REGIONAL ECONOMIC IMPACT OF TWO GROWTH CENTRES IN NEWFOUNDLAND: AN APPLICATION OF INDUSTRIAL COMPLEX ANALYSIS

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A B S T R A C T

The purpose of this study is to examine the short and long-term effects of the establishment of a number of new industries in two "growth areas". These two "growth areas" are Stephenville and Come-by-Chance.

In this study the techniques of input-output analysis are used. This method allows us to trace the probable impact of any new industry upon the entire economy through the interindustry transactions of the input-output table. Input-output analysis is more suitable than any other method for this type of study, since the analysis is detailed enough to show effects at the level of the individual industry. In this way, the dangers of more aggregate methods to overstate the degree of substitution possible between inputs and outputs of different industries is avoided. Also, it is possible to analize developments within each sector of the economy rather than having to consider only the effect upon the whole economy.

In Chapter I the methodology of the study is explained. A short survey of the development of input-output techniques for the type of problem examined in this paper is given. These techniques are criticized and modified to suit the purpose of this paper.

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In Chapter II we identify the new manufacturing establishments entering the two "growth areas" during the period 1968 - 1972. The inputs and outputs of each of these establishments is identified and they are quantified in both physical and value terms. Physical quantification is necessary because in most cases the only source of information is engineering data. Conversion to value terms is necessary because the input-output tables are constructed in value terms. These inputs and outputs are related through an activity matrix in which production activities as well as import and export activities are shown. The intersectoral and interregional origins of inputs and the destination of outputs are established.

In Chapter II we compute (through the input-output table) the direct, indirect and induced (through household income) expansions in output, employment and income generated by each of the new establishments in the two regions.

Effects upon imports are examined in Chapter IV.

Changes in the long-run structure of the economy are examined in Chapter V.

In Chapter VI it is shown that although there has been a superficial measure of success in diversifying the structure of the Newfoundland economy, the province has not been provided with a basis for continued economic growth or development.

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CHAPTER I

SCOPE AND METHODOLOGY

Newfoundland has been, and still is, mainly a producer of primary products. Fishing, forestry and mining have formed the base of Newfoundland's economic structure. For nearly four hundred years, beginning in the early sixteenth century, the fishery has been the major activity. However, some diversification began in the late nineteenth century. The discovery of large copper and iron ore deposits made Newfoundland one of the world's largest mineral producers. This sector of the economy has grown steadily. Today, output from mining is greater than any other sector of the economy.

In the early part of the twentieth century forestry became important. This was a result of the setting up of the pulp and paper mills in Corner Brook and Grand Falls. The Province's economy is heavily dependent upon fluctuations in the markets for these primary products. Manufacturing, on the other hand, comprises a very small sector of the economy (see Table 1.1).

The net value of production in manufacturing is only half that in the primary sector, and employment is approximately one-third. However, average earnings in the primary

sector are much lower than in the manufacturing sector (see Table 3.3, p. 67 , column 1). Also, there is a great deal of seasonal fluctuation in employment in the primary sector.

TABLE 1.1

Net value of Production and Employment in Newfoundland (as percentage of total) by Industry, average 1963-1965

Sector	Net value of production	Employment
Primary	24.9	26.2
Manufacturing	12.8	9.5
Construction	14.2	23.3
Trade, services, utilities	48.1	41.0
	100.0	100.0

Source: Report of the Royal Commission on the Economic State and Prospects of Newfoundland and Labrador, St. John's: Queen's Printer (December, 1967), p. 83.

In order to remedy this situation the Provincial Government has endeavored to encourage more industrial development. A number of areas have been designated as

"growth areas".[1] In these areas the government offers special incentives to industries that establish there. It is also government policy to encourage people to move from the small scattered communities into the "growth areas". It is hoped that they will provide a labor supply for new industry.

So far the government has been successful in attracting industry to two of these "growth areas".

The two areas in which this policy has been successful are the Come-by-Chance (including Long Harbour) and the Stephenville areas. Both of these areas have received special attention from the Newfoundland government. Industries establishing in these areas have been exempted from all provincial taxes. Also, they have been given special electricity rates. The Provincial government has guaranteed bond issues and floated loans for these industries. At Come-by-Chance the Newfoundland government bought large tracts of land and turned them over to new industries at a nominal price. In Stephenville, the government provides buildings at a nominal rent. These buildings were part of the former American Air Force Complex at Harmon Field. As well as provincial government assistance, many of these industries have received federal government assistance in the form of capital grants from the Area Development Agency, improvements to harbour facilities, and construction of water systems.

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[1] These areas are Corner Brook, Grand Falls, Gander, Marystown, Stephenville, and Come-by-Chance.

The new industries that so far have been attracted to the Come-by-Chance area are:

1. A Petroleum Refinery due to start production in late 1971.
2. An Anhydrous Ammonia Plant due to start production in late 1971 or early 1972.
3. A Newsprint Mill due to start production in 1970.
4. A Phosphorous Plant that started production in September 1968.

Those industries attracted to the Stephenville area are:

1. A Magnesium Hydroxide Plant - $Mg(OH)_2$ - that started production in October 1968.
2. A Linerboard Mill due to start production in 1972.
3. An Aluminum Cable Plant due to begin production in mid-1969.
4. A Brewery that began production in mid-1968.
5. A Fishmeal Plant due to start production in mid-1969.
6. A Dairy that began production in mid-1968.

The purpose of this study is to examine the short and long-term effects of the establishment of these new industries in the two "growth areas". The short-run changes in output, employment and income are examined for each new industry establishing. These changes are examined at the industry level. Also, the impact of different industries is compared to see which ones most effect the economy.

These new industries form an industrial complex. The interrelations of this industrial complex with the rest of the economy and its dependence upon it is explored.

A projection is made of the long-run changes in the structure of the Newfoundland economy that will result from these new developments. Changes in the relative importance of various sectors ahd changes in the structure of external trade are examined.

Based upon this analysis, an appraisal of the success of the policy of establishing "growth areas" is made. In particular, conclusions are drawn as to whether the policy is successufl in changing the structure of the economy from a primary to a more manufacturing oriented base.

METHODOLOGY

In this study, the techniques of input-output analysis are used. This method allows us to trace the probable impact of any new industry upon the entire economy through the interindustry transactions of the input-output table. Input-output analysis is more suitable than any other method for this type of study, since the analysis is detailed enough to show effects at the level of the individual industry. In this way, we can avoid the dangers of more aggregate methods that tend to overstate the degree of substitution possible between both inputs and outputs of different industries. Also, it is possible to analize developments within each sector of the economy rather than having to consider only the effect upon the whole economy.

However, the weakness of input-output analysis is that constant production coefficients are assumed. The effects of changing technology or changing tastes of consumers are not taken into account. However, because these changes take place only slowly, input-output analysis can be used for short-term forecasting. In order to make long-term forecasts we need information on probable changes in technology and changes in patterns of consumption, which can be used to alter the structural coefficients of any base year.

In order to handle the wide variety of economic problems, input-output analists have evolved a number of approaches. Each of these approaches is examined and modified to suit the purposes of this study.

Regional Analysis

A basic approach to impact analysis was worked out by Isard and Kuenne (1953).[2] Their purpose was to work out the direct and indirect effects of a new industry, in this case the steel industry, establishing in the New York - Philadelphia region. They wanted

> "(1) to estimate the resulting direct expansion of existing and influx of new steel-fabricating activities within the area and (2) to quantify the direct and indirect repercussions of the new steel production and and associated new steel-fabricating operations upon all activities in the area."[3]

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[2]Walter Isard and Robert E. Kuenne, "The Impact of Steel Upon the Greater New York-Philadelphia Industrial Region," The Review of Economics and Statistics, XXXV (November, 1953), pp. 289 - 301.

[3]Ibid., p. 291.

In order to carry this out they used the 1947 input-output table for the United States. The national input-output coefficient table was used without any modification. The coefficients for the New York-Philadelphia region were assumed to be a reflection of the national coefficients.[4] The household sector was moved into the structural matrix as an industry. This was to catch the local multiplier effect resulting from the generation of new income.[5]

Isard and Kuenne also assumed idential consumption coefficients. They justified this on the grounds that the tastes of the population of the area being studied did not significantly differ from those of the population as a whole.[6]

The Isard-Kuenne method was modified by Moore and Peterson (1955).[7] National input-output coefficients were used as first approximation in determinging the inter-industry flows of a region. Next, they examined differences in regional productive processes, marketing practices and

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[4] Ibid., p. 299.

[5] Ibid., p. 296.

[6] Ibid., p. 299.

[7] Frederick T. Moore and James W. Peterson, "Regional Analysis: An Interindustry Model of Utah," The Review of Economics and Statistics, XXXVII (November, 1955), pp. 368-383.

product mix. Using this information they changed the row and column elements of the flow table. The national input-output table was modified to bring it into line with regional conditions. From this modified table, regional income and employment multipliers were calculated.

This study was not an impact study. However, it did make an important contribution to the advancement of impact analysis in that regional differences in economic structure were recognized. For the first time an attempt had been made to construct an input-output table at the regional rather than the national level.

The next important advance was the study of Hirsch (1959).[8] Hirsch constructed a table for the St. Louis Metropolitan Area. However, he did not merely modify the national table. A survey of business and industry in the St. Louis area was carried out, and the information received was used to construct a regional table. Since the Hirsch study, a number of regional input-output tables have been constructed in the United States. In Canada, at least six provincial tables have been constructed.[9] The existance of a regional input-output table makes any analysis of the impact of a new industry more reliable.

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[8] Werner Z. Hirsch, "Interindustry Relations of a Metropolitan Area," The Review of Economics and Statistics, XXXVII, (November, 1959), pp. 360-369.

[9] Newfoundland, Nova Scotia, New Brunswick, Prince Edward Island, Quebec and Manitoba.

However, the limitation of the regional approach is that interregional feedbacks are ignored. In order to take these feedbacks into account, a more sophisticated "interregional" approach is needed.

Interregional Analysis

Isard (1951)[10] made the first attempt at formulating an interregional input-output model. It was, however, a theoretical model with no empirical content. This was due to a lack of available data.[11] Mathematically it is of the form:

$$ {}_{k1}x_{i1} + {}_{k2}x_{i2} \cdots + {}_{k1}x_{ij} \cdots + {}_{kn}x_{im} + {}_{k}Y_{i} = {}_{k}X_{i} $$

where
- ${}_{k}Y_{i}$ = final demand in region k
- ${}_{k}X_{i}$ = total output in region k
- n = number of regions
- m = goods and services
- ${}_{k1}x_{ij}$ = amount of output of industry i in region k absorbed by industry j in region 1.

or, more generally

$$ \sum_{i=1}^{n} \sum_{j=2}^{m} {}_{k1}x_{ij} + {}_{k}Y_{i} = {}_{k}X_{i} \qquad \begin{matrix} i = 1, 2, \ldots n \\ j = 1, 2, \ldots m \end{matrix} $$

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[10] Walter Isard, "Interregional and Regional Input-output Analysis: A Model of a Space Economy," The Review of Economics and Statistics, XXXIII (November, 1951), pp. 318 - 328.

[11] Ibid., p. 320.

This table is shown in Table 1.2. It has three regions, a total import row and a total export column.

Reading down a row, we can see the inputs originating in the region and the inputs originating in the other two regions. Reading across a column we see how much of the output of a region goes to each sector in the three regions. The regional source of inputs and the regional destination of outputs are shown in the table.

As has been mentioned, Isard was not able to give empirical content to this model. At the time there existed a national input-output table for the United States, but there were no regional tables. The first step towards making the interregional model applicable was the study of Moore and Peterson (1955).[12] A regional table was constructed by modifying the national table. The study of Hirsch (1959)[13] was the first study in which a regional input-output table was constructed from information collected within the area for which the table was constructed. With the increasing number of regional tables has come the possibility of applying interregional models. In Canada, the ADB input-output tables (1960) for the four Atlantic Provinces is an example.

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[12] Moore and Peterson, Op. cit., pp. 368-383.

[13] Hirsch, Op. cit., pp. 360-369.

Table 1.2

Interregional and Regional Input-Output Table

		East				South				West					Subtotals			
		1. Agriculture & Fishing	2. Food Processing	.	9. Chemicals	.	.	20. Households & Govt	1. Agriculture & Fishing	2. Food Processing	.	9. Chemicals	.	.	20. Households & Govt	Exports (national)	Total Output	1. Agriculture & Fishing	2. Food Processing	.	9. Chemicals	.	.	20. Households & Govt
East	1. Agriculture & Fishing																							
	2. Food Processing																							
	.																							
	9. Chemicals																							
	.																							
	.																							
	20. Households & Govt																							
South	1. Agriculture & Fishing																							
	2. Food Processing																							
	.																							
	9. Chemicals																							
	.																							
	.																							
	20. Households & Govt																							
West	1. Agriculture & Fishing																							
	2. Food Processing																							
	.																							
	9. Chemicals																							
	.																							
	.																							
	20. Households & Govt																							
	Imports (national)																							
	Total Input																							
Subtotals	1. Agriculture & Fishing																							
	2. Food Processing																							
	.																							
	9. Chemicals																							
	.																							
	.																							
	20. Households & Govt																							

Source: Walter Isard, "Interregional and Regional Input-Output Analysis: A Model of a Space Economy," *The Review of Economics and Statistics*, XXXIII (November 1951), 321, Cambridge, Mass.: Harvard University Press. Copyright, 1951, by the President and Fellows of Harvard College.

Structural Analysis

Another area of study has been structural analysis. A number of studies have been made in which changes in production and consumption coefficients have been projected. The foremost of these are by Talanus (1966)[14] and Almon (1966).[15] Tilanus projects these changes from a series of thirteen input-output tables for the Netherlands over the period 1948-1960. These thirteen observations are used to project changes in the input-output coefficients.

Almon uses much of the same technique to make projections for the American economy to 1975. Changing technology, consumption patterns, import and export patterns, and government expenditure are examined. With this information, the input-output coefficients of the United States table are changed and projections of final and intermediate demand are made.

Earlier in this paper the purposes of the study were discussed. In this section each purpose is linked to one of the three approaches discussed above, depending on what is required of the analysis.

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[14] C.B. Tilanus, Input-Output Experiments: The Netherlands 1948-1961, Rotterdam: Rotterdam University Press, 1966.

[15] Clopper Almon, The American Economy to 1975, New York: Harper & Row, 1966.

First, the regional impact approach will be used to examine the short-term impact of a new industry. A regional input-output table for Newfoundland is used with no changes in its coefficients.

Second, the range of new industries constitute a new industrial complex and can be treated as a separate region; so the Isard interregional approach is used.

Third, the long-term change in the structure of the economy is examined, making use of the Tilanus-Almon method.

The first method, based on the Isard-Kuenne approach, is to assume no changes in the existing input-output table.

No new sectors are added, and none of the input-output coefficients of the ADB table are changed. A new industry is treated as exogenous to the system and, as a result, we do not get any feedback effects from the existing sectors to the new sector. This assumption at first may seem unrealistic. The entry of a new industry will effect the output activity and the interrelations between all other industries. This will in turn effect the output activity of the new industry. The first method does not permit the measurement of the effect of growth in existing sectors on the new sectors. There is not complete interdependence between the existing sectors and the new sectors. The new sectors are dependent upon the old sectors for their

inputs, but they are not affected by the resulting changes in the output levels of the existing sectors.

The use of this seemingly unrealistic method is justified, however, if we look at the nature of the new industries involved. Most of these industries are export industries. All of their output is exported. They increase output only in response to increases in demand that originate from outside the Newfoundland economy, (e.g., Linerboard, Phosphorous, Magnesium Hydroxide). In this case, feedback effects can be ignored. In some cases, such as the new dairy in Stephenville, the output is too small to have significant effect on the structure of the rest of the economy. The dairy output is only 1.7% of the output of that sector.[16] With such small output levels, the feedbacks from the existing sectors are negligible and can be ignored. It is assumed that these new industries initially are working at full capacity. In the two or three year period it takes these firms to become fully established, they will not want to increase their investment and as a result will not be able to increase their output. Therefore, feedback effects can be ignored. For these three reasons this particular method is justified for short-run impact analysis. It is

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[16] Calculated from Atlantic Development Board Input-Output Table (1960) for Newfoundland.

the method used in Chapter 3 where the impact of each new industry is analized. Expansions in the output of existing sectors, as a result of demand by new sectors, is calculated. From the output expansions, employment and income expansions are calculated. Using the resulting calculations, the total impact is compared to the initial inpact - i.e., employment, output, and income, of each of the new industires. Ratios are developed to compare initial impact with the projected total impact. These ratios then are used to compare the impact of different industries.

The same method is used in Chapter IV to project expansion in import requirements.

The second method, used in Chapter V, is to regard the new industries as separate from the rest of the economy - in fact, as another economy - but interdpendent with it. In effect, the two "growth areas" are treated as one new "region" with its own structure. This approach is similar to the interregional model of Isard (1951).[17] All of the new industries can be regarded as a new industrial complex and therefore as a new "region". This involves construction of a table to show the input-output relationships between the new industries, then combine the new table with the existing ADB input-output table, and show the import

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[17] Isard, Op. cit., p. 321.

and export activities that interrelate the two tables. The difference between this new input-output table and the type developed by Isard is that this new table does not use separate consumption functions for each area. This is because we are dealing with the same population, tastes do not differ. Therefore, there is no need for two sets of consumption functions. The areas also share common services, utilities and transportation sectors.

Sectoral multipliers are calculated from this table. They are then discussed in relation to development planning. Their usefulness and inadequacies for this task are discussed.

The third method is to aggretate the new industries into the existing ADB input-output table. The new inter-sectoral flows are added to the existing flows and a new coefficient table is calculated. This methods gives a picture of the economy when all the new sectors are completely integrated into the system. It is useful if one wishes to compare changes inproduction functions or shifts in demand. In Chapter V, partial use is made of this method in order to show how the development of these two "growth areas" will change the structure of the Newfoundland economy. Changes in the relative importance of various sectors as well as changes in the structure of external trade are discussed with the aid of "self-sufficienty" or "skyline" charts. From this is drawn general conclusions as to the

success of these developments in changing the structure of the Newfoundland economy from a primary base to a more manufacturing oriented base.

PLAN OF THE STUDY

The first step in this study is to identify the new manufacturing establishments entering the two growth areas during the period 1968-1972.

Second, it is necessary to identify the inputs and outputs of each of these establishments and quantify them in both physical and value terms. Physical quantification is necessary because in most cases the only source of information was engineering data. Conversion to value terms is necessary, because the input-output tables used are constructed in value terms. Also, it is necessary to establish the intersectoral and interregional origins of inputs and the destination of outputs.

Third, is the computation (through the input-output table) of direct, indirect and induced (through household income) expansions in output, employment and income generated by each of the new establishments in the two regions.

Fourth, is to determine the impact of these developments on the pattern of external trade and the structure of the economy.

For the purpose of this analysis, the 1960 Atlantic Development Board Input-Output Table for Newfoundland was used. This table is 74 x 83 with 47 processing sectors. It is of the form

$$x_{11} + x_{12} + x_{13} \ldots\ldots + x_{1n} + f_1 - M_1 = X_1$$

$$x_{21} + x_{22} + x_{23} \ldots\ldots + x_{2n} + f_2 - M_2 = X_2$$

$$\vdots \qquad\qquad\qquad\qquad\qquad\qquad \vdots$$

$$x_{n1} + x_{n2} + x_{n3} \ldots\ldots + x_{nn} + f_n - M_n = X_n$$

$$m = \frac{M}{X}$$

Where

x_{ij} = input of industry - output i to industry j

X_j = domestic output of industry j

f_j = final demand for industry output j

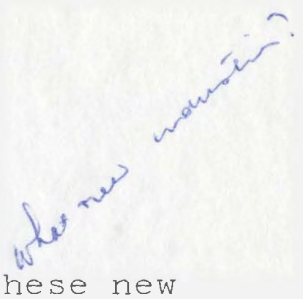
M_j = imports of a type and kind similar to industry output j

m_j = propensity to import industrial goods of a type and kind similar to industry output j.

This basic input-output table gives a picture of the existing sectors of the economy and the interrelations between them. Using this table as a basis for analysis, the impact of new industry upon the economy will be studied.

CHAPTER II

DESCRIPTION OF NEW INDUSTRIES



The first step in the analysis of these new industries is to ascertain the input-output structure of each industry. We need some method of showing the production relationships of each industry. For this purpose it is necessary to construct a "technological matrix" similar to the type developed by Isard.[1] However, whereas Isard considers only production relationships, in the present work the matrix has been extended to cover imports and exports. This "technological matrix" will show the basic input-output flows of each industry being analized. Since more than production relationships are considered, it will be called an "activity matrix".

The Activity Matrix

This matrix shows the relationships between raw material, labor and capital inputs and the level of output in physical terms.

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[1]Walter Isard, Eugene W. Schooler and Thomas Vietorisz, Industrial Complex Analysis and Regional Development, New York: John Wiley & Sons, Inc., 1959, pp. 47 - 53.

Each of the ten industries is listed across the top of Table 2.1. In turn, each industry is broken down into a number of processes. The nature of each process is indicated by the letter at the top of the column. The letter M indicates imports, both foreign and from other regions of Canada. P indicates a production process. X indicates exports to other regions of Canada and foreign countries. There can be more than one production process for an industry. For example, newsprint involves three production processes. P_1 is the production of sulphite pulp from raw wood, P_2 is the production of mechanical pulp, and P_3 is the production of newsprint by combining sulphite and mechanical pulp. This division is not arbitrary. The output of each process can be sold as an input to some other industry. Sulphite pulp can be sold to the chemical industry as a raw material for pharmaceuticals and mechanical pulp can be sold to the building board industry to be made into linerboard.

