

PRIMARY INDUSTRIES AND CANADIAN
ECONOMIC DEVELOPMENT

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Primary Industries and Canadian Economic Development

The significance of primary industries in Canadian economic development is examined and the relevance of the staple theory of development to Canadian experience in the years 1840 to 1970 is considered. The evolution of the staple theory and the literature on its relevance and limitations is reviewed. Specific instances of development in Canada, viz. the Timber trade of 1840 to 1870 and the Alberta oil boom of 1946 to the present are examined in the light of modern staple theory. A brief examination is made of the significance of tariffs for primary industries and for development.

It is suggested that the more-limited-versions of the staple theory are strongly relevant to past and possible future development of the Canadian economy.

The 'succession-of-staples' modification of the theory appears applicable to Canadian in contrast to Australian experience of development. The view that the theory is applicable to 'the atypical case of the new country' seems to require modification unless the frontier is always new country: It appears useful to apply the theory to less-developed regions in an aggregate such as Canada.

ABSTRACT (Continued)

It appears questionable whether the income from the Alberta oil boom of 1946 and since is more than a temporary feature, and whether this income has been used to best effect in preparing for the next staple boom which can generate real development of the Alberta economy.

The U. S. Tariff is viewed as likely to be much less a barrier in the future than in the past for Canadian processed materials. The view is offered that tariff and other restrictions in Asia are important in restricting development of Canadian trade and primary manufacturing but have special importance in that they sustain U. S. dominance of Canada's export trade.

Abbreviations:

mn. = million.

bn. = billion.

DBS = Dominion Bureau of Statistics.

ABS = Alberta Bureau of Statistics.

Mcf = thousand cubic feet.

mi. = mile.

\$ = Canadian dollars.

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1. Introduction.

One major theme and one minor particularly engage our attention though there are other themes we cannot ignore. The major theme is the role of the primary industries (as we define these) in the economic growth and progress of the Canadian economy; the minor theme which is considered only briefly is the significance of foreign Tariffs for Canadian development.

Canada has achieved both economic growth and economic progress, and the reasons must concern us and must invite analysis of their relevance for future economic growth and future economic aims and policies.

We define the primary industries to include agriculture, fishing, trapping, mining, oil and natural gas production, embracing production of the "products of the growth" which formed the basis of the old Colonial system, of metals and minerals which were significant two centuries ago as well as newer items such as nickel, lithium, titanium and potash and also some manufacturing activities.

The definitions of primary, secondary and tertiary sector which are used in most statistical presentations place metals smelting and refining in the secondary sector and electric-power production in the tertiary sector but for a study of economic growth and progress these arbitrary practices are not always helpful. For our purposes activities such as these should be considered primary. In this we follow the example of the Royal Commission on Canada's Economic Prospects¹

1. Royal Commission on Canada's Economic Prospects (1957)
"Canadian Secondary Manufacturing" pp. 3-4

which named "primary manufacturing industries", these being the resource-based manufacturing industries.

Our primary sector, therefore, includes pulp processing to newsprint manufacture, metals melting and refining, and generation of electricity, and would include the export of fresh water and related power generation in Canada if diversion works were undertaken to change natural flows and make water-export a new factor in the economy.

We are concerned with the influence of the primary industries' activity in stimulating economic growth, that is in enlarging the output and value from economic activity, and also in stimulating economic progress. Growth we have had; an example of a stimulus to growth was the opening of the Prairies to wheat in the first decade of this century. This expansion of activity was matched by immigration so that Canadian per capita income did not rise. This was growth without the economic progress which raises living standards². Economic progress is achieved through the process of development, which results in rise of per capita incomes and which usually centres upon the further processing of natural products and the rise of manufacturing industry. The record of particular natural-resource activity in stimulating economic development and progress is thus a major interest in this study.

We are concerned also with the significance of international trade and foreign markets in stimulating growth and progress in Canada through their influence upon Canadian

2. Definitions of Growth and of Progress follow L. J. Zimmerman, "Rich lands, Poor Lands: The Widening Gap." (New York. Random House. 1965)

primary operations. Canada's economy has developed³ from the overtly colonial stage to the point where her major export is automobiles and automobile parts and equipment with much sophisticated engineering content. The employment of Canadians is not now principally in the primary industries, and the urban population is close to 75 per cent of the national population. Canadians themselves now consume close to half their large national output of copper.

The importance of foreign markets for the primary products and for the generation of new supply and processing activity will be examined and the importance of tariff barriers against these primary products will be considered briefly.

Throughout the study we must have in mind other factors in Canadian development: The intervention of the State in the provision and control of transport facilities; in the encouragement and control of immigration of labour; and through taxation and finance policies has a significance which cannot be ignored. Banking developments and technology advances and other factors also claim some attention.

3. The points which follow are fully documented in the main body at the study, see Section 3. "Experience in Economic Growth"

2. Theories of Canadian Economic Development

This study will place most emphasis upon the market-oriented approach to development theory. This approach was uncommon until recent decades amongst analysts of the Canadian experience, and is often neglected today. It is part of a trend in business planning in this century, as well as in historical analysis. The Constitutional approach to history was castigated by Mackintosh⁴ in 1923 with his student's query "were they all Members of Parliament then?", but we bear always in mind that for example constitutional lessons learned from the causes of the American Civil War and incorporated in our British North America Act⁵ may have helped to contain the centrifugal forces in the Canadian nation. The view also of the geographical determinists who see mountain ranges, river systems and factors such as soil deficiencies or short growing-seasons as of paramount importance cannot be ignored. The Turner⁶ view of a Continental whole, or of an "American geography" finds much support in the observed movements of population and activity in Canada. The Laurentian shield was definitely a real barrier, forced open only through very expensive railroad-building: British

4. W. A. Mackintosh "Economic Factors in Canadian History" Canadian Historical Review Vol. IV. No. 1 March 1923, page 12

5. The BNA Act of 1867 gave Provinces more powers and greater autonomy than had been given to the States. These powers have perhaps acted as a safety valve in that Quebec has been able to assume taxing, unemployment insurance and other powers as a right.

6. F. J. Turner. "The Frontier in American History" (New York. 1962)

Columbia's mountain inland and Alberta's foothills were entered from the U.S.A.⁷ and settlement there was in large part by U.S. citizens and development was often through U.S. entrepreneurship.⁸ The failure of the Rideau Canal to achieve substantial development in its region whilst the St. Lawrence system has consistently been a major force in development reflects geographical determinism also.

Then there is the approach which implies a monolithic state with a clear objective or else a sharply-clear action which guides development, for better or worse. Railways so often are associated with the State, and this is the case in Canada: The policies and the distinctions in policies between one nation and another can show sharply different economic effects but often we meet a welter of State policies and actions which themselves have individually different causes, and many causes. An interesting illustration lies in railroads, as they exist today in Canada and the U.S.A. Canada can be said to have a federal system of railroads due to State policy in building and aiding and resuscitating railroads, and the rates for transport in Canada tend to favour the development of great centres because the rates do reflect often the economies of scale involved in terminal handling. (Thus, Winnipeg to Toronto rates can be lower than Lakehead (Thunder Bay) to Toronto rates.⁹) In the U.S.A. the

7. H. A. Innis "Settlement and the Mining Frontier" in Vol. XI. of Canadian Frontiers of Settlement (Toronto 1936)

8. H. A. Innis "Essays in Canadian Economic History" ed. M. Q. Innis (Toronto 1956) p. 313, 314

9. Applied to "loyalty" contracts from Winnipeg or "deferred rebate"

same effect can be met within a region, but there has been no U. S. railroad running all the way from East coast to West Coast, and the recognition by the regional railroads of a multiplier effect upon their traffic through activity within their region has led to higher rates for "outside-origin" than for "inside-origin" hauls. State actions have mostly been similar in railroad matters in the two countries but Anti-trust policy and regional independence and rivalry have given the U.S. railroad scene a different character.

State action in tariffs and in commercial policy is also very important. Hamilton's tariffs built the Cumberland Road in the U.S.A. through to Ohio. Canada's tariffs built the early canals in the St. Lawrence river. Initially-high tariffs made final entry costs lower, and exports more rewarding. However, we can be misled if we examine only the commercially successful cases. Behind successful State action lies usually a very strong element of market advantage and it is on this market aspect of more or of less opportunity for growth and development that we shall concentrate.

Market-oriented studies are many, and there is a vast amount of earlier work to build upon for this study but it should be noticed that the most imaginative recent proposal for Canadian economic growth and development, that is, the Mid-Canada Development Corridor¹⁰ defies and ignores the market

10. R. Rohmer, Q.C. "Mid-Canada Development Corridor" "Lakehead University 1969". Proposing East-West transport facilities in the middle North to support activity of population attracted there.

and yet just might achieve acceptance in Canada. Nations need not act as 'economic man' might act.

The Evolution of the Staple Theory

We have nowadays a structure of highly formal and rigorous theory of growth, built upon Harrod's translation of the long-term equilibrium of static theory into the steady-state-growth concept;¹¹ We have also a very large literature on the theme of development ranging from studies of particular firms and industries to the awesome global sweep of Rostow's thesis.¹² All of this work has some roots in the classical economics, and in our discussion of the evolution of the Staple theory we must begin with early views and concepts of conduct of economic matters and of long-run equilibrium for economies.

It is necessary to go back some way in time. Even in the absence of a formal theory of growth there have been schools of thought and of action and direction in economic matters relevant to growth and progress. Canada's beginnings lie in European penetration of a Stone-Age culture and economy. The guiding European economic principles of the period of significant initial penetration were those of the Mercantilist policy, enunciated by Thomas Mun¹³ for England in the 1620's

11. J. R. Hicks. "Theory of Wages" London, Macmillan, 2nd edition, 1963

12. W. W. Rostow. "Stages in Economic Growth". (Cambr. Eng. 1963)

13. T. Mun (1620) "England's Treasure by Foreign Trade" (Oxford, Basil Blackwell, 1949.) Mun, of the East India Company, broadened the trade theory of his day by arguing for a "general" surplus of treasure whilst permitting some "particular" trade to drain treasure. The case was logical and also aided the East India trade.

and applied in different degrees by England and by France and varying somewhat over the years.

Mercantilism¹⁴ presumed international trade, national rivalry and outright possession of oversea sources of wealth. It was in accord with the facts of European national life in the 16th and 17th centuries and later. National rivalries in Europe then determined events and policies in the many parts of the world into which Europe's seaborne expansion had interrupted. Colonies were properties to be exploited, to strengthen the European possessor for survival in the intense European struggle for national eminence and power.

Mercantilism dictated search for and possession of complimentary oversea territory: Complimentary in the sense that these lands should provide raw materials and other produce not available in the home country but useful there, and should offer also markets for manufactured products from the home country. The colony should provide staples for the imperial power but should take payment in manufactures. Better still if other nations could be totally excluded from the gains: The struggles of the French and English for possession of Canada and the Mississippi had their counterpart on the Indian sub-continent and in other national assaults such as the Amboyna massacre. Possession then was desirable, and exclusive possession for exclusive exploitation the best possible situation. The policy had its rationalization in economic terms and in political terms: In political terms those who failed in the policy lost power in Europe: The English

14. E. Hekscher. "Mercantilism" in Encyclopedia of Social Sciences. New York, 1933. Vols. 9-10. pp. 333-9.

succeeded best and inherited a large part of the earth. In economic terms the policy promised, and often yielded for both imperial country and for colony, economic growth. It also could, through an incidental Pax Britannica, for example, yield economic progress in terms of increased per capita income in the colony, but the Malthusian hypothesis usually was borne out and per capita income mostly did not rise. The severest restrictions of the Mercantilist policy for the colony were in its emphasis upon avoidance of competition. Complementarity meant that flour milling was forbidden in Ireland and that a succession of promising ventures there was stifled as they appeared likely ultimately to threaten English production. In Nigeria at a late date the cotton weaving was outlawed to eliminate challenge to English imports. In the American Colonies iron making was on-again-and-off-again as the English deficit in iron swelled or shrank, and American steelmaking was mostly off.¹⁵ Development of a manufacturing industry was deliberately impeded by the imperial powers - all of them, in all their colonies, because this was a policy for economic growth of a particular kind. The colonies should be "plantations" and should furnish staples: The imperial power should furnish the manufactures. The value-added-by-manufacture should arise in the imperial country adding there to wages and employment, real assets and profits.

15. The Iron Act of 1750 is an example: No rolling or slitting mills and no steel furnaces in the Colonies, and in 1764 Iron was 'enumerated' - Export only to England

British Mercantilist policy was modified earliest towards the North American colonies: The American Revolution was a reverse which perhaps eased British policy towards Canada; Europeans settled abroad apparently wanted greater freedom in development and had to be given it. In any case the Free Trade policy appropriate to the position of the lowest-cost manufacturer on the earth allowed substantial decay of Mercantilist instruments and institutions from the early decades of the 19th century. For Canada then, the struggle for economic development was a struggle against scarcity of capital and of skill and against high cost transport and poor communications.

The natural markets for Canadian products shifted gradually: By the first decade of our century the giant economy across the 49th parallel was the obvious market for timber, pulp and newsprint in which Canada had and still has a cost advantage. The virtues of a cheap press for a literate public in the U.S.A. were the lobby which beat down a tariff and gave the first long-lived entry to manufacture from Canada, for the United States has in our day its colonial policy: their tariffs are higher as processing of an item is advanced. The Paley Commission Report¹⁶ with its emphasis on U.S. import needs may have marked the turning-point for that tariff-based policy as dependence on strategic imports weakens the power to dictate where the value-added on raw materials shall accrue.

16. President's Materials Policy Commission "Resources for Freedom" (The Paley Report) Washington (1952)

The sequence of the dominant activity outside of subsistence agriculture for Canada has been somewhat as follows: furs, fish, wheat, pulp and paper, pulp and paper with minerals and most recently, manufacturing. All but the last has been staple activity, and each has been examined intensely by historical analysts, particularly since the path-breaking work of Mackintosh,¹⁷ Innis,¹⁸ and Lower¹⁹ in the 1920's and later. Yet Easterbrook and Watkins²⁰ plead in an Introduction to their editing work of 1966 for an Innisian approach to the study of the great Staples of Canada's twentieth century: for this present study we make no special claim, but we will examine one 20th century staple, oil and gas, which is of recent significance in a fairly well-defined region of Canada.

It was Mackintosh and Innis particularly who first drove home the principle of Staple-generated economic growth as the major force in Canada's development. Bertram²¹ makes this "a succession of Staples" impetus-to-development. Watkins considers "the staple approach to the study of economic his-

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17. W. A. Mackintosh "Economic Factors in Canadian History" in The Canadian Historical Review. Vo. IV. No 1. (1923)
 18. H. A. Innis "The Fur Trade in Canada: An Introduction to Canadian Economic History". (Toronto 1930. 2nd ed. 1956)
 19. A. R. M. Lower "Settlement and The Forest Frontier" in Vol. XI. "Canadian Frontiers of Settlement" Toronto. 1936
 20. W. T. Easterbrook and M. H. Watkins. "Approaches to Canadian Economic History" Toronto. McClelland & Stewart. 1967
 21. G. W. Bertram. "Economic Growth in Canadian Industry 1870 - 1915. The Staple Model" in Canadian Journal of Economics and Political Science Vol XXI9. No 2. May 1963 and in reference 20 (edited) pp. 74-98

tory is primarily a Canadian innovation"²² but he states that the approach "has now fallen on more uncertain days as its relevance has come to be questioned by Canadian economic historians". In reviewing the literature he recognizes a segment of opinion which devalues the staple approach (eg. Buckley, Easterbrook) whilst for example, Aitken,²³ North, Caves and Holten, and Watkins himself believe still in its strong relevance. Watkins wishes the present day employment of this approach to analysis to be less general, more restricted, if it is to be helpful. He argues that it may be misleading if the theory is applied to growth of export-oriented economies but that it has special relevance "to the atypical case of the new country".

The criticism of the staple theory should be examined: We can classify the arguments offered against it as the "vulnerability" argument; the "new-country" limitation and the "market-advantage" argument. These criticisms we now examine in turn.

The "vulnerability" argument presents mainly the view that staple-based development of an economy is so hedged with risks and traps that a theory of escape from these hazards is necessary and, therefore, staple-based development should be de-emphasised. It is said that an inhibiting mentality²⁴

22. M. H. Watkins "A Staple Theory of Economic Growth" published in reference 21 (1963) pp. 141-158 and in reference 20, pp. 49-53. see opening remarks of text

23. Hugh G. J. Aitken. "American Capital and Canadian Resources," Cambridge, Massachusetts, 1961 and in "The American Impact on Canada", (Durham, N. C., 1959.)

24. W. T. Easterbrook "Uncertainty and Economic Change" in Journal of Economic History. XIV. Autumn 1954.

can be generated through experience of the booms and slumps of staple trading and movements of the terms of trade so that a timid and unventuresome attitude grows up and new opportunities are missed. This may be one way of saying that some staples are better than others, that a staple which faces steadily rising foreign demand is a more certain base for development than a staple which faces fluctuating demand. It also implies that a wide resource base will be of advantage in smoothing out the flow of income in the staple country. Baldwin²⁵ examines staple production using income-distribution and savings-functions arguments: In a "plantation" economy the classical savings function can apply--all savings could be monopolised by plantation owners who are foreign-investment biassed or who spend savings on luxury imports, whilst in a yeoman-farming or widely-held logging industry the earnings and the savings are widely distributed and there may be more flexibility in the economy and in new investment and enterprise. To reply to the vulnerability argument perhaps the best statement is that a "staple" is a commercially-successful export and that Bertram's "succession-of-staples" is a valuable qualification, implying a wide resource-base.

The "new-country" limitation seems a valid qualification of the theory and we admit this in accepting Watkins' statement that "the staple theory is relevant to the atypical case of the new country". But of course there are problems of definition: It seems natural to us to treat Alberta as a

25. R. E. Baldwin. "Patterns of Development in Newly-Settled Regions" Manchester School of Economic & Social Studies. May 1956.

