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FIRST PRIZE

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Essay: Industrialization is going on in many parts of the Empire. Describe the process in a Dominion or Colony. Discuss the effects on the life of that country, and on other parts of the Empire.

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C a n a d a  
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A. Introduction

- 1 Causes of Canada's industrial expansion.
  - a Influence of the last war.
  - b Effect of the defence programme.
  - c Effect of mineral discoveries.
  - d World demand for raw materials.

B. The Process of Industrialization

- 1 Raw materials, hydro-electricity, the St. Lawrence Seaway.
  - a Exploitation of mineral discoveries
  - b Mining
  - c Hydro-electricity
    - i Fraser River development
    - ii St. Maurice River development
  - c The St. Lawrence Seaway.
- 2 Secondary industries
  - a General expansion
  - b Developments by provinces

C. Effects of Industrialization on Canada and the Empire.

- 1 Effects on agriculture - adverse and favourable
- 2 Influence of American investment
- 3 Encouragement of non-Canadian firms to settle there.
- 4 Immigration
- 5 Growth of a more balanced economy
- 6 Canada's role in strengthening the Empire

*in the last few years*

A great change has taken place in the Canadian economy. Under the impetus of the last war Canada was forced to develop her industries. But since then the change has continued under three new incentives: the discovery of vast natural resources and their exploitation, the world demand for raw materials, and the national defence programme. Hitler's conquest of north-west Europe, coming suddenly in 1940, endangered those industries in Britain upon which Canada had relied to supply her war needs, and forced her to expand and convert her own industries to war production in the shortest possible time.

Almost tripling her industrial output in forty-eight months, Canada had, by 1943, become the world's fourth largest producer of war materials. Besides manufacturing large numbers of ships, tanks, guns and aircraft, she had built the only picrite factory possessed by the Allies as well as a synthetic rubber plant capable of satisfying all her own needs, while later she was to contribute to the development of the atomic bomb. Under the pressure of war, new methods of making chemicals from gases were invented or applied, and these remained to supply peacetime demands. By 1943 the first ten items in Canada's export trade were motor-vehicles, cartridges and shells, wheat and wheat-flour, newsprint, guns, aluminium, bacon, wood-pulp, ships, and planks and boards. The factory and the shipyard had replaced the wheatfield and the forest as the main sources of Canadian exports.

The industrialization of the country, although it would have occurred in any case, has been hastened by the Government's defence programme and the defence programmes of other North

Atlantic powers. These all require the same base-metals; so to meet demand, production has been expanded, resulting in a steady rise in employment in the defence production industries, and a substantial increase in nickel, iron-ore and copper output since 1951.

The most important factor in Canada's continuing industrial expansion is the discovery and exploitation of vast mineral resources. Reserves of gold, copper, lead, zinc, titanium, asbestos, iron, coal and uranium have been discovered in the Canadian Shield, less than twenty per cent of which has yet been explored. It is a rough, forested region forming an arc around Hudson Bay, and stretching from northern Quebec to the Yukon.

The discovery of oil at Leduc, Alberta, in 1947, altered Canada's industrial destiny. Output of oil had been dwindling, more than ninety per cent of the country's requirements being imported. Yet within three years Canadian reserves had increased thirty-fold. Continued success in the search for both crude petroleum and natural gas in western Canada, intensive exploration activity, and the size of the sedimentary areas still to be tested, foreshadow a great increase in production, while the exploitation of the Leduc oilfields has been so rapid as to inspire almost complete confidence in other schemes.

Iron-ore, the other element essential for industrial and military strength, has been discovered three hundred and twenty miles north of the St. Lawrence, in Labrador and northern Quebec. More than four hundred million tons has already been proven, and this will, within ten years, replace supplies from the nearly exhausted Mesabi Hills. In 1948 fresh deposits of uranium in north Saskatchewan, and titanium ore near Lake Allard, Ontario, were also found. But it is oil, gas and iron that are trans-

forming Canadian industry and widening the horizon for manufactured goods. The exploitation of existing resources, continuing side by side with these new developments, is taking place under the impetus of the defence preparations of other Western nations, and of a world demand for timber, newsprint and minerals.