In the column at the far left of the table are listed the inputs and outputs of each of the ten industries being considered. The unit of measure of each input and output is also indicated. Each column gives the quantity of each input required to produce the stated level of output.

In the import column, the quantity of each commodity imported is preceded by a positive sign. For the export process, a negative sign precedes the quantity exported. In each production activity, a negative sign indicates an input and a positive sign indicates an output. Rows 1 to 38 give the raw material inputs and final outputs. These are calculated on the assumption of constant production coefficients. Rows I and II deal with labor and capital inputs. Row I shows the number of production workers and salaried staff. Row II shows the amount invested in buildings and equipment. Labor and capital inputs are not proportional to the level of output.

The first industry in Table 2.1 is petroleum refining. To supply the refinery requires imports of 6,000,000 tons of crude oil (Row 1). This crude oil together with 334,080,000 kwh of electricity (Row 38) results in an output level of 360,000,000 barrels of jet fuel (Row 2), 72,000 tons of hydrogen (Row 4), and 10,000 tons of sulphur (Row 3). The process also requires eighty-six workers (Row I) and a plant investment of $84,790,000 (Row II). Of this, the entire output of jet fuel is exported. The hydrogen and sulphur are used domestically. The entire output of hydrogen is used as an input for the new anhydrous ammonia industry at

Come-by-Chance. 2,690 tons of sulphur go the the new newsprint mill (Row 3), and the remaining 7,310 tons is sold, in Newfoundland, to the existing pulp and paper mills.

In the anhydrous ammonia plant, the hydrogen from the petroleum refinery (Row 4) along with 334,080,000 kwh of electricity (Row 38) produce 360,000 tons of anhydrous Ammonia (Row 5). All of this output is exported. The process also requires 114 workers (Row I) and a plant investment of $28,850,000 (Row II). All other industries in the table can be interpreted in the same way.

Table 2.1 must be converted into value terms in order to carry out the analysis of Chapter III. This is done by multiplying each of the quantities in Rows 1 to 38 by their unit prices. These prices are given in Table 2.2. Where available, 1960 prices are used. If they are not available, prices for the nearest year are taken. These prices are multiplied by the appropriate wholesale price index, with 1960 = 100, to obtain 1960 prices. The quantities in Table 2.1 are then multiplied by these prices.

The result is Table 2.3 which show the "activity matrix" in 1960 dollar terms. In cases where this information was supplied by the firm, the price is not needed and does not appear in Table 2.2.

Table 2.1 - Activity Matrix (Physical)

	Commodity	
1.	Crude Oil	M tons
2.	Jet Fuel	M bbl.
3.	Sulphur	M tons
4.	Hydrogen	M tons
5.	Anhydrous Ammonia	M tons
6.	Wood	M cords
7.	Limestone	M tons
8.	Coal and Coke	M tons
9.	Water	MMM gals.
10.	Sulphite pulp	M tons
11.	Mechanical pulp	M tons
12.	Newsprint	M tons
13.	Wood chips	M tons
14.	Linerboard	M tons
15.	Phosphate rock	M tons
16.	Silica quartz	M tons
17.	Carbon Electrode	M tons
18.	Phosphorous	M tons
19.	Sulphuric acid	M tons
20.	Sea water	MM tons

Table 2.1 - Activity Matrix (Physical) Cont.

	Commodity	
21.	Magnesium hydroxide	M tons
22.	Steel core wire	M tons
23.	Aluminum redraw rod	M tons
24.	Aluminum cable (steel reinforced)	M tons
25.	Yeast	tons
26.	Sugar	tons
27.	Malt (Barley)	tons
28.	Hops	tons
29.	Rice and Corn flakes	tons
30.	Beer	M gals.
31.	Fresh fish	M tons
32.	Fishmeal	M tons
33.	Packaging material	M$
34.	Butter	M lbs.
35.	Milk powder	M lbs.
36.	Milk	M gals.
37.	Fuel oil	M gals.
38.	Electricity	MM kwh.
I.	Operating labor	no. men
II.	Plant investment	M $

Table 2.1 - Activity Matrix (Physical) Cont.

	Petroleum Refinery			Anhydrous Ammonia	
	M	P	X	P	X
	1	2	3	4	5
1	+6,000.0	- 6,000.0	.....	.....	.....
2	.....	+360,000.0	-360,000.0	.....	.....
3	.....	+ 10.0	.....	.....	.....
4	.....	+ 72.0	.....	- 72.0	.....
5	.....	.....	.....	+ 360.0	-360.0
6	.....	.....	.....	.....	.....
7	.....	.....	.....	.....	.....
8	.....	.....	.....	.....	.....
9	.....	.....	.....	.....	.....
10	.....	.....	.....	.....	.....
11	.....	.....	.....	.....	.....
12	.....	.....	.....	.....	.....
37	.....	.....	.....	.....	.....
38	.....	- 334.1	.....	- 334.1	.....
I	.....	- 86.0	.....	- 114.0	.....
II	.....	- 84,790.0	.....	-28,850.0	.....

Table 2.1 - Activity Matrix (Physical) Cont.

	Newsprint				
	M	P_1	P_2	P_3	P_4
	6	7	8	9	10
1	.....	.....	.....	.....	.....
2	.....	.....	.....	.....	.....
3	.....	- 2.1	.....	.....	.....
4	.....	.....	.....	.....	.....
5	.....	.....	.....	.....	.....
6	.....	-27.3	- 245.7	.....	.....
7	.....	- 2.2	.....	.....	.....
8	+13.7	-13.7	.....	.....	.....
9	.....	- 1.1	- 4.8	.....	.....
10	.....	+21.0	.....	- 21.0	.....
11	.....	.....	+ 189.0	-189.0	.....
12	.....	.....	.....	+210.0	-210.0
37	.....	.....	.....	.....	.....
38	.....	-15.8	- 396.9	.....	.....
I	.....	.....	- 300.0	.....	.....
II	.....	.....	-52,450.0	.....	.....

Table 2.1 - Activity Matrix (Physical) Cont.

	Linerboard			
	P_1	P_2	P_3	X
	11	12	13	14
3	.....	.....	.....	.....
4	.....	.....	.....	.....
5	.....	.....	.....	.....
6	-880.0	.....	.....	.....
7	.....	.....	.....	.....
8	.....	.....	.....	.....
9	.....	- 9.2	.....	.....
10	.....	.....	.....	.....
11	.....	+ 458.8	-458.8	.....
12	.....	.....	.....	.....
13	+880.0	- 880.0	.....	.....
14	.....	.....	+330.0	-330.0
37	.....	.....	.....	.....
38	.....	.....	-963.5	.....
I	.....	- 360.0	.....	.....
II	.....	-70,800.0	.....	.....

Table 2.1 - Activity Matrix (Physical) Cont.

	Phosphorous			$Mg(OH)_2$	
	M	P	X	M	P_1
	15	16	17	18	19
3	.....	.....	.....	+ 7.4	- 7.4
4	.....	.....	.....	.....	.....
5	.....	.....	.....	.....	.....
7	.....	.....	.....	.....	.....
8	+ 90.0	- 90.0	.....	.....	.....
15	+ 600.0	- 600.0	.....	.....	.....
16	.....	- 192.0	.....	.....	.....
17	+ 2.1	- 2.1	.....	.....	.....
18	.....	+ 60.0	- 60.0	.....	.....
19	.....	.....	.....	.....	+ 23.0
20	.....	.....	.....	.....	.....
21	.....	.....	.....	.....	.....
37	.....	.....	.....	.....	.....
38	.....	- 1.1	.....	.....	.....
I	.....	- 45.0	.....	.....	.....
II	.....	-36,490.0	.....	.....	.....

Table 2.1 - Activity Matrix (Physical) Cont.

	$Mg(OH)_2$ Cont't		Aluminum Cable	
	P_2	X	M	X
	20	21	22	23
3	.....	.....	.....	.....
4	.....	.....	.....	.....
5	.....	.....	.....	.....
6	.....	.....	.....	.....
7	- 60.9	.....	.....	.....
9	- 18.0	.....	.....	.....
19	- 23.0	.....	.....	.....
20	- 28.0	.....	.....	.....
21	+ 35.8	- 35.8	.....	.....
22	.....	.....	+ 4.0	- 4.0
23	.....	.....	+ 8.0	- 8.0
24	.....	.....	.....	+ 12.0
37	.....	.....	.....	.....
38	- 1.1	.....	.....	- 0.1
I	- 45.0	.....	.....	- 21.0
II	-3,670.0	.....	.....	-1,290.0

Table 2.1 - Activity Matrix (Physical) Cont.

	Brewery		Fishmeal		Dairy	
	M	P	P	X	M	P
	24	25	26	27	28	29
25	+ 72.0	- 72.0	.....	.....	.....	.....
26	+ 2,954.0	- 2,954.0	.....	.....	.....	.....
27	+ 1,750.0	- 1,750.0	.....	.....	.....	.....
28	+ 12.0	- 12.0	.....	.....	.....	.....
29	+ 227.0	- 227.0	.....	.....	.....	.....
30	.....	+ 1,250.0	.....	.....	.....	.....
31	.....	.....	-32,000.0	.....	.....	.....
32	.....	.....	+ 6,400.0	-6,400.0	.....	.....
33	.....	.....	.....	.....	+ 4.7	- 4.7
34	.....	.....	.....	.....	+102.1	-102.1
35	.....	.....	.....	.....	+164.5	-164.5
36	.....	.....	.....	.....	.....	+ 70.4
37	+ 71.9	- 71.9	.....	.....	+ 10.9	- 10.9
38	.....	- 0.1	- 2.3	.....	.....	- 0.1
I	.....	- 60.0	- 50.0	.....	.....	- 12.0
II	.....	- 3,320.0	- 458.9	.....	.....	- 22.0

TABLE 2.2 - Unit Prices

	Commodity	Year	Unit	Price
1	Sulphuric Acid	1960	ton	$ 23.95
2	Anhydrous Ammonia	1960	ton	92.00
3	Limestone	1960	ton	4.00
4	Magnesium Hydroxide	1960	lb.	.335
5	Phosphate Rock	1960	ton	8.219
6	Phosphorous	1960	cwt.	24.00
7	Sulphur	1960	ton	23.50
8	Fresh Fish	1960	lb.	.03
9	Fishmeal	1960	lb.	.25
10	Hydrogen	1967	ton	150.00
11	Coal	1967	lb.	.75
12	Coke	1967	lb.	.01
13	Carbon Electrode	1967	lb.	.30
14	Crude Oil	1965	bbl.	2.68
15	Jet Fuel	1965	bbl.	3.84
16	Raw Wood	1965	cord	23.71
17	Mechanical Pulp	1965	ton	67.77
18	Sulphite Pulp	1965	ton	106.33
19	Linerboard	1965	ton	137.00
20	Newsprint	1967	ton	142.00
21	Silica Quartz	1967	ton	3.59

TABLE 2.2 - Unit Prices (cont'd)

	Commodity	Year	Unit	Price
22	Fuel Oil	1967	gal.	.154
23	Electricity	1960	kwh.	.0025

Sources:

1 - 7 Chemical and Engineering News, December 26, 1960, pp. 54-64.

8 Report of Newfoundland and Labrador Royal Commission on Food and Drug Prices, p. 73.

9 Chemical Engineering, February 14, 1966, p. 98.

10 CIM Bulletin, July 1968, p. 842.

11 - 13 CIM Bulletin, September 1968, p. 1072.

14 - 15 DBS 45-205.

16 - 19 DBS 36-204.

20 Globe and Mail: Report on Business, September 18, 1968, p. 9.

21 DBS 46-219.

22 Bonavista Cold Storage.

23 Newfoundland and Labrador Power Commission.

Table 2.3 - Activity Matrix $ '000

	Petroluem Refinery			Anhydrous Ammonia	
	M	P	X	P	X
	1	2	3	4	5
1	+87,243.8	- 87,243.8	.....	.....	.....
2	.....	+120.839.2	-120,839.2	.....	.....
3	.....	+ 235.0	.....	.....	.....
4	.....	+ 9,440.1	.....	- 9,440.1	.....
5	.....	.....	.....	+33,120.0	-33,120.0
6	.....	.....	.....	.....	.....
7	.....	.....	.....	.....	.....
8	.....	.....	.....	.....	.....
9	.....	.....	.....	.....	.....
10	.....	.....	.....	.....	.....
11	.....	.....	.....	.....	.....
12	.....	.....	.....	.....	.....
37	.....	.....	.....	.....	.....
38	.....	- 835.0	.....	- 835.0	.....
I	.....	- 458.4	.....	- 607.7	.....
II	.....	- 84,790.0	.....	-28,850.0	.....

Table 2.3 - Activity Matrix $ '000 (Cont.)

	Newsprint				
	M	P_1	P_2	P_3	X
	6	7	8	9	10
1	.....	.....	.....	.....	.....
2	.....	.....	.....	.....	.....
3	.....	- 49.4	.....	.....	.....
4	.....	.....	.....	.....	.....
5	.....	.....	.....	.....	.....
6	.....	- 565.8	- 5,092.3	.....	.....
7	.....	- 8.9	.....	.....	.....
8	+ 322.4	- 322.4	.....	.....	.....
9	.....	.....	.....	.....	.....
10	.....	+1,951.9	.....	- 1,951.9	.....
11	.....	.....	+11,196.3	-11,196.3	.....
12	.....	.....	.....	+26,066.4	-26,066.4
37	.....	.....	.....	.....	.....
38	.....	- 39.4	- 992.3	.....	.....
I	.....	.....	- 1,599.2	.....	.....
II	.....	.....	-52,450.0	.....	.....

Table 2.3 - Activity Matrix $ '000 (Cont.)

	Linerboard			
	P_1	P_2	P_3	X
	11	12	13	14
3	.....	.....	.....	.....
4	.....	.....	.....	.....
5	.....	.....	.....	.....
6	-18,238.6	.....	.....	.....
7	.....	.....	.....	.....
8	.....	.....	.....	.....
9	.....	.....	.....	.....
10	.....	.....	.....	.....
11	.....	+ 27,180.5	-27,180.5	.....
12	.....	.....	.....	.....
13	+20,000.0	- 20,000.0	.....	.....
14	.....	.....	+39,500.0	-39,500.0
37	.....	.....	.....	.....
38	.....	- 2,408.8	.....	.....
I	.....	- 1,919.0	.....	.....
II	.....	-104,895.0	.....	.....

Table 2.3 - Activity Matrix $ '000 (Cont.)

	Phosphorous			$Mg(OH)_2$	
	M	P	X	M	P_1
	15	16	17	18	19
3	.....	.....	.....	+174.7	-174.7
4	.....	.....	.....	.....	.....
5	.....	.....	.....	.....	.....
7	.....	.....	.....	.....	.....
8	+1,800.0	- 1,800.0	.....	.....	.....
15	+4,931.0	- 4,931.0	.....	.....	.....
16	.....	- 1,680.0	.....	.....	.....
17	+1,092.0	- 1,092.0	.....	.....	.....
18	.....	+28,800.0	-28,800.0	.....	.....
19	.....	.....	.....	.....	+551.8
20	.....	.....	.....	.....	.....
21	.....	.....	.....	.....	.....
37	.....	.....	.....	.....	.....
38	.....	- 1,875.0	.....	.....	.....
I	.....	- 1,750.0	.....	.....	.....
II	.....	-36,490.0	.....	.....	.....

Table 2.3 - Activity Matrix $ '000 (Cont.)

	$Mg(OH)_2$ Cont.		Aluminum Cable	
	P_2	X	M	X
	20	21	22	23
3	.....	.....	.....	.....
4	.....	.....	.....	.....
5	.....	.....	.....	.....
6	.....	.....	.....	.....
7	- 243.4	.....	.....	.....
9	.....	.....	.....	.....
19	- 551.8	.....	.....	.....
20	.....	.....	.....	.....
21	+ 23,986.0	- 23,986.0	.....	.....
22	.....	.....	+ 175.0	- 175.0
23	.....	.....	+ 1,400.0	- 1,400.0
24	.....	.....	.....	+ 2,850.0
37	.....	.....	+ 5.3	- 5.3
38	- 2.6	.....	.....	- 4.0
I	- 170.0	.....	.....	- 105.0
II	- 3,670.0	.....	.....	- 1,290.0

Table 2.3 - Activity Matrix $ '000 (Cont.)

	Brewery		Fishmeal		Dairy	
	M	P	P	X	M	P
	24	25	26	27	28	29
25	+ .1	- .1	.....	.....	.....	.....
26	+ .5	- .5	.....	.....	.....	.....
27	+198.8	- 198.8	.....	.....	.....	.....
28	+ 1.8	- 1.8	.....	.....	.....	.....
29	+ 23.7	- 23.7	.....	.....	.....	.....
30	.....	+2,622.4	.....	.....	.....	.....
31	.....	.....	-1,920.0	.....	.....	.....
32	.....	.....	+3,200.0	-3,200.0	.....	.....
33	.....	.....	.....	.....	+ 4.1	- 4.1
34	.....	.....	.....	.....	+47.5	- 47.5
35	.....	.....	.....	.....	+ 9.9	- 9.9
36	.....	.....	.....	.....	.....	+ 88.1
37	.....	.....	.....	.....	+ 1.5	- 1.5
38	.....	- 9.8	- 5.8	.....	.....	- 1.2
I	.....	- 349.7	- 80.0	.....	.....	- 21.9
II	.....	-3,320.0	- 458.9	.....	.....	- 22.0

Notes: Sources for Activity Matrix

The figures used in the activity matrix were derived from a number of sources. Questionnaires, newspaper items, technical journals, industrial chemistry textbooks, and personal interviews.

To facilitate computation of inputs, the assumption of constant production coefficients is used. The first task was to find the planned level of output for each industry. The amount of each input used for a unit level of output could therefore be multiplied by the planned level of output in order to find the required input levels.

I. Petroleum Refining

The total input of crude oil and the total output of jet fuel per year, as well as an estimate of the annual output of sulphur was obtained from the Newfoundland Vice-President of the Newfoundland Pulp and Chemical Co. Ltd. The annual output of hydrogen is assumed to be the same as the annual requirement of the anhydrous ammonia plant which will use this hydrogen as an input. This assumption was made necessary by the lack of available information.

"Preliminary Power Generation Expansion Schemes for Newfoundland" Table I, published by the National Energy Board, March 1968 provided the figure for the required input of electricity.

Plant investment of $97,000,000 ($84,790,000 in 1960 dollars) was obtained from the industry news section of "Chemical Engineering".

II. Anhydrous Ammonia

The coefficients for the production of anhydrous ammonia were obtained from Isard, Schoolar and Vietorisz "Industrial Complex Analysis and Regional Development", p. 44.

10,000,000 lb. of anhydrous ammonia requires
2,000,000 lb. of hydrogen
4,640,000 kwh of electricity

The output level of 360,000 tons per year was obtained from the Newfoundland Vice-President of the company.

Since the coefficients were for an output level of 10,000,000 lb. (5,000 tons) per year, the annual input levels of hydrogen and electricity were established by multiplying by seventy-two.

Plant investment of $33,000,000 ($28,850,000) was obtained from the industry news section of "Chemical Engineering".

III. Newsprint

The output level of 210,000 tons of newsprint was obtained from the industry news section of "Chemical Engineering".

Coefficients for the newsprint process were taken from "Pulp and Paper Manufacture" Volume I by the Joint Textbook Committee of the Paper Industry of the United States and Canada, p. 353.

1 ton of sulphite pulp requires
1.7 cords of rough wood
200 lb. of sulphur
260 lb. of limestone
1,300 lb. of coal
50,000 gal. of water
750 kwh of electricity

***

1 ton of mechancial pulp requires
1.7 cords of rough wood
20,000 gal. of water
2,100 kwh of electricity

To produce newsprint it requires a composition of ten percent sulphite pulp and ninty percent mechanical pulp.

The labor requirement of 300 men was obtained from the Area Development Agency "Summary of ADA Program to July 30, 1968."

Plant investment of $60,000,000 ($52,450,000) was obtained from the industry news section of "Chemical Engineering".

IV. Linerboard

Since Linerboard is produced from mechanical pulp, the inputs were calculated from the coefficients for the newsprint process given in the previous section.

The input of raw wood is estimated from an article in "The Evening Telegram" of May 23, 1968, p. 3. Wood will be brought to the mill by two ships, each carrying 20,000 cords of wood, and making twenty-two trips per year. Therefore, the quantity of wood is:

(20,000) (2) (22) = 880,000 cords

Linerboard output of 330,000 tons per year was obtained from "The Globe and Mail: Report on Business", January 3, 1969, p.B9 .

Labor requirements of 360 men was derived from "Summary of ADA Program to July 30, 1968".

Plant investment of $120,000,000 ($104,895,000) was obtained from "The Evening Telegram" of June 6, 1968, p. 3.

V. Phosphorous

Coefficients for the production of 1,000 lb. of phosphorous were obtained from "The Newfoundland Journal of Commerce", April, 1968, p. 37.

1,000 lb. of phosphorous requires
3,200 lb. of silica quartz
1,500 lb. of coke
9,000 lb. of phosphate rock
6,300 kwh. of electricity
35 lb. of carbon electrodes
Annual input of phosphate rock = 600,000 tons.

Annual output of 60,000 tons was obtained from "The Evening Telegram", October 21, 1968, p. 22.

To get the annual input levels, the coefficients were multiplied by twice the output level.

Labor requirements of 300 is obtained from "The Evening Telegram", August 5, 1968, p. 4.

