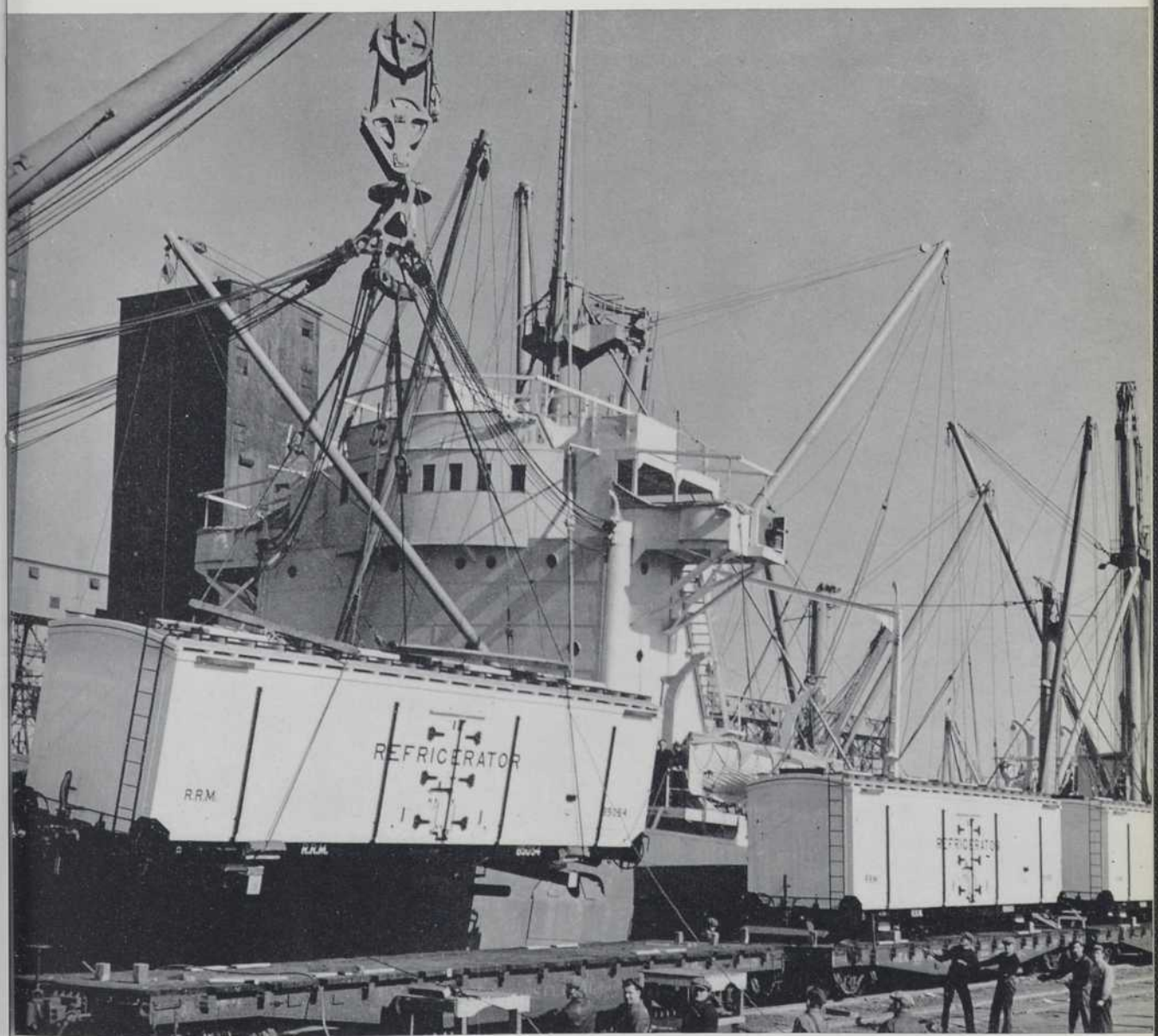
The production of motor vehicles and parts, for instance, is far from having the same importance in this Province as it has in Ontario where it constitutes the leading industrial activity. In the Province of Quebec a type of enterprise which answers a specific need has, nevertheless, developed. This consists in the manufacturing of snowmobiles and snow removal equipment. In 1949 this industry numbered 19 astablishments and employed 800 persons; salaries and wages amounted to $1,600,000 and the value of production was around $7,500,000.

There are also 6 bicycle factories which in 1948 employed 87 persons to whom $156,000 was paid out in salaries

and wages. Production was valued at $349,000.

Boat building establishments numbered 30 in 1949. They employed 136 persons, had a payroll amounting to $205,000 and the value of production was $464,000. The output consisted mainly of life boats, light craft and canoes.

Lastly, in 1948, the Province of Quebec accounted for 26 establishments en-




Railway cars manufactured in Province of Quebec plants run over the rails of every continent. Here we see the SS Empire Wallace taking on a cargo of refrigerator cars for Rhodesia, South Africa.

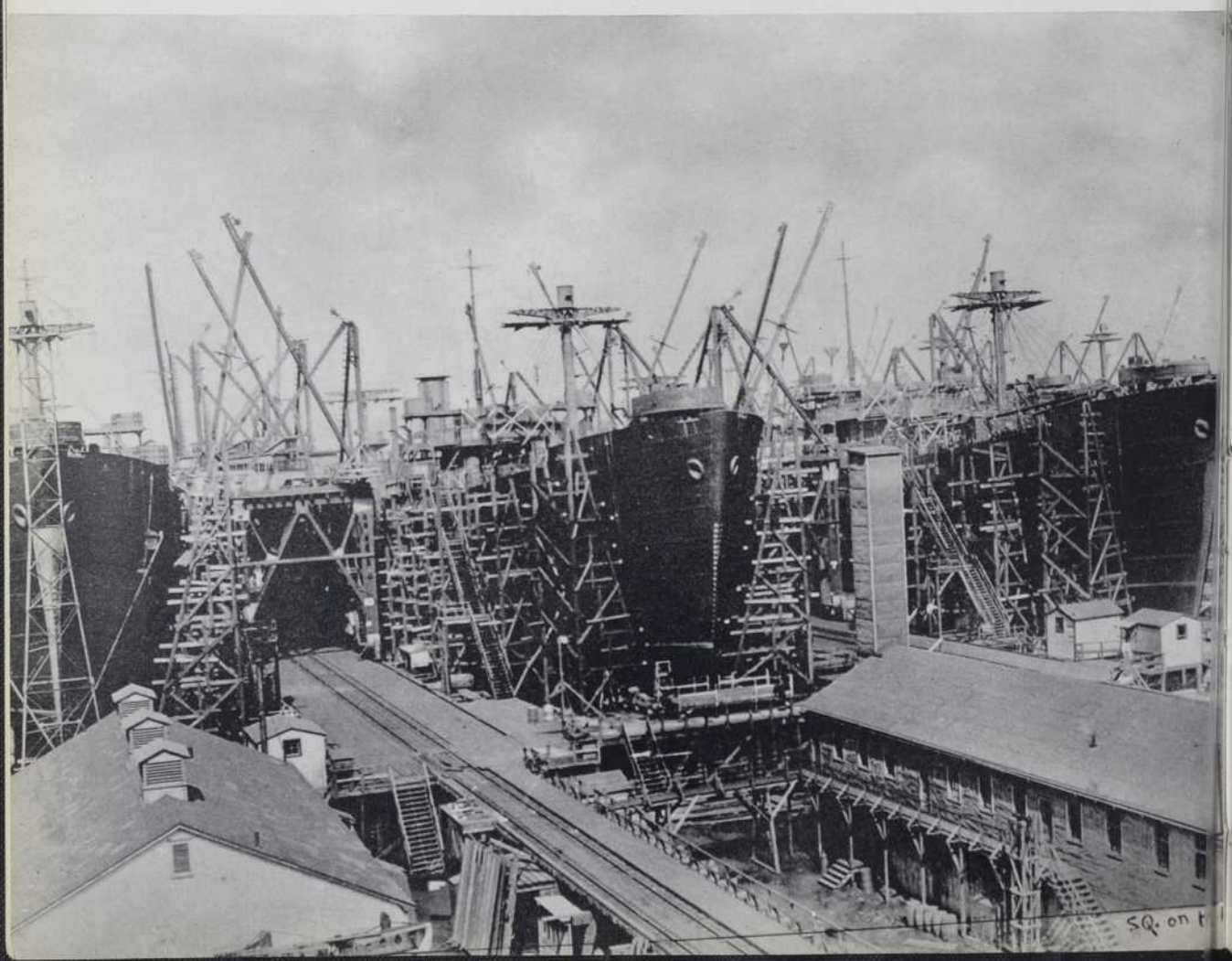
gaged in the production of carriages and sleighs. They employed 144 persons, had a payroll amounting to $190,000 and produced $483,000's worth of goods.

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As a whole, the group of industries producing transportation equipment makes a most valuable contribution to Quebec's manufacturing activity, even though all the divisions do not show the same stability and progress. Besides providing work for 28,000 employees, paying out $68,000,000 in salaries and wages and turning out goods to the value of over $200,000,000, it constitutes a market for several other of Quebec's economic sectors.

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Quebec shipyards play an important part in Canadian shipbuilding. Widely different types of vessels have been launched and our shipbuilders have proven their ability to meet the demands of the most up-to-date techniques.



# Non-ferrous Metals

Without having the economic importance universally accorded iron and steel, non-ferrous metals are outstanding factors in present-day industry. The influence they exert can be expected to increase as time goes on and they are put to more extensive use as substitutes for metals or materials urgently needed in other industrial fields. For instance, aluminum is now put to countless uses unheard of 25 years ago, and research laboratories are constinually finding new ways in which this light metal and several other non-ferrous metals can be successfully employed.

The non-ferrous metals group of industries is one in which the Province of Quebec already holds an advantageous position. Taking into consideration aluminum alone, we find an industry which has brought Quebec to the fore on all the markets of the world and provided a great source of wealth through its contribution to the development of our natural resources.

From the Canadian point of view, the non-ferrous metals industries are noteworthy for the following reasons :

A) The non-ferrous metal smelting and refining industry — the primary industry — represented 69% of the whole non-ferrous metals industry in 1949.

B) The various enterprises comprised in the group employed over 45,-000 persons in 532 establishments.

C) Salaries and wages amounted to $115,000,000.

D) The value of materials used reached a sum of $537,000,000.

E) In the same year, the industries' exports totalled $414,000,000 or half the value of their production.

F) In the field of international trade, this group ranked second among the country's industries, preceded only by pulp and paper.

G) 80% of our output of aluminum ingots was exported as was 65% of our copper and lead production.

Taking into consideration the same industrial group within the Province of Quebec, we find that :

A) The existence of mineral deposits, the abundance of hydro-electric power and of navigable rivers were the predominant reasons for the establishment of non-ferrous metal reduction and refining plants in this Province.

B) The reliable and plentiful labour force as well as the close proximity to the great consumer markets also acted as incentives to the establishment of plants manufacturing non-eferrous metal products.

C) In 1949, the non-ferrous metals group in the Province of Quebec comprised 164 establishments which employed 14,714 persons.

D) The value of production amounted to $313,000,000 and was equivalent to 36% of Canadian production in this group.

E) It is partly to these industries that the extensive regions in Northern Quebec owe their economic activity and prosperity and their development can be said to have resulted in the first phase of Quebec's industrialization.

F) In this Province the more important divisions of the non-ferrous metals industry are aluminum, copper and gold. These metals have given rise to a number of enterprises among which the primary ones, concerned with the smelting and refining of metals, then the secondary ones, manufacturing products made of non-ferrous metals.

G) The secondary industries comprise : 1—the production of articles made of aluminum; 2—articles made of brass or copper; 3—white metal alloys; 4—jewellery and silverware.

H) The value of production in these various divisions was as follows in 1949 :

| | |
|---|---|
| Smelting and refining ..... | $222,496,000 |
| Brass and copper products . | $ 41,614,000 |
| Aluminum products ..... | $ 19,719,000 |
| White metal alloys ..... | $ 17,621,000 |
| Jewellery and silverware .. | $ 11,671.000 |

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## Smelting and refining

The primary industry, that is the establishments engaged in reducing and refining non-ferrous metals, obviously constitutes the most important of the group in the Province of Quebec. This importance results from the size of the plants as much as from the value of their output. The reduction and refining of these metals calls for enormous capital and extensive plants. Consequently, it is not surprising to find 1,200 employees and a value of production of $37,000,000 per establishment.

In 1930 the smelting and refining of non-ferrous metals comprised 8 plants of which 5 were principally engaged in producing aluminum, 2 copper and 1 titanium oxide. There were less than 5 such plants in 1942, but the demand for war materials and urgent needs for defence projects gave rise to the establishment of new entreprises, that resulted in increased employment, salaries and wages and production. From 1,061 in 1933, employment rose to 3,525 in 1940, and to 9,812 in 1942 to reach the record figure of 14,653 in 1943. Despite the war's end and the readjusment of production to meet peacetime needs, employment in the industry remained high and in 1949 there were 7,172 persons working in the industry. This represents half the entire number of employees in the non-ferrous metals industry.

The same year, 1949, the establishments in the smelting and refining division of the non-ferrous metals industry paid out $19,591,000 to their employees or 54% of salaries and wages paid out by all the industries in the group. The value of production at the same time reached the sum of $222,496,-

000 or nearly as much as the peaks attained in 1943 ($259,643,000) and 1944 ($242,855,000). The tremendous output of 1943 and 1944 was in response to Canada's war needs and those of her allies and was only made possible as a result of government controls which guaranteed the industry all the hydro-electric power it required. Therefore, it is in no way surprising to find that, with the end of hostilities the value of production dropped to $106,000,000 in 1946. The industry has since recovered and the value of production of over $222,000,000 attained in 1949, clearly attests to the prosperous condition of establishments engaged in the reduction and refining of non-ferrous metals in the Province of Quebec.

### Aluminum and aluminum products

As noted above, the non-ferrous metals industries by contributing in such large measure to the development of the Province's natural resources have provided a new source of wealth. This is particularly the case with regard to the aluminum industry. The huge developments required to meet that industry's

The aluminum plants seen here were among the first enterprises of the kind in North America. They were built near Shawinigan Falls fifty years ago, at the time the Shawinigan Water and Power Company was founded.



own needs have resulted in the installation of a whole system of hydro-electric stations that have formed the basis for Quebec's extraordinary industrial expansion.

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Aluminum was for many years the object of patient research on the part of scientists who sought to find an effective method of smelting the ore. Linked with this work are such names as Lavoisier, the brothers E. H. and A. H. Cowles, Sir Humphrey Davy, H. C. Oersted, F. Wohler, F. Rose, H. St-Claire Deville, Robert Bunson, Paul Heroult and Charles Martin Hall. It was the latter, a young American chemist, who, in 1886, at about the same time as Paul Heroult in France, succeeded in completing the essays at reduction made by Bunson thirty years earlier. This event marked the beginning of the modern aluminum industry.