"new country" on the evidence of the expansion of the Alberta economy since 1946 and because of the rapid growth in population there since 1946 compared with twenty prior years of relative stagnation and of emigration. The truth may be that either a favourable man/land ratio may characterise a "new country" as Watkins has it or a favourable man/resource ratio may characterize a "new country". The last is perhaps closer to the economic facts in Alberta in recent years, and we find ourselves coming back around the circle: a "favourable man/land ration" is a nice expression in the context of Western extensive grain-farming, but when we think of a favourable man/resource base we are seeing economies of scale and the chance to exploit these, leading to economic growth and probably development. Alberta was no newer in 1946 than in 1906 of the wheat boom. It is resources that are "new" in the sense of newly-discovered, or newly exploitable through new technology. Nevertheless, in the historical context the staple theory is specially relevant to the 'new country', and we shall abide by this limitation of the theory even though it gives overtones of some "ancien regime" relevance.

The "market advantage" argument focuses upon relative prices of factors of production. Watkins²⁶ points out that a great staple might not achieve economic development if that staple, so to speak, is 'all there is there'. Thus economic development of a location such as Bahrein Island is limited by the apparent absence of avenues of investment outside of the oil activity there. Much Canadian policy in the

26. Watkins, in reference 20, p. 59

past has been devoted to aiding development through tariffs which encouraged domestic production of capital goods inputs for staple production and which encouraged substitution of consumption goods imports with domestic production. Perhaps therefore this is a point where we remind ourselves that State policy and intervention, banking and finance development and so on, are factors of great importance in the process of development. Buckley²⁷ favours emphasis upon "economic opportunity" rather than upon resources: However, to say that we should, in Buckley's words, consider some "general concept of economic opportunity" is perhaps a step towards a 'price-theory of growth' which seems to offer little scope.

In our study of part of recent Canadian growth we will in fact be examining activity in what is in effect "new country" within Canada today, specifically the Alberta economy. But then there will probably be "new country" within Canada for many more years. The frontier in Canada is still very open indeed.

In the "empty" lands entered and peopled by Europeans since the Age of Discovery therefore an admittedly atypical growth process is postulated. Exports are considered the main engine of growth; in Rostow's terms export-activity is a leading sector for the economy. Vast areas of land had initially few people but great resources. Europe sent fifty million people to these lands²⁸ in the years 1850 - 1930.

27. K. Buckley. "The Role of Staple Industries in Canada's Economic Development" Journal of Economic History Dec. 1958. p. 444

28. C. M. Cipolla. "The Economic History of World Population" (Penguin. England. rev. ed. 1964) page 102

The injection of the scarce resources, capital and labour, allowed economic growth and progress to occur. Growth occurred rapidly. The average annual rates of growth of the more fortunate new lands exceeded European rates in that period. (See Comparative Growth Table on page 17.)

The flexible and perhaps growth-oriented social attitudes arising from European roots but modified by a frontier environment in these new lands gave strong impetus to growth.

The key in the Staple model of economic growth is that one group of economies has already grown (perhaps as 19th century Europe) whilst the other group has resources. If timber is a required input for the developed economies, Europe had by the eighteenth century so depleted its resources that this input is there got with difficulty whilst some new country has vast timber resources which are easily secured. "The world then was built on wood."²⁹ If the transport problem can be solved then overwhelming comparative advantage lies with the new country and an export base for growth exists.

The export base however must extend its influence into the new economy and must cause diversification if development is to occur. The "plantation" economy, particularly when under management immersed in the priorities of a distant home country, may benefit the new economy little. There seems some agreement, however, that the technology of the export-base, the technology of the staple activity, is a powerful determinant of the degree of development initiated in the new country.

29. A. R. M. Lower, "The Trade in Square Timber". see page 30 in Reference 20

RATES OF GROWTH OF POPULATION, NATIONAL PRODUCT AND PRODUCT PER CAPITA

AT CONSTANT PRICES IN SELECTED COUNTRIES FROM THE MID

19TH CENTURY TO MID 20TH CENTURY

Advanced Countries	Initial Period	Terminal Period	Pop'n	Percent Average Change Per Year	
				National Product	National Product/Head
United Kingdom	1860-9	1949-53	0.8	2.2	1.3
France	1841-50	1949-53	0.1	1.5	1.4
Germany	1860-9	1950-54	1.0	2.7	1.5
Canada	1870-9	1950-4	1.8	4.1	1.9
Australia	1898-1903	1950-4	1.7	2.8	1.0

Source: Kuznetz, S. "Economic Growth", (Glencoe Press, Illinois, 1959) pp.20-1

The "technology of the export base" should be quite a wide concept: it should include the choices available in technology of getting and processing. The choice of technology can mean more or less labour intensive operations; more or less transport e.g. towards coal or to user markets. Thus, in Canada Eastern wheat-farming is land-intensive compared with Western capital-intensive conduct:³⁰ Eastern wheat acre-yields average about 40 bushels, Western about 25, these variations in factor mix reflecting regional factor-price relations which must affect supply industries also. Wheat was earlier shipped abroad as flour. Today for the staple exporter such as Canada there is less value-added per bushel than formerly because international specialisation in grades of wheat and very low cost bulk-wheat handling have led to a trade mostly in wheat.

The options of further processing can be restricted by ancient or modern Mercantilism on the part of importing countries. Tariff structures can develop and protect the industry of a nation which imports a margin of its raw material requirements:³¹ Stability of output is aided in such a nation, which is exporting its booms and slumps of demand to the staple exporter. Typically the margin importer lowers barriers when

30. "Grain Trade of Canada". DBS cat. #22.201. (1966-7) p. 12

31. An example representative of American past practice would be: Copper, Wire bars: Duty 15% ad valorem, plus: 2c/lb. when price 36c or more, but 4c/lb. when price 26/ to 36c/lb.

his internal demand is high and internal prices trend upwards, but raises barriers when prices are low. The instability for the staple exporter is greater also by the gouts of in-flowing investment capital which can be expected to be imposed atop the staple booms because of current and expected profits: booms and slumps imply riskier and more wasteful investment than does steady growth. The tariff structure of the importer also can restrict further processing of the staple by the exporter: Duty-free entry of ores and concentrates can be and often is associated with a high tariff on metal and with an effective embargo rate on "formed, drilled or otherwise 'advanced' shapes" of the metal.

Energy is a special class of staple: Coal offers little in the way of further processing; oil may support a petro-chemical complex with economies of transport for the staple producer aiding low-cost chemical production; natural gas perhaps more so. Supply-industry activity could be considerable for energy staples but might be mostly an initial impetus to diversification of the economy. A favourable situation for the staple producer might be where the energy staple is exported against some trade concessions for other processed staples or manufactured goods. Energy export could reduce factor prices for the importer resulting in lower-cost manufactured products being exchanged for the energy staple, thereby inhibiting diversification of the staple economy.

Watkins³² restricts interpretation of technology of the

32. Watkins. in reference 20. p. 54

export base to a function for the activity expressing the substitutability of factors of production and the nature of returns to scale. Other economic and non-economic factors intrude, however. Levin³³ injects the social values aspect-- "For each stage in an economy's growth the factors of production necessary to its operations have been supplied as the products of its particular system of social values and economic rewards".

There is, therefore, a complex production function for the activity: Complex, because over and above simple concepts of land-productivity, man productivity or capital-to-output ratio there must be expression of availability of new amounts of these inputs and some recognition of the market structure: (Joan Robinson's monopolist-monopsonist in a trade restricts output and pays lower prices to the staple producers than do perfectly competing importers). There must also be some expression of the quality of the available inputs. We then enter non-economic fields such as the value-system which influences mobility of indigenous factors and the ability of the producing system to digest and make productive any new injections from abroad of the productive factors. Brinley-Thomas³⁴ examines the movement of capital and labour into North America in the 19th century and suggests that concurrent movement of these factors occurred in volume significantly stimulating to North American growth in the period to the 1860's.

33. J. V. Levin "The Export Economies." (Cambridge, Mass. 1960) see p. 4

34. Brinley Thomas. "Economies of International Migration" (ed.)--his essay "Migration and International Investment" (London. Macmillan) 1958

As to the productive use of factors the North American experience has been well documented by Habakkuk³⁵ and by others, with perhaps most emphasis on economic factors by Habakkuk who will have scarcity of skilled labour and/or scarcity of unskilled labour as agents channeling entrepreneurial innovation and influencing growth. Others put most emphasis on social values, and rigidity or otherwise of the social structure. Landes³⁶ and North³⁷ emphasise education as a force in growth and in development, and Kindleburger³⁸ uses fine pen work to sit on the fence with argument of the "on the one hand, but on the other hand" kind.

Our theoretical discussion so far has centred mainly around economic growth and we have yet to consider the issue of development and progress. Growth, we have said, can be export-led and the significance of the export staple depends upon its character, upon the market situation and upon the character of the staple-generating economy. The mobility and availability of factors of production, the social and technological opportunity to innovate, the relative prices of factors and of different qualities of the same factors are all part of the character of the staple-generating economy

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35. H. J. Habakkuk "American and British Technology in the 19th Century" (Cambr. Eng. 1962)
 36. D. S. Landes "The Cambridge Economic History of Europe" (Cambr. Eng. 1966) 2nd ed. Vol. VI
 37. D. C. North "The Economic Growth of the United States, 1790 - 1860" (New York. Norton. 1966)
 38. C. P. Kindleburger "Economic Growth in France and Britain 1851 - 1950" (Cambr. Mass. 1964)
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and have importance in aiding or restricting the growth possible through the expansion of markets abroad.

Development Through Staple Activity

The ability of an export sector or activity to generate development and economic progress is fundamental to the staple theory of development and is important in this study. The character of the staple itself and the character of the economy it must lead are of great importance. Often the character of other economies and relevant commercial policies are important because development for the colony is counter always to Mercantilist and often to Imperial policies. The colony is usually short of capital: The bullion obsession of the Mercantilists, the drain of staple-trade profits to the imperial country, the willingness and even ability of the exporters to invest rather than consume their incomes, the character of the investment favoured, all influence the degree of possible development obtained.

The breadth of the economic activity generated will reflect the diversity of the staple activities. We can paraphrase Grossman from a very different context³⁹ "The diversity of development and the breadth of the economic base realised will increase directly as the number of linkage opportunities and as the square of the number of staples." The linkages are Hirschmann's⁴⁰ tentacles of development which we will

39. Jean Grossman in "East Wind West Wind" G. discusses Economic Planning and states that the difficulties of planning increase directly as the number of commodities and as the square of the number of planning agencies.

40. A. O. Hirschmann. "The Strategy of Economic Development" (New Haven, 1958) chapter 6

consider in a moment: first let us consider the difference in experience and opportunity between a new country which had one major export staple through almost one and a half centuries and another which had had a succession of staple activities.

Australia's major activity has been agricultural and her staple export mostly wool in the years 1820 - 1950. Robinson⁴¹ terms 'ephemeral' a number of exports, such as gold, which have had only very short-term significance for the economy, and gives to the wool trade pre-eminence in stimulating economic growth and development in that period. Yet Australia's advance of per capita income has been at about half the Canadian rate. Canada's experience has been of a succession of significant staples and the importance of this diversity must be put very high indeed in achieving high rates of growth and broad development. Faulkner⁴² shows how in New England of the Revolution, commercial activity and commercial fortunes had to be diverted into a succession of activities because of political as well as economic facts. The importance of the mobility of factors and of the formation of habits of mobility is emphasised by Laudes, by Habakkuk, by Faulkner, by Watkins and many others. In New England entrepreneurship was of a quality to meet the requirement of change of activity and in

41. A. J. Robinson: "Exports and Economic Development"
Quarterly Review Economics and Business. Autumn 1966.
Vol. 6. page 63 - 74

42. H. U. Faulkner. "American Economic History", 8th ed. (New York. Harper. 1960) page 135, page 145

Canada the rates of growth and development suggest that entrepreneurship and mobility of factors were also well-developed. Watkins⁴³ discusses an "export-trap" where factor mobility and entrepreneurship are deficient and development lags because society has narrow vision and fails to see and grasp the new opportunity. This may not be a just criticism when Levin's "foreign-factors"⁴⁴ are the entrepreneurs and the providers of capital. An iron-ore mine whose function is to supply a foreign iron works may represent only the medium-term economic facts of supply of the iron works. It has no nationalist overtones other than some foreign nationalism. The new opportunities may be seen and taken by the foreign factor in his home country. A sense of domicile in the new country is, therefore, required of factors if the continuing individual staple is to cause much diversification of the economy.

With a succession of staples the picture is much different: The character of supply needs will change over time, and with a succession of staples there is more chance of multiplication of favourable economic supply situations. The mines and pulp and paper mills use huge quantities of electrical power. Innis⁴⁵ makes this point about the mining industry, and in our time in Canada the mineral industry uses 20% of all electricity

43. M. H. Watkins, in reference 20, p. 63

44. J. V. Levin. in reference 33. page 6: the "income-remitters."

45. in Reference 8. pp. 316-318. audin "American Influence in Cndn Mining" ed. E. Moore. "The Canadian Mining Industry" (Innis)

produced and the pulp and paper industry 16%⁴⁶. This particular supply industry yields very large economies of scale, and given some mobility of electricity via economical transmission lines, the growth of mining can aid pulp and paper or vice versa, and cheap power in a region is almost certainly an incentive to other industrial activity. Innis is quite explicit about the stimulus to integration through cheap power for mining--"The effects of cheap power--were more evident in milling than in mining - (Compared with coal and wood sources, hydroelectric power)---cut concentration costs (from \$2.00 per ton) to \$1.30 and it was expected to \$1.00 for larger operations."⁴⁷

The same cross-linkage is true of railroads: "in the main the transcontinental railroads were built without the knowledge of ore-bodies (Cobalt, Sudbury and Trail) mining contributed important long-haul westbound traffic in the form of machinery and passengers from the industrial East." Thereby both railways and east-bound wheat benefitted. These are external economies arising from staple activities over and above directly-related economies.

Direct economies due to staple activity can be immensely varied. Here we are considering Hirschman's "linkages". Watkins⁴⁸ refers to "diversification around the export base" and we have this concept broken down into demand classifications for factors including capital: Hirschman specifies

46. DBS Year Book. 1968. page 662

47. Innis. page 334. in Reference 8

48. Watkins (1963). page 54 in Reference 20

"backward linkage", "forward linkage" and a "final demand linkage". The instance of railways for western wheat which resulted in the discovery of ore bodies⁴⁹ and the growth of mining supports Watkins case that the most important form of backward linkage is the provision of transport systems. The hydro-electric power case cited above gave forward linkage by cheapening concentrator operations. Backward linkage shows itself in astonishing variety from explosives plants to food products and canning and to power supplies and residential construction. Final demand linkage is consumer demand arising from incomes and modified by income distribution: It must be modified also by the propensity to save of wage earners and profit-takers.

Watkins remarks also that "the law of diminishing returns cannot be checked forever". The single staple is the hard way to economic development: Flexibility and the inheritance of a wide resource-base is a great asset.

49. Innis. Reference 41. Kootenay lode mining. page 312: A reduction of transport costs by \$20 per ton (1902) is cited with the arrival of the railroad in Slocan, B.C.

3. Canada's Experience in Economic Growth 1800 - 1970

An attempt to give some place to the Staple Theory of economic development in the Canadian context, implies a considerable task of simplification. Canada's economic history extends over three and a half centuries and the dominant activity is varied over that period. Analyses of this long period have been made, and we can learn from and be guided by them⁵⁰. There are very many valuable shorter-span analyses, on which we will also draw, with acknowledgement. In our study we can examine two experiences more closely: The economic growth and development based on the trade in wood from 1800 to 1870 and the economic growth and development based on gas and oil in Alberta after 1947.

In discussing Canada's economic growth we should first point to some milestones of employment, population, industrial output and so on over the long time-span.

Canada's population has grown from about one million in 1840 to 3.6 millions in 1870 and 21 millions by 1970. A labour force which totalled 1.8 millions in 1901 reached almost four millions in 1931 and actual employment was 7.8 millions in 1969. An economy relying at first mainly upon human energy for production used in 1867, 0.6 mn. tons of coal.

50. For example: Easterbrook and Aitken, Canadian Economic History (Toronto: Macmillan, 1965) for the entire period, and O. J. Firestone "Canada's Economic Development, 1867 to 1953" (London, 1958) and Canada-One Hundred (Dominion Bureau of Statistics, 1967), for 1867 to 1967

In 1921, 15 million tons of coal plus natural gas equivalent to a million tons of coal plus electric power of 6 million Kilowatt hours⁵¹ was used (In 1921 the major source (98%) of electric power in Canada was hydraulic power and not coal). By 1965 coal was less used at 10 mn. tons; gas consumption was very large at one billion thousands-of-cubic-feet (Mcf), electric power consumption was twenty times the 1921 level and oil provided half Canada's energy needs. Canada's twenty-one million people now are second in the world in per-capita use of energy. This level of application of energy implies great resources, great capital investment and great wealth of output. The level of income, on a national per-capita basis is today perhaps second highest in the world, behind only the United States.

The size of the work-force and its use of energy is one thing; the size and character of the national product another, and the distribution of population across the country and across the range of economic activities yet another. We shall examine the evidence of growth and development provided by these indicators.

The character of the national product has changed and its content is greatly broadened. By the 1840's it is believed the Canadian agricultural product moved higher and exceeded a subsistence-income level. Also the earnings from the timber trade were climbing rapidly. From then, the surplus to subsistence requirements allowed an increasing Canadian-capital

51. 1 ton of coal= 8000 Kwh. (Cipolla. reference 28, p. 49)
(at 100 per cent conversion efficiency; usual is 30 per cent approx.)

contribution to economic progress, earlier totally dependent upon foreign-factor investment. The diversification of economic activity could accelerate where markets existed and where there was comparative advantage in production. The markets of the North Atlantic Community were growing and upon these markets Canada thrived. Initially the major market was the United Kingdom; from the early 20th century it was the U.S.A. and around the export-oriented primary production and primary manufacturing grew the domestic-aligned secondary industries and the service industries. Today we have the great self-spawning activity of secondary manufacturing in Eastern Canada, based mainly upon Canadian domestic demand, though an impressive transportation equipment trade with the U.S.A. has grown up. Canada uses now almost half of her large output of copper. This current output is one hundred times the output at the turn of the century.

COPPER - PRODUCTION AND CONSUMPTION, CANADA.