Plant investment of $41,740,000 ($36,490,000) is obtained from "Summary of ADA Program to July 30, 1968".

VI. Magnesium Hydroxide

Coefficients for the Magnesium hydroxide process were obtained from "Chemical Process Industries" by R. Norris Shreve, p. 225.

1 ton of magnesium hydroxide requires
58,000 gal. of sea water
1.7 tons of limestone
500 gal. of fresh water
30 kwh of electricity

The output level of 35,800 tons per year was obtained from the industry news section of "Chemical Engineering".

Labor requirements of 45 workers were obtained from "Summary of ADA Program to July 30, 1968".

Plant investment of $4,200,000 ($3,670,000) was also obtained from the "Summary".

VII. Aluminum Cable

The output level of 12,000 tons per year was obtained from "The Evening Telegram", December 11, 1968, p. 28.

Input figures were obtained from Alcan.

Labor requirement of 21 workers and plant investment of $1,474,000 ($1,290,000) were obtained from "Summary of ADA Program to July 30, 1968".

VIII. Brewery

Input and output figures were obtained from The Atlantic Brewing Company Limited. Figures for labor requirements and plant investment were also obtained from the company.

IX. Fishmeal

Input requirements for the manufacture of fishmeal were obtained from "Chemical Engineering", February 14, 1966, p. 98.

40 tons of fishmeal per day requires
200 tons of raw fish
600 kw of electricity

Hourly capacity of 10 tons was obtained from "Commercial Fisheries Review" Volume 29, Number 6, p. 26. In order to calculate the level of output, the number of working days was needed. In "Plant Location and Plant Size in the Fish Processing Industry of Newfoundland" by S.S. Mensinkai, p. 151, it is stated that 200 working days

are normal in the fish processing industry. With two eight hour shifts per day, the output level would be 6,400 tons per year. This would require 32,000 tons of raw fish and 2,304,000 kwh of electricity.

Operating labor of 50 workers is obtained from "Atlantic Fisherman", February 1967, p. 4.

Plant investment of $525,000 ($458,900) was obtained from "Commercial Fisheries Review" Volume 29, Number 6, p. 26.

X. Dairy

Inputs and outputs for the dairy were obtained from West Coast Dairy Limited. Labor and plant investment were obtained from "Summary of ADA Program to July 30, 1968".

Initial Impact

The initial impact of the development of these ten new industries can be summarized in Tables 2.4 to 2.6. These Tables show the increase in investment, output, employment, wages and salaries, and regional trade. This initial impact is the result only of the new industries. It does not take into account any increases that may result in other sectors of the economy. These other increases are calculated in Chapter III using input-output analysis.

TABLE 2.4

New Investment and Output

	Investment (1960)	Output
Petroleum refinery	84,790,000	131,068,216
Anhydrous ammonia	28,850,000	33,120,000
Newsprint	52,450,000	26,066,434
Linerboard	104,895,000	39,500,000
Phosphorous	36,490,000	28,800,000
Magnesium Hydroxide	3,670,000	23,986,000
Aluminum Cable	1,290,000	2,850,000
Brewery	3,320,000	2,622,400
Fishmeal	458,000	3,200,000
Dairy	21,980	88,100
	316,763,000	291,301,150

TABLE 2.5

New Employment and Wages and Salaries

	Employment	Wages & Salaries
Petroleum refinery	86	458,425
Anhydrous ammonia	114	607,680
Newsprint	300	1,599,156
Linerboard	360	1,919,000
Phosphorous	300	1,750,000
Magnesium Hydroxide	45	170,000
Aluminum Cable	21	105,000
Brewery	60	349,650
Fishmeal	50	80,040
Dairy	12	21,850
	1,348	7,060,801

TABLE 2.6

Change in External Trade

	Imports	Exports		Balance
Petroleum refinery	87,243,790	120,839,160	+	33,595,370
Anhydrous ammonia	0	33,120,000	+	33,120,000
Newsprint	322,400	26,066,434	+	25,744,034
Linerboard	0	39,500,000	+	39,500,000
Phosphorous	7,823,000	28,800,000	+	20,977,000
Magnesium Hydroxide	174,652	23,986,000	+	23,811,348
Aluminum Cable	1,575,000	0	-	1,575,000
Brewery	225,105	0	-	225,105
Fishmeal	0	3,200,000	+	3,200,000
Dairy	62,940	0	-	62,940
	97,426,887	275,511,594		178,084,707

It should be noted that in Table 2.5 (p. 48) employment and wage bills refer only to the current operations of the industry, and do not include employment or wages relating to investment expenditures.

CHAPTER III

OUTPUT, EMPLOYMENT AND INCOME: IMPACT PROJECTIONS

In Chapter II the structure of the new industries was examined and their initial impact on the Newfoundland economy was shown. In this chapter, the effect of these new industries on the existing sectors of the economy are analysed. The direct, indirect and induced effects on output, employment and income as a result of the projected output of the new industries are examined.

The initial impact of these new industries is to cause an increase in the output of the industries that supply these new industries. These increases in output are necessary to sustain the assumed capacity of the new industry. These constitute the first round expansion in output shown in Column 1 of Tables 3.2-1 to 3.2-10. At the same time, increases in output give rise to increased household income. This increased household income causes increased effective demand for a series of goods. These increases in effective demand together with the indirect demand of industry causes the increase in output. To produce these first round expansions require in turn a while series of inputs, giving rise to a second round expansion, and so on, until the expansions dwindle to zero.

In order to find the final equilibrium output levels an iterative method is used. The direct input requirements of a firm are assumed to constitute the first round increment of production, ΔX_i^1. Next, it is necessary to determine the increases in output necessary to produce the amount ΔX_i^1. From this amount is subtracted imports from outside the province to determine the second round expansion of production, ΔX_i^2. This process is continued until the equilibrium output level is found. Algebraically the method is as follows:[1]

$$\Delta X_i^{(1)} = \Delta Y_i(1)$$

$$\Delta X_i(2) = (1-m)Y_i(2) = \sum_j a_{ij} X_j(1)$$

.....

.....

$$\Delta X_i(n) = (1-m)Y_i(n) = \sum_j a_{ij} X_j(n-1)$$

$$X_i(n) = \sum_{t=1}^{n} \Delta X_i(t)$$

where :
- X = output
- Y = total input demand
- a = input coefficient
- m = import coefficient
- i = 1, 2, 3, ...47, 77 producing industries and household income
- j = 1, 2, 3, ...47, 48 purchasing industries and household consumption

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[1] Hollis B. Chenery and Paul G. Clark, Interindustry Economics, New York: John Wiley & Sons, Inc., 1959, p. 30.

The procedure for calculation is best described by following it through for one industry. The petroleum refinery (Table 3.2-1, p. 56) is used as an example.

When the petroleum refinery goes into full production, it will need the following "bill of goods" from the Newfoundland economy: $835,000 worth of electric power (38) and $458,000 worth of labor inputs (77).[2] These direct input requirements are shown in column 1. Since this column is net of imports, it constitutes the first round expansion of outputs in the Newfoundland economy.

In order to produce this first round expansion, a whole series of inputs is required. These are found by multiplying the first round expansions by the input coefficients for each industry. Since only one material input (electricity) is used, the $835,000 of electricity is multiplied by each of the input coefficients for the electric power industry. This industry uses 12 inputs, so 12 sectors expand in the second round.

However, the induced consumption demands of the household sector (77) must also be considered. The workers in the petroleum refinery demand consumer goods and services with the $458,425 paid to them in wages and salaries. To find this new effective demand, the $458,425 is multiplied

---

[2] The numbers in brackets show industrial classifications. These categories are explained in Table 3.1.

by the household sector consumption coefficient(48). This involves expansions in 25 sectors.

In the second round, thirty industries are involved. The total demand for the products of these industries is found by horizontally summing the input requirements of industries affected and new household demand. These totals are shown in Column 2.

This second round "bill of goods" can be met in two ways, either by domestic production or imports. Since the expansionary effect in the Newfoundland economy can only be maintained by domestic production, it is necessary to determine the amount to be produced within the province. If m_i is the marginal propensity to import in each industry, $1 - \alpha_i$ is the fraction to be produced locally. This fraction is shown in percentage terms in Column 3.

To find the second round expansion in the Newfoundland economy, Column 2 is multiplied by Column 3. This second round expansion is shown in Column 4.

The third round expansion is computed in the same way with the second round expansion being injected into the flow structure. The results are summed horizontally and imports taken out. The result is shown in Column 5. The process is continued until convergence is obvious for all industries. Then the remaining expansions are extrapolated (Column 10). The total expansion of output is obtained by

TABLE 3.1

INDUSTRIAL CLASSIFICATION

ADB INPUT - OUTPUT TABLE

	Rows & Columns
1	Agriculture
2	Forestry
3	Fishing (shellfish)
4	Fishing(all other)
5	Metal Mining and Contract Drilling
6	Non-Metallic Mineral Mining
7	Quarries and Sandpits
8	Meat Products and Poultry Processors
9	Dairy, Feed, and Miscellaneous Food Products
10	Secondary Fishery (shellfish)
11	Secondary Fishery (all other)
12	Fruit, Vegatables and Wineries
13	Biscuits and Confectionary Manufacturers
14	Soft Drink Manufacturers
15	Breweries
16	Shoes, Gloves and all other Leather Goods
17	Cordage, Canvas, Ribbons, etc.
18	Hosiery, Knitting and Clothing Mills
19	Sawmills and other Wood Products
20	MIscellaneous Wood Industires
21	Furniture and Repair
22	Pulp and Paper Mills
23	Printing and Publishing, etc.
24	Iron Foundries, Metal Rolling
25	Ornamental and Miscellaneous Metal Fabricating, Wire and Hardware Products
26	Machinery and Equipment

TABLE 3.1 (cont'd)

27	Railway Rolling Stock, Truck, Body and Trailer Manufacturers, Electric Wiring
28	Boat-shipbuilding and Repair
29	Cement
30	Clay and Concrete
31	Other Non-Metallic Minerals
32	Paints and Varnishes, Soaps, Tar Compounds and Miscellaneous Manufacturers
33	Scrap Iron
34	Residential Construction
35	Non-Residential Construction
36	Transportation
37	Radio Broadcasting, Telephone and Telegraph
38	Electric Power
39	Gas and Water Systems
40	Wholesale and Retail Trade
41	Automobile Operation
42	Travel and Entertainment
43	Finance, Insurance and Real Estate
44	Dwelling Services
45	Hotels and Restaurants
46	Personal Services
47	Business Services

Rows	
57	Coal Mining
58	Sugar Refineries
63	Iron and Steel Mills
68	Petroleum Refineries
77	Households

Columns	
48	Personal Consumption

Rows and Columns	
1	Petroleum Refinery
2	Anhydrous Ammonia
3	Newsprint
4	Linerboard
5	Phosphorous
6	Magnesium Hydroxide
7	Aluminum Cable
8	Brewery
9	Fishmeal
10	Dairy

TABLE 3.2 - 1 OUTPUT EXPANSION

PETROLEUM REFINERY

	(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) Sixth Round Expansion	(9) $\bar{r}$ = .6478	(10) Extrapolation	(11) Summation of Expansions
1	$ 0	$13,019	48.91	$6,368	$3,344	$2,654	$1,566	$1,036	.6620	$672	$15,640
2	0	2,934	98.97	2,904	1,178	1,288	742	507	.6827	329	6,948
3	0	0	100.00	0	153	57	58	31	.5345	20	319
4	0	0	100.00	0	2,160	841	777	422	.5431	273	4,473
5	0	0	100.00	0	0	0	0	0	.0000	0	0
6	0	0	73.68	0	17	77	42	29	.7018	19	184
7	0	0	89.55	0	459	66	34	21	.6053	13	593
8	0	13,524	11.35	1,535	596	541	295	203	.6863	131	3,301
9	0	24,159	13.46	3,252	1,428	1,224	690	466	.6758	302	7,362
10	0	229	100.00	229	86	87	46	32	.6957	21	501
11	0	5,089	88.42	4,500	1,752	1,619	880	606	.6884	393	9,750
12	0	13,844	.07	10	4	3	2	1	.6894	1	21
13	0	9,856	40.93	4,034	1,527	1,408	762	525	.6894	340	8,596
14	0	4,034	99.99	4,034	1,579	1,428	780	535	.6859	347	8,703
15	0	6,372	100.00	6,372	2,402	2,221	1,201	828	.6894	536	13,560
16	0	3,071	9.11	280	106	98	53	36	.6891	24	597
17	0	0	81.74	0	105	96	60	41	.6849	26	328
18	0	21,867	3.26	713	272	250	135	93	.6884	60	1,523
19	0	0	22.40	0	385	481	222	177	.7980	115	1,380
20	0	0	49.06	0	244	26	22	16	.7111	10	318
21	0	4,034	4.34	175	68	62	34	23	.6837	15	377
22	0	0	95.21	0	384	236	216	114	.5286	74	1,024
23	0	2,780	70.23	1,952	917	919	520	349	.6716	226	4,883
24	0	0	30.41	0	99	58	24	21	.8500	13	215
25	0	1,002	28.63	287	259	74	37	28	.7615	18	703
26	0	1,253	1.30	16	37	22	14	9	.6157	6	104
27	0	0	33.64	0	794	453	283	172	.6081	112	1,814
28	0	0	8.27	0	13	13	7	5	.6477	3	41
29	0	0	99.49	0	239	79	39	19	.4872	12	388
30	0	0	19.30	0	315	152	61	54	.8889	35	617
31	0	0	47.26	0	221	205	85	74	.8667	48	633
32	0	313	45.21	142	441	418	215	157	.7311	102	1,475
33	0	0	100.00	0	8	1	0	0	.6865	0	9
34	0	0	100.00	0	11,508	4,337	4,008	2,167	.5407	1,404	23,424
35	0	42,084	100.00	42,084	3,136	1,662	1,243	754	.6066	488	49,367
36	0	45,633	95.21	43,447	31,030	19,855	11,849	7,782	.6568	5,041	119,004
37	0	2,642	100.00	2,642	2,983	2,401	1,455	945	.6495	612	11,038
38	835,000	4,538	100.00	4,538	3,448	2,446	1,527	972	.6365	630	848,561
39	0	688	100.00	688	430	332	302	129	.4272	84	1,965
40	0	84,799	100.00	84,799	34,993	30,182	16,488	11,313	.6861	7,329	185,104
41	0	22,188	100.00	22,188	11,381	9,697	5,405	3,644	.6742	2,361	54,676
42	0	3,841	100.00	3,841	2,277	946	817	445	.5447	288	8,614
43	0	4,229	100.00	4,229	16,335	7,870	5,696	3,343	.5869	2,166	39,639
44	0	39,104	100.00	39,104	14,737	13,620	7,362	5,076	.6895	3,288	83,187
45	0	11,323	100.00	11,323	5,001	4,389	2,330	1,631	.7000	1,057	25,731
46	0	26,721	100.00	26,721	6,689	5,808	3,231	2,194	.6790	1,421	46,064
47	0	752	100.00	752	4,719	2,342	1,663	1,010	.6073	654	11,140
77	458,425	172,762		172,762	159,677	86,310	59,513	34,838	.5854	22,568	994,093
TOTAL	$1293,425	$588,684		$495,921	$329,936	$209,354	$132,791	$82,873		$53,687	$2597,987

TABLE 3.2 - 2 OUTPUT EXPANSION

ANHYDROUS AMMONIA

	(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) Sixth Round Expansion	(9) Seventh Round Expansion	(10) r = .5828	(11) Extrapolation	(12) Summation of Expansions
1	$ 0	$17,258	48.91	$8,441	$3,658	$3,262	$1,659	$1,224	$688	.5624	$401	$19,327
2	0	3,889	98.97	3,849	1,189	1,277	784	610	332	.5455	184	8,235
3	0	0	100.00	0	203	57	73	31	27	.8710	16	407
4	0	0	100.00	0	2,861	850	979	427	350	.8137	204	5,671
5	0	0	100.00	0	0	0	0	0	0	.0000	0	0
6	0	0	73.68	0	22	97	48	34	20	.5870	12	233
7	0	0	89.55	0	459	78	39	25	15	.6071	9	625
8	0	17,927	11.35	2,035	602	682	298	246	128	.5215	75	4,066
9	0	32,025	13.46	4,311	1,494	1,526	715	559	302	.5412	176	9,083
10	0	304	100.00	304	86	110	46	40	20	.5000	12	618
11	0	6,745	88.42	5,961	1,771	2,039	890	729	383	.5255	223	11,996
12	0	18,352	.07	13	4	4	3	2	1	.5178	0	27
13	0	13,065	40.93	5,348	1,529	1,776	766	638	330	.5176	192	10,579
14	0	5,348	99.99	5,347	1,598	1,797	763	648	339	.5231	198	10,690
15	0	8,447	100.00	8,447	2,402	2,804	1,208	1,007	521	.5174	304	16,693
16	0	4,071	9.11	371	106	123	53	44	23	.5165	13	733
17	0	0	81.74	0	139	115	70	46	29	.6250	16	415
18	0	28,986	3.26	945	273	315	136	113	59	.5189	34	1,875
19	0	0	22.40	0	416	616	232	215	108	.5000	63	1,650
20	0	0	49.06	0	250	48	25	19	10	.5526	6	358
21	0	5,348	4.34	232	69	83	34	28	15	.5191	9	470
22	0	0	95.11	0	504	248	271	119	98	.8240	57	1,297
23	0	3,631	70.23	2,550	978	1,136	552	419	303	.7232	176	6,114
24	0	0	30.41	0	100	75	25	25	12	.4699	7	244
25	0	1,002	28.63	287	267	93	38	34	18	.5250	11	748
26	0	1,253	1.30	16	45	24	17	10	6	.5834	3	121
27	0	0	33.64	0	937	512	339	205	129	.6305	75	2,197
28	0	0	8.27	0	17	15	9	6	3	.5942	2	52
29	0	0	99.49	0	239	83	49	21	18	.8571	10	420
30	0	0	19.30	0	315	200	62	68	30	.4473	17	692
31	0	0	47.26	0	229	267	88	91	42	.4611	25	742
32	0	387	45.21	175	517	518	240	188	103	.5470	60	1,801
33	0	0	100.00	0	8	1	0	0	0	.5714	0	9
34	0	0	100.00	0	15,255	4,337	5,061	2,177	1,817	.8346	1,059	29,706
35	0	42,084	100.00	42,084	3,981	1,811	1,515	791	471	.5954	274	50,927
36	0	57,663	95.21	54,901	34,344	24,040	14,069	9,039	5,277	.5837	3,075	144,745
37	0	3,448	100.00	3,448	3,443	2,864	1,781	1,101	658	.5976	383	13,678
38	835,000	6,016	100.00	6,016	3,931	2,914	1,688	1,130	680	.6018	396	851,755
39	0	912	100.00	912	482	400	218	152	88	.5789	51	2,303
40	0	111,157	100.00	111,157	35,627	37,907	15,768	13,650	7,192	.5269	4,191	225,492
41	0	29,412	100.00	29,412	12,045	11,990	5,943	4,480	2,374	.5386	1,384	67,628
42	0	3,841	100.00	3,841	2,969	2,975	1,025	451	370	.8204	216	11,847
43	0	5,035	100.00	5,035	19,976	8,800	6,884	3,694	2,593	.7019	1,511	48,893
44	0	51,835	100.00	51,835	14,737	17,194	7,397	6,174	3,193	.5172	1,861	102,391
45	0	15,010	100.00	15,010	5,023	5,548	2,692	1,988	1,018	.5121	593	31,872
46	0	31,751	100.00	31,751	6,928	7,256	3,374	2,648	1,405	.5306	819	54,181
47	0	752	100.00	752	5,835	2,615	2,012	1,100	752	.6836	438	13,504
77	607,680	172,762		172,762	201,570	86,715	72,385	37,436	27,226	.7273	15,867	1221,641
TOTAL	$1442,680	$699,716		577,548	$389,427	$238,197	$152,323	$93,882	$59,576		$34,718	$2988,351