The reduction of aluminum ore to metal requires such an enormous amount of electric power, the aluminum ingot is sometimes referred to as packaged power to stress the quantity of electric energy that has gone into its production. It is, consequently, easy to see why the existence of central electric stations conditions the location of aluminum smelting plants and why the Province of Quebec plays such a predominant role in this industry.

The first smelters for the reduction of aluminum ore in North America were erected at Shawinigan Falls. They were established there at the beginning of the century at the same time as the Shawinigan Water and Power Company was organized. The establishment was the first consumer of hydro-electric power in the region. The industry's growing needs and the rapidly increasing demand for aluminum resulted subsequently in the harnessing of the Saguenay River, which was to constitute one of the great marvels of modern engineering. The barrage at Ile Maligne was completed in 1925; the one at Chute à Caron (no. 1 Shipshaw), in 1931 and at the same time the town of Arvida was built near the refining works. A second barrage, one of the largest in the world, was begun at Shipshaw in 1939, in order to meet the exigencies created by the second world conflict. In the meantime the plant at Arvida had become the most important one of its kind in the world and placed Quebec immediately after the United States as the second aluminum producing country.

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The potential output of our aluminum industry is now estimated at 458,000 metric tons, distributed as follows between the 5 smelting plants :

| | | |
|---|---|---|
| La Tuque | 6,000 | M.T. |
| Beauharnois | 32,000 | " |
| Ile Maligne | 39,600 | " |
| Shawinigan Falls | 60,000 | " |
| Arvida | 320,400 | " |

In order to provide sufficient hydro-electric power to permit these plants to operate at full capacity, two new barrages are being built on the Peribonka River, one at Chute au Diable which should be completed in 1952, the other at Chute à la Savane to be ready for use in 1953. The two new central electric stations will have a capacity of 270,000 H.P. and will make it possible for Quebec aluminum production to be increased to close to 500,000 metric tons a year.

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These figures indicate the strides made by our aluminum industry since 1901 when our production for the year amounted to 30 metric tons. In 1926 it had increased to 17,000 tons to climb to 38,000 tons in 1927, when the plant at Arvida went into operation. Ten years later, the output was 45,552 metric tons and in 1939, 75,151 tons. In 1943, a production peak was reached with 450,000 tons but in 1949 it dropped to 339,000 to rise again to 410,000 m. t. in 1951. This last figure represents 25% of world production of aluminum estimated at 1,300,000 metric tons and there is every indication that the Quebec industry is far from having reached its fullest expansion. In general, the aluminum industry in the Province of Quebec yields more than anywhere else. Compared to that of the United States, for example, the cost price of a metric ton of aluminum is a dollar less in the Province of Quebec. Considering the advantages it enjoys (reserves of hydro-electric power, the constantly increasing use of the metal, etc.), it can count on an exceptionally prosperous future here in the Province.

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Apart from the 1943-45 period, during which the United States became our leading customer, the United Kingdom has always been the principal buyer of Quebec aluminum. However, Canada itself is absorbing greater and greater quantities. The proportion of our aluminum used in this country had reached 20% in 1951, that is, about 75,000 metric tons. It goes into the manufacturing of a widely varied range of goods, which are comprised in the aluminum products industry.

### Aluminum products

The aluminum products industry comprises establishments occupied chiefly in casting, rolling or fabricating aluminum to make bars, rods, sheets, wire, cable, foil and cooking ustensils. It does not include the primary alumi-

Polishing aluminum kitchen utensils. The industry uses 20% of Quebec's output of aluminum to manufacture utensils and household goods of all kinds.



num smelters or the establishments which make aluminum products as secondary or minor products.

As all Canadian aluminum is treated in Quebec, it was inevitable that concerns using the metal as raw material should have established themselves either in this Prvince or in Ontario, in order to take advantage of the proximity to sources of supply, markets and adequate labour.

In 1950, 23 of the 77 Canadian factories making aluminum products were in the Province of Quebec. Most of them were in Montreal or its suburban area. They employed 1,237 persons to whom they paid out the sum of $3,600,000 in salaries and wages; the gross value of production amounted to $19,600,000. In this branch of the industry Quebec was in second position compared to the other provinces.

It is noteworthy that this industry of the non-ferrous metals group has made the greatest strides since the end of the last war. In 1945 there were only 10 establishments in this branch and employment was 663. At that time the payroll amounted to $1,100,000 and the value of production was about half of what it is now. Twenty years ago the aluminum products industry had barely come into existence.

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It is difficult to give anything like an accurate idea of the extraordinary range of products into which aluminum enters in the course of manufacture. The list of manufacturers of articles made either entirely or partially of aluminum includes almost 1,000 names, of which one out of three are Quebec firms. Over 150 different categories of products are turned out by these factories which include small foundries as well as the biggest construction companies. Products range all the way from cigarette lighters to the fuselage of aircraft.

According to a recent estimate, the proportion of the aluminum output used in each field of activity is as follows :

| | |
|---|---|
| Construction | 28% |
| Transportation equipment | 21% |
| Household articles | 20% |
| Electrical apparatus and supplies | 16% |
| Canning and packing | 7% |
| Chemistry | 2% |
| Agriculture | 1% |
| Miscellaneous | 5% |

The above table also indicates the manifold and various uses made of aluminum. The metal possesses a number of properties which make it particularly suitable for use in construction work as well as for transportation material and the production of cooking utensils and household appliances. In less than twenty years aluminum has acquired a predominant place in the manufacturing industry and the many uses to which it has been put make it as indispensable in peacetime as in wartime.

### Brass and copper products

Even though the other non-ferrous metals may not have done as much toward developing our natural resources as aluminum, it is, nevertheless, worthwhile considering a few because of the position they hold in Quebec's internal economy.

Copper, for instance, is still the most important metal after iron. It is one of the oldest of known metals. Its use goes back to prehistoric times and its remarkable properties account for the fact that it has always been sought after.

The Province of Quebec has a number of copper mines but the only copper smelting plant in the Province is at Noranda and all the refining is done at Montreal East.

In 1949, 67,222 tons of copper were produced in Quebec or 25% of the Canadian output (263,457 tons). It should be noted that Quebec copper contains a certain proportion of gold and silver which are by-products of the copper refining industry. Our gold production amounted to 1,098,082 ounces and that of silver to 4,343,731 ounces in 1950.

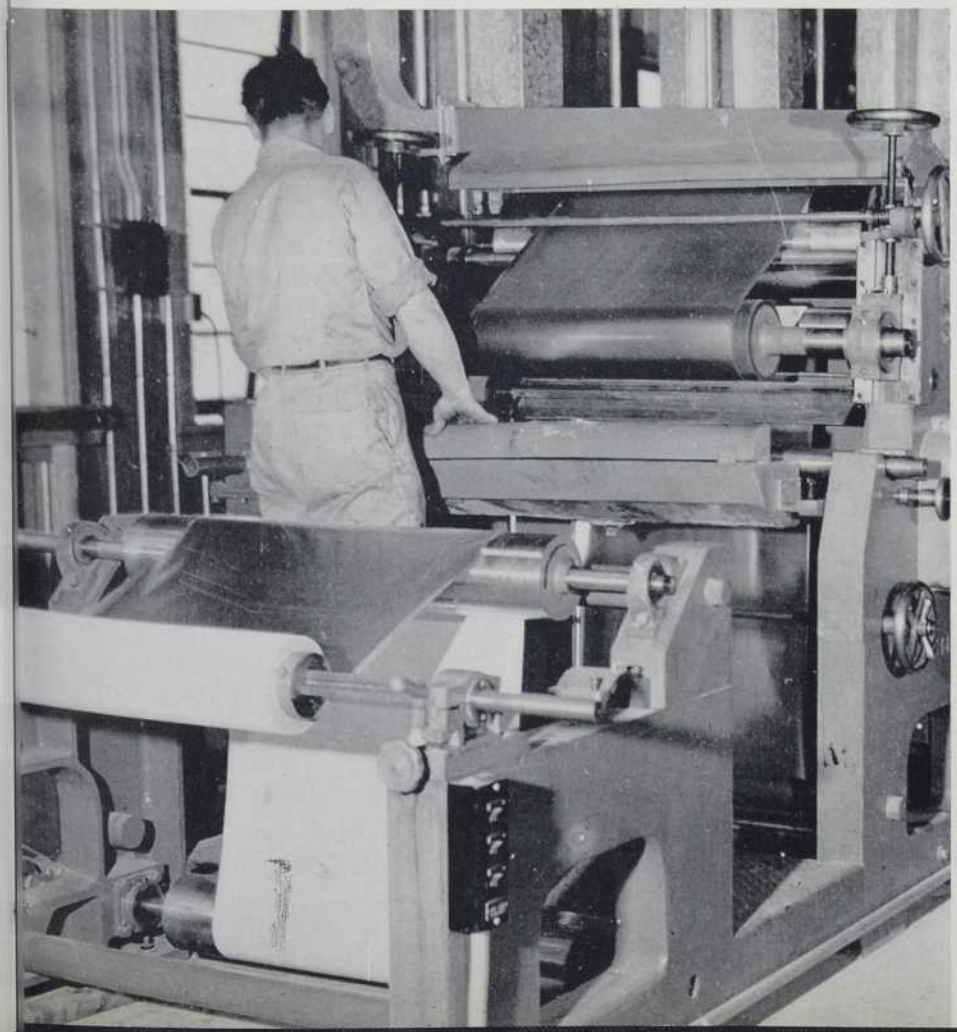
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Brass and copper have always been in great demand and it is not surprising the brass and copper products industry should be the most important among the secondary non-ferrous metal industries.

The Province of Quebec accounted for 41 establishments in this division in 1949 of which 32 were located in Montreal and its suburban area. Employment amounted to 3,000 or double the personnel employed prior to the war and the value of production was $41,614,000. In the City of Montreal the industry employed 1,500 persons and had an output valued at $11,092,000.

Quebec ranks second among the Canadian provinces in the manufacturing of commodities from brass, bronze or copper. It accounts for 36% of the output whereas Ontario supplies 58%. This industry is in 20th place among the Province of Quebec's manufacturing industries.

Copper lends itself to many and varied uses, either in an unalloyed state



Manufacturing aluminum sheets. — The concerns which turn out aluminum products : bars, sheets, wire, cables and household utensils, employ more than 1,200 persons in 23 establishments in the Province of Quebec. Yearly production in this division is worth over $13,000,000.

or fused with other metals such as nickel, zinc, lead, silver, aluminum, tin or manganese. The metal is bound to be important in the economy of a province whose industrial development is making rapid strides.

### Jewellery and silverware

The Province of Quebec produces a sufficient quantity of gold and silver to place it in second position among the Canadian provinces producing these precious metals. Ontario ranks first. Part of the production goes to the Treasury and the remainder is used in the manufacture of luxury items, surgical instruments, etc.

In 1949, 36% of the plants and of the employees engaged in the manufacture of jewellery, silverware and other precious metal products in Canada were located in Quebec; 23% of the gross value of production also came from Quebec. As reviewed here, the jewellery and silverware industry includes the plants making rings and other jewellery, sterling silverware and silver-plated ware, dental supplies, gold leaf, gold and silver melted or rolled, etc.

In 1930 there were 24 plants, 675 employees and an output valued at $2,000,000. The number of establishments in 1945 was 52, employment aggregated 1,765 and production amounted to $7,000,000. Statistics for 1949 report 75 plants, 1,996 employees and a production value of nearly $12,000,000.

Owing to its favourable situation and its consumer market, Montreal is the producing centre of the industry. In 1949 it acounted for 74% of the establishments and 72% of the employee earnings in the Province. Plants in the Metropolis turned out 72% of the production in this division.

### White metal alloys

The white metal alloys industry comprises the operations of firms which are occupied chiefly in the manufacture of white metal alloys, such as babbitt, solders, type and type metal; the refining of scrap to recover white metals, such as lead, tin, zinc, etc.; and the manufacture of products, such as lead sheet, lead pipe, etc. In this Province, there are 14 establishments, nearly all in Montreal, which city accounts for two-thirds of the Province's output valued at $17,621,000. The gross value of Canadian production in this field amounts to close to $45,000,000.

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Taken together, the iron and steel and non-ferrous metals industries constitute an important element of Quebec's internal economy as can be seen from the following brief review :

1) The aggregate value of production of the two groups amounts to the sum of $580,000,000, which represents 15% of the production value of all Quebec's manufacturing industry.

2) Six of the nineteen industries included in the two groups rank among the 40 leading industries in the Province. They are, with their relative position and value of production shown between parentheses: Smelting and refining of non-ferrous metals (2nd - $222,000,000); industrial machinery (19th - $44,000,000); brass and copper products (20th - $42,000,000); sheet metal (24th - $39,000,000); primary iron and steel (25th - $37,000,000); iron castings (35th - $29,000,000).

3) The output of the above 6 industries represents 71% of the production of metals, 14% of the production of the Province of Quebec's 40 leading industries and 11% of its entire manufacturing production.

4) The iron and steel industries together with the non-ferrous metals group employ over 50,000 persons, that is, 13% of the total manpower employed in the Province's manufacturing industries.

5) The 6 principal industries in the two groups under review provide work for 28,700 persons, or 57% of the manpower in the iron, steel and non-ferrous metals industries and 10% of the employees in the 40 leading industries of the Province.