With a labour force less than fifteen per cent larger than in 1939, Canadian production has shown a remarkable expansion. Electricity output has doubled, aluminium production has increased five times, and steel production two and a half times, while Canada is the world's chief producer of newsprint. Important development schemes for oil, gas, steel, electricity, chemicals, aluminium and other metals are now well advanced. In 1949 Alberta had over a thousand oilwells in operation, and markets are being opened by means of two pipelines. The first pipeline, between Edmonton and Superior, was completed in 1951, and shipments by lake tanker to Sarnia were started in April. By December parallel pipelines were being built, while additional pumping stations on the original pipe, which was looped in some sections, increased its capacity. The other pipeline, from Edmonton to Burnaby near Vancouver, is scheduled to be completed early in 1954. Prairie refining capacity has been more than doubled, while refining and storage facilities at Sarnia have also been enlarged. Reserves of natural gas in western Canada are now estimated at eight billion cubic feet, and several companies are investigating the possibility of piping gas to urban areas in eastern Canada and British Columbia.

The building of a road system, a new port at Seven Islands (on the north shore of the Gulf of St. Lawrence), and a railway three hundred and sixty miles long, is involved in the exploitation

of the Labrador-Quebec iron-ore deposits. The rough nature of the country forced the materials for the railway, which will go from Seven Islands to the mining camps of Knob Lake and Burnt Creek, to be flown in by aircraft using twelve improvised runways. Work is thus proceeding at many points simultaneously. "Iron-ore by Fifty-Four" is the slogan, and it is planned to reach an output of ten million tons in the first year, rising eventually to twenty million tons a year.

Mechanized early in 1952, the Wabana mine on Bell Island, Newfoundland, like the mines at Marmora, Helen and Steep Rock, Ontario, gives promise of greatly increased production in the next few years. Iron-ore and petroleum output are both expected to treble by 1955. Titanium ore from Lake Allard is now smelted at Sorel by an electrochemical process, while a new aluminium smelter at Kitimat, British Columbia, is nearing completion, and a chemical refinery to process nickel ore from Lynn Lake is planned for Alberta.

A supply of cheap hydro-electricity has been essential for the development of Canada's chief industries. Industrial expansion has resulted in a greatly increased demand for power, so hydro-electric construction has been accelerated. Although the Canadian Shield, with its many lakes and rivers, is the most important potential source of energy, the relief of Canada as a whole, together with adequate precipitation, results in numerous swiftly flowing rivers with many falls and rapids capable of development. During 1951 construction work resulted in an increased turbine capacity of 881,250 h.p., while at the end of the year, plants with a total capacity of roughly one million seven hundred thousand horse power were under advanced construction for operation in 1952-53. Other schemes, with an estimated capacity of nearly two million horse power will be completed by

1955.

Two projects are especially important. The first will divert the headwaters of the Fraser river to a generating station on the coast of British Columbia. A dam on the Nechako river will force the water to flow westwards through a ten mile tunnel, with a drop of two thousand six hundred feet to a power-house inside a mountain. A transmission line will carry the current to the new aluminium smelter at Kitimat. Under the second scheme dams have been built on the St. Maurice river, a tributary of the St. Lawrence, at Rapide Blanc, La Trenche, La Tuque, Grand Mere, Shawinigan Falls and La Gabelle, and another four dams are proposed. A transmission line carries current from La Trenche across the St. Lawrence to the important new smelter at Sorel, where the titanium from Lake Allard is refined.

Inadequate communications poses one of Canada's most difficult problems; even her greatest route, the Great Lakes - St. Lawrence system, has a bottleneck above Montreal, where, for a hundred and twenty miles, a channel only fourteen feet deep prevents the largest ships continuing west. American interests have, for thirty years, prevented cooperation between Canada and the United States in the creation, by means of dams, locks and a dredged channel of twenty-seven feet, of a "Seaway". The project would place the Prairie Provinces in direct contact with the world's oceans, thereby lowering the cost of carrying grain to Britain, for example, by an estimated ten shillings a ton, and also enable iron ore from Labrador to be moved cheaply to the industrial areas of the Great Lakes. Dams on the Seaway would supply Ontario with electricity. Canada has now determined to proceed alone, largely as a result of the demands of her expanding industries.