TABLE 3.2 - 3 OUTPUT EXPANSION

NEWSPRINT

	(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) Sixth Round Expansion	(9) Seventh Round Expansion	(10) Eighth Round Expansion	(11) Ninth Round Expansion	(12) Tenth Round Expansion	(13) F = .5848	(14) Extrapolation	(15) Summation of Expansions
1	$ 0	$91,246	48.91	$44,628	$63,905	$17,693	$20,109	$8,342	$7,244	$3,055	$2,657	$1,484	.5585	$868	$169,985
2	5658,068	-3,911	98.97	-3,871	27,201	4,873	10,126	3,856	3,656	1,697	1,348	714	.5297	418	5708,086
3	0	0	100.00	0	534	1,417	222	478	138	163	67	59	.8806	35	3,113
4	0	0	100.00	0	7,532	20,101	3,193	6,301	1,965	2,162	921	780	.8469	456	43,411
5	0	0	100.00	0	0	0	0	0	0	0	0	0	.0000	0	0
6	0	0	73.68	0	58	365	609	255	203	107	77	43	.5584	25	1,742
7	8,920	0	89.55	0	115	177	390	219	139	85	55	33	.6000	19	10,152
8	0	47,175	11.35	5,354	14,276	2,226	4,389	1,356	1,507	642	544	275	.5055	161	30,730
9	0	84,276	13.46	11,344	31,125	6,321	9,666	3,405	3,381	1,538	1,228	648	.5277	379	69,035
10	0	800	100.00	800	2,123	332	716	207	245	100	88	43	.4886	25	4,679
11	0	17,751	88.42	15,695	41,885	6,654	13,129	4,094	4,506	1,920	1,626	822	.5055	481	90,812
12	0	48,295	.07	34	90	13	28	8	9	4	3	2	.6667	1	192
13	0	34,382	40.93	14,073	37,384	5,482	11,480	3,490	3,926	1,649	1,413	710	.5025	415	80,022
14	0	14,073	99.99	14,072	37,562	5,968	11,556	3,639	3,974	1,701	1,435	728	.5073	426	81,061
15	0	22,228	100.00	22,228	59,015	8,570	18,131	5,495	6,198	2,600	2,230	1,119	.5018	654	126,240
16	0	11,280	9.11	1,028	2,592	378	796	241	272	114	98	49	.5000	29	5,597
17	0	0	81.74	0	551	1,169	670	395	257	157	96	62	.6458	36	3,393
18	0	76,280	3.26	2,487	6,613	985	2,031	622	695	293	251	126	.5020	74	14,177
19	0	0	22.40	0	582	2,388	4,092	1,107	1,325	538	476	234	.4916	137	10,379
20	0	0	49.06	0	189	308	312	125	111	54	40	23	.5750	13	1,175
21	0	28,785	4.34	1,249	1,604	258	501	159	172	74	62	32	.5161	19	4,130
22	0	0	95.11	0	1,332	3,710	1,095	1,611	559	593	260	215	.8269	126	9,501
23	0	9,322	70.23	6,547	19,226	4,897	7,062	2,728	2,488	1,195	919	497	.5408	291	45,850
24	0	0	30.41	0	56	223	508	102	158	56	57	26	.4561	15	1,201
25	0	6,336	28.63	1,814	212	467	600	197	206	91	74	39	.5270	23	3,723
26	0	20,785	1.30	270	142	269	122	101	51	38	21	14	.6667	8	1,046
27	0	0	33.64	0	2,477	5,019	2,417	484	943	735	416	283	.6803	165	12,939
28	0	0	8.27	0	59	128	76	48	30	19	12	7	.5833	4	383
29	0	0	99.49	0	60	93	257	314	98	105	46	39	.8478	23	1,035
30	0	0	19.30	0	78	551	1,388	235	434	140	150	65	.4333	38	3,079
31	0	0	47.26	0	209	921	1,824	356	578	198	199	90	.4523	53	4,428
32	0	1,106	45.21	500	2,033	3,129	3,194	1,214	1,098	533	409	222	.5428	130	12,462
33	0	0	100.00	0	2	3	6	2	2	1	1	0	.5714	0	17
34	0	0	100.00	0	40,145	106,579	15,463	32,721	9,900	11,184	4,687	4,024	.8585	2,353	327,056
35	0	10,451	100.00	10,451	13,709	2,560	8,337	9,210	3,872	3,316	1,663	1,241	.7462	726	73,089
36	0	203,669	95.21	193,913	384,203	154,738	143,254	67,361	52,718	28,162	19,949	11,445	.5737	6,693	1062,436
37	0	56,383	100.00	56,383	36,458	20,087	16,512	8,825	6,225	3,577	2,393	1,431	.5980	837	152,728
38	1031,625	16,503	100.00	16,503	49,047	21,063	16,773	9,072	6,373	3,674	2,450	1,469	.5996	859	1158,908
39	0	2,451	100.00	2,451	7,044	2,509	2,339	1,140	866	472	329	191	.5805	112	17,453
40	0	320,026	100.00	320,026	762,491	131,240	242,760	78,016	83,556	36,217	30,265	15,459	.5108	9,040	1709,070
41	0	147,559	100.00	147,559	219,669	52,824	74,100	27,708	26,122	12,256	9,590	5,128	.5347	2,999	577,955
42	0	22,308	100.00	22,308	8,195	20,196	3,604	6,565	2,109	2,260	980	819	.8357	479	67,515
43	0	106,533	100.00	106,533	80,571	116,981	40,727	41,419	18,560	15,089	7,838	5,673	.7238	3,318	436,709
44	0	136,408	100.00	136,408	362,144	52,540	111,181	33,639	38,002	15,927	13,673	6,856	.5014	4,009	774,379
45	0	39,499	100.00	39,499	109,017	17,334	35,914	10,624	12,246	5,026	4,396	2,189	.4980	1,280	237,525
46	0	70,654	100.00	70,654	146,446	28,010	4,961	15,711	16,020	7,163	5,835	3,033	.5198	1,774	341,607
47	0	37,203	100.00	37,203	15,260	35,867	12,976	12,041	5,702	4,444	2,381	1,682	.7064	984	128,540
77	1599,156	4245,532		4245,532	615,939	1303,415	394,360	445,515	186,713	160,298	80,375	59,828	.7444	34,987	9126,128
TOTAL	$8297,769	$5925,388		$5543,675	$3211,160	$2195,031	$1295,956	$850,753	$515,552	$331,422	$204,083	$129,951		$75,997	$29651,349

TABLE 3.2 - 4 OUTPUT EXPANSION

LINERBOARD

	(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) Sixth Round Expansion	(9) Seventh Round Expansion	(10) Eighth Round Expansion	(11) Ninth Round Expansion	(12) Tenth Round Expansion	(13) F = .5777	(14) Extrapolation	(15) Summation of Expansion
1	$ 0	$202,231	48.91	$98,911	$196,486	$43,812	$60,329	$10,390	$20,330	$9,837	$7,787	$4,211	.5407	$2,433	$454,526
2	18238,615	-33,315	98.97	-32,972	86,437	9,519	30,623	10,340	10,840	4,614	3,931	2,010	.5113	1,161	18365,118
3	0	0	100.00	0	641	4,497	3,556	1,474	436	488	180	171	.9500	99	11,542
4	0	0	100.00	0	9,038	63,633	6,018	19,355	5,025	6,443	2,469	2,280	.9234	1,317	115,578
5	0	0	100.00	0	0	0	0	0	0	0	0	0	.0000	0	0
6	0	0	73.68	0	70	842	1,762	695	593	296	221	122	.5533	71	4,672
7	0	0	89.55	0	3,159	465	1,109	621	396	247	155	96	.6184	56	6,304
8	0	56,611	11.35	6,425	45,204	4,215	13,460	3,442	4,489	1,720	1,588	774	.4869	447	81,764
9	0	101,131	13.46	13,612	97,438	13,926	29,368	8,809	9,841	4,153	3,591	1,828	.5089	1,056	183,622
10	0	960	100.00	960	6,739	5,329	2,209	653	732	269	257	121	.4708	70	17,339
11	0	21,301	88.42	18,834	132,596	12,541	40,332	10,470	13,426	5,145	4,750	2,310	.4864	1,335	241,739
12	0	57.954	.07	41	285	24	85	21	28	11	10	5	.4824	3	511
13	0	41,259	40.93	16,887	118,641	9,913	35,275	8,701	11,713	4,406	4,131	1,992	.4822	1,151	212,810
14	0	16,887	99.99	16,885	118,849	11,451	35,419	9,159	11,830	4,559	4,190	2,047	.4885	1,183	215,572
15	0	26,674	100.00	26,674	187,358	15,372	55,718	13,692	18,490	6,943	6,520	3,141	.4817	1,815	335,723
16	0	14,681	9.11	1,337	8,229	679	2,447	601	812	305	286	138	.4817	80	14,914
17	0	0	81.74	0	1,046	3,332	1,917	1,140	631	439	284	175	.6149	101	9,065
18	0	91,536	3.26	2,984	20,975	1,802	6,239	1,554	2,074	784	732	354	.4834	204	37,702
19	0	0	22.40	0	2,698	3,392	12,555	2,722	3,996	1,436	1,398	642	.4592	371	29,210
20	0	0	49.06	0	1,843	789	937	335	290	151	119	63	.5330	37	4,564
21	0	64,308	4.34	2,791	5,077	495	1,572	401	512	199	182	89	.4903	52	11,370
22	0	0	95.11	0	1,676	11,855	2,169	5,306	1,425	1,751	699	630	.9006	363	25,874
23	0	11,420	70.23	8,020	59,792	11,392	21,158	7,210	7,315	3,266	2,684	1,427	.5316	824	123,088
24	0	0	30.41	0	747	187	1,596	222	492	146	167	69	.4145	40	3,666
25	0	19,305	28.63	5,527	1,912	971	1,853	514	596	248	219	107	.4895	62	12,009
26	0	65,625	1.30	853	330	803	330	293	142	109	60	41	.6909	24	2,985
27	0	0	33.64	0	6,314	15,135	6,543	5,746	2,821	2,130	1,164	810	.6960	468	41,131
28	0	0	8.27	0	112	373	215	140	84	54	33	21	.6359	12	1,044
29	0	0	99.49	0	1,640	4,647	511	965	245	318	123	111	.9032	65	8,625
30	0	0	19.30	0	2,166	244	4,389	468	1,327	358	444	175	.3929	101	9,672
31	0	0	47.26	0	1,704	922	5,745	763	1,719	511	596	245	.4104	141	12,346
32	0	1,200	45.21	543	5,646	7,084	9,595	3,201	3,250	1,461	1,188	620	.5218	358	32,946
33	0	0	100.00	0	58	6	18	7	6	3	2	1	.5000	1	102
34	0	0	100.00	0	4,817	338,369	27,720	100,575	24,655	33,369	12,514	11,763	.9399	6,795	560,577
35	0	289,200	100.00	289,200	25,296	81,943	21,159	27,350	11,029	9,633	4,663	3,581	.7679	2,069	475,923
36	0	385,818	95.21	367,337	1176,569	404,931	422,861	184,099	152,979	78,235	57,355	32,373	.5644	18,702	2895,441
37	0	164,049	100.00	164,049	106,737	55,212	47,789	24,707	17,846	10,021	6,883	4,108	.5968	2,373	439,725
38	2408,826	20,822	100.00	20,822	145,844	57,649	48,982	25,262	18,161	10,292	7,020	4,182	.5957	2,416	2740,456
39	0	2,879	100.00	2,879	21,252	6,649	6,884	3,135	2,506	1,315	945	544	.5756	314	46,423
40	0	455,760	100.00	455,760	2416,041	258,285	740,826	197,526	248,390	97,284	87,245	43,453	.4980	25,103	4569,913
41	0	319,038	100.00	319,038	682,964	122,171	224,004	72,227	76,621	33,343	27,868	14,461	.5189	8,354	1581,051
42	0	67,620	100.00	67,620	11,352	63,910	7,210	20,034	5,291	6,716	2,637	2,372	.8995	1,370	188,512
43	0	321,830	100.00	321,830	194,803	357,292	104,505	122,807	49,961	43,921	21,733	16,337	.7517	9,438	1242,627
44	0	16,369	100.00	16,369	1149,742	94,189	341,744	83,776	113,385	42,521	39,971	19,244	.4814	11,117	1912,058
45	0	47,399	100.00	47,399	345,093	31,435	110,566	24,259	36,580	13,501	12,862	6,129	.4765	3,541	631,365
46	0	106,309	100.00	106,309	460,049	59,462	140,244	40,340	47,425	19,346	17,012	8,537	.5018	4,932	903,656
47	0	118,895	100.00	118,895	31,680	105,399	34,144	35,678	15,515	13,397	7,224	4,811	.6659	2,779	369,522
77	1919,000	13478,808		13478,808	1104,207	4006,374	982,137	1329,254	498,488	468,597	225,606	172,298	.7637	99,537	24284,306
TOTAL	$22566,441	$16554,564		$15964,627	$9001,352	$6302,917	$3655,827	$2420,439	$1454,738	$944,291	$581,698	$371,019		$214,341	$63477,690

TABLE 3.2 - 5 OUTPUT EXPANSION

PHOSPHOROUS

	(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) Sixth Round Expansion	(9) $\bar{r}$ = .5738	(10) Extrapolation	(11) Summation of Expansions
1	$ 0	$49,700	48.91	$24,308	$22,782	$11,811	$8,572	$4,871	.5682	$2,795	$75,139
2	0	11,200	.98.97	11,085	9,055	5,100	4,234	2,366	.5588	1,358	33,198
3	0	0	100.00	0	584	459	226	182	.8053	104	1,555
4	0	0	100.00	0	8,243	6,585	3,075	2,460	.8000	1,412	21,775
5	0	0	100.00	0	0	0	0	0	.0000	0	0
6	0	0	73.68	0	63	286	251	141	.5618	81	822
7	1680,000	0	89.55	0	1,977	303	184	89	.4837	51	1682,604
8	0	51,625	11.35	5,859	4,672	2,142	1,716	911	.5309	523	15,823
9	0	92,225	13.46	12,413	10,528	5,093	3,749	2,134	.5692	1,224	35,141
10	0	875	100.00	875	688	339	273	143	.5238	82	2,400
11	0	19,425	88.42	17,176	13,722	6,408	5,127	2,721	.5307	1,561	46,715
12	0	52,850	.07	37	29	13	11	6	.5455	3	99
13	0	37,625	40.93	15,400	12,128	5,511	4,454	2,349	.5274	1,348	41,190
14	0	15,400	99.99	15,398	12,326	5,670	4,528	2,408	.5318	1,382	41,712
15	0	24,325	100.00	24,325	19,116	8,683	7,029	3,705	.5271	2,126	64,984
16	0	11,725	9.11	1,068	840	382	309	163	.5275	94	2,856
17	0	0	81.74	0	410	530	320	200	.6250	115	1,575
18	0	83,475	3.26	2,721	2,150	979	790	417	.5278	239	7,296
19	0	0	22.40	0	1,578	2,017	1,501	772	.5143	443	6,311
20	0	0	49.06	0	1,041	193	128	74	.5781	42	1,478
21	0	15,400	4.34	668	533	246	193	105	.5330	60	1,805
22	0	0	95.11	0	1,456	1,543	926	681	.7354	391	4,997
23	0	10,350	70.23	7,269	6,897	4,236	2,972	1,632	.5511	940	23,946
24	0	0	30.41	0	430	237	176	85	.4830	49	977
25	0	3,426	28.63	981	1,126	343	235	128	.5447	73	2,886
26	0	2,813	1.30	37	187	121	76	46	.6053	26	493
27	0	0	33.64	0	3,244	2,388	1,375	927	.6742	532	8,466
28	0	0	8.27	0	53	63	38	24	.6316	14	192
29	0	0	99.49	0	1,027	348	175	119	.6800	68	1,737
30	0	0	19.30	0	1,356	605	452	217	.4801	125	2,755
31	0	0	47.26	0	945	833	625	301	.4733	173	2,877
32	0	39,367	45.21	17,798	2,205	1,983	1,303	694	.5326	398	24,381
33	0	0	100.00	0	36	4	3	1	.3333	1	45
34	0	0	100.00	0	43,932	34,525	15,664	12,680	.8095	7,276	114,077
35	0	181,020	100.00	181,020	15,301	10,399	5,567	3,979	.7147	2,283	218,549
36	0	181,718	95.21	173,014	167,827	93,410	65,214	37,370	.5730	21,443	558,278
37	0	12,345	100.00	12,345	16,622	12,292	7,805	4,401	.5639	2,525	55,990
38	1875,000	37,149	100.00	37,149	20,448	11,690	7,904	4,787	.6056	2,747	1959,725
39	0	12,537	100.00	12,537	2,689	1,582	1,057	625	.5913	359	18,799
40	0	327,587	100.00	327,587	259,491	121,119	95,617	50,965	.5330	29,244	884,023
41	0	0	100.00	0	77,681	40,678	30,494	16,925	.5550	9,712	175,490
42	0	9,129	100.00	9,129	8,960	6,896	3,292	2,586	.7855	1,484	32,347
43	0	140,564	100.00	140,564	63,381	47,548	25,131	18,207	.7245	10,447	305,278
44	0	149,275	100.00	149,275	117,311	53,226	43,085	22,700	.5269	13,025	398,622
45	0	43,225	100.00	43,225	35,518	17,251	13,823	7,255	.5249	4,163	121,235
46	0	84,288	100.00	84,288	49,809	23,745	18,452	10,002	.5421	5,739	192,035
47	0	13,448	100.00	13,448	27,045	15,180	7,916	5,379	.6795	3,086	72,054
77	1750,000	1375,274		1375,274	623,986	505,102	266,123	191,328	.7189	109,784	4821,597
TOTAL	$5305,000	$3089,365		$2716,273	$1671,428	$1070,047	$662,170	$420,261		$241,150	$12086,329

TABLE 3.2 - 6 OUTPUT EXPANSION

MAGNESIUM HYDROXIDE

	(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) $\bar{F}$ = .6743	(9) Extrapolation	(10) Summation of Expansions
1	$ 0	$4,828	48.91	$2,361	$2,279	$1,188	$872	.7340	$588	$7,288
2	0	1,088	98.97	1,077	937	495	428	.8646	289	3,226
3	0	0	100.00	0	57	48	23	.4792	16	144
4	0	0	100.00	0	800	687	308	.4483	208	2,003
5	0	0	100.00	0	0	0	0	.0000	0	0
6	0	0	73.68	0	6	30	25	.8333	17	78
7	243,440	0	89.55	0	139	28	19	.6786	13	243,639
8	0	5,015	11.35	269	486	215	175	.8140	118	1,263
9	0	8,959	13.46	1,206	1,094	511	398	.7789	268	3,477
10	0	85	100.00	85	72	34	28	.8235	19	238
11	0	1,887	88.42	1,668	1,431	642	523	.8146	353	4,617
12	0	5,134	.07	4	3	1	1	.8239	1	10
13	0	3,655	40.93	1,496	1,266	552	454	.8225	306	4,074
14	0	1,496	99.99	1,496	1,286	569	462	.8120	312	4,125
15	0	2,363	100.00	2,363	2,007	869	717	.8251	483	6,439
16	0	1,139	9.11	104	88	38	32	.8421	22	284
17	0	0	81.74	0	38	53	33	.6226	22	146
18	0	8,109	3.26	264	224	98	81	.8265	55	722
19	0	0	22.40	0	118	196	156	.7959	105	575
20	0	0	49.06	0	75	20	13	.6500	9	117
21	0	1,496	4.34	65	56	25	20	.8000	13	179
22	0	0	95.11	0	138	150	88	.5867	59	435
23	0	970	70.23	681	728	389	298	.7661	201	2,297
24	0	0	30.41	0	31	23	18	.7826	12	84
25	0	174	28.63	50	83	35	24	.6857	16	208
26	0	4	1.30	0	19	12	7	.5833	5	43
27	0	0	33.64	0	275	240	138	.5750	93	746
28	0	0	8.27	0	5	6	4	.6667	3	18
29	0	0	99.49	0	72	28	18	.6429	12	130
30	0	0	19.30	0	95	60	48	.8000	32	235
31	0	0	47.26	0	61	73	58	.7945	39	231
32	0	5,636	45.21	2,548	197	190	135	.7105	91	3,161
33	0	0	100.00	0	3	0	0	.0001	0	3
34	0	0	100.00	0	4,268	3,605	1,569	.4352	1,058	10,500
35	0	12,669	100.00	12,669	1,645	1,058	564	.5331	380	16,316
36	0	16,797	95.21	15,992	17,014	9,404	6,479	.6890	4,369	53,258
37	0	1,284	100.00	1,284	1,741	1,162	781	.6721	527	5,495
38	2,625	4,556	100.00	4,556	2,079	1,189	801	.6737	540	11,790
39	0	1,691	100.00	1,691	279	154	107	.6948	72	2,303
40	0	31,470	100.00	31,470	26,917	12,121	9,752	.8046	6,576	86,836
41	0	8,228	100.00	8,228	7,967	4,079	3,105	.7612	2,094	25,473
42	0	742	100.00	742	861	710	332	.4676	224	2,869
43	0	19,344	100.00	19,344	6,615	4,840	2,608	.5388	1,759	35,166
44	0	14,501	100.00	14,501	12,250	5,330	4,396	.8248	2,964	39,441
45	0	4,199	100.00	4,199	3,578	1,722	1,411	.8194	951	11,861
46	0	5,764	100.00	5,764	5,179	2,582	1,881	.7285	1,268	16,674
47	0	1,706	100.00	1,706	1,813	1,458	788	.5405	531	6,296
77	170,000			143,613	62,486	51,536	25,700	.4987	17,330	470,665
TOTAL	$416,065	$174,989		$281,496	$168,861	$108,455	$65,878		$44,423	$1085,178