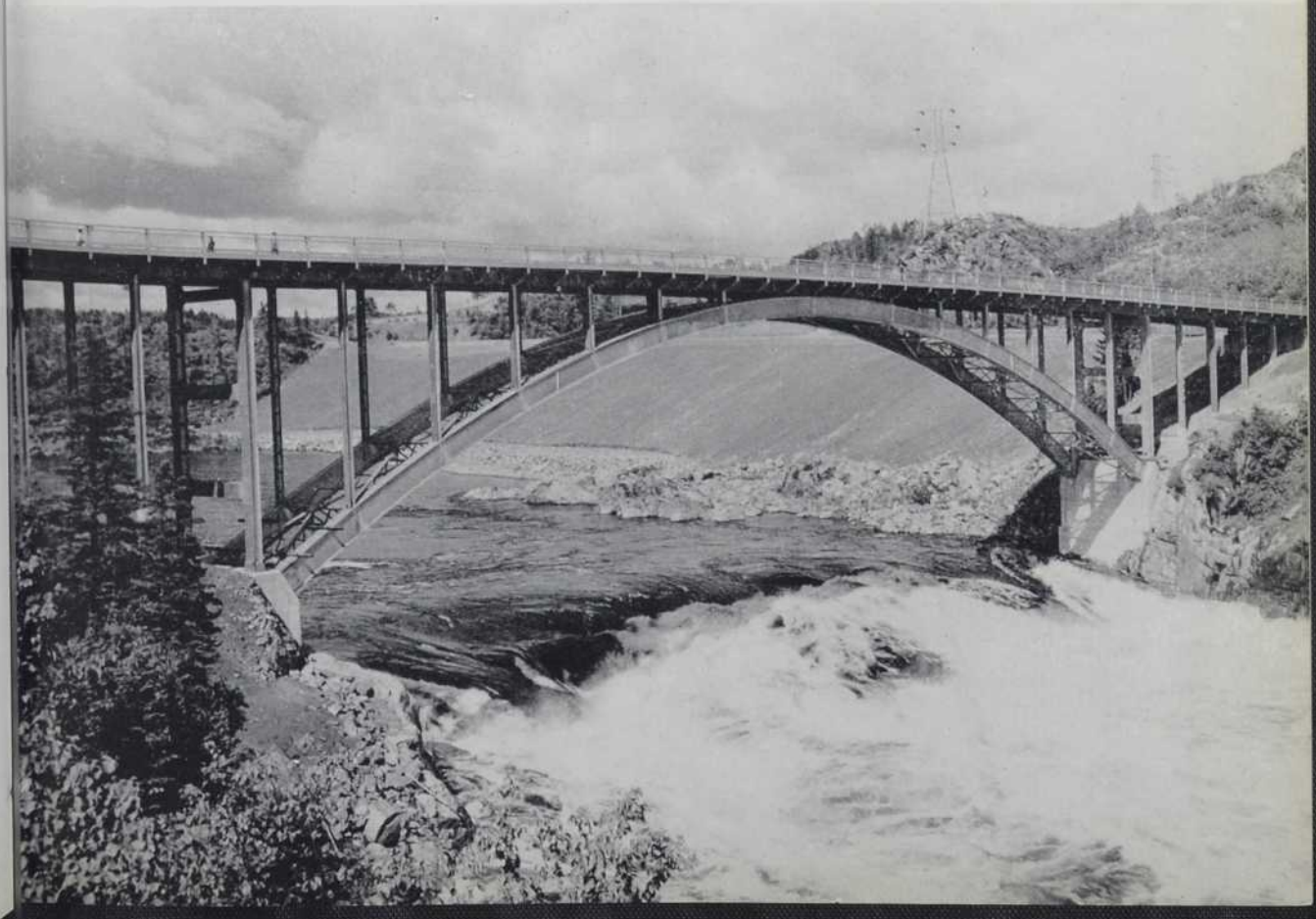
6) Quebec turns out a fifth of the Canadian production of iron and steel and more than 35% of the same production of non-ferrous metals.

7) 37% of the smelting and refining of non-ferrous metals is done in Quebec, this Province also accounts for the manufacturing of 36% of brass and copper products, 30% of industrial machinery, 25% of sheet metal, 22% of iron castings and 12% of the iron and steel produced.

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The foregoing data clearly indicate the outstanding position metallurgy holds in Quebec's industrial activity. However, it will undoubtedly become a much more important factor in the near future once the iron deposits in New Quebec are operating and the other natural resources in our sub-soil are more extensively developed.

Aluminum Bridge at Arvida, Que.—This all-aluminum highway bridge is the first of its type in the world. Overall length 504 feet. Span 290 feet.



# Electrical Apparatus

In Quebec, the richest province in Canada from the point of view of electricity and the possessor of the most plentiful water power resources of any region on the North American continent, the existence of an important and prosperous electrical apparatus and supplies industry is easily justified. The abundant supply of electricity, its low cost, the extensive commercial and domestic uses to which it is applied, the electrification of rural districts, the continuously increasing number of electrical appliances are some of the factors which explain the high level of activity in this section of Quebec's economy.

They may also be considered so many reasons for the further development of the industry. In an age of progress such as this so-called atomic era, it seems hardly likely the use of electricity will not extend to even greater limits in a country which, so far, has only exploited about a third of its potential power. The many and varied appliances discovered in the last quarter of a century may be only a small part of the services that can be looked for in the future.

In Quebec, where the proportion of developed hydro-electric power is the highest in Canada in relation to the population (1,580 H.P. per inhabitant), 94% of the homes had electricity in 1949. At the same time a huge amount of the output of central electric stations was used for industrial purposes. This means that almost the entire population enjoys the benefits of electrical service and it is not surprising the manufacturing of electrical apparatus and supplies should quickly have become an important industry in this Province. In fact, according to the number of factories in Quebec Province, the industry ranks 4th, with 81 establishments, as well as for the number of employees — 16,507 — and 5th, according to the amount paid out in salaries and wages : $42,433,000.

★

Since 1949, official statistics break down the manufactures producing electrical apparatus and supplies into the five following divisions :

1) Batteries;

2) Heavy electrical machinery and equipment;

3) Radios and radio parts;

4) Refrigerators, vacuum cleaners and appliances;

5) Miscellaneous electrical appliances.

The last division covers all manufactures not classed in the preceding ones, such as factories producing lighting fixtures, ,electrotherapy equipment, telephones, etc.

However, as prior to 1949, official reports did not provide such a breakdown, the industry as reviewed here



The meter which registers the consumer's monthly use of electricity must be an accurate instrument. It is put to long and careful tests by qualified employees before being installed. In 1950, more than 16,500 persons in the Province of Quebec were employed in manufacturing electrical apparatus and supplies.

will be considered in its entirety and the figures for 1949 or 1950 cited as a basis for future compilations.

Two outstanding facts are noted with regard to this industry, one is the rapid advances it has made in the Province of Quebec and the other, the marked importance of the miscellaneous electrical appliances division from every point of view.

The predominant position the miscellaneous electrical appliance division holds, compared to others in the same manufacturing group, is easily seen in the difference between its production value and that of the others. In 1949, the outpout in the various divisions was as follows :

| | |
|---|---|
| Miscellaneous electrical appliances | $81,900,000 |
| Radios and radio parts | 14,900,000 |
| Refrigerators, vacuum cleaners and appliances | 14,400,000 |
| Heavy electrical machinery and equipment | 4,800,000 |
| Batteries | 1,700,000 |

Figures relating to the number of establishments, employment, salaries and wages and the value of production clearly indicate that the whole industry has prospered.

In 1900, the industry was represented by only 9 establishments, which paid out $522,000 in salaries and wages to 1,-

Countless articles are turned out by the miscellaneous products division of the electrical apparatus and supplies group of industries. The yearly value of production is over $82,-000,000. Here we see kitchen clocks being checked for accuracy before being put on the market.



024 employees, and the value of production amounted to $1,815,000.

The expansion of transmission lines and, later, the establishment of radio broadcasting on a commercial basis had a marked effect on the industry. In 1925, it comprised 19 establishments with a payroll of $6,440,000, 5,104 employees and a gross value of production of $18,-568,000.

Although it was very adversely affected by the financial crisis of the early 1930s, the electrical apparatus and supplies industry quickly recovered. At the beginning of the second world war, it employed 6,379 persons and the gross value of production had attained $27,-101,000 in 1940.

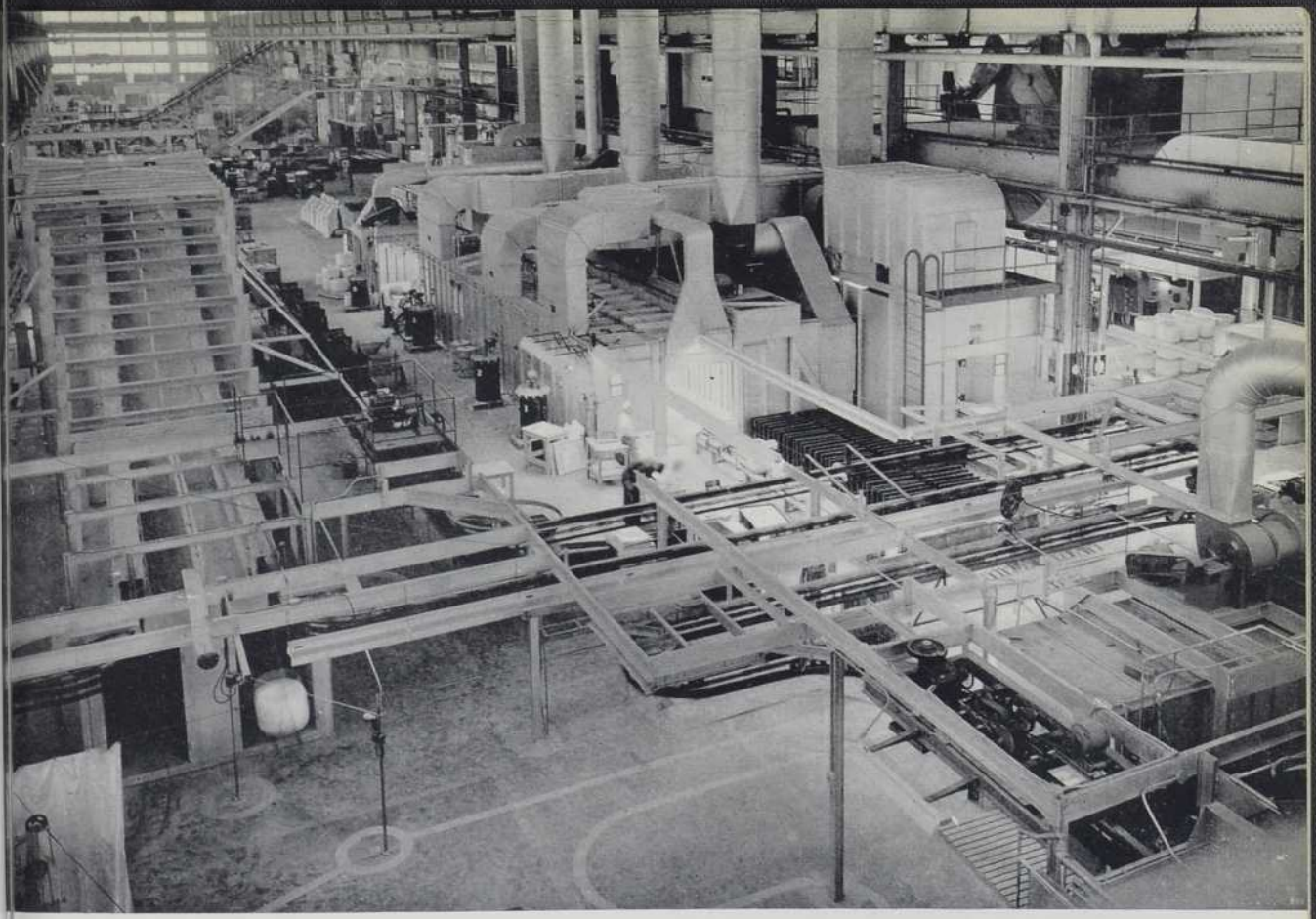
The demands made upon the industry by the last war, in the form of a more extensive output and the perfecting of new products, resulted in a sharp upswing and the figures for preceding years were doubled, tripled and quadrupled. There were 81 factories in 1950 compared to 30 in 1937; 16,507 employees, compared to 6,370 in 1940; a payroll of $42,433,000 compared to $27,-805,000 in 1944; a gross value of production of $142,000,000 in 1950 compared to $27,100,000 in 1940.

Of the 81 factories mentioned above, 32 are classified in the miscellaneous electrical appliances division; 22 produce refrigerators, vacuum cleaners and appliances; 13, radios and radio parts, 11 make heavy electrical machinery and equipment and 3 produce storage and dry and wet cell type batteries.

The geographical concentration of these establishments in Montreal and its suburban area is particularly striking. Of 72 in the area, 62 are in the City of Montreal itself. The remaining 9 are in the southwestern part of the Province and in the Quebec City area. The Metropolis, in fact, accounts for 85% of the gross value of the output and employs 85% of the personnel, that is, 13,000 per-

Completing the assemblage of an electric stove in a Quebec plant. The manufacturing of household appliances is another interesting division of the electrical apparatus and supplies industry whose total production was worth more than $142,000,000 in 1950.





The enamelling of stoves, refrigerators, washing-machines and other household appliances calls for considerable equipment as can be seen from this photograph. The electrical apparatus and supplies group of industries in the Province of Quebec comprises 81 establishments.

sons out of a total of 16,587. The Montreal factories, in the miscellaneous electrical appliances division alone, employ more than 10,000 men and women.

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The establishments manufacturing miscellaneous electrical appliances are, generally speaking, the largest in the group. Although, average employment in the industry as a whole is around 204 per establishment, the average is over 360 in the division in question whose total employment was 11,200 in 1949. The factories producing radios employed 2,962 persons and those making refrigerators, vacuum cleaners and appliances, 1,530, while the manufactures of heavy electrical machinery and equipment employed 781 and concerns making batteries, 141. It is noteworthy that the proportion of women employed in the entire industry is only 27%.

★

The production value of $142,000,000 recorded in this industry in 1950 is $25,000,000 more than that of the preceding year and is equivalent to an output value of $1,760,000 per establishment. The miscellaneous electrical appliances division accounts for more than $82,000,000 of this value of production, thereby ranking 12th among Quebec's leading manufacturing industries.

These figures represent an unprecedented peak in the history of the electrical apparatus and supplies industry and the remarkable increase of $25,000,000 in the value of production in 12 months leaves no doubt as to its sound position.

# Non-metallic Minerals

Man has succeeded in turning to industrial use a quantity of non-metallic minerals, among the more widely known of which are: asbestos, gypsum, salt, sulphur, feldspar, graphite, iron oxides, mica, eclectic syenite, etc.

Although one of these, asbestos, has made Quebec known throughout the world, this group is much less important from an economic point of view than most of the other industrial divisions. The 12 kinds of industries it comprises have an aggregate gross value of production of $68,000,000 and with very few exceptions the undertakings are mostly on a small scale. In spite of this, the non-metallic mineral industries are not only useful but essential to our manufacturing activities as a whole. Quebec's increasing industrialization cannot do otherwise than lead to their further expansion. Actually, some 8,000 workers are employed and the payroll amounts to $17,193,000 a year. Consequently, it is worthwhile considering a few of the principal industries belonging to the group which, according to the gross value of their production, are the following :

| | |
|---|---|
| The cement industries | $22,071,000 |
| The glass industry | 16,938,000 |
| The clay industries | 8,786,000 |
| The asbestos industry | 6,936,000 |

Besides the importance of their output in connection with others in the same group, the above mentioned industries in some instances exert a marked influence on the economic life of the localities in which they are situated and even on industrial activity in general. As an example of this one need only recall the serious situation created in the building trades by the shortage of cement and glass in the postwar period.

### The cement industries

The production of cement and the manufacturing of products made of concrete constitute two distinct industries. Their combined production in 1949 was valued at $22,071,000 of which $13,723,000 represented the production of cement. Accounting for 44% of the output (against 29% in Ontario), Quebec was the leading producer and its production has continued to increase. The cement, of the type known as Portland, came from two plants, one in Montreal East, the other in Hull, both of which manufacture it according to the wet process.

The production capacity of the two plants, based on the potential output of their ovens, was 14,000 tons per day in 1948 : 11,500 from the 5 ovens of the establishment in Montreal East and 2,500 from the one in Hull. A new plant was established in 1950 at St. Basile, Portneuf County, for the purpose of working the limestone quarries there. At present it can turn out 3,500 bags of cement a day and, as a result of additional facilities, it will shortly be able to produce over 5,000. Total production will thus be increased and better able to meet the constantly growing demand. In 1950, Quebec firms produced 6,920,000 barrels of cement worth $14,524,000, which represented an increase of over $5,000,000 within the space of a few years.