	<u>1958</u> + <u>1959</u> + <u>1960</u>	<u>1965</u> + <u>1966</u> + <u>1967</u>
1. Production: mn. tons	1.186	1.605
2. Consumption: % of 1	31	45

Source - Canadian Minerals Yearbook. Department of Energy Mines and Resources.

The size and character of the national product has changed substantially and with it the population has changed in total and in geographic distribution. The frontier now, in the minds of Canadians, is the mid-north⁵² and not the West.

52. R. Rohmer. Mid-Canada Development Corridor (1969). (Lakehead University, 1969.)

The West has gone through a period when it's cities grew faster than any in Canada. The growth of 65 per cent for Calgary's population and 60 per cent for Edmonton in the 1956-66 period exceeds that of any major centres in Canada. Urban concentration has been very rapid; one quarter of Canada's population now lives in the Toronto and Montreal Metropolitan regions.

Concentration of Population, Canada - Urban and Regional.

<u>Population</u>	<u>1870</u> <u>(June 1)</u>	<u>1956</u> <u>(June 1)</u>	<u>1966</u> <u>(June 1)</u>	<u>1969</u> <u>(April 1)</u>
Total. mn.	3.6	18.1	20.0	21.0
- In Urban Centres % of Total	19	67 ‡	74	n.a.
- In Ontario & Quebec % of Total	78	62	64	64

‡ Census Boundary Changes were made after 1956.
Corrected 1956 value would be 58%. (C.M.H.C. Sources).

The major activities have changed. Now the major employer is the service sector, and agriculture, though very productive, occupies only a tenth of the work force.

Percentage Distribution of Employment, Canada.

<u>Industry.</u>	<u>% of Total Employment.</u>			
	<u>1921</u>	<u>1939</u>	<u>1950</u>	<u>1964</u>
Agriculture	37	33	20.5	9.5
Non agricultural industries				
- goods producing	63)	67	37.0	35.5
- service producing			42.5	55.0
Secondary Manufacturing	19	17.0	26.0	25.0
Construction Industry	4.7	4.7	5.5	5.2

(DBS Sources.)

In the period 1901 to 1931 when the great wheat boom in the West drew Canadians and immigrants, employment in agriculture grew to 1.1 mn. (an addition of almost 50 per cent). The continuing advance of technology has since allowed fairly steady increase in agricultural output whilst employment had fallen back to and below 1901 levels by the early 1960's. Agricultural employment was 0.6 mn. by 1969.

Easterbrook⁵³ refers to "the new industrialism" based on new transport systems, on new metals and materials and new technology in getting and using these, on new energy sources and mobility and on new motive power. He suggests that the turn of the century marks the debut of the "new industrialism" in Canada. Canada had a small industrial structure based on the 'old industrialism' of coal, railways, iron and steel and natural building materials but has benefitted doubly by the transition of oversea nations to the new industrialism. In their transition, and greatly accelerating this transition, the oversea nations went to war. A combination of possession of 'new' style resources and interruption of imports from warring Europe and United States has meant a great advance of Canadian production in the style of the 'new industrialism'. Canada provided by 1968 great quantities of aluminum (1 mn. tons/yr.) of Nickel (60% of world output) of copper (0.6 mn. tons). Low-cost energy was the basis of the Canadian aluminum industry which is processing ores (bauxite) from abroad. This same low-cost electrical energy is fundamental to the

53. Easterbrook and Aitken. Reference 50. p. 519

"new industrialism". Canada's resources have shown themselves diverse enough to cause the building of an infrastructure for the economy in the era of the old industrialism, with railways and communications systems well developed by 1900 so that the new industrialism was reared swiftly using earlier unexploited resources.

Data on Canadian exports can indicate changes in activity of Canadians over the years.

Percent of Total Exports, by Value.

<u>Class</u>	<u>1899</u>	<u>1913</u>	<u>1929</u>	<u>1950</u>	<u>1960</u>	<u>1965</u>
Agriculture and fish	63	59	47	32	21	22
Other Primary	28	29	12	19	28	25
Highly Processed and manufactured	9	12	41	49	51	53

Any classification of information must conceal something. An examination of Canada's exports can be made so that the constancy of staples in export significance is revealed but the change in character of these staples is concealed, and vice versa. We require several different classifications of exports in several presentations if the several trends in export activity are to be revealed. Also the decline of a percentage value may hide an absolute increase in volume or value.

Principal Products (by value) among exports. Percent.
Canada - 1870 to 1969.

<u>Class</u>	<u>1870</u>	<u>1910</u>	<u>1930</u>	<u>1950</u>	<u>1960</u>	<u>1965</u>	<u>1969</u>
Wheat and Flour	5	22	25	13	9	11	5
Other Agricultural	41	28	14	15	10	9	n.a.
Timber and Lumber	33	14	5	9	7	6	5
Newsprint	-	-	15	16	14	10	7
Non-Ferrous Metals, etc.	2	12	13	14	17	16	n.a.
Oil & Natural Gas	-	-	-	-	2	5	5
Machinery & Transport Equipment	-	2	5	7	6	11	23
Other Items	19	22	23	26	37	30	n.a.

Source: Canada One Hundred and other DES data.

The major points revealed by these data include the increasing diversity of exports over the years and the steady shift into the spectrum of the 'new industrialism' requirements along with the sophisticated engineering products which in our day comprise the most rapidly growing class in world trade. In 1870 the Canadian staples were forest and agricultural products. By 1910 the mines and smelters were contributing substantially to exports whilst forest products declined in relative importance and wheat was achieving dramatic status. In 1930 wheat still was king, but the newsprint industry's expansion since about 1912 was reflected in its very strong export performance. This industry was to be Canada's greatest employer and producer until metals and motors boomed in the mid-nineteen-sixties. The table suggests that exports have been mainly agricultural or forest products with a slowly

growing minerals contribution, but it should be noted that the "other items" category grows steadily in a rapidly-growing total, and indicates highly progressive diversification.

By 1965 the agricultural contribution appears to have fallen to some plateau though with heavy wheat sales to Russia and China then the annual value of exports in this class was the highest ever, at an average value of one and a quarter billions of dollars in the first four years of the 1960's and at \$1.7 bn. in 1964. The value to Canada of agriculture's contribution today must not be under estimated. The share of "wheat and flour" plus "other agricultural" in total exports fell from 28 per cent of value total in 1950 to 20 percent in 1965 but this was in the context of a 175 per cent expansion of total ^{exports} ~~trade~~, from \$3.1 bn. to \$8.5 bn. Agriculture's export performance was, in fact, handsome; the yearly value rising in that period from \$0.9 bn. to \$1.7 bn.

Some progressive changes in staple emphasis are evident in the export values, and some once-over shifts. The boom in machinery and transportation equipment has probably carried this class to a value plateau. Expansion of this class may be limited (in dollar value) in the coming years and percentage of the class in exports may even fall after 1970. This is a case of an industry whose ownership and technology is specially favourable for continental rationalisation of supply of components and of assembly. The Free Trade agreement of January 1965 between the U.S. and Canada made rationalisation of automobile and automobile parts production commercially attractive and this process of rationalisation took only three or four years. As a direct result of this commercial treaty, and

aided by healthy expansion of automobile industry sales, Canada gained more than \$2 bn. in export sales and made a trade deficit in autos and parts of \$800 mn. per year in the early sixties into a balance by 1969. It depends, of course, who prepares the statistics: The U.S. Department of Commerce claims that the later quarters of 1969 gave Canada a \$150 mn. annual-rate surplus in this trade; Canada claims a closely-balanced trade. (The official figures declared by these Governments should be expected to be influenced by overall commercial aims and balance-of-payments exigencies.) The treaty is called a Free-Trade agreement but is in fact a controlled trade, with Canadian quotas of production specified and some number of hidden incentives to investment in Canada through depreciation and other tax-law provisions. The importance of common ownership must be borne in mind in connection with this trade expansion because the "Big Three" auto firms can react more swiftly to opportunity for rationalisation than might an industry with different national control and less concentration of industry control. The price mechanism and the profit motive do not always operate swiftly to produce change in industry structure or output.

Canada has new staples "waiting in the wings" so to speak. Uranium was a handsome currency-earner in the late 1950's and early 1960's with \$1.5 bn. of cumulative shipments to the U.S. then. The market for uranium depends upon costs of competing power-sources and current high interest rates are a powerful deterrent to high-capital-intensity power generation such as nuclear-power technology. However, amid

current increased interest in forward planning for energy from nuclear reactors, Japan's Mitsui acting for Denison Mines has, in recent months, sold \$350 mn. of forward Uranium to Japanese utility companies. More sales can be expected through the 1970's.

Other new staples are oil, natural gas and fresh water. Oil and gas already comprise 5 per cent of the \$13 bn. of exports; oil is, however, held back as an export by U.S. tariffs (10¢/barrel) and strict quotas which appear to allow only about six percent annual expansion of exports to the U.S. in the present. The growth of oil exports we may find, is conditional upon satisfaction of other U.S. needs, perhaps particularly of fresh water. Gas exports are advancing rapidly in value (up 50 per cent in the years 1965 to 1968) to \$157 mn. value and this industry may have special "spread" effects in the Prairie economies in the coming years. Fresh water is amongst urgent future needs for the U.S. and this export may be a useful fact ten years from now. Canadian opposition to water-export may be eroded by favourable treaty terms for other Canadian exports.

Prediction of future staples and their significance has a risk element. Few long-term predictions have proved accurate in the population or technology fields and the staples are dependent upon foreign demand which itself has demographic, technological and political components. All these are uncertain.

The buyers are different over the years. The new markets have been mentioned: Nickel, aluminum, copper, oil, molybdenum,

potash, gas, uranium and so on but the direction of exports is changing over the years, even for the old staples.

Consider first the overall picture for exports. Canada's markets were at first the United Kingdom, the West Indies and to a limited extent, the Eastern United States. The West Indian market grows little, the British economy and market has grown more slowly than European or U.S. markets, and Asian markets have in recent years grown greatly, partly with increase of very large populations there, but particularly with the rise of incomes and the main cause of that rise, the advance of technology there.

Direction of Exports - 1870 to 1968

By main destinations: Percent of Total, by value.

<u>Destination</u>	<u>1870</u>	<u>1910</u>	<u>1930</u>	<u>1950</u>	<u>1960</u>	<u>1965</u>	<u>1967</u>	<u>1968</u>
United Kingdom	38	50	27	15	17	14	10	9
Other Commonwealth & Preferential	3	6	9	6	6	6	3	3
United States	51	37	45	65	56	57	65	71 ‡
Other Countries	8	7	20	14	21	24	22	17

‡ The 1968 and 1969 U.S. proportion reflects the surge in trade in autos and parts along with fall in grain exports. This proportion may prove to be a historic high.

Trading with the U.S. has for Canada reached an astonishingly high level. The degree of specialisation should be viewed as dangerous, but there are signs of a continuing shift in Canada's trading patterns and possibly the recent once-and-for-all surge in auto and parts trading has obscured a long-term trend towards other markets since 1950.

The group of "other countries" in the Table appears to be showing considerable strength which is obscured partly by some sharp once-and-for-all booms in U.S. demand since 1950. It would be to Canada's advantage to have wide distribution of her exports to avoid the instability which must be associated with dependence upon a dominant buyer. The character of the trade with the U.S. may, however, be more stable than that with some other countries. Newsprint and autos, for example, may show greater stability than grain sales which are influenced by unpredictable foreign harvests in the short term. Also, a considerable part of Canadian exports to the U.S. are not in the category of marginal supplies. Requirements of iron ore, newsprint, nickel, asbestos and other items will probably be affected proportionately (rather than with leverage) by a slump in U.S. domestic demand. In support of this argument must be cited the facts of direct ownership of e.g. iron-ore mines and paper mills by U.S. user-corporations, and also the high level of dependence of U.S. firms on imports.

The Changing Sources of Demand for Staples

The early significance of agricultural products for Canada's fortunes in trade has been mentioned above. The pattern and source has however changed greatly since the beginning of the nineteenth century. Wheat faced Tariff barriers and embargo in the United Kingdom market till the gradual removal of the Corn Laws (ending 1846). The ensuing outright Free Trade policy and the extreme industrial specialisation of the British based on comparative advantage was nowhere

copied earnestly. France and other European industrial countries maintained a large agricultural sector behind tariff barriers through the nineteenth century, and after World War I these barriers were raised. The combination of these barriers with the slow rise of European population after 1900 placing natural limits upon domestic demand for food grains has meant limited volume expansion of these markets. British policy also since the 1930's has in fact encouraged home production of grains. Canada's grain markets have grown elsewhere for reasons other than the original stimulation which was based on actual comparative-cost advantage and shift of economic activity in the industrializing countries of Europe. The new markets are based partly upon Communist-bloc needs, and partly upon substitution by poorer nations of wheat for rice or other "inferior" grains. A generalized statement of Communist bloc affairs could be that in the face of steadily rising population there is a real scarcity of reliable grain-producing acreage and that with an "ideological" approach to agricultural ownership and organisation of production, these countries are at the mercy of the weather. A bad harvest means big imports of grain for Poland, for Russia and for China. For Japan and some other countries in Asia a process of shift of demand from "inferior" to "superior" goods is in process, so that major Asian markets may develop for wheat and for beef as incomes there rise.

In respect of metal and ore staples such as copper, iron ore, oil, timber and lumber and others, there was an earlier time when the U.S. was in direct competition with Canadian

producers for any market. Canadian iron ore properties were closed between 1923 and 1938. There was no production at all.⁵⁴ American ore fed Canadian blast furnaces. In line, however, with general U.S. experience in the decades since 1920, the U.S. has ceased to be an exporter of this industrial staple. Her vastly grown needs require now considerable imports. The Paley Commission Report (1952) painted an apparently gloomy picture of U.S. needs for 1975 but was mostly very low in its estimates of future import requirements. It was estimated that the U.S. might need 21 mn. tons of foreign iron ore by 1975 but in fact the U.S. took 30 mn. tons from Canada alone in 1969. In respect of oil and gas the 1950's forecasts were wildly at variance with today's observed facts. The view in the 1950's was that gas reserves were ample in the U.S. but by 1970 there is some alarm as to gas import needs and Canada's ability to supply these. In oil, the U.S. is now an expensive producer. Present Canadian exports to the U.S. are limited by the willingness of Americans to pay several billion dollars more than world prices annually for domestic oil though if world prices ruled throughout our continent the Alberta industry also would suffer great losses of U.S. and Canadian markets.

In respect, therefore, of the 'new' staples related to the 'new' industrialisation Canada appears to be in a strong position to supply large American requirements over and above her own increasing needs. A growing list of "other nations" is also drawing increasingly on Canadian staple production.

54. B. Goodman. Industrial Materials in Canadian-American Relations. (Detroit, 1961). p. 128 n.

In the period 1959 to 1968 Canada's exports grew from \$5.1 bn. to \$13.6 bn. in current dollars (or to \$10.9 bn. in 1959 dollars). Her gross national product advanced then from \$34.9 bn. to \$70.0 bn. in current dollars (or to \$55.7 bn. in 1959 dollars).

There has been considerable growth. There has also been considerable development. Bertram⁵⁵ studied the shifts in economic activity in Canada with special reference to secondary manufacturing. He is studying the long period 1870 to 1957 and shows for this period a remarkably constant growth in manufacturing production when output is measured throughout the period in constant 1935-9 dollars.

His data indicates also a more rapid growth for the "secondary manufacturing industries" (at forty times 1870 volume by 1956) than for the "primary manufacturing industries" (at twenty eight times 1870 volume by 1956).

His volume indexes are obtained by deflating current-dollar values with the relevant year's wholesale-price-index (1935-9 base period) for the components of output and converting the resultant '1935-9 dollars' series to an index series.

55. G. W. Bertram. Historical Statistics on Growth and Structure of Manufacturing in Canada, 1870 - 1957. Canadian Political Science Association, Conference on Statistics, 1962.

GROWTH RATES - Gross Value of Manufacturing Output
Canada. (in constant 1935-0 dollars).

Compound Rate of Growth per Year.

1870 1890 1910 1946 1957 1965

4.6

4.4

4.2

4.2

4.2

Source: Bertram, and D.B.S. Sources.

Bertram disaggregates the seventeen major industry groups of the 1948 Standard Industrial Classification (S.I.C.) of industries so that the categories 'primary manufacturing' and 'secondary manufacturing' emerge in the data. Primary manufacturing industries are identified in Food, Wood Products, Paper Products, Non-ferrous Metal Products, Non-Metallic Minerals and Chemical industries groups of the 1948 S.I.C. and are resource-based minor-degree-processing, export-oriented industries⁵⁶. Secondary manufacturing industries tend to produce end-products for domestic markets, with higher degree processing. In the analysis of the primary and secondary industries' performance the following conclusions emerge:-

- 1) That on these data the secondary manufacturing complex has grown faster than the primary manufacturing complex.

56. Following the classification developed for the Royal Commission on Canada's Economic Prospects.

INDEXES: Indicators of Canadian Development.

	<u>1870</u>	<u>1956</u> and	<u>1965</u>
Population (Canada, Index)	100	435	560
Exports. (Volume, Index)	100	2100	3900
Manufacturing Value-Added. (Volume, Index)	100	4400	6600
Primary Manufacturing Industries (Gross: Volume, Index)	100	2800	n.a.
Secondary Manufacturing Industries (Gross: Volume, Index)	100	4000	n.a.

Source: Bertram, and DBS Sources.

2) That the export-led-growth theory (the staple theory of development) is relevant to Canadian development in the period 1870 - 1915⁵⁷. Using data for the first year of successive decades over the period 1870 to 1910 and analysing these by industry, Bertram relates the contribution of an industry in total manufacturing value-added to the linkages the industry experiences. Thus, the secondary industry 'iron and steel products' is either largest or second-largest industry in all the data-years to 1957 except for depression - 1933. This industry's rate of growth he reports was greatest in the period of the great wheat-trade expansion of 1900-10. The 'Transportation equipment' group also showed rapid growth then. These two industries expanded their gross real output at twelve per cent per annum compounded then, and Bertram connects this unusual expansion with the machinery and transport needs of rapidly growing wheat production.