TABLE 3.2-7 OUTPUT EXPANSION

ALUMINIUM CABLE

	(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) Sixth Round Expansion	(9) Seventh Round Expansion	(10) Eighth Round Expansion	(11) Ninth Round Expansion	(12) $\bar{r}$ = .5043	(13) Extrapolation	(14) Summation of Expansions
1	$ 0	$2,604	48.91	$1,274	$213	$429	$135	$150	$70	$53	$29	.5472	$15	$2,301
2	0	672	98.97	665	12	224	58	77	31	26	14	.5385	7	1,114
3	0	0	100.00	0	35	0	11	2	3	2	1	.5000	1	55
4	0	0	100.00	0	495	10	142	26	47	17	15	.8824	8	760
5	0	0	100.00	0	0	0	0	0	0	0	0	.0000	0	0
6	0	0	73.68	0	4	13	4	4	1	1	1	.5332	1	39
7	0	0	89.55	0	2	8	4	3	2	1	1	.5485	1	22
8	0	3,098	11.35	352	7	99	19	32	12	11	5	.4546	3	540
9	0	5,534	13.46	745	50	213	50	71	30	24	13	.5417	7	1,307
10	0	53	100.00	53	0	16	3	5	2	2	1	.5000	1	83
11	0	1,166	88.42	1,031	21	296	55	97	36	32	16	.5000	8	1,592
12	0	3,171	.07	2	0	1	0	0	0	0	0	.0001	0	3
13	0	2,258	40.93	924	9	260	46	85	32	28	14	.5000	7	1,405
14	0	924	99.99	924	21	260	49	85	32	28	14	.5000	7	1,420
15	0	1,460	100.00	1,460	12	671	72	134	49	44	22	.5000	11	2,475
16	0	704	9.11	64	1	18	3	6	2	2	1	.5000	1	93
17	0	0	81.74	0	22	13	7	5	3	2	1	.5000	1	54
18	0	5,009	3.26	163	2	46	8	15	6	5	2	.4000	1	248
19	0	0	22.40	0	23	96	13	28	9	10	5	.5000	3	185
20	0	0	49.06	0	5	7	2	2	1	1	0	.0001	0	18
21	0	924	4.34	40	1	11	2	4	2	1	1	.6510	1	63
22	0	0	95.11	0	85	8	38	8	12	5	4	.8000	2	162
23	0	599	70.23	421	46	153	44	51	22	18	10	.5556	5	770
24	0	0	30.41	0	1	12	1	3	3	1	0	.0001	0	21
25	0	5	28.63	0	6	13	3	4	1	1	1	.4000	1	30
26	0	6	1.30	0	6	2	2	1	1	0	0	.0001	0	12
27	0	0	33.64	0	102	41	40	18	15	8	5	.6250	3	232
28	0	0	8.27	0	2	1	1	1	0	0	0	.0001	0	5
29	0	0	99.49	0	1	4	7	1	3	1	1	.9425	1	19
30	0	0	19.30	0	2	34	1	10	2	3	1	.3333	1	54
31	0	0	47.26	0	5	39	2	11	3	4	2	.5000	1	67
32	0	53	45.21	24	50	70	19	39	9	8	4	.5000	2	225
33	0	0	100.00	0	0	0	0	0	0	0	0	.0000	0	0
34	0	0	100.00	0	2,636	21	742	130	241	89	79	.8876	40	3,978
35	0	202	100.00	202	587	111	196	106	66	25	24	.9600	12	1,329
36	0	8,505	95.21	8,098	2,427	2,970	1,158	1,074	557	347	221	.6369	111	16,963
37	0	568	100.00	568	330	330	253	125	69	44	28	.6364	14	1,761
38	4,000	1,040	100.00	1,040	350	332	167	95	73	45	28	.6222	14	6,144
39	0	158	100.00	158	38	48	174	26	9	6	4	.6667	2	465
40	0	18,561	100.00	18,561	599	5,451	1,078	1,792	690	594	302	.5084	151	29,218
41	0	5,082	100.00	5,082	506	1,621	420	550	236	188	99	.5266	50	8,752
42	0	18	100.00	18	488	18	150	34	48	18	16	.8889	8	798
43	0	575	100.00	575	2,582	586	872	311	315	153	108	.7059	54	5,556
44	0	8,957	100.00	8,957	71	2,520	481	820	302	269	134	.4981	67	13,581
45	0	2,593	100.00	2,593	39	817	269	265	95	87	43	.4943	22	4,230
46	0	3,593	100.00	3,593	209	1,023	227	345	137	115	59	.5130	30	5,738
47	0	4	100.00	4	791	201	222	116	91	47	32	.6809	16	1,520
77	105,000	828		828	29,548	5,175	9,618	3,543	3,149	1,574	1,142	.7255	576	160,153
TOTAL	$109,000	$78,924		$58,419	$42,442	$24,292	$16,828	$10,310	$6,519	$3,940	$2,503		$1,267	$275,520

TABLE 3.2-8 OUTPUT EXPANSION

BREWERY

	(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) Sixth Round Expansion	(9) Seventh Round Expansion	(10) Eighth Round Expansion	(11) Ninth Round Expansion	(12) F = .5488	(13) Extrapolation	(14) Summation of Expansion
1	$ 0	$9,930	48.91	$4,857	$747	$1,433	$514	$501	$230	$184	$98	.5336	$54	$8,414
2	0	2,238	98.97	2,215	40	747	225	255	150	93	47	.5054	26	3,797
3	0	0	100.00	0	117	1	37	7	11	4	4	.9957	2	183
4	0	0	100.00	0	1,647	30	474	110	153	57	54	.9474	30	2,525
5	0	0	100.00	0	0	0	0	0	0	0	0	0	0	0
6	0	0	73.68	0	13	44	15	14	7	5	3	.6000	2	103
7	0	0	89.55	0	5	26	13	9	5	4	3	.7500	2	67
8	0	10,315	11.35	1,171	20	330	77	106	40	38	18	.4737	10	1,810
9	0	18,427	13.46	2,480	169	711	200	258	97	85	43	.5059	24	4,067
10	0	175	100.00	175	1	55	11	17	6	6	3	.5000	2	276
11	0	3,881	88.42	3,432	62	988	230	318	118	112	53	.4732	29	5,344
12	0	10,559	.07	7	0	2	0	1	0	0	0	0	0	11
13	0	7,517	40.93	3,077	23	867	194	278	102	98	46	.4694	25	4,710
14	0	3,077	99.99	3,077	63	868	206	281	105	99	47	.4747	26	4,772
15	0	4,860	100.00	4,860	29	1,370	306	439	160	154	72	.4675	40	7,430
16	0	2,343	9.11	213	1	60	13	19	7	7	3	.4286	2	325
17	0	0	81.74	0	78	43	25	17	11	7	4	.5714	2	187
18	0	16,678	3.26	544	5	153	35	49	18	17	8	.4706	4	833
19	0	0	22.40	0	77	318	44	96	33	33	15	.4545	8	624
20	0	0	49.06	0	17	23	6	8	3	3	1	.3333	1	62
21	0	3,077	4.34	134	2	38	9	12	5	4	2	.5000	1	207
22	0	0	95.11	0	281	30	130	29	43	16	15	.9375	8	552
23	0	1,995	70.23	1,401	149	511	151	172	76	63	32	.5079	18	2,573
24	0	0	30.41	0	3	41	2	12	3	4	2	.5000	1	68
25	0	12	28.63	3	21	45	9	15	9	5	3	.6000	2	112
26	0	15	1.30	0	19	7	7	3	3	1	1	.6944	1	42
27	0	0	33.64	0	338	135	132	65	50	27	19	.7037	10	776
28	0	0	8.27	0	8	5	3	2	1	1	0	0	0	20
29	0	0	99.49	0	3	12	61	4	8	3	3	.9637	2	96
30	0	0	19.30	0	4	113	3	32	8	11	4	.3636	2	177
31	0	0	47.26	0	20	147	8	43	12	14	6	.4286	3	253
32	0	176	45.21	80	165	233	63	78	34	28	14	.5000	8	703
33	0	0	100.00	0	0	0	0	0	0	0	0	0	0	0
34	0	0	100.00	0	8,777	51	2,473	551	792	289	278	.9619	153	13,364
35	0	495	100.00	495	1,985	366	647	246	229	109	85	.7798	47	4,209
36	0	28,284	95.21	26,929	8,011	9,884	4,196	3,613	1,825	1,352	756	.5592	419	56,981
37	0	1,890	100.00	1,890	1,097	1,097	553	419	235	161	95	.5901	52	5,599
38	9,828	3,462	100.00	3,462	1,168	1,111	591	432	241	165	98	.5939	54	17,150
39	0	524	100.00	524	125	160	73	59	31	22	13	.5909	7	1,014
40	0	61,793	100.00	61,793	1,876	18,172	4,809	5,901	2,260	2,089	1,004	.4806	551	98,055
41	0	16,923	100.00	16,923	1,665	5,402	1,626	1,821	774	659	335	.5083	184	29,389
42	0	45	100.00	45	1,623	57	491	119	160	61	56	.9180	31	2,643
43	0	1,909	100.00	1,909	8,591	1,935	2,918	1,151	1,038	507	386	.7613	212	18,647
44	0	29,825	100.00	29,825	173	8,403	1,871	2,691	981	946	444	.4693	244	45,578
45	0	8,636	100.00	8,636	109	2,724	570	870	311	304	141	.4638	77	13,742
46	0	11,916	100.00	11,916	617	3,409	911	1,125	448	401	197	.4913	108	19,132
47	0	9	100.00	9	2,628	663	828	362	305	155	114	.7355	63	5,127
77	349,650	2,033		2,033	98,506	21,930	31,545	11,503	11,086	5,204	4,077	.7834	2,237	537,771
TOTAL	$359,478	$263,019		$194,115	$141,078	$84,750	$56,905	$34,113	$22,224	$13,607	$8,702		$4,780	$919,752

TABLE 3.2 - 9 OUTPUT EXPANSION

FISHMEAL

(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) Sixth Round Expansion	(9) $\bar{r}$ = 2.2135	(10) Extrapolation	(11) Summation of Expansions
$ 0	$ 2,273	48.91	$ 1,112	$ 19,256	$ 4,867	$ 6,261	$ 2,439	.3895	$ 5,398	$ 39,333
0	12,416	98.97	12,288	11,047	1,314	3,149	1,096	.3479	2,425	31,319
0	0	100.00	0	27	456	50	151	3.0200	334	1,018
1,920,000	0	100.00	0	7,221	8,463	803	1,987	2.4745	4,398	1,940,872
0	0	100.00	0	0	0	0	0	.0000	0	0
0	67,584	73.68	49,796	40	242	182	76	.4170	168	50,504
0	0	89.55	0	176	48	113	65	.5794	145	547
0	2,361	11.35	268	4,577	547	1,384	387	.2799	858	8,021
0	4,218	13.46	568	9,724	1,655	3,031	978	.3226	2,164	18,120
0	40	100.00	40	683	75	227	58	.2555	128	1,211
0	17,016	88.42	15,046	13,467	1,674	4,140	1,157	.2796	2,562	38,046
0	2,417	.07	2	29	3	9	2	.2705	5	50
0	1,721	40.93	704	12,025	1,320	3,625	982	.2711	2,175	20,831
0	704	99.99	703	12,029	1,476	3,644	1,030	.2827	2,280	21,162
0	1,113	100.00	1,113	19,014	2,057	5,725	1,547	.2702	3,424	32,880
0	536	9.11	49	834	91	251	68	.2703	150	1,443
0	48,192	81.74	39,392	538	468	204	119	.5863	264	40,985
0	3,818	3.26	124	2,125	238	641	175	.2734	388	3,691
0	1,344	22.40	301	775	426	1,286	305	.2373	676	3,769
0	22,656	49.06	11,115	26	119	65	37	.5682	81	11,443
0	704	4.34	31	523	63	158	45	.2858	100	920
0	0	95.11	0	240	1,141	255	546	2.1418	1,209	3,391
0	457	70.23	321	5,625	1,291	2,184	791	.3621	1,750	11,962
0	0	30.41	0	78	27	162	27	.1651	59	353
0	15,943	28.63	4,564	166	125	188	56	.2968	124	5,223
0	21,897	1.30	285	72	83	36	31	.8657	68	575
0	0	33.64	0	778	1,493	703	602	.8569	1,333	4,909
0	32,064	8.27	2,652	18	46	23	15	.6813	32	2,786
0	0	99.99	0	91	40	57	98	1.7368	218	504
0	0	19.30	0	105	48	445	59	.1321	130	787
0	0	47.36	0	79	119	584	93	.1586	205	1,080
0	14,441	45.21	6,529	832	776	993	349	.3520	774	10,253
0	0	100.00	0	4	0	2	1	.5000	2	9
0	0	100.00	0	2,009	34,290	3,708	10,456	2.8198	23,144	73,607
0	16,034	100.00	16,034	3,457	8,393	2,330	2,842	1.2197	6,291	39,347
0	52,591	95.21	50,072	117,743	44,341	44,147	20,146	.4563	44,594	321,042
0	8,113	100.00	8,113	9,550	5,782	4,990	2,629	.5269	5,819	36,883
5,760	792	100.00	792	15,645	6,145	5,118	2,707	.5289	5,992	42,159
0	120	100.00	120	2,323	721	719	327	.4548	724	4,934
0	45,650	100.00	45,650	246,016	32,691	76,449	22,156	.2898	49,042	472,004
0	3,874	100.00	3,874	68,731	14,090	23,157	7,965	.3440	17,631	135,448
0	26	100.00	26	1,494	6,464	884	2,065	2.3360	4,571	15,504
0	39,612	100.00	39,612	20,226	36,438	11,582	12,805	1.1056	28,344	149,007
0	6,827	100.00	6,827	116,514	12,601	35,527	9,469	.2665	20,960	201,898
0	1,977	100.00	1,977	33,838	4,126	11,349	2,976	.2622	6,587	60,853
0	2,775	100.00	2,775	46,351	7,223	14,461	4,492	.3106	9,943	85,245
0	5	100.00	5	3,374	10,749	3,736	3,759	1.0062	8,321	29,944
80,040	1,365,928		1,365,928	147,726	411,668	111,003	138,166	1.2447	305,830	2,560,361
$ 2,005,800	$ 2,568,239		$ 1,688,808	$ 957,221	$ 664,513	$ 389,740	$ 258,332		$ 571,820	$ 6,536,234

TABLE 3.2 - 10 OUTPUT EXPANSION

DAIRY

	(1) Direct Input Requirements	(2) Second Round Total	(3) % to be Produced in Nfld.	(4) Second Round Expansion	(5) Third Round Expansion	(6) Fourth Round Expansion	(7) Fifth Round Expansion	(8) Sixth Round Expansion	(9) Seventh Round Expansion	(10) Eighth Round Expansion	(11) Ninth Round Expansion	(12) Tenth Round Expansion	(13) F = .5635	(14) Extrapolation	(15) Summation of Expansions
1	$ 0	$710	48.91	$347	$55	$103	$32	$35	$16	$13	$6	$5	.7692	$3	$615
2	0	160	98.97	158	4	53	14	20	7	7	3	2	.6667	1	269
3	0	0	100.00	0	0	0	0	1	1	0	0	0	.0000	0	2
4	0	0	100.00	0	118	2	34	6	11	4	4	2	.5000	1	182
5	0	0	100.00	0	0	0	0	0	0	0	0	0	.0000	0	0
6	0	0	73.68	0	1	3	1	1	1	0	0	0	.0000	0	7
7	0	0	89.55	0	1	2	1	1	0	0	0	0	.0000	0	5
8	0	738	11.35	84	2	24	4	8	3	3	1	1	.8000	1	131
9	0	1,318	13.46	177	13	51	12	17	6	6	3	2	.8421	1	288
10	0	13	100.00	13	0	4	1	1	0	0	0	0	.0000	0	19
11	0	278	88.42	246	5	70	13	23	8	8	4	3	.7500	2	382
12	0	755	.07	1	0	0	0	0	0	0	0	0	.9000	0	1
13	0	538	40.93	220	2	62	11	20	7	7	3	2	.8571	1	335
14	0	220	99.99	220	5	62	12	20	7	7	3	3	1.0000	2	341
15	0	348	100.00	348	3	98	17	31	10	11	4	4	1.0000	2	528
16	0	168	9.11	15	0	4	1	1	0	0	0	0	1.0000	0	21
17	0	0	81.74	0	6	3	2	1	1	1	0	0	.0000	0	14
18	0	1,193	3.26	39	1	11	2	4	1	1	0	0	.9333	0	59
19	0	0	22.40	0	6	23	9	7	2	2	1	1	1.0000	0	51
20	0	0	49.06	0	1	1	0	0	0	0	0	0	.0000	0	2
21	0	220	4.34	10	0	3	1	1	0	0	0	0	1.0000	0	15
22	0	0	95.11	0	20	2	10	3	3	1	1	0	.0001	0	40
23	0	142	70.23	100	11	37	11	13	5	4	2	1	.6667	1	185
24	0	0	30.41	0	0	3	1	1	0	0	0	0	.0000	0	5
25	0	1	28.63	0	2	3	1	1	0	0	0	0	.0001	0	7
26	0	2	1.30	0	1	0	1	0	0	0	0	0	.6000	0	2
27	0	0	33.64	0	24	10	9	4	3	2	2	1	.5000	0	55
28	0	0	8.27	0	1	0	0	0	0	0	0	0	.0000	0	1
29	0	0	99.49	0	0	1	0	1	0	0	0	0	.0000	0	2
30	0	0	19.30	0	0	8	2	2	0	1	0	0	1.0000	0	13
31	0	0	47.26	0	1	10	3	3	0	1	0	0	1.0000	0	18
32	0	13	45.21	6	12	16	5	5	2	2	1	1	1.0000	0	50
33	0	0	100.00	0	0	0	0	0	0	0	0	0	.0000	0	0
34	0	0	100.00	0	628	185	177	31	57	19	20	8	.4000	5	1,130
35	0	60	100.00	60	142	27	46	16	16	7	6	3	.5000	2	325
36	0	2,027	95.21	1,930	582	710	277	253	123	93	49	35	.7255	20	4,072
37	0	135	100.00	135	79	79	38	31	16	11	6	4	.6667	2	401
38	1,200	248	100.00	248	85	80	39	30	16	11	6	4	.6667	2	1,721
39	0	38	100.00	38	9	11	5	4	2	2	1	1	1.0000	1	74
40	0	4,420	100.00	4,420	154	1,303	266	422	146	147	62	53	.8548	30	7,003
41	0	1,210	100.00	1,210	125	388	101	129	51	46	21	17	.8095	10	2,098
42	0	6	100.00	6	116	5	35	7	11	4	4	2	.5000	1	191
43	0	138	100.00	138	617	141	210	76	73	34	26	14	.5385	8	1,337
44	0	2,133	100.00	2,133	21	602	106	193	63	67	27	24	.8889	14	3,250
45	0	618	100.00	618	11	195	33	62	20	21	9	8	.8889	5	982
46	0	859	100.00	859	48	245	54	80	29	28	12	10	.8333	6	1,371
47	0	1	100.00	1	189	48	69	24	21	10	8	4	.5000	2	376
77	25,000	248		248	7,062	1,245	2,263	744	783	316	283	138	.4876	78	38,160
TOTAL	$26,200	$18,958		$14,028	$10,163	$5,933	$3,929	$2,333	$1,521	$897	$578	$353		$201	$66,136

summing horizontally all the round expansions. The result is shown in Column 11.

Although only two direct inputs to the refinery are supplied locally, all but one sector expand as a result of indirect and induced demand.

The same procedure was followed for each new industry. The results of these calculations are shown in Tables 3.2-1 to 3.2-10.

Output, Employment and Income Effects

The direct, indirect, induced and total output, employment and income effects for each of the new industries are shown in Tables 3.4-1 to 3.4-10. Total output is the summation of the expansions in Tables 3.2-1 to 3.2-10. Direct output is the direct input requirements for each new industry. Indirect output is computed the same as the method outlined for Tables 3.2-1 to 3.2-10, except that household income and household consumption is not included in the matrix.

Employment is found by dividing the output figures in Tables 3.4-1 to 3.4-10 by output per man given in Table 3.3.

Income figures are derived by multiplying output figures for each sector by the household income coefficient of that sector.