## Cement products

The cement products industry includes all manufactures making concrete blocks, drain and sewer pipe, etc. Their output was valued at $8,348,000 in 1949, or a quarter of the Canadian production in this field.

The most notewarthy fact in connection with this industry is the remarkable growth in the number of establishments since the last war. From 54 in 1945, the figure jumped to 81 in 1946, then to 114 in 1948 to reach 125 in 1949. In 1943 there were only 37 factories. Today they are spread throughout the Province, although Montreal predominates both with regard to production and the size of its establishments and is the leading Canadian producing centre of the industry.

Of the sum of $8,348,000 mentioned above, Montreal's 17 factories account for $3,863,000 and Quebec City's 4 concerns for $386,000. The remaining half of the production was divided among the other 104 plants. After Montreal, the more important Canadian centres of the cement products industry are Toronto ($3,646,000); Vancouver ($1,675,000) and Windsor ($1,634,000).

Montreal's production also gives the Metropolis the highest average output per establishment, valued at $227,200, while in Quebec City the average is



Mixing the substances used in manufacturing glass. Glass is obtained by the fusion of silica sand mixed with potash or soda. The Quebec industry produced $16,938,000's worth of glass in 1950, the highest peak ever reached in the industry.

$96,500 and $39,400 elsewhere in the Province. Montreal also has the highest percentage of employment with 28% of the personnel that is, 368 out of a total of 1,296 in 1949. It is worth noting that in 1936 the total employment in the cement products industry in the Province of Quebec amounted to only 125 persons.

Ranking second among the Canadian provinces in the cement products industry Quebec is, however, the leading producer of concrete bricks with an output worth $777,000. Its production of hollow blocks amounts to $1,904,000; that of pipe for drains, sewers and waterworks, to $1,361,000 and the value of miscellaneus products to close to $5,000,000.

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### Glass and glass products

The glass industry, one of the most important of the non-metallic mineral group, is divided into two sections : pressed, blown and drawn glass in one ant cut and bevelled glass in the other.

The first comprised 3 establishments in the Province, in 1950, all located in Montreal, while there were 30 in the second category. Of this number, 20 were in Montreal, 4 in Quebec, 2 in St. Joseph de Sorel and 1 in each of the following localities: Verdun, Victoriaville, Sayabec and Iberville.

Production in the glass industry in the Province of Quebec reached a record peak in 1950 with the sum of $16,938,000 or 34% of the value of the Canadian output. Quebec production had been worth $4,378,000 in 1940 and $9,832,000 in 1945.

Montreal's share in glass manufacturing amounted to $6,422,00 in 1949 whereas Quebec City accounted for $303,000. As can be seen, the Metropolis is of considerable importance in this field but to a lesser extent than in the production of cement products. The average output of Montreal factories is worth $279,000 as against $75,700 in Quebec City concerns. Over 2,400 persons earn their living in the glass industry. This is double the figure for 1940 and 37% of Canadian employment in the manufacturing of glass.

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### The clay industries

The Province ou Quebec has plentiful resources in shale and clays suitable for the manufacturing of such building materials as bricks, hollow blocks and drain pipe. Mixed with other ingredents the minerals are used for the production of certain kinds of ceramics but they do not lend themselves to the making of glazed products as well as imported clay.

Bricks and tiles are the chief products made from domestic clay in Quebec industries and imported clay is used for the production of electrical porcelains, pottery, various kinds of fireclay refractories and tableware.

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There are 22 manufactures making products from domestic clay in the Province of Quebec. They are distributed in 16 municipalities in the outskirts of Quebec City, the Lower St. Lawrence region, Beauce and Montreal. The gross value of their output is estimated at some $6,324,000.

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A cement oven.—The materials used to make cement are gradually heated until a temperature of approximately 2,600 degrees Fahrenheit is reached. The production capacity of plants in the Province of Quebec, based on the capacity of their ovens is now over 16,000 tons a day.

Bricks constitute the principal product. Over 155,000,000 units with a value of $4,489,145 were turned out in these factories in 1950 and Quebec is in first position among the Canadian provinces in this industrial undertaking. The second most important item of production is hollow blocks of which 52,600 tons, worth $935,000, were produced. Next comes drain and sewer pipe valued at $430,000, then pottery worth $93,000.

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The production of imported clay products is of lesser importance in this Province. The value of the output amounted to $3,651,000 in 1950, that is half the value of products made from domestic clay. However, production in this field has more than doubled since 1945. There are 9 establishments which employ nearly 400 persons and on the national scale Quebec ranks second, coming immediately after Ontario with a quarter of the output.

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### Asbestos products

The leading producer of asbestos in the world, the Province of Quebec also holds first place in Canada with regard to the production of asbestos products. The chief of these are brake linings, boiler and pipe covering, clutch facings, asbestos packings, gaskets, cloth, yarn, dryer felts, shingles, paper, etc.

The number of establishments in this category has never exceeded 10 but the value of production has considerably increased since 1940. From $1,379,000 that year, it rose to $3,465,000 in 1945, to $6,936,000 in 1949, to reach $8,674,000 in



Asbestos fibre rolled on warp-beam prior to weaving.—Asbestos can be woven as easily as wool or cotton and lends itself to hundreds of uses. The Province of Quebec supplies two-thirds of the Canadian output of the asbestos products industry.

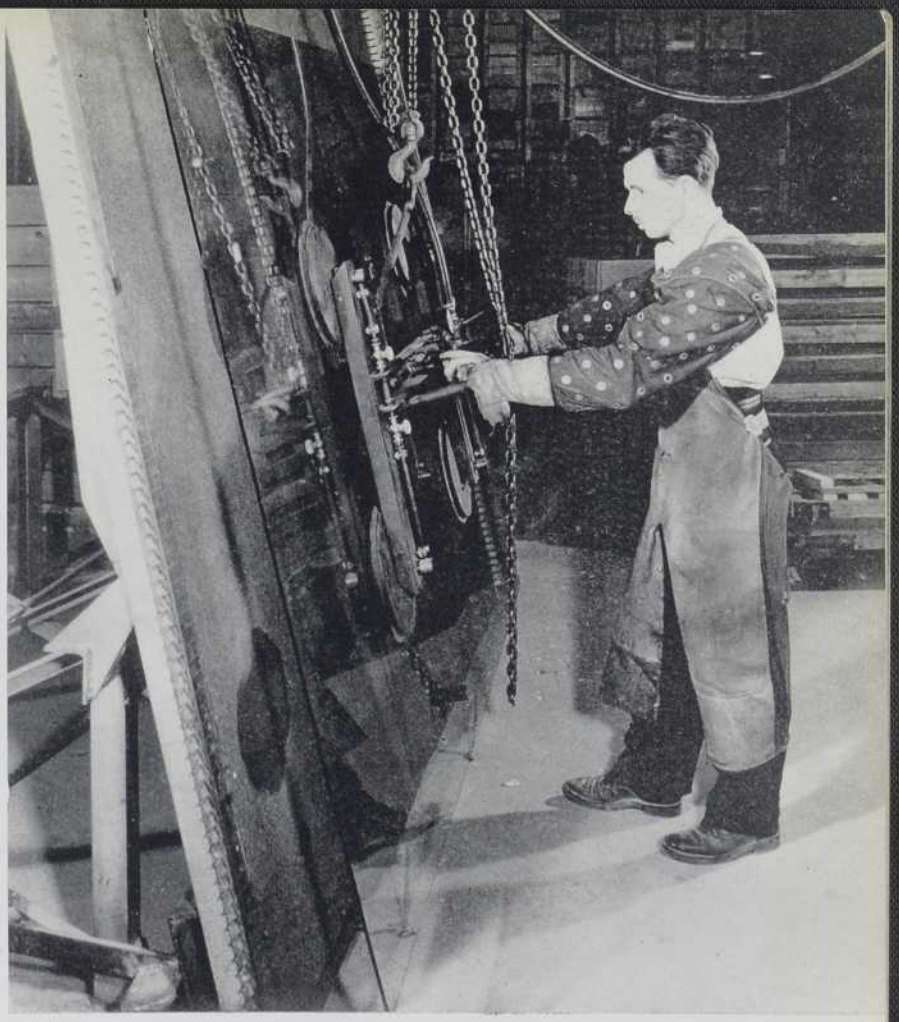
1950, which sum was equal to two-thirds of the Canadian value of production. Close to 1,200 persons are employed in the manufacturing of asbestos products.

The use of asbestos waste, refuse and shorts, made possible within the past few years, is one of the chief factors of the expansion of this industry. The shorts consist of fine powder while the others are so light and thin they are gathered by means of air filtration. They are used in bituminous compounds for the production of plastics and certain kinds of paint.

The long fibres are used chiefly for the production of textiles and can be woven as easily as wool or cotton, while medium length fibres are employed by the building and automobile industries and in the making of certain products such as asbestos cement. Asbestos can be adapted to over 2,000 different uses and it seems likely many more uses can be found for it.

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Besides, the industries already reviewed, the non-metallic mineral group comprises other industrial categories which, according to the value of production, rank as follow :



In the workshop where the cutting is done, large sheets of glass are handled with the aid of a mechanical device armed with strong rubber cups. The division of the industry engaged in cutting and bevelling comprises about thirty establishments in the Province of Quebec and employs 2,015 persons.

| | |
|---|---|
| Miscellaneous products | $4,450,000 |
| Artificial abrasives | 3,820,000 |
| Lime | 3,310,000 |
| Gypsum and sand-lime bricks | 3,110,000 |
| Stone | 2,490.000 |

In 1949 these various enterprises comprised a total of 81 establishments. Or this number the stone industry accounted for 46 and that of miscellaneous products for 17. Their aggregate production of $16,560,000 was equivalent to a quarter of that of the entire non-metallic mineral group of industries in the Province of Quebec.

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As a whole, the industries which make use of non-metalilc minerals constitute a valuable asset to Quebec's economy and, as in a great many other fields, Montreal has a leading share. In 1949 the Metropolis accounted for 69 establishments in the group and the gross value of their output amounted to the sum of $23,000,000. More than 2,800 persons were employed and their salaries and wages amounted to $6,300,000. Montreal therefore accounts for about a third of these industrial enterprises.

Although, in dollar value, the group under consideration has not the outstanding importance of some of the others, it is nonetheless essential to our manufacturing activity. The strides made in the past few years by the various industries it comprises indicate that they meet Quebec's needs and are keeping pace with the Province's industrial expansion.



# Petroleum Products
# Coke and Gas

The extent to which petroleum contributes to the present-day high standard of living can be compared to the benefits derived from electricity. In a sense, both have made our civilization what it is and it is difficult to imagine how far modern life would have evolved without them. If all the advantages we owe to electric energy and all supplies of petroleum were suddenly to disappear, the world would be faced with chaos. Such confusion would result in setting our social, economic and intellectual life back several generations.

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The uses to which petroleum lends itself are countless. In Canada no less than 760 products are made from it and many more are likely to follow. Among the better known are gazoline, which is of outstanding importance in a country where there is one automobile to every seven inhabitants, asphalt which is used for road paving and also as an ingredient in the manufacturing of black enamel paint, the frames of electric piles, etc.; industrial oils used for the concentration of ores or metals, in treating leather, making textiles, cosmetics, pharmaceutical products and insecticides. Besides, petroleum is used in the production of synthetic cements, paints, waxes, waterproof goods and kerosene to mention only a few items.

Statistics show that in Canada the yearly consumption of motor gazoline is nearly 2,000,000,000 gallons; that of oil for diesel engines, nearly 300,000,000 gallons; light fuel oil, 500,000,000 and heavy oil, twice as much. All of which indicates the important share petroleum products have in present-day living as well as the tremendous capital they represent and put into direct or indirect circulation in our economic system.

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The petroleum products and coke and gas industries in the Province of Quebec comprise a group of enterprises whose value of production in 1949 amounted to $160,355,000, or 30% of the total Canadian output. They are, therefore, among our leading manufacturing industries but Quebec's position in this field is chiefly due to its petroleum refineries.

Since the beginning of the century, when the huge development of oil refineries began, this type of establishment has prospered continuously in the Province of Quebec. In 1910 there were 6 plants engaged in refining crude oil. In 1949 the number was still the same and had remained unchanged since 1946, al-

← The ease with which motor gazoline and fuel oil can be obtained make us forget the enormous amount of scientific research, industrial organization, planning, equipment and capital investment required to extract them from crude oil. The output of Quebec refineries, estimated at 125,000 barrels a day, makes this Province the leading producer of petroleum products in Canada.

though prior to that it had varied between 4 and 8. But, from 1910 to 1949, employment had risen from 105 to 2,-192; salaries and wages had increased from $62,000 to close to $6,000,000 and the gross value of producton, from $899,000 to nearly $144,000,000.

Except for a few short periods of slackening, as for instance during the financial depression, the level of activity in Quebec's oil refineries has never ceased to progress. Everything seems to point to even greater expansion as a result of the recent developments in Canadian oil fields. The putting into operation of numerous oil wells will bring increased supplies to our refineries, particularly once transportation is facilitated by means of a pipe-line from the West. Furthermore, the output of Montreal crude oil refineries in the past, as well as the improvements effected in their equipment, give every indication Quebec will soon become one of the great oil refining centres.

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For the time being the Province of Quebec's sources of supply are foreign markets. In 1949, our biggest supplier in this domain was Venezuela which shipped us 30,000,000 barrels of crude oil. Arabia came second with over 8,-000,000 while Trinidad supplied nearly 600,000 and Iraq around 350,000 barrels.

During the navigating season on the St. Lawrence, crude oil comes to Montreal directly by boat. During the remaining months of the year, supplies reach Montreal refineries by way of a pipe-line which links them to Portland, Maine, where the oil tankers unload their cargoes.

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Althopgh countless products are made from petroleum, the crude oil refineries account for almost the entire production of the industries in this group in the Province of Quebec. Out of a production value of over $160,000,000, the output of refineries represented more than $144,000,000 in 1949. It can be judged from this figure that Quebec is the leading producer in this field in Canada. In 1945, when 4 refineries were in existence, their capacity amounted to 59,000 barrels a day, or 25.5% of the Canadian capacity per day. The following year Quebec's capacity had risen to 71,000 barrels and had reached 107,000 by 1948. Figures for 1949 show the daily output of the same refineries to have risen to 124,000 barrels or 37% of the production of Canadian oil refineries. This output places the Province of Quebec in first position in the oil refining industry. Ontario ranks second with a capacity of 83,700 barrels a day and Alberta third, with 43,000.

In the production of motor gazoline, the best known of the petroleum products, Quebec also has the most important plants in the country. In 1949 they turned out 15,000,000 barrels of gazoline or 40% of the output of all Canadian plants. Light and heavy fuel oils rank second among the products of Quebec establishments with a total production of 13,000,000 barrels or 50% of the Canadian output. The other products, in the order of their importance, are: stove oil (2,500,000 barrels); diesel fuel (2,400,-000 barrels); asphalt (1,700,000 barrels); naphta products (350,000 barrels) and aviation gazoline (100,000 barrels).