The expansion of manufacturing that has occurred in the last ten years appears to be only a beginning. Production during the last war of aluminium chemicals and machine tools laid the foundation for current developments. Industries have been established to produce articles, such as ball-bearings, magnesium, synthetic rubber, optical glass, penicillin and sulphadiazine, that were previously imported. The greatest expansion has been in durable goods, especially in the production of cars, lorries and electrical apparatus. The output of iron and steel, non-ferrous metals, petroleum products, chemicals, aircraft and ships has also increased, while the marked expansion in the petroleum products industry reflected a growing domestic demand and enlarged refining facilities. Wood-pulp, newsprint, clothing, textile and rubber production showed a moderate increase, but the influence of a high level of capital investment is not yet fully reflected in the figures. Important developments have occurred in the chemical industry. Ammonia and sulphuric acid capacity, enlarged during the war, is now used in civilian production. Plants recently established are for the manufacture of sulphuric acid, ammonia, phosphorus, formaldehyde, pentaerythritol, phenol, acetone, tartaric and citric acid, and synthetic resin adhesives. The chemical industry is clearly passing through a period of very rapid expansion.

Ontario, producing over half the country's manufactures, is the most important province industrially. Numerous industrial areas are being created, for new or expanding plants are tending to settle in the smaller towns. Steel ingot capacity has been greatly increased by developments at the Steep Rock Iron Mines, while a group of products, based on the oil piped from Edmonton and carried across the Great Lakes, will be obtained from a new plant at Sarnia. A nylon plant at Kingston is only one of

several developments in the industrial and consumer chemicals industry, while recent expansion in the electrical industries is linked not only to defence needs, but the growth in Ontario's population, which is increasing by ten thousand a month. Most of the new plants have been established in Quebec, which produces thirty per cent of Canada's manufactured goods, while plants for the production of pulp, paper, tobacco, cotton yarn and cloth, boots, shoes, men's and women's clothing, railway rolling stock, real and artificial silk, medical preparations, fur goods and corsets have recently been established.

Industrial development in British Columbia is spreading to the more remote areas, while the province is exploiting its natural resources, mainly forests, more intensively. The discovery of oil and natural gas has radically altered the economies of the Prairie Provinces, but Alberta also supplies a large part of the world's coal. Here, too, the value of manufactures exceeds that of agricultural products, while Manitoba's industrial output has risen a hundred and forty per cent in the past ten years. The Atlantic Provinces are developing their wood-pulp, paper, sawmill, dairy products, fish curing and packing industries. Industries established in Newfoundland include fish-canning, fur processing, oil hardening, birch veneering, leather tanning, and flour, paper and feed milling.

Under the pressure of the last war, the new defence programme, the world demand for raw materials, and the new incentives supplied by the discovery of vast reserves of minerals, Canada is full of manufacturing and mining projects. The drift of population to the towns, caused by the industrial expansion, is everywhere pronounced, farm-bred Canadians preferring the higher wages and amenities of the towns to the hard work and uncertainties

of farming. It has been estimated that by August 1951 the farm labour force throughout the country was sixty-three thousand fewer than a year earlier, while the population of Saskatchewan, unable to offer the industrial counter-attractions of Manitoba and Alberta, has fallen by almost sixty-seven thousand in the past ten years. Three measures to steady the new trend have been decided on by the National Advisory Council on Manpower: inducements to young men to remain in farming, better housing for farm hands, and replenishment by immigrants trained in agriculture. Immigrants have been taken from Britain, Holland, Austria, Germany and Italy. But the selection of settlers has been planned to secure labour not only for agriculture, but for mining, forestry, railway and hydro-electric construction also, while during 1952 there has been increasing emphasis on bringing in professional and skilled workers: engineers, draughtsmen, toolmakers, die-setters, machinists and carpenters. This has stimulated the economy, and contributed in many industries to the momentum of expansion, but it does not seem to have stopped the drift away from agriculture. But the Advisory Council's measures are only precautions in a situation that, although a nuisance to the farmer at harvest time, has not yet become acute.