57. G. W. Bertram. Economic Growth and Canadian Industry 1870-1915 in reference 20, pp. 74-98 and in Canadian Journal of Political Science, Volume XXIX, May 1963, pp. 162-184.

- 3) A process of specialisation of firms and of regions is shown in the data⁵⁸ as early as 1870 - 1900 when the iron and steel products group was enlarged in Ontario by sixteen per cent but declined in other provinces, while Quebec's textile group grew by 75 per cent.
- 4) Rostow's⁵⁹ staple industries or leading sectors are defined as manufacturing industries but Canada's leading sectors are shown to have been timber (to the turn of the century) followed by wheat, with great expansion to 1910, then by pulp and paper in the years 1910 to 1926. The staple theory with its emphasis upon export-oriented primary production and linked Primary-manufacturing industry seems to offer a better interpretation of Canadian economic history than does the leading-sector-theory of Rostow. The staple theory also concurs with the fairly steady growth observed for Canadian industry from 1870 to 1957 whereas Rostow proposed a rapid acceleration or "take-off" for some short-span time which for Canada he set at 1896 - 1914.

Bertram's treatment of the aggregates of the 1948 S.I.C. industrial groups, dividing these into 'primary manufacturing' and 'secondary manufacturing' follows the Royal Commission⁶⁰ precedent and is currently expressed in several DBS series, including for example the revisions of the S.I.C. made for 1961 and subsequent (1961 S.I.C.). This treatment allows us to examine the growth of the 'new' industrialism of Easterbrook⁶¹

58. G. W. Bertram. reference 20, p. 97

59. W. W. Rostow. reference 12

60. reference 50

61. reference 50. Easterbrook and Aitken

within the broad framework of manufacturing activity. A very useful classification offered by DBS⁶² is that giving "direct-resource-based manufacturers" and "traditional secondary industries" and "newer secondary industries", this last class including electrical apparatus, transportation equipment (heavily weighted with motors), petroleum and coal products, chemical products, and rubber production. From this series emerges a picture of change and development in the manufacturing sector:

VALUE-ADDED IN SELECTED MANUFACTURING INDUSTRIES

AS PERCENTAGES OF TOTAL

	<u>1910</u>	<u>1926-29</u>	<u>1957</u>
1. Direct resource-based manufactures: (Food, Wood, Pulp and Paper, non-ferrous metals, chemicals, non-metallic minerals)	29	26	24
2. Traditional Secondary Industries: (Textiles, Iron and steel products, furniture, publishing, leather-products, paper products, non-ferrous metals products, non-metallic mineral products)	56	54	47
3. Newer Secondary Industries: (Electrical, etc.) (See text, above)	14	20	28

Source: Reference 62

Since 1957 value-added in manufacturing has increased greatly but the industry which has advanced most is certainly the transportation equipment industry. The index of industrial production (based on 1961 = 100) rose to 153 in 1967 but

62. Canada, 1867 - 1967, DBS (Queen's Printer, Ottawa 1967)
p. 182

the motor vehicle production index (1961 = 100) was by then 263. The class of "newer secondary industries" therefore will have increased its share of manufacturing value added.

The overall Canadian experience in the period since 1840 therefore has been of almost continuous expansion of exports and of manufacturing activity, but manufacturing has expanded fastest. Over the years there has been diversification in Primary and in secondary activities as the resources available to Canadians have allowed successive exploitation of those for which market demand has been strong. The markets have changed: initial alignment with industrial England changed slowly after the 1840's with the growth of American population, manufacturing and markets. The staples have been mixed in character and the U.S. demand for ever-greater amounts of the 'new-industrialism' staples is today reinforced by rising Asian demand for old as well as new staples. The process of development in Canada is reflected in current large per-capita income, high energy consumption, large production of advanced engineering products, and a large service sector such as exists only in the rich, advanced societies.

The Trade in Wood (1800 - 1870)

Our purpose in examining this phase of Canadian economic Activity is to relate it and its observed implications for development to the staple theory of development. At a later point in this work a modern staple, Alberta oil-and-gas, will be examined in similar fashion, the overall purpose being to

test the views of those who believe the staple theory to be of relevance only to the early development of Canada, and those who consider the theory as of continuing relevance to the Canadian experience.⁶³

The early staple, square timber and lumber, is examined because in much of the period we review it comprised more than a third of Canadian export earnings, and for Upper Canada in the years 1800 to 1840 it was close to three-quarters of all exports by value. It was a great staple for a small economy. Canada was exporting her forests to gain capital for development, and of course the process did not stop in 1870. Canada's exports of lumber, pulp, newsprint and paper products are today valued at \$2.3 bn (1968). The present larger total of automobiles and parts is the only higher-valued (at \$2.7 bn.) class of products in current exports and likely can be overtaken soon by the forest-based exports total. Lower⁶⁴ states that furs were for two centuries the main reason for Canada's place in international trade, then for almost a century logs and lumber dominated. Up to our time forest products are the biggest class in exports.

63. The 'historical' relevance view appears to be held by K. Buckley (reference 27) whilst amongst those who suggest it is still relevant are Aitken and Watkins. (References 23 and 22)

64. a) A. R. M. Lower "The Trade in Square Timber" (reproduced in reference 20) from University of Toronto Studies, History and Economics. Contributions to Canadian Economics. Vol. IV. 1933 (University of Toronto Press 1933), and b) "Settlement and the Forest Frontier", Canadian Frontiers of Settlement, Vol. IX. (Toronto 1933), and c) "The North American Assault on the Canadian Forest". (Ryerson Press, Toronto, 1938)

The references of special value, when examining the lumber activity in the early period are mostly Lower's works.⁶⁴ (Easterbrook⁶⁵ considers the literature and describes Lower's work as "still definitive" in 1966). He was of course the major co-architect with Innis in rearing the structure of the staple theory on a solid base of historical analysis of the Canadian experience. The sources for the more recent periods and for information on linkages and on spreading effects of the lumber trade in an economy include works by Caves and Holton⁶⁶, Sartorius⁶⁷ and by Goodman.⁶⁸

Lower begins his analysis of the square timber trade by remarking that before our recent iron age "the world was built on wood. It was so; in machines, in buildings, in vehicles and in ships, wood was the structural material and therefore the forest was a valuable resource. (The resource has not lost its significance in our time, perhaps now the world is built on paper.)

The "pull" of timber in that earlier time is written in the movement of the embryo iron industry in England across the

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65. W. T. Easterbrook, in reference #20, p. XII. Bibliography and Postscript. P. 258 et. seq.
 66. R. E. Caves and R. H. Holton "The Canadian Economy: Prospect and Retrospect." (Harvard University Press, 1959)
 67. P. Sartorius and H. Henle "Forestry and Economic Development (Praeger, New York, 1968)
 68. Bernard Goodman "Industrial Materials in Canadian/American Relations" (Wayne, Detroit 1961)

country as the forest resources diminished.⁶⁹ By the early 1700's England was importing both timber and iron and needed both badly. Absolute inadequacy of supply⁷⁰ as well as high price were apparent in England for these resources by 1800. Only by the 1780's was coke replacing charcoal in significant proportion, and iron was not much used in ships or buildings before 1870 so that the market for timber was large and long-lived. Sea-power demanded forest resources and the rapid growth of English population from the 1760's required housing. Urbanization was as much an impressive process in England from 1780 to 1880 as it is in Canada today. Timber was needed and England leaned on unstable partners before settling for Canadian lumber.

Political facts dominated the direction of trade in lumber in the 18th and early 19th centuries. England's early trade was with the Baltic, a traditional source of 'naval stores' but Mercantilism in the early 17th century pressed development of supply from New England, a territorial possession, until the Revolution ended that relation in 1776. The Maritime Provinces then were favoured with bounties to develop their supply but, Baltic and American imports were still usually major sources of supply.

69. For the story of the mobile English iron industry see "Cambridge Economic History of Europe" Vol. IV. p. 105, (Cambridge 1967)

70. The 100 percent tariff on Baltic timber after 1809 and the great surge in Canadian exports at fantastic prices for the English supports the "inadequacy" argument.

Napoleon's "Continental System" of geopolitics plus isolation for England from 1808 meant the almost total stoppage of Baltic supplies. This stoppage occurred during a naval struggle in which England lost forty percent of her shipping⁷¹ - she replaced these and built more during the same 1803 - 14 period. Reaction to the stoppage was the frantic differential duties, precursor of the Imperial Preference, and these duties which quickly reached 100 percent persisted until Free Trade policies swept most English trade restrictions away in the 1840's. Canadian exports then suffered a severe blow. Lower's collection of data shows the influence upon Canadian lumber exports of the English deflation of 1827 - 29, of the boom from 1832 to 1836, of the international depression of 1837 and of the damage done by Free Trade in 1842. Thereafter, mixed influences are at work. Where from 1810 to 1840 the Canadian export activity was a backward linkage of the English civil and marine construction industry, after 1842, this activity was a backward linkage of both English and United States construction and of Canadian settlement and farm extension. All of these linkages have severe boom-and-slump implications. Warfare and defence expenditures are highly volatile and uncertain, housing construction is almost a safety valve in some economies and rapid phases of urbanization and migration seem unpredictable and, in the 19th century sometimes explosive. The same English Free Trade policy which damaged Canada's lumber trade spurred Canada's wheat exports greatly, but exten-

71. L. C. A. Knowles "Industrial and Commercial Revolutions in Great Britain" (London, Routledge. 1926) p. 296 of 1946 reprint

sion of farming was sporadic and the demand for lumber mostly an initial demand for each surge of expansion. There was also speculation disturbing trade: Lower makes that point in connection with the period (1842-51) when duties were in course of revision in England. Imlah⁷² insisted that Free Trade did not lower prices of imports for the English consumer and suggested that oversea producers benefitted immediately by higher prices equivalent to the sum of $\frac{1}{2}$ 100 mn. per annum by the 1870's. Probably it depended where the ownership lay who got this surplus. (Levin's 'foreign factors'⁷³ would have domiciled the surplus in London.) Anyway, the prospect of higher margins for dealers in Baltic timber because of lower tariff rate coupled with stable consumer prices meant a threat to the volume of sales of a Canadian-timber merchant. If it was rumoured that Baltic imports were soon to pay smaller tariff, then Baltic offerings would fall whilst Canadian lumber would be dumped on the market. Instability in shipments was thereby compounded.

Prices received by Canadians appear to have been fairly stable. Lower suggests that the prices paid Canadian producers rose because the preference was removed in England⁷⁴ but perhaps the vast growth of the U.S. Market for lumber had more to do with this price rise. The new American markets are documented also by Lower, in another work.⁷⁵ Probably the

72. Albert Imlah. "Economic Elements of the Pax Britannica"
(Harvard, 1958)

73. J. V. Levin. reference 33

74. See reference 20. page 35

75. Reference 64c. page 55 and on. By 1835 New York had access to Ottawa Valley timber via Champlain and Richelieu canals.
(p. 57)

greatest truth was that the Western nations were almost all of them building cities in the 1840's.

The industry as described by Lower was "haphazardly organized up to the mid '50's" by which time men and firms of substance had begun to appear. This implies something about changes in technology.⁷⁶ The trade in wood did, of course, change in its nature and the capital requirements, the location of operations in Canada and the distribution of incomes must have changed with changes in the production function for the Canadian industry.

One point which must be emphasised strongly in discussion of any forest operations is the vast acreages, the hundreds of square miles which are stripped in a generation to meet the giant human demands for timber. This is a mobile industry with a ghastly historical record of destruction.⁷⁷ Apulia and Calabria and Sicily were devastated by their own populations in the days of the Roman Empire. North Africa was the "granary of the (Roman) empire" but these granary provinces, Mauretania, Africa and Cyrenaica are today's "hot ante-room of the Sahara", Tunisia and Algeria. France and Switzerland were stripped for fuel and salts (potassium), England also. Canada was open to attack as technology was more advanced and consumption rates were greater. Lower's studies indicate that significant logging activity was extended from St. John to Georgian Bay, a range of 1500 miles by water, in the years 1808 to 1855.⁷⁸ Timber

76. Reference 64c. page 46

77. Sartorius and Henle. Reference 67. pp. 4-15

78. Lower, in reference 20. p. 59

to the height-of-land north of the Thousand Islands had been stripped in the years 1810 to 1838 by which time the port of Gananoque and others on the St. Lawrence ceased lumber shipments; the Pine Plains of Simcoe County were opened up by the Northern Railway in 1853 and the region was 'barren gravel' by 1880.⁷⁹

Our major interest in this study is in economic development. The above remarks may make it appear that the lumber and board trade produced deserts, but there is more than this to the picture. We shall find that development did occur and that the forest was and is a major factor in Canadian development.

It must be remembered that the forest was an obstacle to human settlement and movement in Canada. Settlers who came to Canada to farm the land (and mostly that was the aim of the peasant immigrants from Europe) had first to remove the forest, clearing and burning. The very difficult travel conditions through the forest have been well documented. In 1847, for example, transport cost for a barrel of pork was fifteen shillings Cleveland to Ottawa (Bytown) and then forty-five shillings Ottawa to Mattawa (220 miles).⁸⁰ Innis argues that both forest and Laurentian Shield were very formidable barriers to settlement.

The trees, therefore, had to be cleared for substantial permanent settlement to be possible. Lacking an external market for this timber the settlers burned it, sometimes

79. Lower, in reference 64c, p. 118

80. Reference 64c, p. 30

exporting the ashes. When a market appeared for masts and naval stores, whole logs were exported and the square-timber also (broad-axe squared). A market for construction lumber in England required thick planks (traditional 'deals') for resawing there. The market in the U.S. after 1850 required cut (sawn) lumber in great quantity and some price adjustment would find a buyer for any quality of cut, therefore, precision diminished and quality for the sake of quantity became irrelevant. Speed of cutting was the thing then.

In the forest the work required mostly men, horses and axes till 1870, when the saw was used for felling and later for topping, limbing, etc. At this technological stage of the production process the need of capital was slight through the period we consider. But wood is bulky. It must be moved, sawn and moved to market. Wood below height-of-land can use the river for transport downstream. Beyond the height-of-land, teams, roads and railroads are necessary to gain access to water transport or to find market. Sawmills at first could be crude and slow, but the economies of scale apply here. The early mills were small, cutting less than 1 mn. board-feet per year, usually because supply of lumber was restricted by transport difficulties. With the railway came real scale - at Bradford, Ontario, a 3 mn. foot mill by 1855 and at Ottawa, fed by several rivers and railway lines, Booth's mill cut 103 mn. feet in 1903.⁸¹ These mills needed great capital, but even before railway or great sawmill, capital was needed for river control and navigation. Dams were common by 1828 when

81. reference 64c, p. 50-51

the timber-slide was invented. Ten per cent of Upper Canada's saw mills were steam-driven by 1850 and most by 1875. Ships always were needed; for the St. Lawrence trade with England, for Maritimes to New York and for Oakville to Oswego in the years after 1825. The timber schooners and ships could carry passengers cheaply on the trip back to Canada and did so at only thirty shillings per suffering passenger.

The clearing of the forest began so that farmers could farm. English demand for timber cleared land so that some new areas could be farmed and it drew farmers to produce local foodstuffs for woodsmen. Easily accessible timber was exhausted and roads, railroads, docks and dams and timber slides were built. Lower states that on the St. Lawrence the lumber trade brought immigration (whilst on the Pacific he says immigration brought on the lumber trade).⁸² The linkages are many and varied, and even where the lumber trade falls to nothing it has left railways, roads and farms which mostly adopt a new economic life.

If we are to assess the worth of the lumbering and saw milling activity in the period 1800 - 1870 we must examine the evidence of the scale of this activity at the beginning and at the end of the period, assess also the monuments it reared (railroads, etc.) mostly without assistance of other sectors, and decide how far lumbering led to other economic activity concurrently and subsequent to its period of dominance in a region.

82. reference 64c, p. XI. Lumber was back-haul trade for immigrant-carrying ships to the Pacific Coast

Lower gives values for the export trade of the St. Lawrence, and of Canada. There are difficulties in obtaining data and in relating one set of data to another because the collection of information in the early 19th century was regional and not co-ordinated. (The regions themselves were not politically joined till 1867.)

Lower's data clearly shows the rapid growth of the American trade, beginning in the 1830's and rising swiftly. More than anything it was canal transport (Erie and Richelieu) which made this possible, coupled with swiftly rising needs of foreign timber for the American East.

St. John's on the Richelieu moved⁸³ $\frac{1}{2}$ 2000 by value of wood in 1834 but moved an average yearly value of $\frac{1}{2}$ 31,000 in the years 1837 - 41. There was then a U.S. tariff of 20 to 30 Percent but through the 'forties the flow increased; the ports further west feeding the Erie canal increased shipments through the 'forties from 2 mn. board feet in 1840 to 44 mn. board feet in 1849. These exports were paying a great part of the annual import bill for the Provinces.

Lower shows that in the Province of Canada in 1849 forest products exported totalled \$5 $\frac{1}{2}$ mn. of which the U.S. took less than one-quarter, but by 1867 the total was \$14 mn. of which the U.S. took half. In 1849 forest products comprised 56 per cent of all exports by value, and taken over three-year moving-averages, the proportion was still more than one-quarter throughout the sixties.

83. reference 64c, p. 134

For Nova Scotia the fish trade was consistently much more important than lumber but for New Brunswick⁸⁴ lumber appears to have been rather more than half of a rising export total from 1828 to 1867. Caves and Holton⁸⁵ show that for New Brunswick by 1871 amongst the ten leading industries the largest employer was sawmills with 7,100 employees whilst the junior five in this ten employed each only between 800 and 300 workers. The three leading industries were sawmills, lumber products (an aggregate industry) and shipyards employing together two-thirds of this ten-leader total. Felling of trees in New Brunswick linked forward into sawmilling, lumber products and shipyards. It has been suggested that farming was actually weakened by the woods activity in that farming became a part-time occupation and, therefore, was almost a casual activity. Perhaps the quality of the land is a factor also.