Apart from the refineries responsible for the above production, Quebec has two plants engaged in compounding lubricating oils and greases with a petro-



Filling tank cars at the refinery. Quebec refineries are the largest in Canada and their chief product is motor gazoline. In 1949 they turned out 15,000,000 barrels or 40% of the entire output of Canadian oil refineries.




Coal arriving at the Ville La Salle plant where both coke and gas are produced.

leum basis, whose output in 1949 amounted to $450,680.

As can be seen, the Province of Quebec's oil refineries place it in the very forefront in Canada, in an industry that is becoming increasingly essential to modern economy. The way in which petroleum is sought after in the world today leaves no doubt as to the promising future in store for Quebec's oil refining industry.

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### Coke and Gas

The coke and gas industry comprises concerns engaged in reducing coal and petroleum into coke and gas by various processes. According to the value of production, its importance is relatively small, especially compared to oil refineries, but it fills an essential need in connection with the other industries.

There are nine coke plants in Canada, one of which is situated at Ville Lasalle near Montreal, and 17 gas works, 4 of which are in Shawinigan Falls, Quebec, Trois-Rivières and Sherbrooke. The 5 Quebec plants in 1949 employed 869 persons, had a payroll amounting to $2,385,000 and a gross value of production of $16,357,000.

Quebec produced 493,622 tons of coke in 1949. Valued at $7,506,603 this output came from three sources: 457,646 tons from the coke and gas industry; 33,585 tons from petroleum refineries and 2,391 tons from coal tar distillation plants.

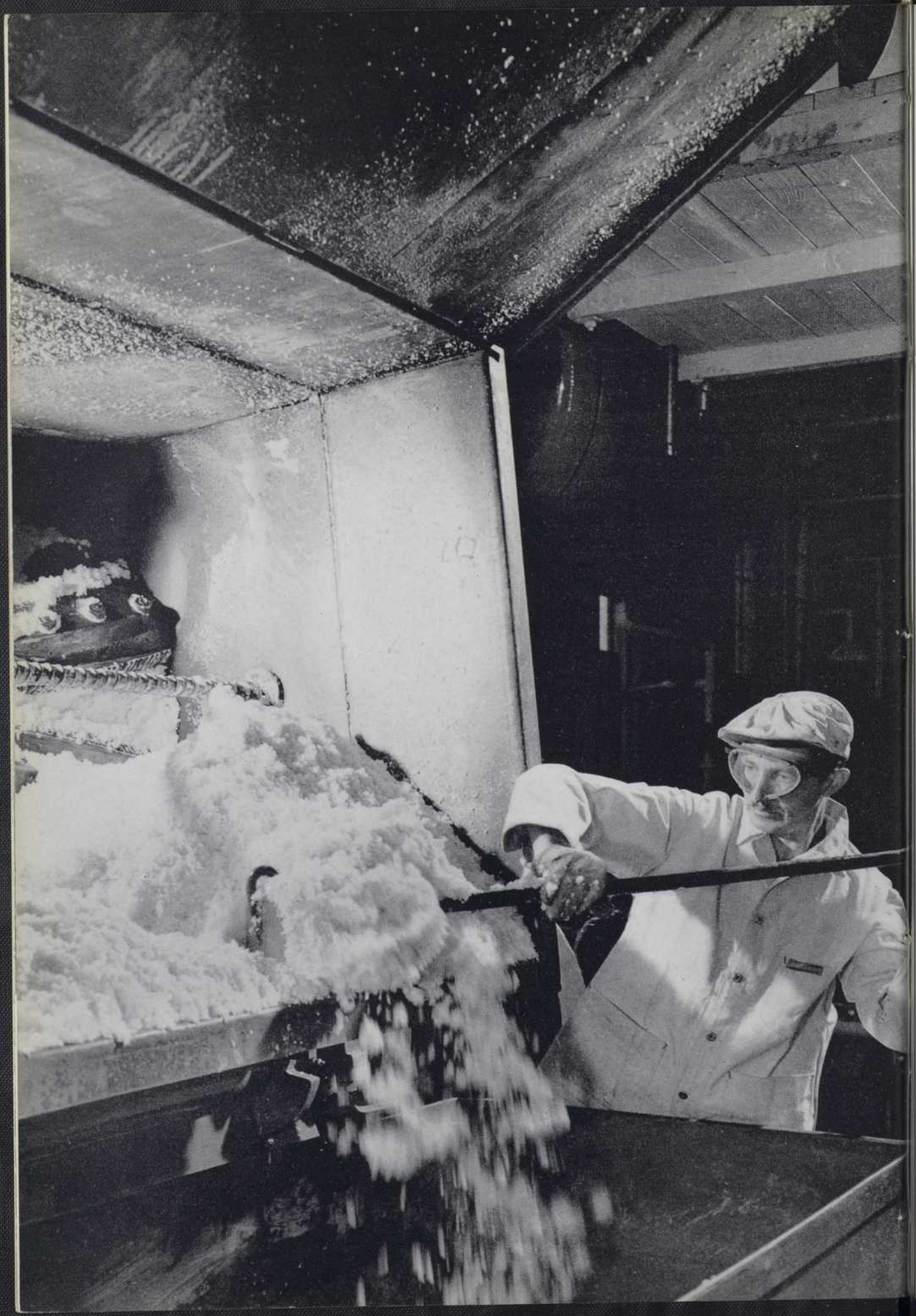
The plant at Ville LaSalle is the only one combining the production of coke and gas. The plants located in Shawinigan, Quebec and Trois-Rivières purchase coke to make gas while the Sherbrooke plant makes propane gas, a by-product of petroleum.

The only decline in this industry is recorded in the employment figure. Improvements effected in the manufacturing processes have resulted in a reduction of the personnel while at the same time the output has been increased. Production in 1949 with 869 employees was more than double that of 1926 with 1,124 employees. On the other hand, the payroll in 1949 as well as the value of production reached an unprecedent peak in the industry.

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Linked to the petroleum and coal industries, coke and gas, together with the huge petroleum products industry, provide a typical illustration of the Province of Quebec's manufacturing activity. They show how large and small undertakings can prosper side by side, each sustaining the other to a certain extent.

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# Chemical Products

Without the aid of chemistry the advances made in every sphere of human activity would probably still lie ahead and we could not pride ourselves on achievements which justify calling this the age of scientific industrialization. To the ancients chemistry held the key to a world of magic and in our own time it has produced wonders never before imagined. Since, by means of this science, mankind has succeeded in penetrating matter and resolving all its secrets, the discoveries made have been little short of miraculous. Today there is scarcely a field of endeavour in which chemistry has no part, even in some instances it has become an indispensable element. Either in the form of basic materials or as an operational factor, 90% of industrial production is said to depend on chemicals. From the processing of foods to the construction of armaments, industry makes use of chemical products in one way or another.

The tremendous role chemicals play in our life can be judged from this and it also explains the number and importance of the manufacturing enterprises their production has brought into existence. It was only to be expected that a large chemical industry, with an output scaled to its functions in present-day economy, should develop here. In fact, chemicals and allied products constitute a group of outstanding importance among our leading industries, a group largely responsible for Canada's colossal war effort. And the progress it has made since the war is such that one may ask oneself if it is not called upon to head the list of our manufacturing activities.

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It would be out of the question to review in detail the more than 4,000 products comprised in this group. A broad outline of the chief industries will have to suffice. The extent of the field covered will necessitate curtailing the data to a few facts and figures that will, nevertheless, serve to show the influence chemicals and allied products exert on Quebec's economy.

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In Canada the chemical industries rank 8th among the industrial groups. They comprise 1,037 establishments whose total output value is $590,000,000. The number of these manufactures located in the Province of Quebec is 334. Their share in Canadian production amounts to $170,000,000.

The second world war gave these Quebec industries a tremendous impetus and the value of their output rose at that time to as much as $370,000,000, or half the production of Canadian plants in the group. A return to peacetime

← The highly refined pulp used as a basic material is defibrated and churned in an immense vat. Here an employee is emptying the white flakes into a small conveyance. This photograph was taken in a plant in Shawinigan Falls where some of the most important chemical works in the country are located.

conditions resulted in a sharp drop in the level of activity but the value of production has remained a great deal higher than it was 12 years ago : $66,-307,000 in 1940; $123,000,000 in 1946; $167,000,000 in 1949.

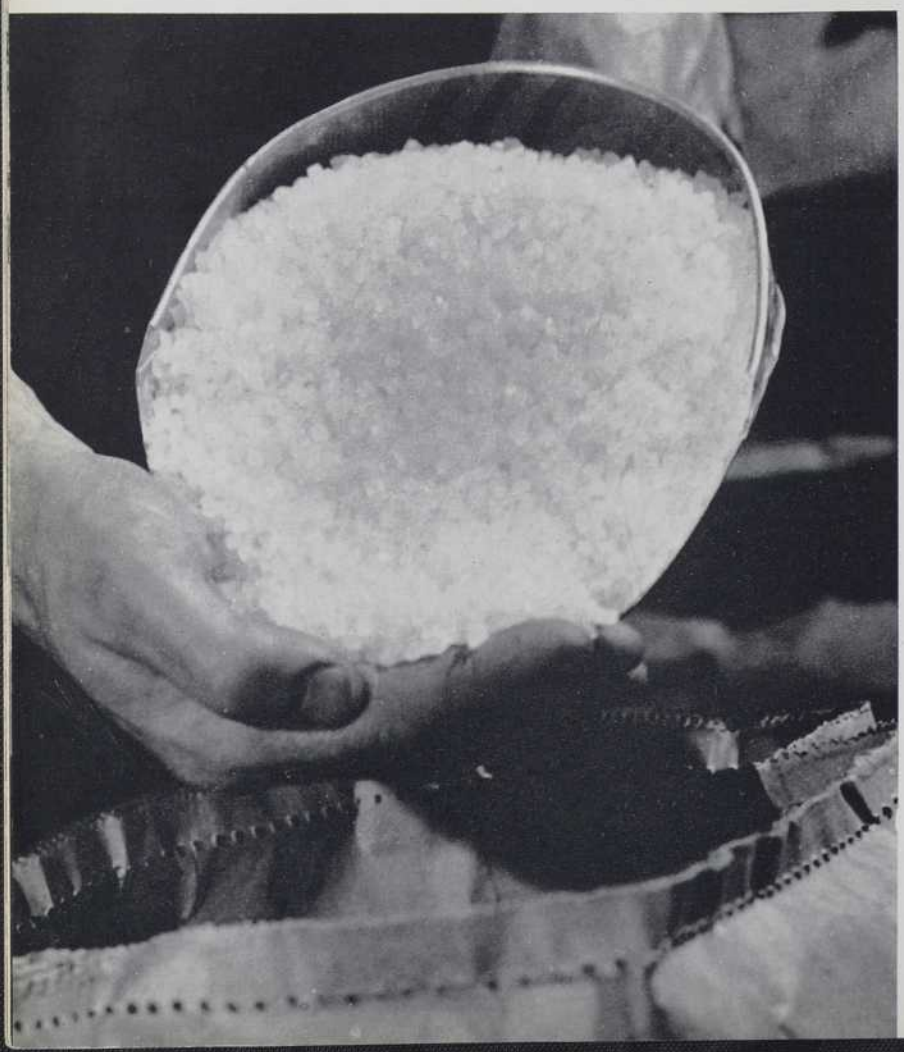
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Out of a total of 41,328 persons employed in the Canadian chemical industries, Quebec manufactures accounted for 15,500. These manufactures are distributed in 56 municipalities of which 209 in Montreal, 24 in Quebec City, 8 in Ville La Salle, 6 in Shawinigan and 6 in Lachine. These enterprises which turn out a wide variety of products, comprise 14 different industries the principal ones being, according to the gross value of their production, the following:

| | |
|---|---|
| Medicinals and pharmaceuticals | $30,700,000 |
| Acids, alkalies and salts | 28,700,000 |
| Paints and varnishes | 28,600,000 |
| Miscellaneous products | 26,700,000 |
| Plastics (primary only) | 12,300,000 |
| Fertilizers | 6,900,000 |

The eight industries which complete the group have an aggregate output valued at $33,500,000.

The industries considered as primary comprise those whose products serve as raw material for other enterprises



The chemical industry makes great use of polymer polythene as a base. It comes in the form of cubic granules which to the touch are not unlike solid paraffin. It has remarkable properties as an insulator of even the highest electric voltage. It is used for television, radar, etc.



One of the wonders of modern chemistry is the production from wood of cellophane, combining the transparency of glass with the suppleness of the finest woven fabrics. It is one of the most popular products of the plastics industry in which field of enterprise Quebec leads all the Canadian provinces with 60% of the output.

classed as secondary, they are the acids, alkalies and salts, the primary plastics, the compressed gases, the vegetable oils. Secondary industries consist of those engaged in producing: fertilizers, medicinals and pharmaceuticals, paints and varnishes, soaps and washing compounds, toilet preparations, adhesives, inks, polishes and dressings and miscellaneous products.

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*A) Medicinal and pharmaceutical preparations:* The pharmaceutical products manufactured in the Province of Quebec in 1949 were valued at $30,716,000 or 18% of Quebec's output of chemical products and 47% of the Canadian output of pharmaceutical products. From this point of view it is the most important division in the group. It is also the one which employs the greatest number of persons and pays out the highest amount in salaries and wages.

There were 95 manufactures of medicinal and pharmaceutical products in the Province of Quebec in 1949; 76 were located in Montreal and its outskirts and 9 in Quebec City and its suburban area. The remaining 10 were scattered throughout the Province, mainly in the Eastern Townships. In 1936 there were 65 establishments and in 1941, 68. A few

are large establishments, but for the most part they are small factories specializing in patent medicines. Employment is now over 3,600 and salaries and wages amount to over $7,750,000.

Compared to Canada as a whole, Quebec's position in the manufacturing of medicinal and pharmaceutical products is as follows: the Province accounts for more than 40% of the output with 95 establishments out of a total of 218; it employs 45% of the personnel and pays out 49% of the salaries and wages.

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*B) Acids, alkalies and salts:* Basic elements in a great number of the other industries, acids, alkalies and salts are among the most important materials used in manufacturing processes and are consequently comprised in the primary chemical industries. The volume of production is considerable and widely diversified as several different products are obtained from a single natural substance.

The raw materials used in this division are derived from sulphur, chlorine, sodium, calcium, carbon and phosphorus. A chemical reaction obtained with one or the other results in a new product which may in turn be transformed in a similar way.

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The 9 establishments in the Province of Quebec which specialize in this field manufactured 47 different products in 1949. Of this number 8 were organic or inorganic acids, among others sulphuric acid and liquid chlorine; 2 are bases or alkalies, of which one is sodium hydroxide (caustic soda); 28 are classed as salts and 9 are gases, various substances or organic chemicals.