In some instances, however, industrial expansion has helped the farmer. The discovery of oil and natural gas in Alberta has aided wheat-growers by spreading the overhead costs on railway freight charges, while mechanization, delayed by depression, drought and war, has enabled Canada to maintain her position as a wheat producer, allowing larger farms, mechanically ploughed and harvested, to be worked with much less labour. For the Prairie Provinces in general, industrial production has become a 'second crop' with all the advantages of integration,

and the spreading and reduction of economic risk. Yet, although there are provinces, such as Prince Edward Island and Saskatchewan, that are still largely rural, the most densely populated provinces, Ontario and Quebec, have changed to a decisively urban pattern.

Large investments from the United States have been attracted by Canada's industrial expansion; there are also over a hundred American companies in the Albertan oilfields, while the iron-ore of Labrador is being exploited jointly by Canadian and American companies. At the beginning of 1951 American investments in Canada amounted to more than six thousand five hundred million dollars, and it is estimated that in 1952 they were increased by another five hundred million dollars. Without American investment it would be impossible to finance the many Canadian industrial projects, yet it is feared that it might lead to increasing American control over Canadian industry. Canadian life, however, is already deeply influenced by the United States, for the bulk of the population lies in a thin belt, or series of beads, along the boundary, the large cities being closer to American cities than to other Canadian ones. Industrialization might lessen this influence by moving industries and population further north, giving the country breadth; although the north and north-west are too inhospitable to allow mass movements of population similar to the successive waves that swept into the Prairies.

The country's new industries have, however, also lessened dependence on the United States. Until the exploitation of her Albertan oil, Canada relied for most of her supplies upon her neighbour, causing a heavy drain on holdings of American currency. Also, the new nylon plant at Kingston has made it unnecessary to import over ninety per cent of her silk requirements. Originally the chemical ingredients for silk manufacture came from the United States, but the completion of a large

chemical plant between Brockville and Prestcott has ended this dependence too.

The Government is encouraging non-Canadian firms to open branches in Canada by means of propaganda emphasising the 'free-enterprise' nature of its economy, and about three thousand one hundred firms are now established. About two thousand four hundred are from the United States, and six hundred from Britain. There has also been some British investment in Canadian enterprises, while the British Government has agreed to lend the Aluminium Company of Canada forty million dollars for its expansion programme in Quebec and British Columbia in return for an ensured supply of aluminium until 1955.

During recent years Canada has experienced very little unemployment, and indeed the country's industrial expansion has created a shortage of labour. Canada has sought, and is seeking, immigrants from Europe, and especially from Britain. These new settlers have not been sufficient, however, to alter radically the population pattern of the country.

The most important effect of Canada's industrialization is the creation of a more balanced economy, meaning less dependence on the export of primary raw materials and agricultural products, and more processing of these resources in Canada. As the change takes place it will result in a more flexible national economy and a greater demand for skilled labour. The development of industries will lead to a general economic strengthening of Canada's position, and the Empire's position, in the world. For instance, plans now under way will make the International Nickel Company the largest non-ferrous metal mining enterprise in the world, while it is expected that Quebec will probably become the world's most important metallurgical centre. The oil lost by the Empire in Persia may be replaced by that found in Alberta.

An economic strengthening means a military strengthening, yet Canada's new industries are aiding, by means of the defence programme, more directly in strengthening the Empire's military position. Canadian equipment has an important part in the line of radar stations built jointly by Canada and the United States in the Canadian north, while Canada has recently, as only one example, supplied Britain with jet fighters. Canada's industrial expansion, then, together with the industrial developments proceeding in the other Dominions and Colonies, will lead to a strategic, economic and political strengthening of the British Empire.

On the map Canada appears a large country, but Canadians have not yet made themselves masters of its surface. Civilization runs with Canada's two main railways; away from them it peters out. Now, however, Canada is demonstrating by her industrial expansion that she can stand on her own, independent of Britain, and the moral equal of the United States.

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## S o u r c e s

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