TABLE 3.3 OUTPUT PER MAN

Sector	Average Earnings	Number of Workers	Output Per Man
1	1,349	645	10,792
2	1,767	10,949	2,933
3	1,215	5,899	3,651
4	1,215	5,899	3,651
5	4,074	4,962	16,051
6	2,974	386	5,765
7	2,565	138	12,246
8	2,300	89	17.049
9	3,024	270	17,818
10	1,385	4,432	5,651
11	1,385	4,432	5,651
12	3,503	1	18,900
13	2,528	506	9,724
14	2,381	229	15,046
15	3,419	245	21,816
16	1,537	79	4,904
17	2,866	96	9,099
18	1,737	173	3,642
19	1,369	730	6,467
20	1,870	73	9,447
21	2,706	30	5,220
22	4,726	3,747	18,232
23	2,763	496	6,443
24	3,233	91	4,549
25	2,808	175	8,825
26	3,684	80	6,735
27	2,862	418	4,200
28	2,882	42	6,498
29	3,110	251	11,801
30	3,110	251	11,801
31	2,772	119	11,075
32	3,191	148	15,041
33	2,451	–	–
34	2,130	21,478	6,674
35	2,130	21,478	6,674
36	2,782	13,939	5,790
37	2,831	1,382	5,806
38	3,131	722	15,130
39	3,105	93	10,930
40	2,313	17,587	4,766
41	1,853	2,806	8,657
42	1,815	–	–
43	3,334	1,385	22,545
44	978	–	–
45	1,402	1,831	5,580
46	1,007	6,266	2,454
47	3,092	498	27,891

TABLE 3.4 - 1 OUTPUT, EMPLOYMENT, INCOME

PETROLEUM REFINERY

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	5	15,635	15,640	0	0	1	1	0	2	6,238	6,240
2	0	249	6,699	6,948	0	0	2	2	0	177	4,753	4,930
3	0	0	319	319	0	0	0	0	0	0	170	170
4	0	3	4,470	4,473	0	0	1	1	0	2	3,177	3,179
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	14	170	184	0	0	0	0	0	7	33	40
7	0	497	96	593	0	0	0	0	0	292	57	349
8	0	0	3,301	3,301	0	0	0	0	0	0	313	313
9	0	0	7,362	7,362	0	0	0	0	0	0	1,000	1,700
10	0	0	501	501	0	0	0	0	0	0	66	66
11	0	7	9,743	9,750	0	0	2	2	0	2	2,929	2,931
12	0	0	21	21	0	0	0	0	0	0	7	7
13	0	0	8,596	8,596	0	0	1	1	0	0	3,145	3,145
14	0	0	8,703	8,703	0	0	1	1	0	0	4,141	4,141
15	0	1	13,559	13,560	0	0	1	1	0	1	7,814	7,815
16	0	0	597	597	0	0	0	0	0	0	139	139
17	0	5	323	328	0	0	0	0	0	2	107	109
18	0	0	1,523	1,523	0	0	0	0	0	0	648	643
19	0	657	723	1,380	0	0	0	0	0	200	220	420
20	0	230	88	318	0	0	0	0	0	60	23	83
21	0	1	376	377	0	0	0	0	0	1	222	223
22	0	86	938	1,024	0	0	0	0	0	22	243	265
23	0	222	4,661	4,883	0	0	1	1	0	144	3,020	3,164
24	0	102	113	215	0	0	0	0	0	67	74	141
25	0	528	175	703	0	0	0	0	0	179	60	239
26	0	34	70	104	0	0	0	0	0	23	48	71
27	0	496	1,318	1,814	0	0	0	0	0	335	890	1,225
28	0	5	36	41	0	0	0	0	0	1	7	8
29	0	305	83	388	0	0	0	0	0	115	32	147
30	0	321	296	617	0	0	0	0	0	68	62	130
31	0	203	430	633	0	0	0	0	0	62	132	194
32	0	264	1,211	1,475	0	0	0	0	0	88	402	490
33	0	8	1	9	0	0	0	0	0	0	0	0
34	0	0	23,424	23,424	0	0	4	4	0	0	9,196	9,196
35	0	42,941	6,426	49,367	0	6	1	7	0	14,669	2,195	16,864
36	0	16,848	102,156	119,004	0	3	18	21	0	9,452	57,309	66,761
37	0	1,176	9,862	11,038	0	0	2	2	0	628	5,407	6,035
38	835,000	393	13,168	848,561	55	0	1	56	172,762	81	2,724	175,567
39	0	32	1,933	1,965	0	0	0	0	0	19	1,118	1,137
40	0	6,720	178,384	185,104	0	1	38	39	0	4,540	120,516	125,056
41	0	1,428	53,248	54,676	0	0	6	6	0	529	19,718	20,247
42	0	4,075	4,539	8,614	0	0	0	0	0	0	0	0
43	0	7,226	32,413	39,639	0	0	2	2	0	1,994	8,946	10,940
44	0	0	83,187	83,187	0	0	0	0	0	0	22,851	22,851
45	0	473	25,258	25,731	0	0	5	5	0	181	9,653	9,834
46	0	11,442	34,622	46,064	0	5	14	19	0	8,619	26,081	34,700
47	0	2,310	8,830	11,140	0	0	0	0	0	408	1,558	1,966
IMPACT TOTAL	835,000	99,307	669,497	1,603,804	55	15	101	171	172,762	42,970	328,912	544,644
Initial				131,068,216				86				458,425
GRAND TOTAL	835,000	99,307	669,497	132,672,020	55	15	101	257	172,762	42,970	328,912	1,003,069

TABLE 3.4 - 2 OUTPUT, EMPLOYMENT, INCOME

ANHYDROUS AMMONIA

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	5	19,322	19,327	0	0	2	2	0	2	7,709	7,711
2	0	249	7,986	8,235	0	0	3	3	0	177	5,684	5,861
3	0	0	407	407	0	0	0	0	0	0	203	203
4	0	3	5,668	5,671	0	0	1	1	0	2	4,029	4,031
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	14	219	233	0	0	0	0	0	7	113	120
7	0	497	128	625	0	0	0	0	0	292	75	367
8	0	0	4,066	4,066	0	0	0	0	0	0	1,001	1,001
9	0	0	9,083	9,083	0	0	0	0	0	0	2,355	2,355
10	0	0	618	618	0	0	0	0	0	0	82	82
11	0	7	11,989	11,996	0	0	2	2	0	2	3,604	3,606
12	0	0	27	27	0	0	0	0	0	0	9	9
13	0	0	10,579	10,579	0	0	1	1	0	0	3,871	3,871
14	0	0	10,690	10,690	0	0	1	1	0	0	5,086	5,086
15	0	1	16,692	16,693	0	0	1	1	0	1	9,619	9,620
16	0	0	733	733	0	0	0	0	0	0	171	171
17	0	5	410	415	0	0	0	0	0	2	137	139
18	0	0	1,875	1,875	0	0	0	0	0	0	798	798
19	0	657	993	1,650	0	0	0	0	0	200	302	502
20	0	230	128	358	0	0	0	0	0	60	33	93
21	0	1	469	470	0	0	0	0	0	1	277	278
22	0	86	1,211	1,297	0	0	0	0	0	22	314	336
23	0	222	5,892	6,114	0	0	1	1	0	144	3,818	3,962
24	0	102	142	244	0	0	0	0	0	67	93	160
25	0	528	220	748	0	0	0	0	0	179	75	254
26	0	34	87	121	0	0	0	0	0	23	59	82
27	0	496	1,701	2,197	0	0	0	0	0	335	1,148	1,483
28	0	5	47	52	0	0	0	0	0	1	9	10
29	0	305	115	420	0	0	0	0	0	115	44	159
30	0	321	371	692	0	0	0	0	0	68	78	146
31	0	203	539	742	0	0	0	0	0	62	166	228
32	0	264	1,537	1,801	0	0	0	0	0	88	510	598
33	0	8	1	9	0	0	0	0	0	0	0	0
34	0	0	29,706	29,706	0	0	4	4	0	0	11,663	11,663
35	0	42,941	7,986	50,927	0	6	1	7	0	14,669	2,728	17,397
36	0	16,848	127,897	144,745	0	3	22	25	0	9,452	71,750	81,202
37	0	1,176	12,501	13,678	0	0	2	2	0	628	6,672	7,300
38	835,000	393	16,362	851,755	55	0	1	56	172,762	81	3,385	176,228
39	0	32	2,271	2,303	0	0	0	0	0	19	1,313	1,332
40	0	6,720	218,772	225,492	0	1	46	47	0	4,540	147,802	152,342
41	0	1,428	66,200	67,628	0	0	1	1	0	529	24,514	25,043
42	0	4,075	7,775	11,847	0	0	0	0	0	0	0	0
43	0	7,226	41,267	48,493	0	0	2	2	0	1,994	11,390	13,384
44	0	0	102,391	102,391	0	0	0	0	0	0	28,127	28,127
45	0	473	31,399	31,872	0	0	6	6	0	181	12,000	12,181
46	0	11,442	42,739	54,181	0	5	17	22	0	8,619	32,196	40,815
47	0	2,310	11,194	13,504	0	0	0	0	0	408	1,975	2,383
		0										
IMPACT TOTAL	835,000	99,307	832,403	1,766,710	55	15	114	184	172,762	42,970	406,987	622,719
Initial				33,120,000				114				607,680
GRAND TOTAL	835,000	99,307	832,403	34,886,710	55	15	114	298	172,762	42,970	406,987	1,230,399

TABLE 3.4 - 3 OUTPUT, EMPLOYMENT, INCOME

NEWSPRINT

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	24,209	145,776	169,985	0	2	14	16	0	9,659	58,165	67,824
2	5,658,068	12,950	37,068	5,708,086	1,929	4	13	1,946	4,026,847	9,217	26,381	4,062,445
3	0	0	3,113	3,113	0	0	1	1	0	0	1,554	1,554
4	0	20	43,391	43,411	0	0	12	12	0	14	30,843	30,857
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	45	1,697	1,742	0	0	0	0	0	23	880	903
7	8,920	988	244	10,152	1	0	0	1	5,242	588	136	5,966
8	0	0	30,730	30,730	0	0	2	2	0	0	7,569	7,569
9	0	68	68,967	69,035	0	0	4	4	0	18	17,883	17,901
10	0	0	4,679	4,679	0	0	1	1	0	0	621	621
11	0	42	90,770	90,812	0	0	16	16	0	13	27,285	27,298
12	0	0	192	192	0	0	0	0	0	0	62	62
13	0	0	80,022	80,022	0	0	8	8	0	0	29,280	29,280
14	0	0	81,061	81,061	0	0	5	5	0	0	38,569	38,569
15	0	3	126,237	126,240	0	0	6	6	0	2	72,750	72,752
16	0	105	5,492	5,597	0	0	1	1	0	24	1,281	1,305
17	0	251	3,142	3,393	0	0	0	0	0	84	1,049	1,133
18	0	2	14,175	14,177	0	0	4	4	0	1	6,033	6,034
19	0	1,936	8,943	10,879	0	0	1	1	0	589	2,719	3,308
20	0	664	511	1,175	0	0	0	0	0	172	133	305
21	0	1,287	2,843	4,130	0	0	1	1	0	762	1,683	2,445
22	0	404	9,097	9,501	0	0	0	0	0	105	2,358	2,463
23	0	2,108	43,742	45,850	0	0	7	7	0	1,366	28,345	29,711
24	0	290	911	1,201	0	0	0	0	0	191	598	789
25	0	2,566	1,157	3,723	0	0	0	0	0	872	393	1,265
26	0	372	664	1,036	0	0	0	0	0	253	453	706
27	0	2,138	10,801	12,939	0	0	3	3	0	1,444	7,292	8,736
28	0	33	350	383	0	0	0	0	0	6	65	71
29	0	786	249	1,035	0	0	0	0	0	297	94	391
30	0	828	2,251	3,079	0	0	0	0	0	174	474	648
31	0	606	3,822	4,428	0	0	0	0	0	186	1,173	1,359
32	0	872	11,590	12,462	0	0	1	1	0	290	3,851	4,141
33	0	16	1	17	0	0	0	0	0	0	0	0
34	0	0	227,056	227,056	0	0	34	34	0	0	89,142	89,142
35	0	69,595	9,490	79,085	0	10	2	12	0	23,774	3,241	27,015
36	0	109,130	953,306	1,062,436	0	19	164	183	0	61,222	534,805	569,027
37	0	58,578	94,150	152,728	0	10	16	26	0	31,263	50,248	81,511
38	1,031,625	3,695	123,591	1,158,908	68	0	8	76	213,443	764	25,571	239,778
39	0	449	17,004	17,453	0	0	1	1	0	260	9,837	10,097
40	0	48,640	1,660,430	1,709,070	0	10	348	358	0	32,861	1,121,787	1,154,648
41	0	79,276	498,679	577,955	0	9	58	67	0	29,356	184,661	214,017
42	0	23,350	44,165	67,515	0	0	0	0	0	0	0	0
43	0	129,340	307,369	436,709	0	6	13	19	0	35,698	84,834	120,532
44	0	0	774,379	774,379	0	0	0	0	0	0	212,722	212,722
45	0	3,965	233,560	237,525	0	1	41	42	0	1,515	89,267	90,782
46	0	18,077	323,530	341,607	0	7	132	139	0	13,617	243,716	257,333
47	0	44,645	83,895	128,540	0	1	3	4	0	7,880	14,807	22,687
IMPACT TOTAL	6,698,613	642,329	6,184,289	13,525,231	1,998	79	920	2,997	4,245,532	264,560	3,034,610	7,544,702
Initial				26,066,434				300				1,599,156
GRAND TOTAL	6,698,613	642,329	6,184,289	39,591,665	1,998	79	920	3,297	4,245,532	264,560	3,034,610	9,143,858

TABLE 3.4 - 4 OUTPUT, EMPLOYMENT, INCOME

LINERBOARD

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	78,029	376,497	454,526	0	7	35	42	0	31,134	150,222	181,356
2	18,238,615	42,025	84,478	18,365,118	6,218	14	29	6,261	12,980,422	29,909	354,787	13,365,118
3	0	0	11,542	11,542	0	0	3	3	0	0	5,763	5,763
4	0	61	115,517	115,578	0	0	31	31	0	43	82,110	82,153
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	130	4,542	4,672	0	0	1	1	0	67	2,342	2,409
7	0	3,567	2,737	6,304	0	0	0	0	0	2,096	1,609	3,705
8	0	0	81,764	81,764	0	0	5	5	0	0	20,138	20,138
9	0	1,683	181,939	183,622	0	0	10	10	0	436	47,177	47,613
10	0	0	17,339	17,339	0	0	3	3	0	0	2,301	2,301
11	0	128	241,611	241,739	0	0	43	43	0	38	72,629	72,667
12	0	0	513	513	0	0	0	0	0	0	166	166
13	0	0	212,810	212,810	0	0	22	22	0	0	77,867	77,867
14	0	0	215,572	215,572	0	0	14	14	0	0	102,569	102,569
15	0	9	335,714	335,723	0	0	15	15	0	5	193,472	193,477
16	0	340	14,574	14,914	0	0	3	3	0	79	3,397	3,476
17	0	802	8,263	9,065.	0	0	1	1	0	268	2,758	3,026
18	0	5	37,697	37,702	0	0	10	10	0	2	16,043	16,045
19	0	5,497	23,713	29,210	0	1	3	4	0	1,672	7,211	8,883
20	0	1,880	2,684	4,564	0	0	0	0	0	488	697	1,185
21	0	2,009	9,361	11,370	0	0	2	2	0	1,189	5,542	6,731
22	0	1,205	24,669	25,874	0	0	1	1	0	312	6,395	6,707
23	0	6,538	116,550	123,088	0	1	18	19	0	4,237	75,524	79,761
24	0	820	2,846	3,666	0	0	1	1	0	539	1,870	2,409
25	0	7,678	4,331	12,009	0	1	0	1	0	2,609	1,472	4,081
26	0	1,161	1,824	2,985	0	0	0	0	0	791	1,242	2,033
27	0	6,328	34,803	41,131	0	1	9	10	0	4,273	23,499	27,772
28	0	102	942	1,044	0	0	0	0	0	19	175	194
29	0	2,187	6,438	8,625	0	0	0	0	0	826	2,432	3,258
30	0	2,304	7,368	9,672	0	0	1	1	0	485	1,550	2,035
31	0	1,722	10,624	12,346	0	0	1	1	0	528	3,260	3,788
32	0	2,211	30,735	32,946	0	0	2	2	0	735	10,213	10,948
33	0	58	44	102	0	0	0	0	0	0	0	0
34	0	0	560,577	560,577	0	0	84	84	0	0	220,083	220,083
35	0	307,756	168,167	475,923	0	46	25	71	0	105,129	57,446	162,575
36	0	332,632	2,562,809	2,895,441	0	57	443	500	0	186,617	1,437,735	1,624,342
37	0	187,423	252,302	439,725	0	32	43	75	0	100,028	134,653	234,681
38	2,408,826	11,121	329,509	2,749,456	159	1	21	181	498,386	2,301	68,175	568,862
39	0	1,241	45,182	46,423	0	0	4	4	0	718	26,138	26,856
40	0	149,130	4,420,783	4,569,913	0	31	928	959	0	100,752	2,986,681	3,087,433
41	0	253,929	1,327,122	1,581,051	0	29	153	182	0	94,030	491,033	585,463
42	0	70,713	117,799	188,512	0	0	0	0	0	0	0	0
43	0	406,565	836,062	1,242,627	0	18	37	55	0	112,212	230,754	342,966
44	0	0	1,912,058	1,912,058	0	0	0	0	0	0	525,242	525,242
45	0	12,152	619,213	631,365	0	2	111	113	0	4,644	236,664	241,308
46	0	45,701	857,955	903,656	0	18	350	368	0	34,427	646,297	680,724
47	0	141,099	228,423	369,522	0	5	8	13	0	24,904	40,317	65,221
IMPACT TOTAL	20,647,441	2,087,941	16,458,002	39,193,384	6,377	264	2,470	9,111	13,478,808	848,532	8,378,050	22,705,390
Initial				39,500,000				360				1,919,000
GRAND TOTAL	20,647,441	2,087,941	16,458,002	78,693,384	6,377	264	2,470	9,471	13,478,808	848,532	8,378,050	24,624,390

TABLE 3.4-5 OUTPUT, EMPLOYMENT, INCOME.

PHOSPHOROUS

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	101	75,038	75,139	0	0	7	7	0	40	28,940	28,980
2	0	1,084	32,114	33,198	0	0	11	11	0	771	22,856	23,627
3	0	0	1,555	1,555	0	0	0	0	0	0	776	776
4	0	16	21,759	21,775	0	0	6	6	0	11	15,467	15,478
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	63	759	822	0	0	0	0	0	32	392	424
7	1,680,000	2,093	511	1,682,604	137	0	0	137	987,336	1,230	300	988,866
8	0	0	15,823	15,823	0	0	1	1	0	0	3,307	3,307
9	0	2	35,139	35,141	0	0	2	2	0	1	9,111	9,112
10	0	0	2,400	2,400	0	0	0	0	0	0	319	319
11	0	34	46,681	46,715	0	0	8	8	0	10	14,033	14,043
12	0	0	99	99	0	0	0	0	0	0	32	32
13	0	0	41,190	41,190	0	0	4	4	0	0	15,071	15,071
14	0	0	41,712	41,712	0	0	3	3	0	0	19,847	19,847
15	0	78	64,906	64,984	0	0	3	3	0	45	37,105	37,150
16	0	1	2,855	2,856	0	0	1	1	0	0	666	666
17	0	32	1,543	1,575	0	0	0	0	0	11	515	526
18	0	1	7,295	7,296	0	0	2	2	0	0	3,105	3,105
19	0	2,813	3,498	6,311	0	0	1	1	0	855	1,064	1,919
20	0	1,007	471	1,478	0	0	0	0	0	261	123	384
21	0	2	1,803	1,805	0	0	0	0	0	1	1,070	1,071
22	0	403	4,594	4,997	0	0	0	0	0	104	1,191	1,295
23	0	1,305	22,641	23,946	0	0	4	4	0	846	14,675	15,521
24	0	453	524	977	0	0	0	0	0	298	344	642
25	0	2,049	837	2,886	0	0	0	0	0	696	285	981
26	0	160	333	493	0	0	0	0	0	109	227	336
27	0	2,200	6,266	8,466	0	1	1	2	0	1,485	4,231	5,716
28	0	23	169	192	0	0	0	0	0	4	32	36
29	0	1,339	398	1,737	0	0	0	0	0	506	150	656
30	0	1,409	1,346	2,755	0	0	0	0	0	296	284	580
31	0	887	1,990	2,877	0	0	0	0	0	272	611	883
32	0	18,620	5,761	24,381	0	1	0	1	0	6,187	1,915	8,102
33	0	35	10	45	0	0	0	0	0	0	0	0
34	0	0	114,077	114,077	0	0	17	17	0	0	44,787	44,787
35	0	188,305	30,244	218,549	0	28	5	33	0	64,325	10,331	74,656
36	0	75,909	482,369	558,278	0	13	83	96	0	42,585	270,609	313,194
37	0	9,113	46,877	55,990	0	2	8	10	0	4,864	25,018	29,882
38	1,875,000	21,702	63,023	1,959,725	124	1	4	129	387,938	4,490	13,039	405,467
39	0	10,085	8,714	18,799	0	1	1	2	0	5,834	5,041	10,875
40	0	31,639	852,384	884,023	0	7	178	185	0	21,375	575,871	597,246
41	0	5,945	169,545	175,490	0	1	19	20	0	2,201	62,783	64,984
42	0	14,848	17,499	32,347	0	0	0	0	0	0	0	0
43	0	158,066	147,212	305,278	0	7	7	14	0	43,625	40,632	84,257
44	0	0	398,622	398,622	0	0	0	0	0	0	109,501	109,501
45	0	2,289	118,946	121,235	0	1	21	22	0	875	45,461	46,366
46	0	26,298	165,737	192,035	0	11	67	78	0	19,810	124,850	144,660
47	0	21,321	50,733	72,054	0	1	2	3	0	3,763	8,955	12,718
IMPACT TOTAL	3,555,000	601,730	3,108,002	7,264,732	261	75	466	802	1,375,274	227,818	1,536,311	3,139,903
Initial				28,800,000				300				1,750,000
GRAND TOTAL	3,555,000	601,730	3,108,002	36,064,732	261	75	466	1,102	1,375,274	227,818	1,536,311	4,889,903