So far as Ontario and Quebec are concerned, Caves and Holton are quite assertive about the effects of the timber trade.⁸⁶ It encouraged immigration and settlement. Between 1820 and 1850 Canada's population⁸⁷ rose from 0.58 mn. to 1.8 mn. and in 1850 most were engaged in farming and not timber operations. Farmers' exports exceeded the timber exports by

84. reference 64c, p. 129

85. reference 66, p. 154

86. Caves and Holton. reference 66, p. 171

87. The old province, Canada

1850. Another relevant point must be that the needs of machinery and power in the sawmills and wood products mills aided the growth of foundries and boiler works. There must also be an accumulation of skill and experience in the labour force.

The trade in wood began with log shipment but value-added was increased for production throughout the period. By 1870 two pulp mills were operating in Quebec and forward integration has gone on from that time. The activity led to damming and control of many rivers and thereby in due course aided the growth of hydro-electricity generation, partly as user. It brought people, railways and roads. Its taxes and limit payments and stumpage put funds in the hands of provincial governments for infrastructure spending. The wood trade was a leading sector for the provinces of Canada and New Brunswick through most of the period 1800 to 1870 and contributed greatly to economic development.

4. Growth and Development of Alberta: 1946 to 1970

Our general theme in this study is the relevance of the Staple Theory in past and current Canadian development.

One of the recent surges in Canadian growth is clearly marked in Alberta. The two major cities there grew faster in population than any other substantial Canadian centres in the period 1956 to 1966.

CANADA'S LARGER CENTRES: (Census-Metropolitan Areas)

POPULATION GROWTH 1956-66

<u>Census Area</u>	<u>Population</u>		<u>Percent Changes</u>
	<u>1956</u>	<u>1966</u>	
Calgary	0.200 mn.	0.331 mn.	64.9
Edmonton	0.251	0.401	59.9
Toronto	1.358	2.158	58.9
Montreal	1.621	2.436	50.3
Ottawa	0.345	0.495	43.1
Hamilton	0.328	0.449	37.0
Vancouver	0.665	0.892	34.2
Quebec	0.310	0.413	33.4
Winnipeg	0.409	0.509	24.3
Windsor	0.186	0.212	13.9
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Total: Larger Centres	5.673	8.296	46.2
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Total: Canada	16.081	20.015	24.5
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Total: Alberta	1.123	1.463	30.5

Source: DBS Census of Population

The population of the province was earlier stable through emigration, an important Prairie fact since the 1920's but a cursory glance at the population changes in recent decades suggests that the discovery of the Leduc oilfield in 1947 may

have begun very great changes in the economy of Alberta, retarding emigration and stimulating immigration. The birth rate in these years follows an unusual pattern compared with many Provinces: it remained consistently at rural levels (25 to 30 per 1,000 population) from the obviously rural early 1940's right through to the mid 1960's and fell only to 21 per 1,000 by 1966. By contrast, in Ontario the pattern is of consistently lower rates with an earlier decline. The decline of birth rate showed itself from the unusual Ontario high of 27 per 1,000 in 1957 to current levels of 17 or 16 per 1,000 (1967).

A limited overview of Alberta economic facts of recent years is given in the following table where comparison is made between population trends and output of oil and natural gas for the Province.

ALBERTA 1941 TO 1966

COMPARISON: POPULATION, AND OIL AND GAS OUTPUT

	<u>1941</u>	<u>1946</u>	<u>1951</u>	<u>1956</u>	<u>1961</u>	<u>1966</u>
Population mn.	0.796	0.803	0.940	1.123	1.332	1.463
Oil + Natural Gas Production, \$mn.		22	161	365	428	674
<hr/>						
% Change from previous date:						
- of population	-	2	17	20	19	10
- of Oil and Gas Output	-	-	730	227	17	57

Sources: DBS Census, and, "Alberta Industries and Resources"

In the table the oil and gas production is primary production. Oil is crude oil and natural gas is minimally processed (though sulphur recovery values are included in industry output). Not included is the production of specific gases, such as butane, propane, etc. These are specific products extracted from the resource to give chemical and plastics manufacturers a specific feedstock. These gases we consider the output of a primary manufacturing industry and they represent a step in economic growth and progress for the Alberta economy, their output being close to six million tons in 1966.

For Alberta, stagnation in terms of population changed to growth. The population doubled between 1946 and 1970. Several economic currents can, of course, have been at work. The output of coal, a substantial employer in South-West Alberta, fell greatly from 8.6 million tons in 1949 to 2 million tons by 1961.

The major change in economic activity in Alberta in these years appears to be the production of oil and gas. But oil and gas have not in the past been included amongst the staples which generate economic progress. We can quote earlier views of economic mechanisms -

"Oil does not in general attract major industries to its source or origin--- major industrial concentrations are not a normal feature of oilfields as they have been of coalfields."⁸⁸

A staple must generate primary manufacturing, secondary manufacturing and service activity of significance if it is to meet the conceptual guidelines laid down by Innis and his

88. R. C. Ecstall and R. O. Buchanan. "Industrial Activity and Economic Geography" (1961) page 60

successors.

The Ecstall and Buchanan view was widely held at an earlier time but it was based on the European experience of the complementary economies - the demand-deficient Middle East supplying the industrial machine of the advanced economies. The U.S.A. is the world's largest producer of oil, Canada is the sixth largest; these economies suffer no destitute indigenous population and have an acute awareness of transport costs. The industrial user in Alberta pays almost well-head prices for crude oil or gas: The industrial user in Chicago pays four times the Texas rate for gas.⁸⁹ New capital has moved to Texas and to Alberta for fuel-hungry or petrochemical industries. In 1960 there were one hundred petrochemical plants in the U.S. Gulf Coast region.

At Lacq in France, the oil and gas field supports sulphur, basic chemicals, fertilizers and plastics. O'Dell⁹⁰ cites the growth of the small settlement at Maracaibo in Venezuela after 1918 to a city of 150,000 persons by 1930 and 250,000 by 1960. (Larousse says 456,000 in 1964.)⁹¹ Abadan is a clear-cut case of growth through transport and other service requirements for crude oil and for refining but ninety percent of employment

89. P. O'Dell - "Economic Geography of Oil". Bell (London) 1963. page 189

90. P. O'Dell. page 192

91. Larousse. "Encyclopedia of The World". 1964 Edition

there in 1960 was in oil-related activities. This island is a refining and shipping focus for the near-by fields. It lacks both markets and resources for broad-based development through the oil activity and, therefore, does not show significant diversification of employment or production.

In respect of Alberta we shall examine whether diversification of employment has proceeded and whether this is due mainly to the oil and gas industry. First it is necessary to examine the technology of the oil and gas industry itself so that we can develop some appreciation of its production function, of the backward and forward linkages we can seek, and of any special character of the demands generated by incomes derived from this industry. The technology of the industry will imply different economic results in Alberta than in say Libya or in Abadan. The ownership,⁹² mobility, productivity and initiative of factors of production, the relative availabilities of factors, the relative prices of superior and inferior equipment and labour can be different from one place to another. The distribution of income, the savings habits and the investment habits or policies of individuals and of firms, the rate of generation of new techniques and practices and the availability of these will differ in different parts of the world or of a country and will affect the degree of success achieved in attaining economic growth and progress.

92. "Ownership" includes control of capital through holding companies or financial institutions. It also should include control of mineral rights which must be a factor in aiding or retarding exploration and development.

The Technology of the Oil and Gas Industry

The oil and gas industry is an extractive industry. A resource long stored underground is raised to the surface and usually is refined to a greater or less degree before distribution for destructive use. The uses of the resource are varied: The major use is as fuel and energy generation in which some uses are not competitive, e.g. there is no real challenge yet to the gasoline powered engine as a means of motive power for automobiles and for road-haulage; aircraft and ships must use oil or its derivatives. In other fields there are substitutes for oil or for gas as in home heating, in large scale power generation or in thermal processes such as metal-treating or firing of bricks.

Other major uses of the resource are for fertilizer production, for the enormously diversified range of petrochemicals, and for plastics and man-made fibres.

The resource may lie underground as a liquid in pools of more or less complex form. It may also be so viscous that its recovery begins as an open-pit-mining operation as with the Athabasca tar-sands and the widely occurring oil shales. To the present the technology has been almost wholly that of raising liquids to the surface: there is now appreciable investment in the strip-mine, distil and centrifuge technique of recovery at Fort McMurray in Alberta but this innovation must still be considered infant, tentative and costly to the innovators.⁹³

93. Great Canadian Oil Sands Co. at Fort McMurray. The operation has lost money in 1967, 1968 and 1969. The investment totals \$240. mn. (1968)

The pools of liquid which are usually economically useful are trapped in domes in the sedimentary basins of the earth's crust. Usually the oil lies above a water pool because of the relative densities of these liquids and almost always there is natural gas under very great pressure atop the oil or distributed with the oil.

"Oil fields are essentially gas fields; oil in the earth is more gas than oil"⁹⁴ - except with the surface shales: The pools generally are under high pressure and the piercing of the earth's crust by drilling through to the pool will allow this high pressure to force oil through a pipe to the surface of the earth. The trapping dome configuration means that for a particular dome there is a best position for a well (or perhaps a few positions) where maximum recovery of oil is attainable. This maximum may be a low percentage of the reservoir volume. The Pembina field in Alberta was developed in a fashion which in the 1950's yielded only 12½ percent recovery of the oil.⁹⁵

Drilling requires a frame (a "rig"), motive power for rotary well-drilling and steel piping for the drill which may extend 8,000 or more feet into the earth. There are hoists for raising and lowering the drill pipe, pumps for forcing viscous mud to the point of drilling and the drill end is tipped with tungsten carbide or sometimes diamond fragments. There are instruments to record depth, condition of the strata (permeability, etc.) and so on. The break-through into high-

94. W. E. Pratt. "Oil in the Earth", 1942. p. 31

95. P. O'Dell. *ibid.* p. 10

pressure gas bearing strata can have disastrous results for the entire rig, but the pressures usually are restrained and the driller can probe through and below the gas belt, hopefully to reach an oil pool, if oil is preferred to gas. The approach to production has three principal stages: First, geophysical research and plotting of the below-surface strata to determine the promising regions; second the exploration drilling to seek pools, and thirdly the development drilling to tap the resource pool from the most favourable position.

The exploratory drilling and the development drilling fluctuate greatly in activity from year to year. There was in Alberta a thirty percent reduction in exploratory drilling for 1966 compared with 1965.⁹⁶ Severe changes in the price or in some quota for oil can alone cause such a sharp change, but the major influences on the scale of exploration drilling seem to be a very successful "wildcat" in a little known area or the completion of information-collection for an area. Development drilling must, of course, succeed exploration. The lag in peaks of activity for development compared with exploration peaks is quite marked but may be influenced by the geology of the field. Alberta fields require more development wells per surface square mile than are needed for the giant dome formations of East Texas or the Arctic.

A producing well can sometimes deliver oil for a very long period with the pressure of overlaying gas forcing oil to the surface. It is, however, possible to release the gas pressure

96. DBS Year Book. 1968. page 603

through clumsy drilling, or the gradual oil-volume decrease may enlarge the gas volume and lower the pressure so that oil is no longer forced up. Oil then often is forced up by pumping water down a well to push out the oil, or high pressure gas can be pumped atop the oil to force it out.

Gas is an almost inevitable by-product of oil-getting, though of course, exploration and development in our time may be for the single purpose of obtaining marketable gas, perhaps with oil as a by-product. Chemically speaking, gas is the "light-end" of the spectrum of hydrocarbon series which begins with the simpler molecules of the alkane and the alkene series of hydrocarbons. Gas usually is methane, CH_4 with ethane, butane and propane: Higher members of this alkane ($\text{C}_n\text{H}_{2n+2}$) series are the liquid paraffins which are used as jet fuel, and the heaviest molecules are waxes and tars. Automobile fuel is octane with some higher members. There are also the alkenes, the C_nH_{2n} series of hydrocarbons beginning with ethylene C_2H_2 and propylene C_3H_6 and so on.

Gas can be trapped within oil and oils can vary from pool to pool and do vary particularly from region to region. Oil (and gas) may be sulphurous or not (i.e. sweet or 'sour') it can be colourless (but rarely is) it can be light, or very viscous and black, according as the spectrum of hydrocarbons is represented in it. But the markets are for fairly specific "fractions" or limited groups of compounds and, therefore, oil must be refined to separate the fractions, and gas may be treated to remove valuable by-products needed for the non-fuel markets. Oil needs refineries and gas needs processing plants.

The products from many wells are "gathered" using perhaps 2" to 6" diameter gathering pipelines. The crude untreated product can be exported, but local fuel and chemical feedstock needs must usually be produced from the oil at a local refinery. From the confluence of the gathering lines a trunk line of up to 48" diameter might move oil for export or perhaps a 10" diameter line might feed a refinery.

Refinery techniques and treatment vary: Fractional distillation may be used to separate "lighter" and "medium" and "heavy" fractions. The chemical compounds at the "light" end may be joined in a "forming" operation to give "medium" compounds; the "heavies" may be "cracked" to give lighter alkanes and alkylenes. These processes use the "platformers" and the "cat-crackers" of refinery technology. Much heat, and high pressurization are requirements in refineries, along with much cooling-water. Very sophisticated instrumentation is used for automatic control of flows and physical conditions, because refineries are most economically operated at large scale with little labour. The heat is obtained by burning the "light-end" compounds in the feed-stock oil, but much of the light end is flared-off i.e. burned to waste. Catalysts are characteristic of petroleum chemistry and of refinery operations: Catalysts cause a reaction to occur without themselves being destroyed or used up. The "cat-cracker" is a catalytic cracker, the catalyst which promotes the cracking operation within this tower being perhaps platinized- or palladised-asbestos mat.

Because a region produces a characteristic oil, comprising a particular spectrum of hydrocarbons, a refinery will be designed

to process the proportions of the fractions present in the feedstock: the refinery will be tied to a particular class of oil. But also the market adjacent to the refinery will influence refinery design and the interdependence can create problems for refiner and for consumer. A refiner will assess the markets for classes of oil products - so much heavy oil for bunkering, for railroad diesels, for trucks and for thermal power stations, so much gasoline for automobiles, so much "avgas" or so much kerosene. A considerable change in the market pattern through economic changes (new industries, decline of old industries, etc.) can leave some refined products unsold whilst others become scarce. If total demand is expanding healthily then the added refining capacity can attack the scarcity problems (as indicated, perhaps, by rising prices) through a change in the balance of product classes in its output. Taxation, of course, can be a factor in product-class balance. Heavy oil has been taxed in the United Kingdom to protect the market for coal:⁹⁷ increasing taxation on gasoline could direct consumption gradually towards diesel fuel; pollution-control costs on automobiles using gasoline have directed attention to natural-gas as motor fuel.⁹⁸ There is scope for Provincial or Federal taxation or subvention policy to influence competition of fuels and growth of supply or user industries.

97. P. O'Dell. *ibid.* p. 87. A 25% ad valorem tax, 1961

98. The General Services Agency of the U. S. Government converted 1,500 vehicles to natural gas during 1969.

Refined oil products are often moved by pipeline or water-transport to distributing centres from which road-tanker distribution is the general rule.

The Refineries send out a range of products which on average have only 20 percent value-added in refining.⁹⁹ This makes the refiner very sensitive to costs of crude oil because it represents 80% of final costs of his output.

In the case of natural gas, there may be processing to remove specially poisonous or noxious contaminants such as hydrogen sulphide, yielding sulphur for chemical industry use. Sulphur has been a valuable by-product, though over-supply has depressed prices in 1969-70.

Movement of oil or gas through pipelines requires pumps. Gas, of course, can be compressed and moved swiftly through pipes but cost of pipe increases very greatly as service pressures increase. Therefore, a given diameter of a given-strength pipe can move more heat-generating capacity of oil than of gas: For a particular flow of thermal energy oil can be moved in a narrower pipe than can gas, and in the outcome gas transport per thermal unit is more expensive than oil transport in pipes.

There are greater incentives with gas than with oil, therefore, to locate user industries close to the well-head. Gas pulls harder than oil. Gas can be liquified, at high pressures with normal temperatures and with normal pressures at low temperatures. There can be pressure-tank liquid shipping or refrigerated-liquid shipping and both are used within regions

99. "Industrial Profiles" 1958-65; U.S. Dept. Commerce, p. 63

of a country and for ocean shipments. Mostly, however, gas is delivered to the user by metered pipe, whereas for oil there is intensive road transport movement to users. After refining or treatment, oil products can be distributed with less capital investment than for gas, and for oil the customer can often be induced to make appreciable investment in tanks, etc. Even with gasoline outlets, the investment required may appear moderate to the oil companies, and tied outlets are the rule rather than the exception.

With oil also the road vehicles used for distribution can conveniently be made outside the oil-producing region, as can steel pipe for gas distribution, but the construction costs for distribution pipelines for gas in a city will vastly outweigh the steel pipe input. We should expect a tendency for capital-intensive trunk-line gas transport to be financed and controlled by firms other than the well-owners or gas processors, and other firms again to undertake the enormous capital burden of city-wide distribution.¹⁰⁰ With gas, the user-region gets a handsome share of value-added in construction; with oil this may not be the case but an established distribution system will offer more employment with oil than for gas.

With this admittedly limited picture of the technology of the oil and gas industry and with the fairly general remarks as to costs and capital requirements we can better analyze the significance of oil and gas industry activity in Alberta.

100. This seems the case in the gas industries of Canada and of the U.S. See A. W. Currie "Canadian Transportation Economics". University of Toronto 1967. page 633

The Economics of North American Oil

The Alberta oil and gas industry should be examined in the context of continental supply and demand. In the case of gas, U.S. and Canadian demand has risen swiftly so that markets seem assured for the medium-term future production of most fields on the continent. Gas prices are rising at well-head (in 1969-70) and Alberta production seems assured of its markets, whether or not these are specified by the National Energy Board (of Canada) to be predominantly Canadian. Exports to the U.S. are being strictly controlled. There is no problem in selling Canadian gas.