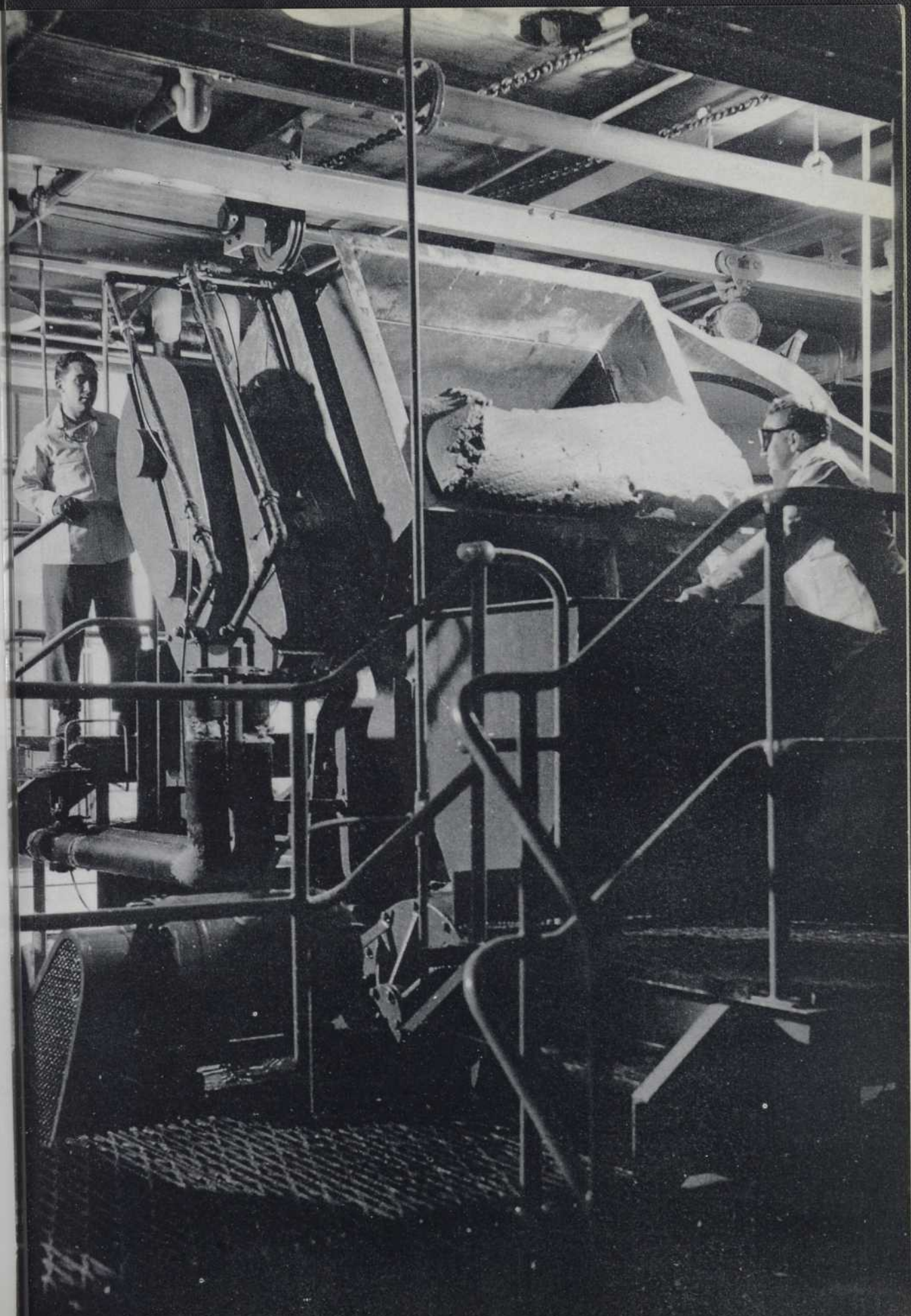
The development of this type of undertaking has been one of the most rapid ever known in Quebec industry; its production more than quadrupled between 1930 and 1949 and the output for 1950 is estimated at nearly $35,000,000.

Although available statistics do not give the respective values of each product in this division, in the Province of Quebec there are at least three which are of outstanding economic and industrial importance, namely, sulphuric acid, chlorine and caustic soda.

Nearly all industries make use of sulphuric acid in one or another stage of their operations. The output of around 700,000 short tons of 100% sulphuric acid in Canada is used to a great extent for the production of fertilizers. During the war it was chiefly used in the manufacture of explosives of all kinds. Today Canadian manufacturers of chemical fertilizers absorb 70% of the production and the other chemical industries 13%. The percentage consumed by the primary iron and steel, non-ferrous metals, coke, gas and petroleum industries accounts for 12.5%, leaving only 3.6% for other industries.

As for chlorine and caustic soda, they are of particular importance because of the heavy consumption in the Canadian pulp and paper industry: 62.7% of the output of the first and 41.1% of the second. The heavy chemicals industry also uses 32% of the chlorine produced and 20% of the caustic soda.

**A stage in the making of cellulose sponge ⟹ in a Shawinigan Falls plant. The town is the Canadian centre of the primary plastics industry.**



The 9 establishments which account for the output are very large plants. Two, located in the St. Maurice Valley, produce chlorine, caustic soda, hydrogen peroxide, acetone, acetic acid, etc. One establishment in Arvida produces sulphuric acid (essential to the production of aluminum) chlorine, caustic soda, etc. A huge plant in Buckingham specializes in the production of products and by-products of phosphorus, sodium and potassium. Chlorine and caustic soda are also obtained by electric reduction at Beauharnois, while two establishments in Montreal manufacture zinc oxide and one in Ville La Salle makes anhydrous caffeine, sodium benzoate and phenacetin.

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A characteristic feature of the chemical industry is that employment is relatively low compared to the heavy volume of production. Most of the operations involved in this type of enterprise, and particularly in the acids, alkalies and salts division, are automatic and the workman's job consists mainly in manipulating and supervising the elaborate equipment, which is very costly, highly specialized and has a great capacity of output. The 9 manufactures in this category had an aggregate personnel of 2,651 in 1950 (as against 1,590 in 1940) and salaries and wages amounted to $8,000,-000.

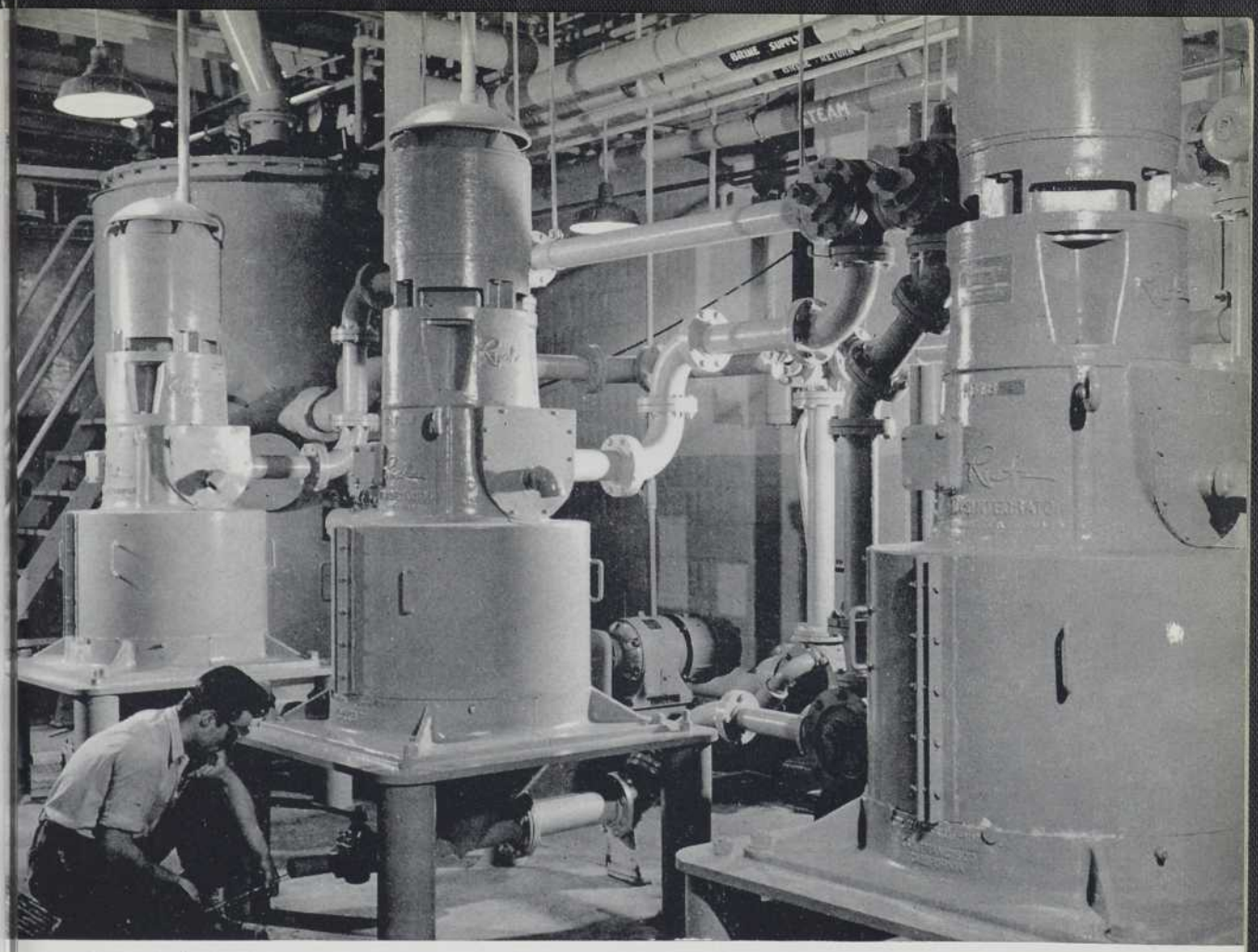
*C) Paints and varnishes:* The manufacturing of paints and varnishes ranks third in the chemical industries in the Province of Quebec. Its output value is $30,000,000.

Numerous ingredients are used in the production of paints and varnishes. Many are used in a natural state, others are obtained from chemical compounds and many more are synthetic products. Ready-mixed paints form the bulk of production in this category with a proportion of 42%. Enamels rank second with 27%. In third place come water-thinned paints or pastes that account for 16%. Finally, varnishes and lacquers represent respectively 9% and 6%.

The Province of Quebec had 33 manufactures of paints and varnishes in 1949. They were distributed as follows: 26 in Montreal, 3 in Quebec City, 2 in Outremont and 1 each in Granby and St. Paul l'Ermite.

The Montreal establishments are the largest not only compared to those in the remainder of the Province but to all others in Canada. Their average value of production is $1,036,000, whereas in Quebec City factories it is $232,000 and in those in Toronto, $958,000. Montreal also leads Canadian cities with an aggregate output of $26,918,000 but Toronto runs a close second with $26,855,-000.

The last war provided a stimulus to the paint and varnish industry but the discovery of a new pigment with remarkable properties promises further expansion. This pigment, an extract of titanium, is already being used extensively in the manufacturing of paints. In 1925, the paint and varnish industry employed 1,073 persons. In 1949, employment had risen to 2,837 and the payroll amounted to $6,248,000. Considered in relation to the country as a whole, the industry in Quebec accounts for over a third of the output. With 30% of the establishments, Quebec employs 47% of the manpower, pays out 44% of the salaries and wages, uses 33.5% of the raw materials and supplies 34% of the production value.



Part of the intricate apparatus of a chemical plant. Establishments producing chemicals do not employ a great many people but their equipment is very costly. It is estimated that for every person employed there is $20,000 invested in the organization and equipment of a factory. Grinding and sifting sodium nitrate, one of the ingredients used in the making of dynamite.

*D) Primary plastics:* The plastic industry is one of the latest to come into existence in Canada, but it is nonetheless, the one whose products have the greatest popular appeal. They are used virtually in everything everywhere. They are to be found in textiles as well as in electrical appliances, they go into the production of furniture, the building of houses, ships and the manufacturing of paints, and are used in countless ways as substitutes for other materials. Their economic value is far beyond the limits of the industry wherein they are produced, for the latter only turns out primary material for use in further manufacture.

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In 1950, the Province of Quebec had 5 plants producing primary plastics, employment amounted to 1,000 persons and the payroll to $2,900,000. Their production value of $9,300,000 was equivalent to 56.5% of the output of all Canadian plants in the industry and made Quebec the leading producing centre of primary plastics in the country.

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The various plastics can be divided into two main categories: thermo-plastic (reacting to heat) and non-thermoplastic (heat resistant); there is also a plastic with a casein base.

Quebec's output consists chiefly of thermo-plastics. The principal ones produced in recent years are:

1) Cellulose. — Wood and cotton are used to produce basic cellulose from which such products as "Cellophane", cellulose sponges, etc, are made.

2) Polythene: from ethylene, a petroleum product. It is used as an insulator, for packaging and is resistant to acids and corrosion.

3) Synthetic resin (vinyl chloride type), used for the production of clothing, such as waterproofs, furniture covering, electrical insulation and for packaging.

4) Synthetic resin of the polystrene and vinyl chloride type produces a fairly hard plastic that is more heat resistant than most plastics of the kind. It is very extensively used and goes into the making of household ware, toys, automobiles, paper, etc.

Another synthetic resin of the casein type is an extract of milk. It is used for such products as buttons, door knobs, toys, etc.

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*E) Chemical fertilizers:* This industry, which employs 450 persons in 6 plants is making great strides in the Province of Quebec. Its value of production amounted to $2,617,000 in 1940 and the latest figures shows it is now over $8,000,000.

The various kinds of chemical fertilizers can be divided into 4 categories according to the basic material: superphosphate, ammonium nitrate, ammonium sulphate and ammonium phosphate. Mixed fertilizers are also produced from superphosphate, muriate of potash and nitrate. Of the 6 chemical fertilizer plants in the Province, 2 are located in Montreal. One produces ammonium sulphate and the other mixed fertilizers. The plants in Chambly, Laprairie and Quebec also manufacture mixed fertilizers. The works at McMasterville produce superphosphate.

The industries considered are the foremost in the chemical products group. However, there are several others which contribute to Quebec's economy to a considerable extent, since their aggregate production is valued at over $60,000,000. Of these, two in the Montreal area are engaged in coal tar distillation and two others in the extraction of vegetable oils. These establishments employ 240 persons, pay out $580,000 in salaries and wages and have an output worth $14,000,000.

The toilet preparations industry comprises 30 establishments with 740 employees and a payroll of $1,380,000. Their combined production is valued at approximately $8,000,000.