TABLE 3.4 - 6 OUTPUT, EMPLOYMENT, INCOME

MAGNESIUM HYDROXIDE

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	13	7,275	7,288	0	0	1	1	0	5	2,903	2,908
2	0	77	3,149	3,226	0	0	1	1	0	55	2,241	2,296
3	0	0	114	114	0	0	0	0	0	0	72	72
4	0	1	2,002	2,003	0	0	1	1	0	1	1,423	1,424
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	5	73	78	0	0	0	0	0	3	37	40
7	243,440	143	56	243,639	20	0	0	20	143,070	84	33	143,187
8	0	0	1,263	1,263	0	0	0	0	0	0	311	311
9	0	0	3,477	3,477	0	0	0	0	0	0	902	902
10	0	0	238	238	0	0	0	0	0	0	32	32
11	0	3	4,614	4,617	0	0	1	1	0	1	1,387	1,388
12	0	0	10	10	0	0	0	0	0	0	3	3
13	0	0	4,074	4,074	0	0	0	0	0	0	1,491	1,491
14	0	0	4,125	4,125	0	0	0	0	0	0	1,963	1,963
15	0	11	6,428	6,439	0	0	0	0	0	6	3,705	3,711
16	0	0	284	284	0	0	0	0	0	0	66	66
17	0	3	143	146	0	0	0	0	0	1	48	49
18	0	0	722	722	0	0	0	0	0	0	307	307
19	0	196	379	575	0	0	0	0	0	60	115	175
20	0	72	45	117	0	0	0	0	0	19	11	30
21	0	0	179	179	0	0	0	0	0	0	106	106
22	0	31	404	435	0	0	0	0	0	8	105	113
23	0	118	2,179	2,297	0	0	0	0	0	76	1,412	1,488
24	0	33	51	84	0	0	0	0	0	22	33	55
25	0	127	81	208	0	0	0	0	0	43	28	71
26	0	12	31	43	0	0	0	0	0	8	21	29
27	0	159	587	746	0	0	0	0	0	107	397	504
28	0	2	16	18	0	0	0	0	0	0	3	3
29	0	96	34	130	0	0	0	0	0	36	13	49
30	0	101	134	235	0	0	0	0	0	21	28	49
31	0	63	168	231	0	0	0	0	0	19	52	71
32	0	2,613	548	3,161	0	0	0	0	0	868	181	1,050
33	0	2	1	3	0	0	0	0	0	0	0	0
34	0	0	10,500	10,500	0	0	2	2	0	0	4,122	4,122
35	0	13,449	2,867	16,316	0	2	0	2	0	4,594	980	5,574
36	0	5,570	47,688	53,258	0	1	8	9	0	3,125	26,753	29,878
37	0	941	4,554	5,495	0	0	1	1	0	502	2,431	2,933
38	2,625	3,018	6,147	11,790	0	0	1	1	543	624	1,272	2,439
39	0	1,451	852	2,303	0	0	0	0	0	839	493	1,332
40	0	2,419	84,417	86,836	0	0	18	18	0	1,634	57,032	58,666
41	0	401	25,072	25,473	0	0	3	3	0	148	9,285	9,433
42	0	838	2,031	2,869	0	0	0	0	0	0	0	0
43	0	20,576	14,590	35,166	0	1	1	2	0	5,679	4,027	9,706
44	0	0	39,441	39,441	0	0	0	0	0	0	10,834	10,834
45	0	152	11,709	11,861	0	0	2	2	0	58	4,475	4,533
46	0	123	16,551	16,674	0	0	7	7	0	93	12,468	12,561
47	0	2,345	3,951	6,296	0	0	0	0	0	414	697	1,111
IMPACT TOTAL	246,065	55,164	313,283	614,513	20	4	47	71	143,613	19,153	154,298	317,064
Initial				23,986,000				45				170,000
GRAND TOTAL	246,065	55,164	313,283	24,600,513	20	4	47	116	143,613	19,153	154,298	487,064

TABLE 3.4-7 OUTPUT, EMPLOYMENT, INCOME

ALUMINUM CABLE

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	0	2,368	2,368	0	0	0	0	0	0	945	945
2	0	1	1,113	1,114	0	0	0	0	0	1	792	793
3	0	0	55	55	0	0	0	0	0	0	27	27
4	0	0	760	760	0	0	0	0	0	0	540	540
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	29	29	0	0	0	0	0	0	15	15
7	0	2	20	22	0	0	0	0	0	1	12	13
8	0	0	540	540	0	0	0	0	0	0	133	133
9	0	0	1,203	1,203	0	0	0	0	0	0	312	312
10	0	0	83	83	0	0	0	0	0	0	11	11
11	0	0	1,592	1,592	0	0	0	0	0	0	479	479
12	0	0	3	3	0	0	0	0	0	0	1	1
13	0	0	1,405	1,405	0	0	0	0	0	0	514	514
14	0	0	1,420	1,420	0	0	0	0	0	0	676	676
15	0	0	2,475	2,475	0	0	0	0	0	0	1,426	1,426
16	0	0	98	98	0	0	0	0	0	0	23	23
17	0	0	54	54	0	0	0	0	0	0	18	18
18	0	0	248	248	0	0	0	0	0	0	106	106
19	0	3	182	185	0	0	0	0	0	1	55	56
20	0	1	17	18	0	0	0	0	0	0	5	5
21	0	0	63	63	0	0	0	0	0	0	37	37
22	0	1	161	162	0	0	0	0	0	0	42	42
23	0	1	769	770	0	0	0	0	0	1	498	499
24	0	1	20	21	0	0	0	0	0	1	13	14
25	0	3	27	30	0	0	0	0	0	1	9	10
26	0	0	12	12	0	0	0	0	0	0	8	8
27	0	2	230	232	0	0	0	0	0	1	156	157
28	0	0	5	5	0	0	0	0	0	0	1	1
29	0	1	18	19	0	0	0	0	0	0	7	7
30	0	2	52	54	0	0	0	0	0	0	11	11
31	0	1	66	67	0	0	0	0	0	0	21	21
32	0	1	224	225	0	0	0	0	0	0	75	75
33	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	3,978	3,978	0	0	1	1	0	0	1,562	1,562
35	0	205	1,124	1,329	0	0	0	0	0	70	384	454
36	0	81	16,882	16,963	0	0	3	3	0	45	9,471	9,516
37	0	6	1,755	1,761	0	0	0	0	0	3	937	940
38	4,000	2	2,142	6,144	0	0	0	0	828	0	443	1,271
39	0	0	465	465	0	0	0	0	0	0	269	269
40	0	32	29,186	29,218	0	0	6	6	0	22	19,718	19,740
41	0	7	8,745	8,752	0	0	1	1	0	3	3,238	3,241
42	0	20	778	798	0	0	0	0	0	0	0	0
43	0	35	5,521	5,556	0	0	0	0	0	10	1,523	1,533
44	0	0	13,581	13,581	0	0	0	0	0	0	3,731	3,731
45	0	3	4,227	4,230	0	0	1	1	0	1	1,616	1,617
46	0	55	5,683	5,738	0	0	2	2	0	41	4,281	4,322
47	0	11	1,509	1,520	0	0	0	0	0	2	266	268
IMPACT TOTAL	4,000	477	110,890	115,367	0	0	14	14	828	204	54,407	55,439
Initial				2,850,000				21				105,000
GRAND TOTAL	4,000	477	110,890	2,965,367	0	0	14	35	828	204	54,407	160,439

TABLE 3.4 - 8 OUTPUT, EMPLOYMENT, INCOME

BREWERY

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	0	8,618	8,618	0	0	1	1	0	0	3,439	3,439
2	0	3	3,743	3,798	0	0	1	1	0	2	2,683	2,685
3	0	0	183	183	0	0	0	0	0	0	91	91
4	0	0	2,555	2,555	0	0	0	0	0	0	1,816	1,816
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	103	103	0	0	0	0	0	0	53	53
7	0	6	61	67	0	0	0	0	0	4	35	39
8	0	0	1,810	1,810	0	0	0	0	0	0	446	446
9	0	0	4,067	4,067	0	0	0	0	0	0	1,055	1,055
10	0	0	276	276	0	0	0	0	0	0	37	37
11	0	0	5,342	5,342	0	0	1	1	0	0	1,606	1,606
12	0	0	10	10	0	0	0	0	0	0	3	3
13	0	0	4,710	4,710	0	0	0	0	0	0	1,723	1,723
14	0	0	4,772	4,772	0	0	0	0	0	0	2,271	2,271
15	0	0	7,430	7,430	0	0	0	0	0	0	4,282	4,282
16	0	0	325	325	0	0	0	0	0	0	76	76
17	0	0	187	187	0	0	0	0	0	0	62	62
18	0	0	833	833	0	0	0	0	0	0	355	355
19	0	8	616	624	0	0	0	0	0	2	188	190
20	0	3	59	62	0	0	0	0	0	1	15	16
21	0	0	207	207	0	0	0	0	0	0	123	123
22	0	1	551	552	0	0	0	0	0	0	143	143
23	0	3	2,570	2,573	0	0	0	0	0	2	1,665	1,667
24	0	1	67	68	0	0	0	0	0	1	44	45
25	0	6	106	112	0	0	0	0	0	2	36	38
26	0	0	42	42	0	0	0	0	0	0	29	29
27	0	6	770	776	0	0	0	0	0	4	520	524
28	0	0	20	20	0	0	0	0	0	0	4	4
29	0	4	92	96	0	0	0	0	0	2	34	36
30	0	4	173	177	0	0	0	0	0	1	36	37
31	0	2	251	253	0	0	0	0	0	1	77	78
32	0	3	700	703	0	0	0	0	0	1	233	234
33	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	13,364	13,364	0	0	2	2	0	0	5,247	5,247
35	0	505	3,704	4,209	0	0	0	0	0	173	1,265	1,438
36	0	198	56,783	56,981	0	0	10	10	0	111	31,855	31,966
37	0	14	5,585	5,599	0	0	1	1	0	7	2,981	2,988
38	9,828	5	7,317	17,150	1	0	0	1	2,033	1	1,514	3,548
39	0	0	1,014	1,014	0	0	0	0	0	0	587	587
40	0	79	97,976	98,055	0	0	20	20	0	53	66,193	66,246
41	0	17	29,312	29,389	0	0	3	3	0	6	10,877	10,883
42	0	48	2,595	2,643	0	0	0	0	0	0	0	0
43	0	85	18,562	18,647	0	0	1	1	0	23	5,124	5,147
44	0	0	45,578	45,578	0	0	0	0	0	0	12,520	12,520
45	0	7	13,735	13,742	0	0	2	2	0	3	5,249	5,252
46	0	135	18,977	19,132	0	0	8	8	0	102	14,303	14,405
47	0	27	5,100	5,127	0	0	0	0	0	5	900	905
IMPACT TOTAL	9,828	1,170	380,983	391,981	1	0	50	51	2,033	507	181,795	184,335
Initial				2,622,400				60				349,650
GRAND TOTAL	9,828	1,170	380,983	3,014,381	1	0	50	111	2,033	507	181,795	533,985

TABLE 3.4 - 9 OUTPUT, EMPLOYMENT, INCOME

FISHMEAL

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	147	39,186	39,333	0	0	4	4	0	59	15,635	15,694
2	0	14,706	16,613	31,319	0	5	5	10	0	10,466	11,824	22,290
3	0	0	1,018	1,018	0	0	0	0	0	0	508	508
4	1,920,000	7,324	13,548	1,940,872	526	2	4	532	1,364,736	5,206	9,630	1,379,572
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	49,988	516	50,504	0	9	0	9	0	25,774	266	26,040
7	0	232	315	547	0	0	0	0	0	136	185	321
8	0	0	8,021	8,021	0	0	0	0	0	0	1,976	1,976
9	0	3	18,117	18,120	0	0	1	1	0	1	4,698	4,699
10	0	0	1,211	1,211	0	0	0	0	0	0	161	161
11	0	15,202	22,844	38,046	0	2	5	7	0	4,570	6,867	11,437
12	0	0	50	50	0	0	0	0	0	0	16	16
13	0	6	20,825	20,831	0	0	2	2	0	2	7,620	7,622
14	0	0	21,162	21,162	0	0	1	1	0	0	10,069	10,069
15	0	30	32,850	32,880	0	0	1	1	0	17	18,932	18,949
16	0	0	1,443	1,443	0	0	0	0	0	0	336	336
17	0	39,750	1,235	40,985	0	4	0	4	0	13,269	412	13,681
18	0	1	3,690	3,691	0	0	1	1	0	0	1,571	1,571
19	0	2,321	1,448	3,769	0	0	0	0	0	706	440	1,146
20	0	11,177	266	11,443	0	1	0	1	0	2,902	69	2,971
21	0	2	918	920	0	0	0	0	0	1	544	545
22	0	258	3,133	3,391	0	0	0	0	0	67	812	879
23	0	297	11,665	11,962	0	0	2	2	0	192	7,559	7,751
24	0	93	260	353	0	0	0	0	0	61	171	232
25	0	4,794	429	5,223	0	0	0	0	0	1,629	146	1,775
26	0	366	209	575	0	0	0	0	0	249	143	392
27	0	952	3,957	4,909	0	0	1	1	0	643	2,672	3,315
28	0	2,690	96	2,786	0	0	0	0	0	501	17	518
29	0	142	362	504	0	0	0	0	0	54	136	190
30	0	150	637	787	0	0	0	0	0	32	134	166
31	0	94	986	1,080	0	0	0	0	0	29	302	331
32	0	7,104	3,149	10,253	0	1	0	1	0	2,361	1,046	3,407
33	0	4	5	9	0	0	0	0	0	0	0	0
34	0	0	73,607	73,607	0	0	11	11	0	0	28,898	28,898
35	0	19,992	19,355	39,347	0	3	3	6	0	6,829	6,612	13,441
36	0	58,063	262,979	321,042	0	10	45	55	0	32,573	147,532	180,105
37	0	10,421	26,462	36,883	0	2	4	6	0	5,562	14,122	19,684
38	5,760	2,159	34,240	42,159	0	0	2	2	1,192	447	7,084	8,723
39	0	277	4,657	4,934	0	0	0	0	0	160	2,694	2,854
40	0	36,994	435,010	472,004	0	8	91	99	0	24,993	293,893	318,886
41	0	3,171	132,177	135,448	0	0	15	15	0	1,174	48,982	50,156
42	0	1,336	14,168	15,504	0	0	0	0	0	0	0	0
43	0	52,800	96,207	149,007	0	2	4	6	0	14,573	26,553	41,126
44	0	0	201,898	201,898	0	0	0	0	0	0	55,461	55,461
45	0	337	60,516	60,853	0	0	11	11	0	129	23,129	23,258
46	0	386	84,859	85,245	0	0	34	34	0	291	63,924	64,215
47	0	3,337	26,607	29,944	0	0	1	1	0	589	4,696	5,285
IMPACT TOTAL	1,925,760	347,061	1,703,052	3,975,873	526	49	248	823	1,365,928	156,247	828,477	2,350,652
Initial				3,200,000				50				80,040
GRAND TOTAL	1,925,760	347,061	1,703,052	7,175,873	526	49	248	873	1,365,928	156,247	828,477	2,430,692

TABLE 3.4 - 10 OUTPUT, EMPLOYMENT, INCOME

DAIRY

	OUTPUT IN DOLLARS				EMPLOYMENT IN MAN-YEARS				INCOME IN DOLLARS			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
1	0	0	615	615	0	0	0	0	0	0	245	245
2	0	1	268	269	0	0	0	0	0	0	191	191
3	0	0	2	2	0	0	0	0	0	0	1	1
4	0	0	182	182	0	0	0	0	0	0	129	129
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	7	7	0	0	0	0	0	0	4	4
7	0	1	4	5	0	0	0	0	0	1	2	3
8	0	0	131	131	0	0	0	0	0	0	32	32
9	0	0	288	288	0	0	0	0	0	0	75	75
10	0	0	19	19	0	0	0	0	0	0	3	3
11	0	0	382	382	0	0	0	0	0	0	115	115
12	0	0	1	1	0	0	0	0	0	0	0	0
13	0	0	335	335	0	0	0	0	0	0	123	123
14	0	0	341	341	0	0	0	0	0	0	162	162
15	0	0	528	528	0	0	0	0	0	0	304	304
16	0	0	21	21	0	0	0	0	0	0	5	5
17	0	0	14	14	0	0	0	0	0	0	5	5
18	0	0	59	59	0	0	0	0	0	0	25	25
19	0	1	50	51	0	0	0	0	0	0	16	16
20	0	0	2	2	0	0	0	0	0	0	1	1
21	0	0	15	15	0	0	0	0	0	0	9	9
22	0	0	40	40	0	0	0	0	0	0	10	10
23	0	0	185	185	0	0	0	0	0	0	120	120
24	0	0	5	5	0	0	0	0	0	0	3	3
25	0	1	6	7	0	0	0	0	0	0	2	2
26	0	0	2	2	0	0	0	0	0	0	1	1
27	0	1	54	55	0	0	0	0	0	1	36	37
28	0	0	1	1	0	0	0	0	0	0	0	0
29	0	0	2	2	0	0	0	0	0	0	1	1
30	0	0	13	13	0	0	0	0	0	0	3	3
31	0	0	18	18	0	0	0	0	0	0	6	6
32	0	0	50	50	0	0	0	0	0	0	17	17
33	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	1,130	1,130	0	0	0	0	0	0	444	444
35	0	62	263	325	0	0	0	0	0	21	90	111
36	0	24	4,048	4,072	0	0	0	0	0	13	2,271	2,284
37	0	2	399	401	0	0	0	0	0	1	213	214
38	1,200	1	520	1,721	0	0	0	0	248	0	108	356
39	0	0	74	74	0	0	0	0	0	0	43	43
40	0	10	6,993	7,003	0	0	1	1	0	7	4,724	4,731
41	0	2	2,096	2,098	0	0	0	0	0	1	776	777
42	0	6	185	191	0	0	0	0	0	0	0	0
43	0	10	1,327	1,337	0	0	0	0	0	3	366	369
44	0	0	3,250	3,250	0	0	0	0	0	0	893	893
45	0	1	981	982	0	0	0	0	0	0	375	375
46	0	16	1,355	1,371	0	0	0	0	0	12	1,021	1,033
47	0	3	373	376	0	0	0	0	0	1	65	66
IMPACT TOTAL	1,200	142	26,634	27,976	0	0	1	1	248	61	13,035	13,344
Initial				88,100				12				25,000
GRAND TOTAL	1,200	142	26,634	116,076	0	0	1	13	248	61	13,035	38,344

From Tables 3.4-1 to 3.4-10 it is apparent that the indirect impact of these industries upon the economy is fairly small. However, the induced income effect is large. This is due to the small number of interindustry transactions. Most industries import their raw materials. This limits the amount of backward linkage. The larger sectors such as fish processing, pulp and paper, and mining export their products. This limits the foreward linkage from these industries. The food processing industries import raw material, process it and sell it to the consumer, again limiting linkages. This lack of backward and foreward linkage in the economy severly limits the indirect effect of a new industry.

Most of the expansionary effect of new industry is due to induced demand by households. In most industries, labor comprises a large share of local inputs. The demand by households for consumer goods and services comprise a large share of the expansionary process.

Using the results shown in Tables 3.2-1 to 3.2-10 and 3.4-1 to 3.4-10 ratios can be constructed to compare the impact of the new industries. The relevant ratios are:

(1) $\frac{\text{Total Impact Production}}{\text{Plant Output}}$

By taking the ratio between the total impact production - (ie.) direct and indirect input requirements and induced output - and the initial plant output we can measure the impact of the new plant on the economy in relation to its own capacity. We can see whether or not the impact of the new plant on the existing sectors of the economy is significant in comparison to the size of the new plant.

$$(2\text{-}1) \qquad \frac{\text{Plant Output}}{\text{Capital Investment}}$$

This ratio gives an annual rate of return, in terms of production, for the new plant per dollar of investment.

$$(2\text{-}2) \qquad \frac{\text{Total Impact Production}}{\text{Capital Investment}}$$

From this ratio we derive an annual rate of return per dollar of investment in terms of increased production in other sectors of the economy resulting from a new plant.

$$(3) \qquad \frac{\text{Total New Employment}}{\text{Plant Employment}}$$

This gives us a ratio between total new employment created throughout the economy and the initial plant employment.

(4-1) $\frac{\text{Initial Plant Output}}{\text{Wage Bill of Plant}}$

This ratio gives an annual rate of return per dollar of labor input for the plant.

(4-2) $\frac{\text{Total Impact Production}}{\text{Wage Bill of Plant}}$

From this ratio we derive an annual rate of return per dollar of labor input in terms of increased production in other sectors of the economy resulting from a new plant.

(5-1) $\frac{\text{Wage Bill of Plant}}{\text{Capital Investment}}$

This shows the income generated in a new plant per dollar of investment.

(5-2) $\frac{\text{Total Income Generated}}{\text{Capital Investment}}$

This shows the income generated throughout the entire economy per dollar of investment in a new plant.

(6) $\frac{\text{Total Income Generated}}{\text{Wage Bill of Plant}}$

This gives a measure of total income generated throughout the entire economy per dollar of labor input in a new plant.

TABLE 3-5

IMPACT OF NEW INDUSTRIES

	1*	2-1*	2-2*	3*	4-1*	4-2*	5-1*	5-2*	6*
Petroleum Refinery	0.012	1.546	0.019	2.990	285.910	3.498	0.005	0.012	2.190
Anhydrous Ammonia	0.053	1.148	0.061	2.614	54.502	1.646	0.021	0.043	2.025
Newsprint	0.519	0.497	0.258	10.990	16.300	8.458	0.030	0.173	5.713
Linerboard	0.992	0.377	0.373	26.308	20.584	20.423	0.018	0.235	12.832
Phosphorous	0.252	0.789	0.199	3.673	16.457	4.151	0.048	0.134	2.794
Magnesium Hydroxide	0.026	6.536	0.167	2.578	141.094	3.615	0.046	0.133	2.865
Aluminum Cable	0.041	2.209	0.090	1.667	27.143	1.099	0.081	0.124	2.949
Brewery	0.149	0.790	0.118	1.850	7.500	1.121	0.105	0.161	1.527
Fishmeal	1.242	6.987	8.681	17.460	39.980	48.424	0.175	5.307	30.368
Dairy	0.318	4.008	1.273	1.083	3.524	1.119	1.137	1.744	1.534

For explanation of these column headings see pages 78 to 80.

These ratios are shown in Table 3.5.

From these ratios we see that many of the new industries do not have a significant impact on the other sectors of the economy. Ratio 1 shows us that only the newsprint mill, linerboard mill and fishmeal plant have a significant effect on the output of the other sectors. These three industries are large users of the products of local primary sectors, whereas the others import most of their inputs. Even in the case of the three industries with a significant impact, this impact does not extend much beyond the primary sectors that supply the raw material inputs.

Ratio 2-1 shows that the newsprint, linerboard, phosphorous, and brewing industries do not have a high rate of return in terms of production per dollar of investment. This reflects their capital intensity. The other industries have a high rate of return. However, when we look at Ratio 2-2, the situation is somewhat reversed. The annual rate of return per dollar of investment in terms of increased production in the other sectors of the economy is highest in the newsprint, linerboard, fishmeal, and dairy industries. For the first three this is again due to their heavy dependence on the primary sectors.