In respect of oil there are very difficult market complications. First, the U.S. has operated since the Eisenhower Administration (1958), a national oil policy which reserves 82 per cent of the domestic market for domestic (U.S.) producers, and has shown only limited flexibility in operating the policy. Because of this, U.S. wellhead and refinery-product prices (and costs) are high in terms of world price levels. At these high price levels, Alberta oil imported under quota into the U.S. sells very profitably in the American Midwest and in Chicago. (The refiners are very sensitive to crude prices because their value-added in manufacturing is usually only twenty percent of the price of products from the refinery. Therefore, a two percent fall in crude-price can mean that a gross profit/turnover ratio of five percent is advanced to seven percent; the ratio is enlarged by forty percent). The continent's oil industry and its refining is almost one-hundred percent U.S. owned and production and market-

ing could easily be rationalised on the basis of continental economics. This "continental energy policy" is, in fact, being pressed by the present Secretary of the United States Department of the Interior¹⁰¹. The Canadian attitude to this should reflect Canadian realities. The markets held tentatively today in the U.S. by Alberta would almost certainly be lost to Alaskan and Mackenzie oil if this very cheap oil were moved down a U.S. controlled Mackenzie pipeline through Edmonton. Conceivably, Alberta could have slightly cheaper oil for provincial demand but would lose lease-income, royalties and oil industry value-added. The Arctic oil appears to be as cheap as Middle-East oil (\$1.50 per barrel or 4½ cents per gallon, wellhead). A \$2.2 bn. pipe (46" dia.; 1,600 mi.) to Edmonton amortized over fifteen years and delivering a total of four billion barrels, would probably add only two or three cents per gallon to wellhead price delivered in Edmonton; right of way taxes would be an extra. Alberta oil appears to average \$2.30 to \$2.50 per barrel or about 7 cents per gallon.

The Eastern-Canada market also must be given consideration. Canada has an oil policy: In accord with some economic (cost and price) facts, in 1961 the Canadian Government reserved markets West of the Ottawa valley for Canadian crude. Quebec and the Atlantic Provinces buy cheap Venezuelan and Middle East crude in large quantities (imports comprised 40 percent of Canadian refinery intake at the end of 1968). It would

101. He is from Alaska, and the Continental Policy is to Alaska's advantage.

seem unwise to raise the cost of Eastern refinery products. Oil provides 50 percent of Canadian energy requirements and expensive energy implies expensive manufacturing and processing and heating. The best solution for Canada would seem to be: a) to resist movement of oil through Arctic waters or up the Mackenzie and thereby protect the Alberta producing industry, provided b) there is access for Alberta oil into the U.S. as far as its price (without quotas or tariff) will carry it at current artificially high U.S. price levels and c) to admit cheap foreign oil into Canada as far as its price will carry it, which probably means the fall of the entire Seaway-system market to foreign oil. This increase in oil imports would be balanced probably by increased oil earnings in the U.S. so that no serious balance-of-payments problem should be involved. This solution is, however, probably not achievable.

There is also the question of oil in the Canadian Arctic, known at Atkinson Point (160 miles West of the Mackenzie Delta) and confidently predicted for large areas of the sedimentary basins which underlie much of the Arctic. The Mackenzie region has provided oil (at Norman Wells) since 1931 but the new fields at Prudhoe Bay (200 miles West of Atkinson Point) and the geological formations being explored now in the Canadian Arctic are of the giant-dome character which provides very low cost crude oil. This crude poses serious problems of shipment to market. Arctic passage is extremely hazardous even for greatly-strengthened conventional tankers. The voyage of the "Manhattan" (1969) was made in the warmest summer in ten years

but McClure Strait was found impassable for her. The investment required to ship by pipe (\$2.2 bn. to Edmonton plus another billion dollars to the U.S. Eastern market) is probably double that for special tankers. The first U.S. plan to move Arctic oil was a pipeline from Prudhoe Bay to Valdez (120 air miles East of Anchorage) costing close to a billion dollars and crossing very difficult country with high construction costs and apparently great operating risks. From ice-free Valdez, tankers must move the oil perhaps to Seattle and then pipe to the great Eastern markets, or perhaps through Panama to New Jersey. Tankers running the Arctic Passage, or the Pacific shore, or the long haul to Panama and the Eastern seaboard, must under the Jones Act, be U.S.-built and U.S.-manned. They are expensive. The truth appears to be that for Prudhoe Bay oil or Canadian-Mackenzie oil, however low its well-head price, Canada's sovereignty or the Alberta industry are 'in the way'. The real need for both Canada and the U.S. is a large low-cost field no further north than James Bay and preferably on the Atlantic shore.

In present circumstances Canada should bargain for the U.S. to take up one barrel of Alberta oil for every ten barrels of Alaskan oil moved down the Mackenzie and then, after four years, perhaps a 4-barrel-in-10 Canadian option to take advantage of any new Canadian finds in the Arctic.

The Staple Theory and the Alberta Experience 1946 - 1970

We are considering a phase of Alberta development, the immediate past development. The question is whether and how the oil staple brings development, and in fact whether oil is a staple.

Innis' staple studies were taken at first to be a comprehensive theory of economic development. The theory in the hands of recent scholars is

(a) a theory relevant to the atypical case of the 'new' country¹⁰² or is

(b) a theory relevant to the empty lands' initial development up to the advent of the 'new' industrialism,¹⁰³ or is

(c) relevant "certainly up to 1915 and probably later"¹⁰⁴ or it has still strong relevance today.¹⁰⁵

We have quoted also the view that the oil industry is not one to stimulate development.¹⁰⁶ We shall now examine the evidence and offer conclusions.

Amongst those who examine specifically the Alberta oil industry since 1946 are Caves and Holton,¹⁰⁷ and Hansen¹⁰⁸

102. M. H. Watkins, reference 20

103. Easterbrook, reference 50

104. G. W. Bertram, reference 57

105. Aitken, reference 23

106. Ecstall and Buchanan, reference 87

107. Caves and Holton, "The Canadian Economy" (Harvard 1959)

108. E. Hansen, "Dynamic Decade" Toronto, 1958

who are at some disadvantage in that they wrote after less than ten years of measurable Alberta oil boom experience. We can say briefly that Caves and Holton emphasize the profits which arise from the industry and deemphasize the employment and backward and forward linkages. Hansen gives to the oil industry every virtue.

Caves and Holton, necessarily using data mostly to 1951 conclude after a study of wheat and oil booms in Alberta¹⁰⁹ that "the local repercussions of the petroleum and gas development are likely to be distinctly limited".¹¹⁰ We must note at once that in 1951 Alberta oil production was 46 mn. barrels (bbl) whereas by 1969 production was 284 mn. bbl. Scale of current and expected future operations will influence linkage effects of an activity, and time also is a factor. By 1951 the oil boom had been underway only four or five years and this is little enough time for firms to build plants and so on. Because of the major differences in the evidence available to us today compared to 1951, there might legitimately be different conclusions reached.

Nevertheless, a part of their method of analysis can be challenged. When concluding that 'it is not the people but the pelf'¹¹¹ which causes excitement about the oil industry, they express their conviction - first, that the industry generates very little direct or indirect employment and - second,

109. Reference 107, pp 206 - 215

110. *ibid.* p. 215

111. *ibid.* p. 213

at very high proportions of gross product value go to rentiers and entrepreneurs of whom most live in the U.S. Both assertions can be challenged. They choose the year 1955 as an example of expatriation of profits and interest.¹¹² In that year oil industry net revenues were \$329 mn. which Caves and Holton say is for depreciation, profits and other expenses. But \$126 mn. was paid to the provincial government and \$167 mn. was spent on construction by the industry in Alberta. The Canadian government would take a share of profits, and municipal governments tax facilities and pipes.

Caves and Holton remark that agriculture drew into Alberta great numbers of farmers who provided little employment for others. By contrast a highly capital-intensive industry such as the oil industry could have a high multiplier for indirect employment because of the works necessary to start and sustain production.

Hansen's study is a cheerful contrast. Here is admiration of the oil industry expressed in a wealth of data on which we can draw. He shows the flows of income for and from the industry¹¹³ and applies generative ratios to capital inflows¹¹⁴ to show how very well everybody is doing out of oil in the years to 1956.

With the help of these references and other more recent data we can establish some of the facts of Alberta development since 1946 and offer some conclusions as to the influence of the new staple.

12. *ibid.* p. 214

13. Hansen, reference 108, pp. 254 - 260

14. *ibid.* ep. 257

POPULATION OF ALBERTA 1946-1969

	<u>1936</u>	<u>1941</u>	<u>1946</u>	<u>1951</u>	<u>1956</u>	<u>1961</u>	<u>1966</u>	<u>1969</u>
Population mn.	0.77	0.80	0.80	0.94	1.12	1.33	1.46	1.56
% change from previous date	0	4	0	18	19	19	10	11*

*change if rate maintained for five years.

DBS Sources

Alberta's population increased slowly in the 1930's, stagnated during the war years despite rising coal production but rose extremely rapidly in the fifteen years 1946 to 1961, after which the rate of growth eased. The rapid growth period saw an increase of two-thirds in the population over the fifteen years, an annual compound rate of $3\frac{1}{2}$ per cent. The slower growth period (1961-69) was of growth at close to $2\frac{1}{4}$ per cent per annum. The $3\frac{1}{2}$ percent rate is very large for most countries and $2\frac{1}{4}$ percent is still high. The population of Alberta has increased from 33 percent to 43 percent of the Prairie total in the years 1941-69 in a 40 percent bigger Prairie total. In the post-1946 period, Alberta's population and its production and income have advanced more than for other Prairie provinces. Manitoba and Saskatchewan have much in common with Alberta in their agricultural resources, in their isolation from manufacturing centres and markets and in their relatively small populations. They do not have the great oil production of Alberta. Though oil and gas are produced in those provinces, the industries remain small. The population changes in these three provinces indicate differences in experience.

POPULATION: PRAIRIE PROVINCES - 1941 to 1969

Population, mn.	<u>1941</u>	<u>1951</u>	<u>1956</u>	<u>1961</u>	<u>1966</u>	<u>1969</u>
Alberta	0.80	0.94	1.12	1.33	1.46	1.56
Saskatchewan	0.90	0.83	0.88	0.93	0.96	0.96
Manitoba	0.73	0.78	0.85	0.92	0.96	0.98

Source: DBS

POPULATION: Percent Change from Preceding Census.

	<u>1941</u>	<u>1951</u>	<u>1956</u>	<u>1961</u>	<u>1966</u>	<u>1969</u>
% Change of Population	(from) (1931)	(from) (1941)	(from) (1951)	(from) (1956)	(from) (1961)	(from) (1966)
Alberta	8.8	18.0	19.5	18.6	9.9	7.0
Saskatchewan	2.8	7.2	5.9	5.1	3.3	0.4
Manitoba	4.2	6.4	9.5	8.4	4.5	2.0

Source: DBS

There must have been important economic forces at work in Alberta to draw immigrants (many of them from Saskatchewan throughout these years and from Manitoba in the early and late years). The surge in opportunity for employment was due almost entirely to oil industry needs, direct and indirect.

The significance of oil and gas production in these provinces is indicated by the following:

PRODUCTION - OIL - PRAIRIE PROVINCES. (mn. bbl.)

	<u>1947</u>	<u>1951</u>	<u>1957</u>	<u>1961</u>	<u>1966</u>	<u>1969</u>
Alberta	7	46	137.5	157.8	203.3	284
Saskatchewan	0.5	n.a.	36.9	55.9	93.2	87.0
Manitoba	nil	nil	6.0	4.5	5.2	n.a.

Source: Canada Yearbook.

PRODUCTION - NATURAL GAS - PRAIRIE PROVINCES. (Mcf.)

	<u>1951</u>	<u>1957</u>	<u>1961</u>	<u>1966</u>
Alberta	70 mn.	183.1 mn.	500.8 mn.	1,090.6 mn.
Saskatchewan	nil	14.0	37.2	49.9
Manitoba	nil	nil	nil	nil

Source: Canada Yearbook.

The difference between Alberta and Saskatchewan is more than in output. Alberta has had a succession of impressive discoveries. (Leduc, Redwater, Pembina, Rainbow Lake, etc.), whereas Saskatchewan has had few impressive discoveries and only about one-fifth of Alberta's drilling.

PERSONAL INCOME - PRAIRIE PROVINCES.

	<u>1962</u> \$bn.	<u>1966</u> \$bn. (Current dollars)	<u>1969</u> \$bn.
Alberta	2.33	3.24	-
Saskatchewan	1.58	2.13	2.47
Manitoba	1.58	1.97	-

The character of employment in Alberta has changed greatly in the years since 1946 after relative stagnation earlier.

DISTRIBUTION OF LABOUR FORCE - ALBERTA.

<u>Percent in:</u>	<u>Agriculture:</u>	<u>Service:</u>	<u>Industry*</u>
1921	53.2	30.4	16.4
1931	51.8	30.9	17.3
1941	50.4	33.6	16.0
1951	33.2	45.3	21.5
1961	22.3	56.9	20.8

(*Industry includes construction, mining, oil.)

Source: Census of Canada

The sectoral net values of production in Alberta also show the shift of activity over the years.

NET VALUE OF PRODUCTION.
VARIOUS INDUSTRIES - ALBERTA.

<u>% of Total Net Value.</u>	<u>1947</u>	<u>1951</u>	<u>1956</u>	<u>1964</u>
Agriculture	55	50	25	21
Mining*	10	15	26	31
Manufacturing	17	14	19	21
Construction	14	18	28	23

Other industries are fishing, Trapping, Forestry and Electric Power, together making about 3½ per cent of Total Net Value.

*Mining is 95 percent Oil and Gas.

ABS Sources

Alberta in its present boundary is not specially fortunate in its resources. It has cheap power because it has cheap fuel; coal and petroleum and natural gas apparently in abundance. It has much useful agricultural land, and some large forest area. It lacks metals and minerals, its population is still small but it has an important communications centre in that Edmonton is the natural gateway to the Mackenzie River

system and a vast area of the Canadian North.

The province was entered by trappers and eventually peopled by farmers brought by railways. These farmers provided most of the provincial income, aided by coal mining and limited oil activity and some manufacturing up to the 1940's. At that point in time the chances were that the provincial economy would make limited advance. Advancing technology and productivity in agriculture could be expected (given the generally good market conditions which materialized) to result in greater farm income supporting fewer farmers plus a larger machinery and equipment input.¹¹⁵ Employment in agriculture would have fallen and some slight increase in food processing and in machinery industries could have occurred. There has, however, been a decline in the agricultural machinery and implements¹¹⁶ industry across Canada since the mid-fifties and it is a question whether any growth in Alberta requirements would have been met within Alberta. The trend on the continent has been to concentration and rationalisation of production in this industry. (There was a Free Trade agreement in agricultural machinery between Canada and the U.S. in 1960 (some years before the more-shrewdly-negotiated Auto Agreement) and the process of rationalisation took a good part of the industry to the U.S. where economies of scale overcame the costs of greater shipping distances to Canadian markets.)

115. Capital Investment on Canadian farms doubled 1950-1965. (Canada Department of Industry sources.)

116. Volume Index (1949 = 100) was 70 in 1965 (Canada Dept. of Industry sources).

Increased agricultural activity could be expected to strengthen railway and road transport services but to fail to provide employment for a growing population, and linked with decline of coal as energy source for railroads and other purposes and, therefore, of coal-mining in S.W. Alberta, appreciable emigration from the province was likely. We could take the view that agriculture (mainly wheat and beef in the years 1935 to 1969) had largely completed its development work in Alberta by 1930 and that lacking a new staple and lacking substantial population and manufacturing in Alberta the economies of scale in Eastern Canada - and in U.S. - manufacturing would have prevented much new development in Alberta.

At this point substantial oil and gas pools were discovered and new discoveries have been made year by year since 1946.

The European view quoted earlier that oil activity does not seem to bring industry and development cannot be dismissed lightly. Alberta's net value of industrial production was \$475 mn. in 1965, manufacturer's shipments being \$1.28 bn. (own manufacture) giving a per capita net value of \$330 and per capita shipments value of \$870. These values must be compared with Ontario per capita net value then of \$1,160 and per capita shipments \$2,600 (own manufacture). Alberta industry has still a long way to go.

The new staple has had some obvious results; provincial personal income is higher and the population is greater. There are petrochemicals and plastics plants now in Alberta.

There are aluminum extrusion plants, mobile home plants, a steel mill and several pipe-and-tube mills, building-materials plants and so on. We will examine the modernity of Alberta industry.

In 1946,¹¹⁷ of 1,315 establishments in manufacturing in Alberta, 112 were in iron and iron products, chemicals and chemical products, non-ferrous-metal products or miscellaneous industries, which number though it produced only 15 per cent of net provincial manufacturing output could be considered almost wholly the 'new' industrialism of Alberta and perhaps some 'old' industrialism besides. By 1961 the clearly 'new' classes of products accounted for 38 per cent of net output¹¹⁸ and in 1965¹¹⁹ and 1967¹²⁰ 41 percent.

PERCENT OF "NEW" INDUSTRIES IN MANUFACTURING INDUSTRY
+ PRAIRIE PROVINCES.

By Percent of Total Net Value of Shipments.

	Alberta	Saskatchewan	Manitoba
1946*	15	7	32
1965	41	30	33
1967	41	31	38

*1946 Data in Census of Manufactures are not disaggregated to the degree found in the later data.

DBS Sources.

These data suggest that Alberta has overtaken Manitoba in the modernity of its industrial structure: They could

117. DBS. Canada Yearbook, 1950. p. 632
 118. ABS. "Industry and Resources" 1964. pp. 24-5
 119. DBS. "Canada Yearbook" 1968. p. 710
 120. DBS. "Census of Manufactures, (Preliminary)." Cat. No. 31-201 P

conceal expansion of Manitoba's 'old' industries as its 'new' industries expanded and, therefore, overall industrial expansion must be examined.

TOTAL NET VALUE OF MANUFACTURERS' SHIPMENTS.

PRAIRIE PROVINCES 1946, 1961, 1965 AND 1967.

	<u>Alberta</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
<u>1946</u>			
- Total \$mn.	83.7	38.5	122.8
- per capita \$	104	46	168
<u>1961</u>			
- Total \$mn.	350.3	113.3	284.7
- per capita \$	265	123	307
<u>1965</u>			
- Total \$mn.	475.3	138.7	364.3
- per capita \$	327	146	375
<u>1967</u>			
- Total \$mn.	574.2	166.0	424.9
- per capita \$	385	172	442

(Current \$ Basis.)

DBS and ABS sources.