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The miscellaneous products industry covers some 66 manufactures. Their total value of production amounts to $26,720,000 and their payroll to nearly $7,000,000. The most representative establishments of this category are the ones



Explosives are classified in the miscellaneous products division of the chemicals and allied products industry.

manufacturing explosives and matches. To complete the data on the chemicals and allied products group, suffice it to mention the following with their value of production:

| | |
|---|---|
| Soaps and washing compounds | $4,820,000 |
| Polishes and dressings | 3,290,000 |
| Compressed gases | 2,970,000 |
| Adhesives | 2,360,000 |
| Inks | 960,000 |

## Producing centres

Montreal is unquestionably the centre of production of chemicals and allied products in the Province of Quebec with a production value of $80,310,000. 209 manufactures and 7,920 employees. Each industry is represented by at least one establishment. The principal Montreal manufactures of chemical products rank as follows according to the value of their output:

| | |
|---|---|
| Paints and varnishes | $26,920,000 |
| Medicinal and pharmaceutical preparations | 16,380,000 |
| Miscellaneous products | 7,550,000 |
| Toilet preparations | 4,690,000 |
| Soaps and washing compounds | 2,590,000 |

The Metropolis contributes 48% to the total production of chemical products in the Province, but taking the industries separately, we find its share amounts to 99% of the output of inks; 94% paints and varnishes; 89% toilet preparations; 86% compressed gases; 54% soaps and washing compounds and 53% of the produc-




Mixing nitroglycerine with non-explosive ingredients. This is one of the stages in making dynamite in a large chemical factory. The yearly production of chemicals and allied products in the Province of Quebec amounts to over $170,000,000.



Preparing to cut sheets of cellophane to required size in a Shawinigan Falls factory.

tion of medicinal and pharmaceutical preparations.

Montreal employs more than half the manpower in this manufacturing group. According to employment, the more important establishments are those engaged in making paints and varnishes which employ 2,700 persons and those making medicinal and pharmaceutical preparations with a personnel of 2,147.

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In spite of the fact that, on the whole, Quebec City's manufacturing production is not very extensive, it accounts, however, for a wide variety of enterprises. It has no less than 24 establishments in the chemicals and allied products group, divided as follows:

| | |
|---|---|
| Medicinal and pharmaceutical preparations | 6 |
| Soaps and washing compounds | 6 |
| Miscellaneous products | 4 |
| Paints and varnishes | 3 |
| Polishes and dressings | 1 |
| Chemical fertilizers | 1 |
| Compressed gas | 1 |

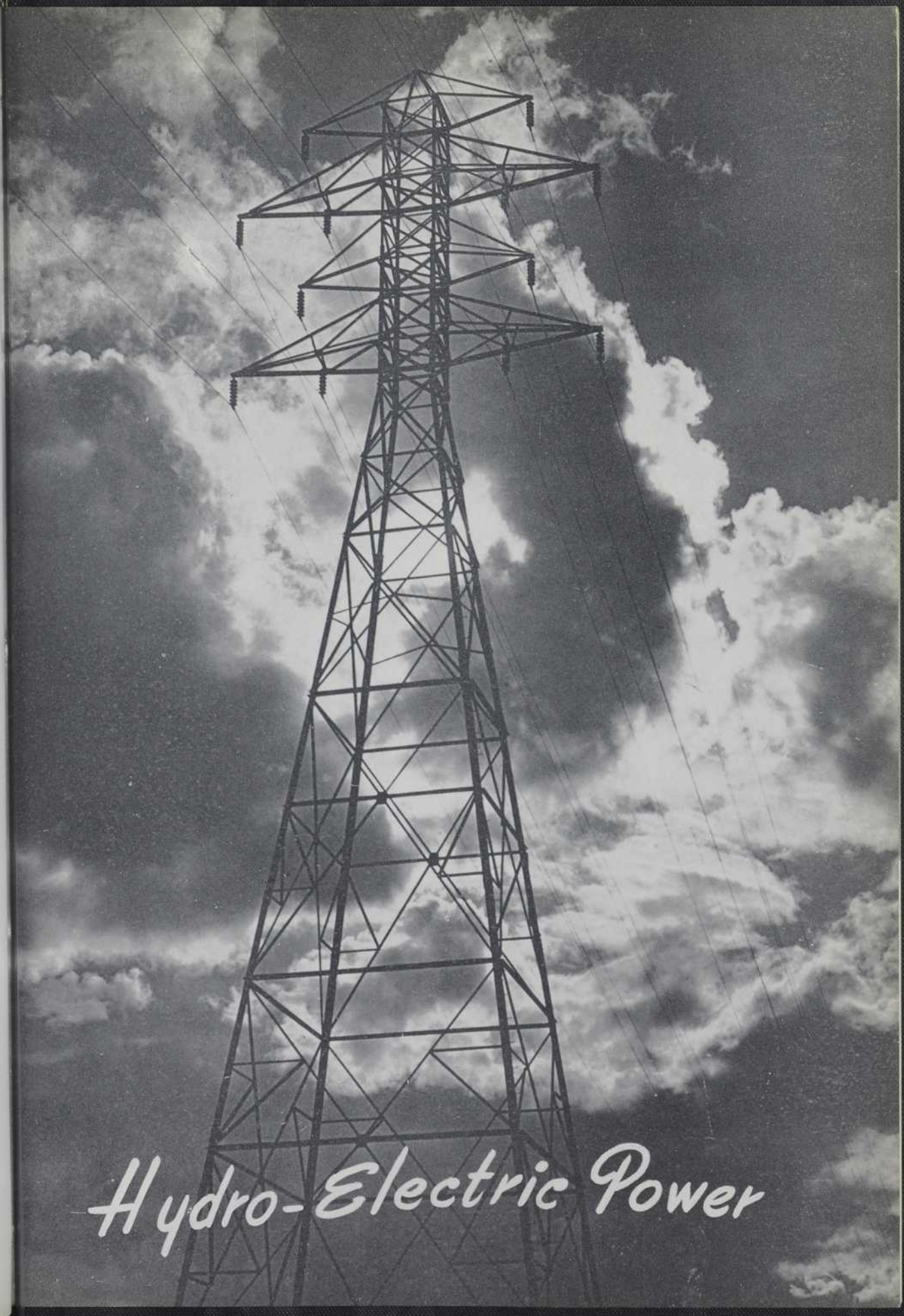
Shawinigan Falls, on the St. Maurice River, is a town in which the production of primary chemicals exerts great economic influence. Of its 45 industrial establishments, 6 manufacture chemicals and several others make use of them in large quantities: aluminum, pulp and paper, etc. The six chemical plants represent three industries in which Shawinigan has an important share.

In the acids, alkalies and salts industry, Shawinigan has two plants with a widely varied output; the list of their principal products comprises over 30 chemicals, several of which are not made elsewhere in Canada. The same town is also the Canadian centre of the primary plastics industry. The three plants supply over a third of the Canadian production and some of the products are also made exclusively in these factories, such as cellophane, cellulose sponges, polythene, vinyl, dioctyl phthalate. Compressed gas is also manufactured in a plant at Shawinigan.

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In conclusion, chemicals and allied products can be said to constitute one of the most interesting and progressive industrial groups in the Province of Quebec as a result of the strong impetus provided by the recent discoveries in the field of chemistry. With fresh advances continually being made, this science can be relied upon to make possible the even greater development of Quebec's vast store of natural wealth.

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Hydro-Electric Power

# Hydro-Electric Power

The Province of Quebec finds perhaps its greatest single natural resource in the rivers, streams and waterfalls of the St. Lawrence River system. For this wealth of water power, which is converted to hydro-electric power has made possible and profitable the development of many of Quebec's other natural riches; selling at minimum cost, it has fostered the development of the wide range of industries which have made Quebec a leading economic region. This chapter on the Province's water power is, therefore, a fitting conclusion to this booklet. It is an extract from the Provincial Publicity Bureau's fine publication "Industry in Action".

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In 1691, the Petit Pré mill at Château Richer, a few miles from the present city of Québec, was the pioneer user of harnessed water-power in North America. Today the Province is a world leader in the development of hydro-electric power. That first little water-wheel of 260 years ago, developing a few horsepower, was the forerunner of the hundreds of turbines now found at about 100 different sites on three dozen different rivers in Quebec. They are grouped in generating stations which range in capacity from 100 horsepower to 1,200,000 horsepower — some of them among the world's largest hydro plants. Together, they are capable of over 6,000,000 horsepower — more than half of all the hydro-electric capacity in Canada — and the equivalent of about one-quarter of the total in the United States or almost a twelfth of the grand total throughout the world. Of all the hydro-electric plants in North America with a capacity of more than 150,000 horsepower, a quarter is in the Province of Quebec.

On a population basis, according to the latest available international returns, Norway leads all nations in the utilization of water-power with 1,180 horsepower per 1,000 inhabitants, Canada is second with 860, Switzerland third with 805, Sweden fourth with 550, and the United States follows with about 160. The Province of Quebec, however, has an installation of about 1,580 horsepower per 1,000 population — almost twice as much as Canada as a whole, and nearly 10 times as much as the United States.

A study of the world production of electricity, both hydro and steam, presents a slightly different picture but still leaves Quebec pre-eminent. The figures for 1949 show the per capita production to be as follows :

| | | | | | |
|---|---|---|---|---|---|
| Prov. of Quebec | 6,600 | kilowatt | hrs | per | capita |
| Norway | 4,700 | " | " | " | " |
| Canada | 3,460 | " | " | " | " |
| United States | 2,300 | " | " | " | " |
| Sweden | 2,300 | " | " | " | " |
| Britain | 980 | " | " | " | " |
| France | 690 | " | " | " | " |
| Italy | 435 | " | " | " | " |
| Poland | 334 | " | " | " | " |



An aerial view of what is now one of the great chemical enterprises of the world. It had its start in a small carbide plant, established at Shawinigan Falls, in 1903, to utilize some of the power produced by the Shawinigan Water and Power Company.

*THE generator room in Beauharnois Plant No. 2, photographed in course of construction, part of the development undertaken by the Province of Quebec Hydro-Electric Commission destined to increase Beauharnois production to more than 1,400,000 HP. Constructed on a rock escarpment, the Beauharnois plant is near the town whose name it bears. It will be 3,300 feet long—nearly two-thirds of a mile—when completed. The rotating part of the generators, seen here, which measures 43 feet in diameter and weighs over 300 tons, attains a peripheral speed of more than 90 miles per hour. Every generator is propelled by a Francis-type turbine capable of 75 revolutions per minute—operating under an 80-foot head of water.*



There are other significant comparisons. In the United States, about 81 per cent of the generating capacity is to be found in public utility plants while the rest is operated by industries for their own exclusive use. In Canada, 90 per cent is in public utilities, and in Québec the figure is 94.1 per cent. In the United States, only about a quarter of the electricity is produced from hydro-plants and the rest from fuel plants. In Canada, more than 95 per cent of electricity is from water-power, and in Quebec it is virtually 100 per cent.

The most striking contrast of all is that of price. In the United States, including all regions, the latest figures available (1947) show that the average selling price of electricity was 1.78 cents per kilowatt hour. It ranged from 1.12 cents in the "east south central" states to 2.60 cents in New England. In Canada as a whole the comparable figure was 0.58 cents, but in Quebec it was 0.36 cents — about one-fifth of the United States average, and the lowest in North America if not in the world.

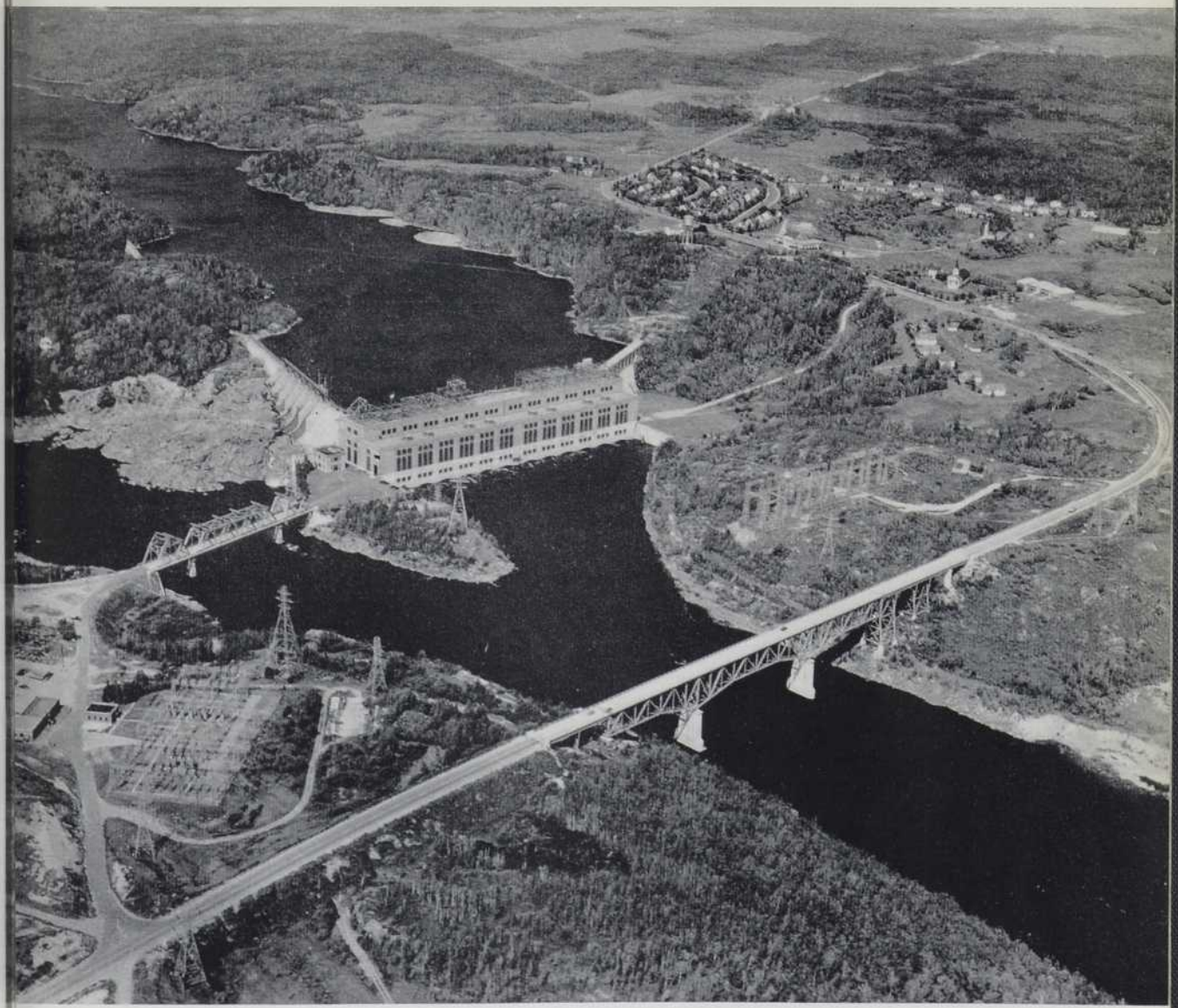
There are many factors which contribute to the low cost of power production in Quebec. The distribution of precipitation is remarkably even throughout the year and the nature of the forest-covered terrain provides excellent run-off conditions with considerable natural regulation of stream flow. Then there is the excellent availability of water-storage reservoirs provided in many instances through the active co-operation of the Quebec Streams Commission. In addition, the high load-factor resulting from the character of the industrial utilization of the power permits particularly economical production. About 20 per cent of Quebec's power is sold outside the Province. Of that used in Quebec, large scale industry consumes 82 per cent, of which 68 per cent is used in the manufacture of wood and paper products and for the production of non-ferrous metals.