The rates of advance for these provinces do differ. The fact that Alberta has provided sixty percent of Canadian oil production in the last decade and has produced \$5½ bn. value of oil in the period 1957 to 1969 plus about a quarter of this value in natural gas seems however not to have given any remarkable growth to Alberta industry in the sixties as is shown when indexes of value of production are prepared. These data, however, do not challenge the previous conclusion that Alberta's industry has overtaken Manitoba's industry in modernity.

MANUFACTURING EXPANSION IN THE 'SIXTIES: PRAIRIES

INDEX: NET VALUE OF MANUFACTURERS' SHIPMENTS

(1961 = 100)	<u>1961 - 1967</u>			(Current \$ basis)
	<u>Alberta</u>	<u>Saskatchewan</u>	<u>Manitoba</u>	
<u>1961</u>				
- Total Net Value	100	100	100	
- per Capita	100	100	100	
<u>1965</u>				
- Total Net Value	136	122	128	
- per Capita	123	119	122	
<u>1967</u>				
- Total Net Value	163	147	150	
- Per Capita	146	140	144	

These data suggest an initial surge in manufacturing in Alberta from 1946 at the start of the oil boom, but then by the 'sixties a slow expansion.

From these data we can deduce the following: 1) Alberta's net value of manufacturers' shipments has risen from \$84 mn. in 1946 to \$574 mn. in 1967, a near seven-fold current-dollar increase; Saskatchewan's climb was from \$39 mn. to \$166 mn., a four-fold increase; Manitoba began at \$123 mn. and reached \$425 mn., a less-than-four-fold increase. The per-capita ratios of increase for the period are: Alberta, x3.7; Saskatchewan, x3.7; and Manitoba, x2.6. We can say that Alberta's industry has expanded much (the fastest of the three) and Manitoba the slowest, but Manitoba was more advanced in 1946. Perhaps industrial sectors grow most rapidly in the earliest phases of development. If this were so, we might still consider Alberta's pace the most promising but Saskatchewan greatly lagging in its advance from the lowest level. 2) The industrial complex is more modern in structure throughout the

Prairies than in 1946. At that earlier date Saskatchewan had almost no output of motors or parts, electrical equipment, rubber or chemical products or machinery. Alberta had about a sixth of net production in this class, Manitoba a third. Alberta's industrial modernisation has carried it to parity with Manitoba while Saskatchewan has reached Manitoba's 1946 stage. In fact Manitoba has not changed much in the twenty years except that the scale of operations in industry is rather larger. Manitoba has in the years since 1946 gone through phases of population expansion and then emigration, these phases probably coinciding with expansion or stagnation in the industrial sector but possibly affecting the degree of fluctuation in per capita net value of production. 3) The significance of the industrial expansion can be measured in the proportion of the labour force and in the actual numbers employed in industry. For Canada as a whole, manufacturing employment has been close to 24 percent of the labour force since 1946. For Alberta, however, the proportion was 9 percent in 1946 and has remained close to this level. Manufacturing is still small in this province, where farming still occupies more than one fifth of the labour force and construction close to ten percent and mining (mainly oil) something less than five percent.

Distribution of Employment: Percent of Total, 1966

	<u>Agriculture</u>	<u>Manufacturing</u>	<u>Construction</u>	<u>Other Primary</u>
Canada	7.6	24.4	7.0	3.1
Alberta	20.0	9.0	11.0	-
Manitoba	-	-	9.0	-

It is, however, significant that service sector population at 57% of the labour force in 1961 was already at very-rich-society level. Incomes in Alberta are high, but this is not a developed economy. The income is from unusual sources and should be considered impermanent.

What appears to have happened is that a farm economy in 1946 solidly based on high-income-market staples (wheat and beef) has been given a new income from oil. There is some employment from oil also, in the form of construction and finance and other services as well as directly in drilling and moving oil and in the part of manufacturing industry serving the oil industry. The province has experienced growth and development but the unusually high income from oil masks the fact of limited development.

The reason the oil income should be considered impermanent is that Alberta producers could be drowned in cheap Arctic oil, or the U.S. could buy oil elsewhere than Canada, leaving Alberta with one-third of its present production unsold. Also, there is risk that the rate of discovery of new pools slows down so that the confidence of the oil investors diminishes and there is then a steep fall in provincial income at government and personal levels as reservation and lease payments diminish and construction is curtailed.

The oil income is large. At provincial government level the leases plus the royalties levied at the production stage, plus the reservation fees for new searches have annually met half the Alberta Government budget since the late 1940's. Hansen states the total of lease and reservation payments in the period 1947-56 comprised one-third of all revenues collected by the provincial government:¹²¹ But there is also the royalty income which on oil can be from seven percent to one-sixth of production value (fair market value) depending upon rate of flow of a well. (A fast-flowing well pays higher royalties than a slow one). On natural gas the royalty is usually fifteen percent of well-head price. If we use the output and value reported by DBS for Alberta we can make an estimate of royalties in 1966.

<u>Estimate of Oil and Gas Royalties: 1966 Alberta</u>			
	<u>Production Value</u>	<u>Estimated Royalty Rate</u>	<u>Government Income</u>
Oil:	\$524 mn.	12½%	\$65.5 mn.
Gas:	\$145 mn.	15%	<u>\$21.8 mn.</u>
	Total 1966 Estimated Royalties		<u>\$87.3 mn.</u>

This income is over and above the large lease and reservation payments made to the provincial government. The municipal governments collect a type of realty tax on wells and on pipelines: For this tax the rates vary considerably: a 30" pipe might carry municipal government taxes of \$3,000 per mile. A smaller pipe pays less.

121. Hansen, p. 195

According to Hansen the provincial government reacted to the windfall oil income by initially following a policy of reducing net debt, and bought large amounts of Federal Government bonds and made large loans to its municipal governments. A net debt of \$118 mn. in 1947 (equal then to near three times its current annual revenues) was changed to a net credit of \$253 mn. by end of 1956.¹²² Since that time expensive roads and railroad mileage have been built, and Alberta's educational system is of high quality and is also expensive.

Roads and railways have been mentioned: this is part of very large construction activity in Alberta.

<u>Construction in Alberta: New and Repair</u>					
	<u>1947</u>	<u>1951</u>	<u>1958</u>	<u>1962</u>	<u>1967</u>
Total (mn. \$)	68	380	790	810	1,320
-Building \$(mn.)	n.a.	204	385	453	622
-Engineering \$(mn.)	n.a.	175	403	361	696
-Gas and oil Facilities \$(mn.)	n.a.	61	217	172	360
No. employed	12,260	46,424	57,141	56,519	59,800
(current \$ basis)					

Source: DBS cat. #64-201,
and ABS sources

Construction is an important activity in Alberta, generating an unusually high share of all value-added in the province each year, employing a larger proportion of the labour force than is the case for all-Canada or for Ontario, but apparently representing a strong effort in gas and oil facilities and very limited effort in manufacturing facilities.

122. Hansen, p. 277

Construction. Alberta: 1951-63 Distribution

Building & Engineering Construction (not machinery & equipment) % of Total (New plus Repair). Current \$ basis.

<u>Industrial</u>	<u>Residential</u>	<u>Gas & Oil</u>	<u>Roads Highways Aerodromes</u>
3½	24	25	9

ABS Sources

Because Gas and Oil Facilities comprise an unusually large part of total construction these data can usefully be rearranged excluding the Gas and Oil item¹²³ so that the distribution of construction can be compared with other provinces' performance:

Construction. Distribution (Current \$ basis)

Provinces Compared

Alberta, 1951-63

% by Type of Construction (net of Gas and Oil).

<u>Industrial</u>	<u>Residential</u>	<u>Roads Highways and Airports</u>	<u>Institutional (schools, hospitals, etc.)</u>
4½	31	15	10

Alberta 1966 and '67. same basis.

<u>Industrial</u>	<u>Residential</u>	<u>R.H. & A.</u>	<u>Institutional</u>
2½	24	10	17½

British Columbia 1966 & '67. same basis.

<u>Industrial</u>	<u>Residential</u>	<u>R.H. & A.</u>	<u>Institutional</u>
7	27	11	8½

Ontario 1966 and '67. same basis.

<u>Industrial</u>	<u>Residential</u>	<u>R.H. & A.</u>	<u>Institutional</u>
11½	30	10	13

Sources ABS and DBS data.

123. This item in the sources includes a very small Petrochemicals item.

To enlarge the picture we can show the current dollars per capita construction expenditure (not including gas and oil) for the provinces.

<u>All Construction (less gas and oil), per capita (Current \$)</u>		
(average annual)		
		\$
Alberta	1951-63	450
	1965-66	805
Alberta	1966-67	635
British Columbia	1965-66	730
	1966-67	790
Ontario	1965-66	500
	1966-67	550

Because some of these provinces are heavy investors by per capita total construction we can usefully show industrial investment on a per capita basis.

<u>Industrial Construction: per capita. (New and Repair)</u>			
		<u>Manufacturing plus Mine and Oil Bldgs.</u>	<u>Manufacturing only</u>
Alberta	1951-63	n.a.	23
	1966&67	300	22
	1968&69	330	35
British Columbia	1966&67	135	43
	1968&69	158	45
Ontario	1966&67	62	52
	1968&69	84	51

Adapted from: "Public & Private Investment in Canada"
cat. #61-205 and ABS Sources

Data for investment can of course show impressive booms and slumps. Also a single pulp and paper mill or large chemical plant can make a large percentage difference in manufacturing investment level in a particular year for small economies such as those of Alberta or British Columbia.

The broad conclusions from these data must be that total new investment in Alberta is much greater in per capita terms than for say, Ontario, which is a manufacturing province. For Alberta and British Columbia primary production by oil and mining industries respectively brings capital investment which is huge in terms of the provincial economy. The manufacturing sector in both these Western provinces is a small employer and a small investor on a provincial-per-capita basis.

Manufacturing is growing in Alberta, as in British Columbia, and it is being intensified in the economy. The rate of growth of manufacturing is however roughly in line with Canadian overall experience and having in mind the small base from which manufacturing begins in Alberta this growth would have to be more rapid to achieve transformation into a manufacturing economy of an initially primary-production economy.

Growth of Population and of Manufacturing 1961-67

	<u>% Increase</u> <u>Manufacturing</u>	<u>Population</u>
Alberta	65%	12%
British Columbia	65%	20%
Ontario	75%	14%
Canada	65%	12%

DBS Sources

Manufacturing is measured in current value of shipments of own manufacture.

The theme of our discussion to this point has been that provincial government and personal revenues from the oil and gas activity have been great but that manufacturing development was initially rapid and then slowed down. Alberta's manu-

facturing growth has apparently been concentrated in the 'new' industries as should be expected of a recent growth.

If the remote observer, admittedly with hindsight, can conclude that oil has its limitations as a staple generating development in the Alberta economy then it seems reasonable to expect that the provincial government could much earlier reach the same conclusion and devise policy to encourage development. There seems room for criticism of the provincial government in this respect: Alberta has probably a higher per capita personal income than Ontario, itself a rich province. At this high level of income the Albertans are probably the lowest-taxed Canadians. There is no estate-tax (ostensibly to avoid driving the wealthy to retire to Vancouver Island) there is no sales tax (at five-percent in Ontario and eight-percent in Quebec). Realty taxes are relatively low in Alberta because much provincial government money is fed as loans and grants to the municipalities. The policy of reducing provincial government debt was noted above, diverting \$370 mn. to this duty over the first half of the 20-year period we are considering. It seems reasonable to suggest that the Government should have been spending, rather than saving, on ground works for economic development.

To this point in the discussion of Alberta's experience we are arguing that the staple theory of development appeared relevant only in the first decade of the oil boom. The theory then ceased to be relevant because oil exploitation has effects on economic growth so long as it generates construction and

incomes but has effects on manufacturing development apparently only in the initial stages of the boom. It seems possible that an end of oil pool discoveries, or delivery into Alberta of cheaper oil from elsewhere could result in collapse of a construction industry (which is one-quarter gas-and-oil) and in very severe tax increases upon a suddenly-poor population, as well as in emigration of large numbers of people. The question then arises as to what policy to pursue to limit the risks and if possible to prepare the ground for some new (presently unknown) staple which could bring development.

A statement of the implications of staple theory might present guidance in examining development policy. These implications are that development is aided by, for example, favourable distribution and use of income, favourable man-to-resources ratio, favourable qualities in labour and in entrepreneurs, available capital, good communications (physical and financial) cheap and mobile fuel and power and efficiency in linked industries. For a provincial government the question would be how to attack this range of factors of production and improve them.

Two areas which could be immediately attacked are those of labour quality and good communications. The issue of personal incomes also would invite attention. First we consider labour quality. There is much evidence linking productivity of labour and levels of per-capita income with

educational attainment. Denison¹²⁴ attributes almost a quarter of the growth in total real nation income and 42 per cent of the increase in per capita real income in the U.S. in the period 1929-1959 to higher educational attainments. For current and future economic progress therefore investment in education appears very important. In this field Alberta effort appears to be of high level in quality and in expenditure when compared with other provinces.

Comparison of Education in the Provinces

Number and Percent of Population in some of the Significant Educational Institutions.

	<u>Alberta</u>	<u>B.C.</u>	<u>Ontario</u>
Pupils: Elementary and Secondary	0.362mn	0.421mn	1.728mn
Percent of provincial population:	25	23.3	25.4
Students: University, <u>Part-time</u>	41,500	31,400	89,600
Percent of provincial population:	2.86	1.74	1.32
Students: University, <u>Full-time</u>	14,750	23,150	58,983
Percent of provincial population:	1.02	1.28	0.87
Percent of provincial population <u>Part-Time</u> and <u>Full-Time</u> University students	3.88	3.02	2.19

DBS Sources.

Other information gives a picture of Alberta's educational effort:¹²⁵ On the capacity of Universities;

124. e.g. Edward F. Denison. "The Sources of Economic Growth in the United States and The Alternatives before Us." Committee for Economic Development. (New York, 1962)

125. Data on space, and grants are taken from paper by Univ. of B.C. Vice-Pres., at UBC Alumni meeting 1969, and in "Academic Goals and Financial Realities" UBC Study Group 1969

University Space: per full-time student - 1968

	<u>University of B. C.</u>	<u>University of Alberta</u>	<u>University of Toronto</u>
Square Feet/Student	115	148	156

We should remember that Alberta's facilities are in use also by a heavy load of part-time students.

and, on capital financing of Universities:

Universities Capital Grants: per capita, 1969-70

Province:	Alberta	British Columbia	Ontario
\$ per capita:	19.85	7.27	13.65

and in finances for operating Universities:

University Operating Grants: per capita, 1969-70

Province:	Alberta	British Columbia	Ontario
\$ per capita:	43.26	31.52	33.66
Index: (Ont.=100) Corrected for students (full-time) in provincial population	109	64	100

These data have many limitations: The proportion of persons in a particular age-group could differ in the provinces; The data are neither recent enough nor old enough-- a picture over a range of years might give a different impression but we can support this limited view with what we know of the Alberta and other education systems. In Alberta there has been a definite policy of raising teacher-quality

and teacher-training standards. A University degree plus one year of teaching training is needed now for licensing as an elementary school teacher in Alberta and large salary incentives encourage new studies by those teachers who entered the system before these higher standards were introduced. Alberta's teacher qualification requirements are much ahead of those in Ontario where many teachers left high school, entered training college for one year and then became teachers.

In terms of expenditure Alberta appears to have invested quite heavily in education:

Total Income of School Boards: for Publicly-Controlled Elementary and Secondary Schools. 1962-4				
	Alberta \$	B.C. \$	Manitoba \$	Ontario \$
1962. Total Income	144.75mn	143.3mn	65.53mn	549.0mn
Income per capita provincial population	106	81	70	86
1963. Total Income	148.72mn	149.1mn	69.96mn	599.1mn
Income per capita provincial population	106	88	73	92
1964. Total Income	148.61mn	163.7mn	74.35mn	686.1mn
Income per capita provincial population	104	93	77	103
Debenture Debt is not reported here: Not all Provincial Governments provide this information.				
DBS Sources.				

Compared with neighbour provinces and with Ontario, Alberta investment seems quite heavy. It seems certain that Alberta is following a policy of using oil revenues to achieve

high educational standards in the province, and that these standards are higher than in other provinces. The character of education could differ in the provinces but it seems that, for example in the technological training field the Community Colleges (of Applied Arts and Technology) established in the nineteen sixties are efficient, and rivalled amongst the provinces only by Ontario's similar Colleges.

In respect of communications the assessment of performance is quite difficult: roads, railways, telegraph and telephone and air transport and intercity and urban passenger and freight transport are all part of the picture. The most clearly defined investment might be in roads and railways but still there are problems in distinguishing those facilities which are of service nature (e.g. in dormitory towns or suburbs) from those which can be viewed as infrastructure of benefit in opening new areas and giving access to new resources. It has been remarked that construction investment in Alberta is heavy: The evidence appears to be of high-level investment in roads, highways and aerodromes (roads, etc.) in the period 1951 to 1963 with a reduction thereafter. Between 1951 and 1963 roads, etc. absorbed nine per cent of the large Total Construction spending. When this Total is made net of Oil and Gas, the Roads, etc. content becomes 15 percent. But per capita expenditure in both British Columbia and in Alberta is at a high rate compared with Canada or with Ontario on a Total or on a net of oil and gas basis. Probably for Alberta it is twenty-five percent above the Ontario level in the 1965-1968

period on a net basis. Some of the large road investment in the '51 to '63 period can be seen in the four-lane divided-highway between Calgary and Edmonton, in the Trans-Canada-Highway program shared with the federal government, and in the roads built to oil-fields for exploitation. The process of urbanization and the quite new towns built (such as Devon) also implies large spending in the cities and towns. In the period after 1963 the railroad from Peace River to Pine Point in the North West Territories was built (projected cost \$82 mn, actual cost perhaps \$140 mn), and the Yellowhead Pass road to British Columbia (then via Fraser Valley for the Coast). The Pine Point railroad into NW Territories is an example of an apparent need of territorial integration to achieve development which must be considered more fully. Allowing that the fact of a near-doubling of population implies a great need of housing, roads and of commercial construction it appears that significant useful construction of infrastructure has been achieved.

The narrowness of Alberta's range of resources has been reviewed earlier, and the instance of Pine Point is an example of an apparent institutional or political limitation on what the Alberta Government could attempt in respect of investment for future development. It seems as if the resources Alberta lacks are in and around the Mackenzie basin which is logically entered from Edmonton--"the gateway". The next staple(s) for Alberta probably lie outside Alberta's present boundaries--in the N.W.T. Difficulties of water-borne transport in the Arctic

have been mentioned in connection with oil movement and the same difficulties would arise for ores or metals. The Arctic and sub-arctic of the Mackenzie basin also place difficulties in the way of urban living: it is not easy to persuade large numbers of people to live in areas very remote from the rest of society.

Alberta appears to have properties and resources complementary to those of the N.W.T. In skilled and educated population, in existing urban concentrations, in financial and commercial machinery, in developed domestic agriculture and in the logic that Alberta's centres of population lie astride the road to Canadian and U.S. user-markets for metals and minerals, Alberta appears to be the logical processor of N.W.T. primary products. Development infrastructure for Alberta should probably therefore be aligned towards the aim of full economic integration with the northern territory. At Pine Point this has been done, but perhaps Alberta should be spending more of its government outlays within the Territory to cement the economic relationship and "Lock" the Territory economy into its own. Alberta, however, has neither rights in, nor significant control of what is done or planned in the Territory which is a Federal government possession. It requires some boldness and perhaps naivete for a provincial government to build roads deep into areas over which it has no control, only liabilities if maintenance of these arteries is required. It seems reasonable to suggest that the cession of the N.W. Territories to Alberta is in accord with economic facts, though

the Federal Government might wisely impose some conditions as to a development timetable for such a land-grant.

We have discussed labour and communications; we should consider, at least, the distribution and use of income.

In respect of income the Albertans, on a per capita basis, are amongst the world's (and North America's) fortunate.

<u>PER CAPITA PERSONAL INCOME</u> <u>ALBERTA, AND CANADA.</u>		
	<u>1957</u> (current \$)	<u>1967</u>
Alberta	1,426	2,372
Canada	1,399	2,313

ABS Sources.

But they claim to be, and are, the lowest taxed of Canadians. Though in some recent years the Alberta personal income tax added to federal income tax could have added one or two percent to income taxation rates compared with Ontario, this burden is much less than the relief Albertans have in very low excise taxes on gasoline, or the complete absence of sales taxes, or estate taxes. The differences in taxation cited suggest that the high-income and wealthy groups in Alberta may be favoured in the tax structure, compared with Ontario.

Broadly, however, it must be noted that real personal incomes at most levels are probably higher than Ontario. Wages are at a high level, exceeded only by Ontario in Eastern Canada. Land and residence costs are lower than in Ontario and fuel for heating is very cheap. Municipal taxes are low because

of low debt and provincial grants and cheap loans to the municipalities and school boards. Provincial finance appears to be conducted strictly, despite generous education expenditure. In examining possible plans for development it could be said that if these people are temporarily rich on an income from oil then perhaps they should tax themselves more to provide infrastructure for future development.

To conclude this discussion of the relevance of modern staple theory to the Alberta experience of 1946 to 1970:

It appears that oil operations and industrial development followed the path plotted by staple theory for an initial short period. The economy did develop significantly in the first decade but though in the later period income continued to increase on a per capita basis the process of transformation of the economy into a manufacturing economy slowed down. It seems that oil is not a classic staple and is not the best basis of development. A less mobile fuel might better achieve development, as used to be the case with coal.

No new staple is in view today. It seems probable that mining staples lying outside Alberta's borders could later bring manufacturing development for Alberta and that development of the infrastructure with this prospect in mind is the best economic policy for Albertans.

It seems that the staple theory cannot be shown strongly relevant to the past twenty years in Alberta but this does not say that it will be the same case in the next twenty years.

5. Foreign Tariffs and Canadian Development

This brief discussion of foreign tariffs has two main purposes: First, to consider the importance of tariffs in influencing the size and stability of markets for staples formerly and presently important to Canada; and secondly, to consider the implications of the changes in character and location of important markets for Canada's interest and efforts concerning foreign tariffs.

First then, the importance of foreign tariffs:

In our discussion of Canadian development in the period 1800 to 1870 we reviewed the significance of the English timber preference for Canadian trade.¹²⁶ The decay of this preference and the dismantling of the Corn Laws saw Canadian exports to Britain become less timber and more grain. The relevant duties had been large enough that this case seems clear-cut but a parallel expansion occurred in the same period in Canadian trade with the U.S. despite a high tariff. In the 1840's Lower says, the sawn-lumber trade was not held back by the twenty-to-thirty-percent tariff at the U.S. border.¹²⁷ Probably we should say that the comparative cost advantage of the Canadian supplier allowed trade despite the tariff but that expansion of trade might have been greater in absence of the tariff. Tariffs, therefore, were of real importance in Canadian development in the 1800's and in the 1840's. They were important also in the 1910's when pulp and newsprint were admitted free of duty into the U.S. and a great pulp and paper

126. See 50 above

127. See 56 above

industry grew in Canada. In the economic warfare of the 1930's the shift of Canada's trade to the U.K.¹²⁸ reflected the Imperial Preferences which temporarily reversed the trend towards increased Canadian economic partnership with the U.S. In the post-1947 era the experiments in free-trade in particular items between Canada and the U.S. caused a severe defeat for Canada in agricultural implements manufacturing¹²⁹ and a major benefit to Canada in a controlled-free-trade in autos and auto-parts. Tariffs were of importance still in the 1930's and in the 1960's.

The issue, and our discussion of tariffs would be simpler if trade were restrained or advanced only by the rise or fall of prices paid abroad for Canadian products but of course a tariff can be a complex thing and there are also the quotas and other restraints upon trade, and difficult non-economic factors intrude into trade also. We shall review these things.

Tariffs can be specific, ad valorem or 'mixed':¹³⁰ The specific tariff is at so much per pound, gallon, etc. and is regressive in its effects upon import volumes as price levels change or as qualities differ; the ad valorem tariff is at some percentage of value whilst the mixed type is specific plus ad valorem with sliding scale. Thus the tariff on 'advanced' copper and brass (not pipe or tube) entering the U.S. even

128. See p. 37 above

129. References 115, 116

130. For a definitive discussion, see G. vonHaberler, "The Theory of International Trade." (Hodge, London, 1965) pp. 337ff.

after Kennedy Round¹³¹ is 2c/lb plus 12 percent ad valorem when price is high but is 4c/lb plus 24 percent ad valorem when price is low. For Japan, also after Kennedy Round, the tariff on unwrought lead has two clauses--item 78.01.-1(1) - unwrought lead, unalloyed (1) value less than 48 yen/kg: tariff 8 yen/kg plus half the difference between 58 yen and value at customs, (2) value more than 48 yen/kg., tariff 8 yen/kg.

There are also quotas, valuation provision, marking requirements and safety and health provisions affecting imports. Our discussion of oil prices in the U.S.¹³² has outlined the dependence of present Canadian oil exports to the U.S. upon, firstly, the quota-supported high prices in the U.S., and, secondly the Canadian share of the total foreign quota. Marking requirements (as, country of origin) may cause difficulties to exporters and health and safety regulations can even prohibit import, though it should be admitted that citizens expect protection from unsafe or impure products. Valuation provisions are a problem in many countries' customs law: In the U.S. and elsewhere some concept of 'fair market price' is used in valuing items for duty purposes and this can result in high valuation and high tariff. The European chemical industry protests the valuation by 'American selling price (instead of e.g. 'f.o.b. export price') of a range of coaltar

131. Kennedy Round: Tariff negotiations amongst GATT member countries; concluded 1967. Major reductions in trade restrictions were granted by most of the member-nations.

132. see p. 72 above

intermediates and dye-stuffs of which U.S. imports are still severely restricted by effective tariff. The valuation problems most relevant to Canadian trade are usually due to inclusion in a valuation of the costs of selling and distribution experienced in Canadian domestic trade.

It is not a part of our study to plead that Canada suffers unjustly by foreigners' tariffs. Probably the Canadian tariff and other import-restraining measures and practices result in a high level of protection in Canada compared with many nations. Our examination of the foreign tariff seeks Canadian advantage in exports and in economic development and ignores mostly the issues of reciprocity or of equal treatment for other nations. Reciprocity however cannot altogether be ignored because trade concessions by another nation without compensation are rare.

We should outline the significance and apparent purpose of the present-day tariffs relevant to Canadian trade: First of all, Canada's exports are still largely resource-based and are mostly not highly-advanced by processing in Canada.¹³³ Few nations wish to pay dearly for raw materials therefore ores, concentrates and some refined metals move in world trade with only small tariff restrictions though corporate sharing of markets (as in asbestos) does affect trading patterns. Advanced products such as large electrical equipment, automobiles, chemicals or telephone equipment are large items by value in world trade but are strongly influenced by tariff

132. See p. 72, above

133. See Table on p. 32, above

restrictions at most international borders. The purpose of tariffs is sometimes revenue for a state but mostly is economic nationalism: In many ways the Mercantilist spirit and the race for growth and development dictate national tariff policy, as when tariffs are made higher for completely assembled products than for 'knocked-down' or unassembled products, or when 'advanced' products attract higher duty than do the unprocessed.

Canada's development has proceeded swiftly, we have argued, despite 'colonial' policy of other nations, because even the limited processing of Canadian staples has generated linked-industry activity and the changes in world demand for staples has been matched by the diversity of Canadian resources resulting in diversity of linkages and impressive broadening of Canadian economic activity. Wars also have created supply problems for Canada which have caused domestic manufacturing industry to grow quickly. The trade of Canada is however strongly dependent upon U.S. economic activity and U.S. economic (and tariff) policy. In recent years 70 percent of Canadian exports go to the U.S. whilst a similar percentage of imports are from the U.S. It might therefore appear that U.S. tariffs are of greater importance to Canada than those of other nations. For some years the trend in U.S. tariff barriers against Canadian products has been lower: The expanding needs of the U.S. economy have resulted in progressively freer entry of metals and minerals: Tariffs on a number of classes of copper are temporarily suspended and nickel now enters free of duty. It appears that some kind of free-trade policy in energy is part

of the U.S.-proposed 'Continental Energy Policy', presumably allowing free movement of petroleum, gas and electrical energy between the U.S. and Canada.

If the major trading partner is always to be the U.S. then the U.S. tariff on advanced products can claim major significance for Canada's exports, but if Canada wishes to be less dominated in trade by the U.S. economy then other nations' tariffs and markets must be viewed as of paramount importance. Because an expanding new market tends to be less affected by trade-stabilizing cartels and territorial agreements than an older market it seems probable that Canada should attach more significance to the rising Asian market^e than e.g. to existing European markets. We should examine the Japanese markets and the probable course of future economic events.

The rise of Japanese production and the parallel rise of consumption of raw materials there must be examined. In 1955 per capita GNP in Japan was recorded as \$210_{U.S.} compared with \$1910_{U.S.} for the U.S.A.;¹³⁴

The Japanese then were one-ninth as productive as the Americans. By 1966¹³⁵ the per capita GNP in Japan (current dollars) had risen to \$875_{U.S.} compared to \$3820_{U.S.} for the USA: By 1966 the Japanese were one-quarter as productive as the Americans. In this eleven year period the Japanese GNP per capita increased at 13.8 percent compounded rate whilst the American economy expanded to give GNP per capita increase of 6.5 percent

134. reference: P. Studenski "The Income of Nations" (New York Univ. Press, 1958) p. 229

135. UN. Statistical Yearbook

compounded rate. Subject to the fearful risks of extrapolation we might say that Japanese GNP per capita will be half that of the U.S. in 1977 and will equal the U.S. performance in 1987. But Japanese resources are limited compared with American resources and the U.S., we find, needs great volumes of imports. Japan will be a bigger importer of raw materials than the U.S. within a few years. The Japanese and the Americans must compete for foreign markets for finished goods but must compete also for raw materials. It is possible that the growth of the industrial nations will cause the terms of trade to swing in favour of producers of some modern staples, and possibly also the U.S. interest in free trade with Canada in some items is part of a policy of ensuring supplies for the U.S. and limiting sources of supply for Japan.

Canadian interest in foreign tariffs on raw materials should probably be focussed upon refined-metals tariffs in Japan and elsewhere. The British Columbia Parliament recently gave first consideration¹³⁶ to a Bill to establish a smelter in the Province and compel mines to supply their concentrates to this smelter: More value-added for British Columbia, when the project reaches fruition. Japanese tariffs on refined metals can be high but the present large movements of concentrates to Japan (yearly more than \$100mn recently in copper alone) can perhaps be changed to metal movements. The Japanese tariff will not easily be changed. Bilateral trade preferences are outlawed under the terms of GATT membership¹³⁷

136. March, 1970

137. G.A.T.T. The General Agreement on Tariffs and Trade; a useful sixty-nation group which generally has progressively reduced trade barriers since 1947.

and there can be third-party retaliation for infractions. The Kennedy Round ending in 1967 was a difficult three-year negotiation and few significant general reductions of tariffs could be expected in the near future.

To sum up our discussion of tariffs: Canadian trade has shown sharp changes in volume and in direction with past changes in tariff levels, and can be expected to show similar sensitivity to future changes. Historic tariffs often were much higher than is common today but quotas, market-sharing and trading blocs are at least as well developed today as at any time since 1815 except for the 1931 to 1939 period of economic warfare and the periods of open war. Negotiated entry to trading blocs is a possible means of changing trade direction and volume but the growth of great Asian markets may present the best opportunity for enlarged sales of Canadian staples. Free Trade in North America carries risks, exemplified by the fortunes of the Canadian agricultural machinery industry since 1960. The auto trade is "controlled" free trade.

Canada's interest in foreign tariffs should be focussed upon the "advanced manufactured products" tariff in the U.S.A. and upon the "advanced primary materials" tariff in Asia.

6. Conclusions

The staple theory of development has been the central matter of this study. The evolution of this theory, its broad form in Innis' time and its modern expression have been examined. An attempt has been made to show how the Canadian experience in economic growth and development gave to the theory its first form and contributed to recent refinements. Early nineteenth-century Canadian economic experience has been reviewed and events of the immediate past in Alberta have been analyzed and reported so that past and present relevance of the theory could be assessed critically. The special features of oil and natural gas as a staple have been discussed and a limited comparison has been made of the differences in experience of economies depending upon one major staple and economies favoured with a diversity of staples. The significance of foreign tariffs for staple-based economies has been reviewed briefly. Current change in balance and scale of regional staple-markets has been discussed and suggestions have been offered as to the implications for Canadian commercial policy. The study is strongly market-oriented but the relevance of State intervention, of Constitutional and of Sociological factors, of commercial and banking practice and policy, and of geographical and other factors such as wars in economic development has been touched upon.

The following conclusions emerge:

1. In respect of the staple theory, the limitation of relevance of the theory to 'new' countries is acceptable provided that national economies be disaggregated so that 'the frontier'

is 'new' country.

2. The production function concept in the theory seems to be either a limited technological concept which is inadequate for analysis of the staple or it is a very broadly-defined concept which includes non-economic factors and is too unwieldy to be helpful in the theory. The major recent addition to the formal theory is the linkage (and cross-linkage) concept of Hirschman.

3. The concept of linkages formalises major implications of Innis' descriptive economic history. It allows some expression of the quality of a staple. A high-quality staple has important linkages and cross-linkages so that it derives and contributes reinforcement for the process of development.

Both linkage and production function expressions are supply-side concepts and the staple theory needs market considerations also. The fact of change in industrialism from a timber age to an iron age and to a new-materials age need not affect the quality of a staple but it does affect its significance in the market. The relevance of a staple is expressed in the growth or otherwise of markets, and can be changed exogenously by tariffs or by technology.

4. Cross-linkages between staples and between staple-linked activities are of great importance and appear to account for some significant part of the differences in performance amongst staple-based economies in 'new' regions. Diversity of resources is an enormous advantage for a staple-based economy.

5. The staple theory was inspired by Canadian economic history and its past relevance is almost unquestioned. An analy-

sis of the economic aggregates for all of Canada allows the self-spawning secondary manufacturing to mask the possible relevance today of the theory. It is necessary to disaggregate the statistics for manufacturing if the modernity (or new-industry content) of the industrial structure is to be observed, and it is necessary to make analyses of individual economic regions of Canada if the relevance of development theory is to be considered. Using more narrow classifications the process of development can be distinguished from simple growth and more refined conclusions can emerge from data.

6. It is not proven in this study that the staple theory is relevant to the Alberta experience since 1946. The limited development observed there is considered a result of poverty of resources. It is concluded that there is no high-quality staple there, and substantial development in Alberta may hinge upon high-quality staples lying in the Territories to the north.

The disaggregation of statistics on manufacturing in Alberta shows that the industrial structure is modern but small. The modernity of this structure is due largely to rapid development in the early years of the oil boom, but the linkages and cross-linkages for oil activity appear weak.

It seems that the oil exports of Alberta are precarious and temporary. The quota plus the tariff on foreign oil in the United States is the major support of this Alberta activity.

7. Energy staples appear to be low-quality staples. Canadian development has been influenced and advanced most by agricultural, forest and mineral staples though wars abroad must be

allowed important. -

8. Using staple theory plus market and tariff information and experience it is possible to deduce advantageous commercial policy for Canada, viz: a) The terms to the U.S. for agreement to a Mackenzie right-of-way for Alaskan oil destined for the U.S. could usefully be continuing required purchase of Alberta oil and a near-future option for significant Canadian use of the right-of-way.

b) The rising needs of the U.S. for raw materials, and the growth and broadening of Asian raw materials needs, suggest that attempts should be made to achieve reduction of U.S. barriers against Canadian manufactured goods and reduction of Asian barriers against processed primary products. An overall aim of policy should be limitation of dependence of Canadian trade upon U.S. markets.

9. The present day relevance of the staple theory has not been proven but the examination of the Alberta economy does suggest continuing need of special Alberta Government policies to ensure future development and guard against future losses of employment and income in Alberta. The best policy would be integration of the Mackenzie district into the province of Alberta and positive development of the district so that greater Alberta can benefit. Roads and railways and airstrips seem to be the first need in the district.

CONCLUDED.

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