The phenomenally low cost of power has attracted industry and by building up the demand has played a large part in the immense development of Quebec's hydro-electric resources. Even so, at the present time only a third of the Province's potential hydraulic power has been harnessed, although perhaps an equal amount lies within present economical transmission distance of already-established centres of population and industry.

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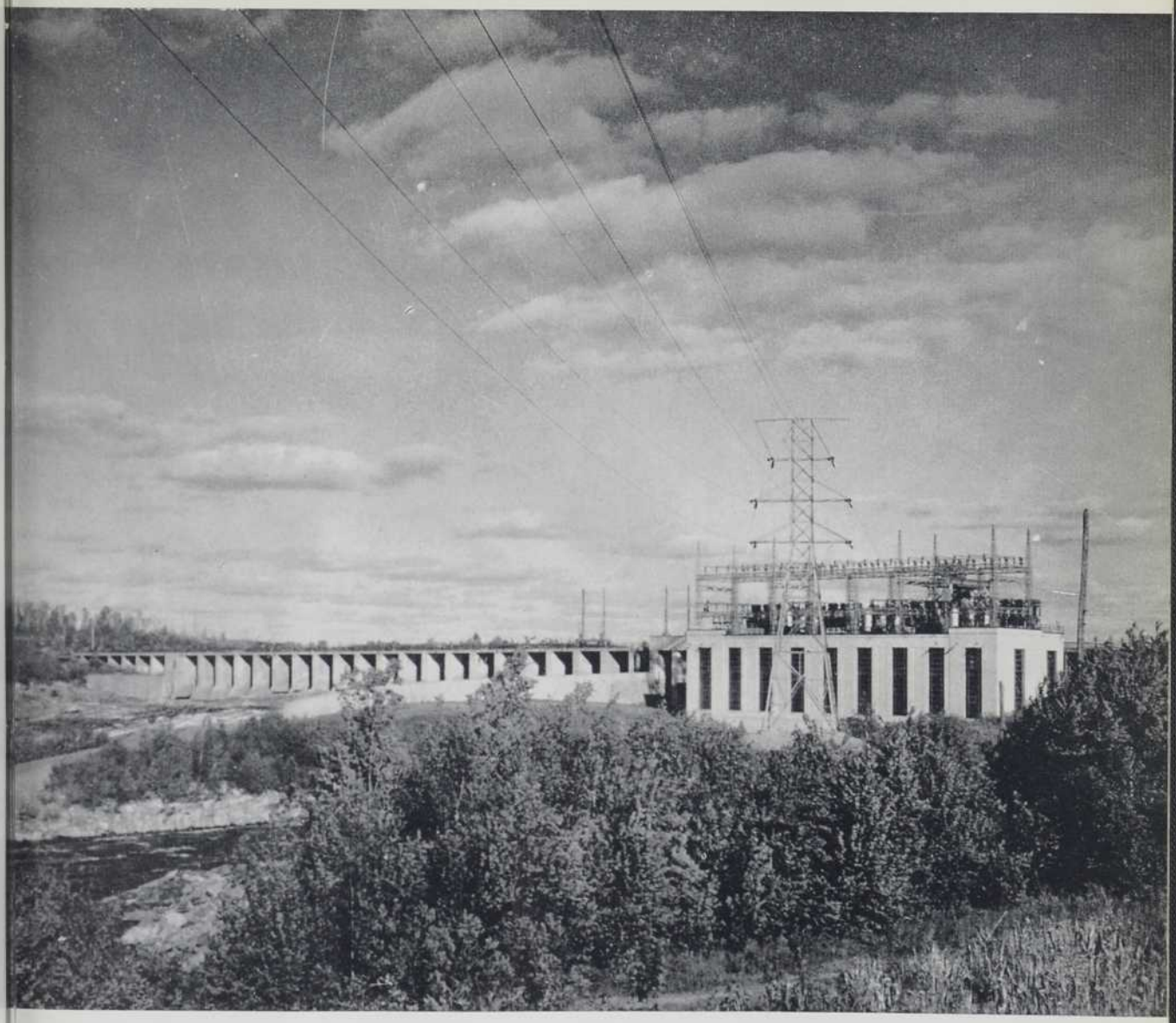
The history of Quebec and of power development in the Province during the past half century reads almost like fiction. Although power is now supplied to a considerable extent by the provincially owned Quebec Hydro-Electric Commission, perhaps the general growth of development can be well illustrated by following the development of one of the pioneer companies, the Shawinigan Water and Power Company.

Just over 50 years ago a group of business men stood beside a waterfall called Shawinigan, on the St. Maurice River about 20 miles north of its confluence with the St. Lawrence. All around was forest and there was hardly a settlement in all the hundreds of miles of the St. Maurice river valley, except the little town of Trois Rivières at its mouth; yet, those business men thought that if they could start a company and



Powerhouse and townsite at l'Isle Maligne, Quebec. This station has a capacity of 540,000 h.p.

*RAPID VII : Power-station on the Upper Ottawa river, 38 miles south of Cadillac in the northwestern part of the Province. The plant, with a 68,000 HP. installation, supplies electricity to Noranda and other mines in the district and to local electrical co-operatives and in this way contributes to the development of the whole region. The Quebec Hydro-Electric Commission is building a 70,000 HP. power-house at Rapid II, about twenty miles below Rapid VII, to meet the growing demand in the region.*



harness the Shawinigan waterfall for electricity, they might arrange for the establishment of some industry to use the power. Although electricity had never before been transmitted that distance, they might even devise a method of sending some of it the whole 85 miles to Montreal where there would be a ready market. It was a risky business venture but they organized The Shawinigan Water and Power Company and arranged to sell first water and later electric power to an aluminum plant which was to be built at the falls. They employed expert engineers who, by constructing a 50,000-volt transmission line — the first of this capacity in North America — were able to transmit power to Montreal. They decided to install two 5,000-horsepower generators in the hope that, some time in the future, they might be able to increase the capacity of the plant to as much as 30,000 horsepower. Within seven years not only had that seemingly distant goal been reached but the installed capacity was twice that visionary amount. Industry followed industry to the neighbourhood of the Shawinigan waterfall; the Shawinigan company itself started a carbide plant as a subsidiary to use its ever-increasing supply of power and a paper mill was also built.

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Today near that cataract, where there was only wilderness at the beginning of the century, stands the thriving city of Shawinigan Falls, with a population of nearly 40,000. Its aluminum plant produces, among other items, mile after mile of transmission-line wire, much of which is used by the Shawinigan company. The carbide plant has expanded into a vast chemical works, sending its products to countries throughout the world. The little paper mill has become one of the most important in Canada and other great plants produce aluminum ingots, textiles, wood products, plastics.

The power company which made it possible to replace wilderness by industry, and forest by homes, has developed too. By attaining and then doubling its founders' original plan of 10,000 horsepower at Shawinigan Falls, it has now reached at that site alone a production 50 times the original figure. It has five more giant plants at other sites on the St. Maurice, including one which went into operation in 1951, and smaller installations on other rivers. With its subsidiary, Quebec Power Company, it has a total system capacity of more than 1,800,000 horsepower, and a further 800,000 horsepower already planned for development. No longer puzzled about how to transmit power 85 miles, it now sends electricity to industry and to residential areas over a network covering an area of 25,000 square miles, from the Ottawa River and the New York State line in the south-west, almost to the Saguenay in the north-east and the Maine border to the south-east.

The electricity distributed would be sufficient to supply every home in Canada from the Atlantic to the Pacific as well as all those in New England. Instead, every kilowatt-hour of Shawinigan electricity is sold in the Province of Quebec. Ten per cent of it goes to residential, rural, commercial and municipal customers in 700 municipalities, including about 50,000 farm homes. The other 90 per cent is used by large industries: pulp and paper mills which turn out almost a quarter of all newsprint used in the United States; asbestos plants which produce 60 per cent of the



Inside of Shipshaw No. 2 powerhouse. Each of the 12 generators has a capacity of 100,000 h.p.

*PART of the huge equipment in a gigantic undertaking. A steel shaft of three-foot diameter transmits the rotating movement of the turbine to the generator in Plant No. 2. The Beauharnois Power Development, which the Quebec Hydro-Electric Commission is now completing, constitutes one of the greatest efforts man has ever made to harness water power. Diversion of the St. Lawrence River to form the Beauharnois Canal—linking Lake St. Francis and Lake St. Louis—necessitated the construction of a series of island-anchored control dams spanning the river and other work including : the dredging of a canal 15 miles in length and 3,300 feet in width; the construction of 3 bridges each more than 3,000 feet long; the replacing of 20 miles of highway; the digging of a navigation channel 600 feet wide; the building of 58 steel head gates with an average width of 42 feet and varying between 16 and 35 feet in height, etc.*



world's supply; shipyards and food factories; and other great plants manufacturing chemicals and aluminum, machinery and foundry castings, cotton and rayon, shoes and gloves, wood and paper products, abrasives and wire cloth, metal foils and wire products, and dozens of other commodities.

Soon to be added to the list is titanium — a vital ingredient in white paint and other industrial materials, and now being developed for use as a metal. Formerly most of the American supply came from India, but Shawinigan's own research department helped to work out a method of processing ilmenite — the source of titanium — by electric furnace. Vast deposits of ilmenite have long been known to exist in northeastern Québec, * but until recently no method had been found to exploit the ore economically. Now an immense smelter is being built at Sorel, for the separation of titanium slag and pig-iron from ilmenite, and Shawingan is to supply the plant with 160,000 horsepower of electricity for the furnaces.

The St. Maurice valley, a wilderness in 1900, is being developed steadily. Its industrial production amounts to $175,000,000 a year. Its population is 165,000 compared with a fraction of that number when Shawinigan began. Cities and towns and villages have sprung up and are growing, nourished by hydro-electric power from the succession of generating stations reaching ever northward to harness the wild waters of the river. Since its inception fifty years ago, Shawinigan's program has been multiplied 250 times over. The company's assets have grown from the ownership of one waterfall to installations and properties worth more than $250,000,000. Its contribution to the economic life of Quebec and to that of Canada has been incalculable.

While the growth of the Shawinigan Water and Power Company has been used to ilustrate the importance of water-power development in the rapid industrialization of Quebec, it is but one of a number of important companies operating in the Province such as: The Aluminum Company of Canada which owns and operates the largest plant in Canada and one of the larger plants in the world, Shipshaw on the Saguenay River (1,200,000 horsepower) and also the Chute à Caron plant of 300,000 horse-power; The Saguenay Power Company with 540,000 horsepower in its Ile Maligne plant on the Saguenay River; the Gatineau Power Company with more than 680,000 horsepower in three plants on the Gatineau River and two on the Ottawa River and in other smaller plants; a number of companies with lower installations.

The future progress now envisaged for the New Quebec region probably will be a continuation and extension of the successful projects of the power organizations of Quebec. In the southern parts of the Province the development has been less romantic but no less vital to general progress. In the Montreal district, low-cost electric power is mainly supplied by the Quebec Hydro-Electric Commission from the Beauharnois plant.

The Beauharnois Power Development, whose production will soon exceed 1,088,000 horsepower, is destined to become one of the greatest power-produc-

* For information on ilmenite, see chapter on Iron and Steel.



Quebec's unlimited electric power resources have resulted in the building in this Province of the biggest aluminum plants in the world. The aluminum ingots stretching out of sight on the wharves at Port Alfred, near Chicoutimi, will be loaded on cargo boats and carried to the four corners of the globe.

*BEAUHARNOIS : The Beauharnois Power Development when completed will be one of the greatest in the world. The plant on the right, between the island in the centre of the photograph and the shore, is Plant No. 2 whose construction was begun in 1948 and finished in the autumn of 1950.*

*The first unit went into operation in December 1950. Six units of 55,000 HP apiece are already installed in Plant No. 2. The installation of the six others should be completed in 1953.*



BIBLIOTHÈQUE
SAINT-SULPICE

ing sites in the world when the additional units planned bring production up to more than 2,000,000 horsepower.

Every extension of power lines has facilitated the development of the local natural resources, and the establishment of new population centres. More than that, the increasing supply of low-cost power has brought about the extensive manufacture of primary products and the processing of goods which in earlier years were not considered as part of Quebec's economy. The immense production of aluminum in the Province is one example. Bauxite is transported the thousands of miles from British Guiana, through the Gulf of St. Lawrence and up the St. Lawrence and Saguenay Rivers because low-cost power is an important consideration in turning bauxite into aluminum. An abrasive company, with its head office in Buffalo, has just established itself at Cap de la Madeleine because of the plenitude of low-cost electricity — even though many of the raw materials have to be imported. The ilmenite ore about to be mined in the north-eastern part of the Province will be shipped more than 500 miles to the Sorel smelter to take advantage of the power supply there. Soon the vast deposits of iron in the Ungava country, and other mineral deposits elsewhere in the north, will be brought into production to add their wealth to Quebec's industrialization with the help of abundant low-cost electricity.

The cost of industrial power in Quebec in now less than a half-cent per kilowatt-hour, and the investment required for the installation of additional horsepower is generally considerably less than that necessary in the United States. Quebec has a known potential of 13,064,000 horsepower which will allow an economic installation of nearly 20,000,000 horsepower. Roughly one-third is now developed, another third within economic distance of the industrial heart of the Province and waiting to be harnessed, and the remaining third a reserve for the future.

This means Quebec can look forward to still greater industrial developments in the years to come as it can count on its wealth of water power and other outstanding factors to ensure stability. Quebec is a province wherein the decentralization of industry, strongly encouraged by the Government, has made rapid progress in recent years. It is also a province where diversity of enterprise is looked upon as essential to general welfare, and the conviction is firmly held that private enterprise and initiative remain the sole basis for the success of the individual as well as of the nation.

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La Province de Québec, Industrial Expansion is a summary of a detailed survey made by the Department of Trade and Commerce and published under the title, The Province of Quebec and its Manufactures. Comprising 8 booklets containing a quantity of statistics, charts and data of all kinds, the survey covers the Province's manufacturing activity during the first half of the 20th century. Any or all of the booklets may be obtained free of charge by writing to the Industrial Commission, Department of Trade and Commerce, Parliament Buildings, Quebec. The booklets are bilingual and the various manufacturing groups are divided as follows:

Booklet No. 1 Foods and Beverages — Tobacco

2 Rubber — Leather

3 Textiles — Clothing

4 Wood and Paper — Printing

5 Iron and Steel — Non-ferrous Metals

6 Transportation Equipment — Electrical Apparatus

7 Non-metallic Minerals — Petroleum and Coal

8 Chemical Products

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The French or English edition of La Province de Québec, Industrial Expansion may be obtained by writing to the Provincial Bureau of Publicity.