If we take Ratio 3, total new employment to plant employment, we again see that newsprint, linerboard and fishmeal have the largest impact. This reflects the low productivity per man in the primary sectors that supply inputs to these industries.

Ratio 4-1 shows that the greatest return per dollar of labor input is in the petroleum refinery, anhydrous ammonia plant, and magnesium hydroxide plant. However, the greatest impact on the other sectors of the economy - Ratio 4-2 - is again as a result of newsprint, linerboard and fishmeal production. This is also true of Ratio 5-2 and Ratio 6.

These ratios show that newsprint, linerboard and fishmeal have the greatest impact on other sectors of the economy. This is due to their dependence on the local primary sectors. On the other hand, if we consider only productivity within the new plant, the greatest returns to investment and labor inputs are achieved in the petroleum and chemical industries.

CHAPTER IV

REGIONAL IMPORTS

In Chapter III the impact of the development of the industries in the Come-by-Chance - Long Harbour and Stephenville areas upon the existing sectors of the Newfoundland economy was investigated. However, these developments will also necessitate an increase in imports. Therefore, the next step is to calculate the economic impact of the development of these two "growth areas" on other regions having trade relations with Newfoundland. Some of the direct input requirements of the new industries must be imported. In addition, there will be an increase in imports as a result of indirect and induced output expansions. As indirect and induced output expansions take place, there will be a need for increased imports to be used as inputs to sustain the increased output levels.

After the total import requirements have been calculated, the regional origin of these imports is analized.

The import requirements generated by each industry, and their origin, are given in Tables 4.1-1 to 4.1-10. Import requirements of each new industry are shown in the "Direct Import" Column. Imports arising from increased

indirect and induced demand are shown in the "Indirect and Induced Imports" column. The remaining columns show the regional origins of these imports. The origins of direct import requirements was obtained from press releases and direct contact with the industries. The regional origin of indirect and induced import requirements is estimated from the 1960 ADB Input-Output Table for Newfoundland.

From Tables 4.1-1 to 4.1-10 we can see that the relative importance of trade with the other three Atlantic Provinces as compared with other regions is small. They provide only a small fraction of Newfoundland's total import requirements. In some sectors, however, they provide a large share of these requirements. (eg.) 5 - Sandpits and Quarries, 11 - Secondary Fishing, 20 - Miscellaneous Wood Products, 22 - Pulp and Paper Mills, and 23 - Printing and Publishing. It can be seen that the Atlantic Provinces provide goods that are also produced in Newfoundland.

TABLE 4.1-1 IMPORT REQUIREMENTS OF ECONOMY DUE TO PETROLEUM REFINERY

	Direct Import Requirements	Indirect & Induced Imp. Requirements	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Rest of Canada and Foreign
1	$ 0	$ 7990	$ 7990	$ 1175	$ 257	$ 166	$ 6392
2	0	72	72	0	4	0	68
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	48	48	14	0	0	34
7	0	62	62	62	0	0	0
8	0	2926	2926	8	308	487	2123
9	0	6371	6371	382	681	438	4870
10	0	0	0	0	0	0	0
11	0	1129	1129	290	397	0	442
12	0	21	21	1	0	0	20
13	0	5078	5078	789	156	0	4133
14	0	1	1	0	0	0	1
15	0	0	0	0	0	0	0
16	0	543	543	0	0	0	543
17	0	60	60	0	0	60	0
18	0	1473	1473	31	0	0	1442
19	0	1071	1071	318	193	0	560
20	0	162	162	114	0	0	48
21	0	361	361	12	1	0	348
22	0	50	50	0	47	0	3
23	0	1454	1454	1073	0	0	381
24	0	150	150	5	0	0	145
25	0	502	502	23	17	9	453
26	0	103	103	1	0	0	102
27	0	1204	1204	146	0	0	1058
28	0	38	38	8	0	0	30
29	0	2	2	0	2	0	0
30	0	498	498	22	0	0	476
31	0	334	334	3	1	0	330
32	0	808	808	105	20	0	683
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	5700	5700	0	0	0	5700
011	87243790	0	87243790	0	0	0	87243790
	$87243790	$38211	$87282001	$4582	$2084	$1160	$87274175

TABLE 4.1-2 IMPORT REQUIREMENTS OF ECONOMY DUE TO ANHYDROUS AMMONIA

	Direct Imports	Indirect and Induced Imps.	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Others
1	$ 0	$ 20188	$ 20188	$ 2966	$ 650	$ 4199	$ 16572
2	0	86	86	0	5	0	81
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	83	83	24	0	0	59
7	0	73	73	73	0	0	0
8	0	31758	31758	92	3344	5281	23041
9	0	58443	58443	3507	6248	4021	44667.
10	0	0	0	0	0	0	0
11	0	1571	1571	404	553	0	614
12	0	38544	38544	2559	0	116	35869
13	0	15268	15268	2373	469	0	12426
14	0	1	1	0	0	0	1
15	0	0	0	0	0	0	0
16	0	7313	7313	0	37	0	7313
17	0	93	93	0	0	93	0
18	0	55640	55640	1185	0	0	54455
19	0	5716	5716	1695	1031	0	2990
20	0	372	372	262	0	0	110
21	0	10359	10359	342	24	0	9993
22	0	67	67	0	63	0	4
23	0	2592	2592	1914	0	0	678
24	0	558	558	18	0	0	540
25	0	1865	1865	80	65	32	1688
26	0	9187	9187	52	0	0	9135
27	0	4334	4334	527	0	0	3807
28	0	577	577	129	4	0	444
29	0	2	2	0	2	0	0
30	0	2893	2893	130	0	0	2763
31	0	828	828	7	3	0	818
32	0	2183	2183	283	53	0	1747
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	7282	7282	0	0	0	7282
	$ 0	$277876	$277876	$18622	$12551	$13742	$237097

TABLE 4.1-3 IMPORT REQUIREMENTS OF ECONOMY DUE TO NEWSPRINT

	Direct Imports	Indirect and Induced Imps.	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Other
1	$ 0	$177562	$177562	$26102	$5717	$36933	$108810
2	0	520	520	0	26	0	494
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	614	614	177	0	0	437
7	0	122	122	122	0	0	0
8	0	240034	240034	696	25275	39918	174145
9	0	443845	443845	26631	47447	30536	339231
10	0	0	0	0	0	0	0
11	0	11893	11893	3059	4183	0	4651
12	0	274228	274228	18209	0	823	255196
13	0	115487	115487	17947	3545	0	93995
14	0	7	7	0	0	0	7
15	0	0	0	0	0	0	0
16	0	55841	55841	0	279	0	55562
17	0	758	758	0	0	758	0
18	0	420679	420679	8960	0	0	411719
19	0	37690	37690	11179	6799	0	19712
20	0	1220	1220	859	0	0	361
21	0	91075	91075	3005	209	0	87860
22	0	488	488	0	457	0	31
23	0	19437	19437	14350	0	0	5087
24	0	2745	2745	87	0	0	2658
25	0	9278	9278	418	323	159	8378
26	0	78723	78723	449	0	0	78274
27	0	29931	29931	3640	0	0	26291
28	0	4266	4266	953	28	0	3285
29	0	4	4	0	4	0	0
30	0	12869	12869	580	0	0	12289
31	0	4947	4947	40	17	0	4890
32	0	15101	15101	1959	370	0	12772
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	106170	106170	0	0	0	106170
	322400	0	322400	322400	0	0	0
	$322400	$2155534	$2477934	$461824	$94679	$109127	$1812305

TABLE 4.1-4 IMPORT REQUIREMENTS OF ECONOMY DUE TO LINERBOARD

	Direct Imports	Indirect and Induced Imps	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Other
1	$ 0	$499172	$499172	$ 73378	$16073	$103828	$305893
2	0	1317	1317	0	67	0	1250
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	1669	1669	482	0	0	1187
7	0	734	734	733	0	0	1
8	0	638635	638635	1852	67248	106205	463330
9	0	1180581	1180581	70835	126204	81224	902318
10	0	0	0	0	0	0	0
11	0	31660	31660	8143	11135	0	12382
12	0	729265	729265	48423	0	2188	678654
13	0	307126	307126	47727	9429	0	249970
14	0	21	21	0	0	0	21
15	0	0	0	0	0	0	0
16	0	148805	148805	0	744	0	148061
17	0	2026	2026	0	0	2026	0
18	0	1118785	1118785	23830	0	0	1094955
19	0	101193	101193	30014	18255	0	52924
20	0	4739	4739	3336	0	0	1403
21	0	250605	250605	8270	576	0	241759
22	0	1330	1330	1	1244	0	85
23	0	52178	52178	38523	0	0	13655
24	0	8393	8393	266	0	0	8127
25	0	29934	29934	1350	1042	512	27030
26	0	226646	226646	1292	0	0	225354
27	0	81141	81141	9867	0	0	71274
28	0	11594	11594	2590	77	0	8927
29	0	45	45	0	45	0	0
30	0	40438	40438	1824	0	0	38614
31	0	13780	13780	113	47	0	13620
32	0	39927	39927	5197	978	0	33770
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	145670	145670	0	0	0	145670
	$ 0	$5667309	$6045337	$378028	$253164	$295983	$4740233

TABLE 4.1-5 IMPORT REQUIREMENTS OF ECONOMY DUE TO PHOSPHOROUS

	Direct Imports	Indirect and Induced Imps	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Other
1	$ 0	$ 78487	$ 78487	$ 11538	$ 2527	$ 16325	$ 48097
2	0	345	345	0	17	0	328
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	293	293	85	0	0	208
7	6731000	325	6731325	325	0	0	6731000
8	0	123585	123585	358	13014	20552	89661
9	0	225934	225934	13556	24152	15544	172681
10	0	0	0	0	0	0	0
11	0	6116	6116	1573	2151	0	2392
12	0	140825	140825	9351	0	42	131052
13	0	59446	59446	9238	1825	0	48383
14	0	4	4	0	0	0	4
15	0	0	0	0	0	0	0
16	0	28489	28489	0	142	0	28347
17	0	352	352	0	0	352	0
18	0	216522	216522	4612	0	0	211910
19	0	21861	21861	6484	3944	0	11433
20	0	1534	1534	1080	0	0	454
21	0	39876	39876	1316	92	0	38468
22	0	257	257	0	241	0	16
23	0	10152	10152	7495	0	0	2657
24	0	2239	2239	71	0	0	2168
25	0	7194	7194	324	251	123	6496
26	0	37437	37437	213	0	0	37224
27	0	16688	16688	2029	0	0	14659
28	0	2136	2136	477	14	0	1645
29	0	8	8	0	8	0	0
30	0	11512	11512	519	0	0	10993
31	0	3197	3197	26	11	0	3160
32	1092000	29336	1121336	3805	719	0	1116812
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	28085	28085	0	0	0	28085
	$7823000	$1092235	$8915235	$71475	$49108	$52938	$8738333

TABLE 4.1-6 IMPORT REQUIREMENTS OF ECONOMY DUE TO

MAGNESIUM HYDROXIDE

	Direct Imports	Indirect and Induced Imps.	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Other
1	$ 0	$ 7614	$ 7614	$ 1119	$ 245	$ 1584	$ 4666
2	0	33	33	0	2	0	31
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	28	28	8	0	0	20
7	0	33	33	33	0	0	0
8	0	12505	12505	36	1337	2080	9072
9	0	22357	22357	1341	2390	1538	17087
10	0	0	0	0	0	0	0
11	0	604	604	155	212	0	236
12	0	14343	14343	952	0	43	13348
13	0	5881	5881	914	181	0	4787
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	2824	2824	0	0	0	2824
17	0	32	32	0	0	32	0
18	0	21438	21438	457	0	0	20981
19	0	1992	1992	591	359	0	1042
20	0	121	121	85	0	0	36
21	0	3925	3925	13	9	0	3786
22	0	22	22	0	21	0	1
23	0	975	975	720	0	0	255
24	0	191	191	6	0	0	185
25	0	517	517	23	18	9	467
26	0	3322	3322	19	0	0	3303
27	0	1471	1471	179	0	0	1292
28	0	201	201	45	1	0	155
29	0	0	0	0	0	0	0
30	0	983	983	44	0	0	939
31	0	315	315	3	1	0	311
32	0	3830	3830	497	94	0	3239
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	2679	2679	0	0	0	2679
68	174652	0	174652	0	0	0	174652
	$174652	$108236	$440026	$7240	$4870	$5286	$265374

TABLE 4.1-7 IMPORT REQUIREMENTS OF ECONOMY DUE TO ALUMINUM CABLE

	Direct Imports	Indirect and Induced Imps.	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Other
1	$ 0	$ 2473	$ 2473	$ 364	$ 80	$ 514	$ 1515
2	0	11	11	0	1	0	10
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	6	6	2	0	0	4
7	0	2	2	2	0	0	0
8	0	4211	4211	12	443	700	3055
9	0	7733	7733	464	827	532	5910
10	0	0	0	0	0	0	0
11	0	209	209	54	74	0	82
12	0	4786	4786	318	0	14	4454
13	0	2025	2025	315	62	0	1648
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	976	976	0	5	0	971
17	0	12	12	0	0	12	0
18	0	7372	7372	157	0	0	7215
19	0	651	651	193	117	0	340
20	0	21	21	15	0	0	6
21	0	1383	1383	46	3	0	1334
22	0	7	7	0	7	0	0
23	0	326	326	241	0	0	85
24	0	51	51	2	0	0	49
25	0	84	84	4	3	1	76
26	0	928	928	5	0	0	923
27	1575000	457	1575457	56	0	0	1575401
28	0	70	70	16	0	0	54
29	0	0	0	0	0	0	0
30	0	224	224	10	0	0	214
31	0	92	92	1	0	0	91
32	0	275	275	36	7	0	232
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	852	852	0	0	0	852
68	5245	0	5245	0	0	0	5245
	$1580245	$35237	$1615482	$2313	$1629	$1773	$1609762

TABLE 4.1-8 IMPORT REQUIREMENTS OF ECONOMY DUE TO BREWERY

	Direct Imports	Indirect and Induced Imps.	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Other
1	$ 1750	$ 9002	$ 10752	$ 1323	$ 290	$ 1872	$ 7267
2	0	39	39	0	2	0	37
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	27	27	1	0	0	26
7	0	7	7	7	0	0	0
8	0	1605	1605	5	169	267	1164
9	222875	26148	249023	1569	2795	1799	242860
10	0	0	0	0	0	0	0
11	0	619	619	160	218	0	241
12	0	10	10	1	0	0	9
13	0	2782	2782	432	85	0	2265
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	295	295	0	0	0	295
17	0	34	34	0	0	34	0
18	0	806	806	17	0	0	789
19	0	484	484	144	87	0	231
20	0	32	32	23	0	0	9
21	0	198	198	7	0	0	191
22	0	27	27	0	27	0	0
23	0	766	766	566	0	0	200
24	0	47	47	1	0	0	46
25	0	80	80	4	3	1	72
26	0	41	41	0	0	0	41
27	0	515	515	63	0	0	452
28	0	18	18	4	0	0	14
29	0	0	0	0	0	0	0
30	0	143	143	6	0	0	137
31	0	133	133	1	0	0	132
32	0	385	385	50	9	0	326
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	2729	2729	0	0	0	2729
58	480	0	480	0	0	0	480
	$225105	$46972	$272077	$4384	$3685	$3973	$260012

TABLE 4.1 - 9 IMPORT REQUIREMENTS OF ECONOMY DUE TO FISHMEAL PLANT

	Direct Imports	Indirect and Induced Imports	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Other
1	0	$ 41,086	$ 41,086	$ 6,040	$ 1,323	$ 8,546	$ 25,177
2	0	326	326	0	16	0	310
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	18,041	18,041	5,214	0	0	12,827
7	0	64	64	64	0	0	0
8	0	62,649	62,649	182	6,597	10,419	45,451
9	0	116,501	116,501	6,990	12,454	8,015	89,042
10	0	0	0	0	0	0	0
11	0	4,983	4,983	1,282	1,753	0	1,948
12	0	442,368	442,368	29,373	0	133	412,862
13	0	30,063	30,063	4,672	923	0	24,468
14	0	2	2	0	0	0	2
15	0	0	0	0	0	0	0
16	0	14,397	72	0	0	0	14,325
17	0	9,156	9,156	0	0	9,156	0
18	0	10,953	10,953	233	0	0	10,720
19	0	13,057	13,057	3,873	2,355	0	6,829
20	0	11,882	11,882	8,365	0	0	3,517
21	0	20,278	20,278	669	47	0	19,562
22	0	174	174	0	163	0	11
23	0	5,071	5,071	3,744	0	0	1,327
24	0	808	808	26	0	0	782
25	0	1,302	1,302	59	45	22	1,176
26	0	43,656	43,656	249	0	0	43,407
27	0	9,684	9,684	1,178	0	0	8,506
28	0	30,902	30,902	6,904	204	0	23,794
29	0	0	0	0	0	0	0
30	0	3,291	3,291	148	0	0	3,143
31	0	1,205	1,205	10	4	0	1,191
32	0	12,204	12,204	1,583	299	0	10,322
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	16,152	16,152	0	0	0	16,152
	0	$920,255	$920,255	$80,858	$ 26,183	$ 36,291	$ 776,923

TABLE 4.1-10 IMPORT REQUIREMENTS OF ECONOMY DUE TO DAIRY

	Direct Imports	Indirect and Induced Imports	Total Imports	Nova Scotia	New Brunswick	Prince Edward Island	Other
1	$ 0	$ 642	$ 642	$ 94	$ 21	$ 13	$ 514
2	0	3	3	0	0	0	3
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	3	3	1	0	0	2
7	0	1	1	1	0	0	0
8	0	1023	1023	3	108	170	742
9	57360	1852	59212	111	198	127	58776
10	0	0	0	0	0	0	0
11	0	50	50	13	18	0	19
12	0	1428	1428	95	0	4	1329
13	0	483	483	75	15	0	393
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	210	210	0	1	0	209
17	0	3	3	0	0	3	0
18	0	1751	1751	37	0	0	1714
19	0	177	177	52	32	0	93
20	0	2	2	2	0	0	0
21	0	331	331	11	1	0	319
22	4110	2	4112	0	2	0	4110
23	0	78	78	56	0	0	22
24	0	11	11	0	0	0	11
25	0	17	17	1	1	0	15
26	0	152	152	1	0	0	151
27	0	108	108	13	0	0	95
28	0	11	11	2	0	0	9
29	0	0	0	0	0	0	0
30	0	54	54	2	0	0	52
31	0	20	20	0	0	0	20
32	0	61	61	8	1	0	52
33	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0
36	0	204	204	0	0	0	204
58	1470	0	1470	0	0	0	1470
	$62940	$8677	$71617	$578	$976	$314	$70324

CHAPTER V

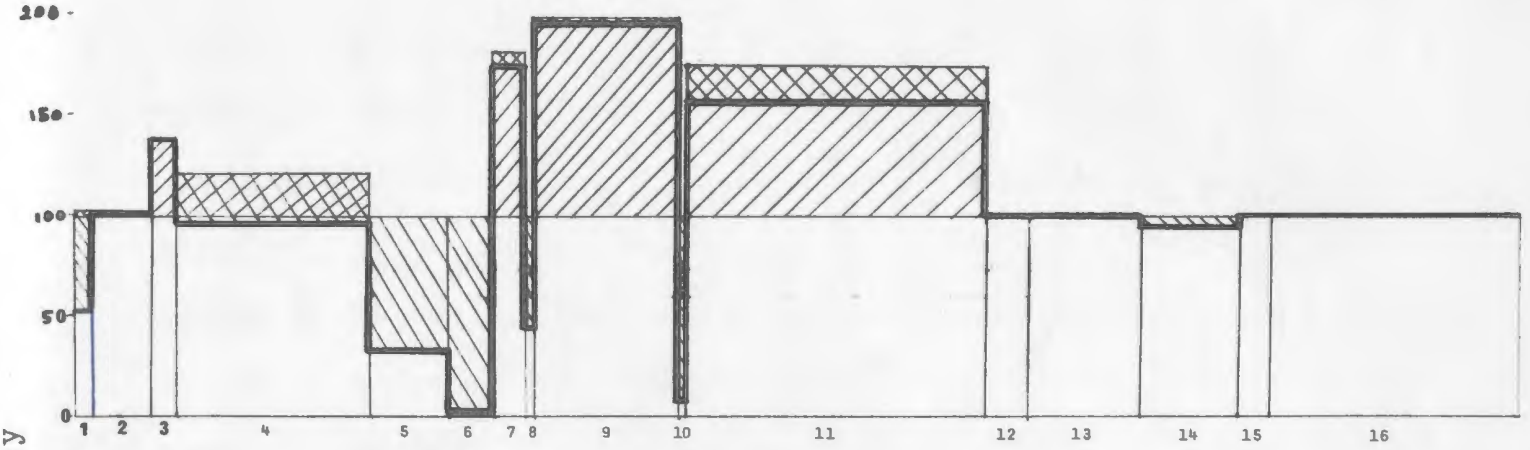
STRUCTURAL CHANGE IN THE ECONOMY

As a result of the entrance of a number of new industries into Newfoundland there is bound to be some changes in the structure of the economy. In this chapter, some of these structural changes are examined. First, we examine probable changes in the pattern of external trade and the relative importance of different sectors. This is done with the aid of a self-sufficiency or skyline chart. Second, probable changes in the interdependence between industries in the economy are examined.

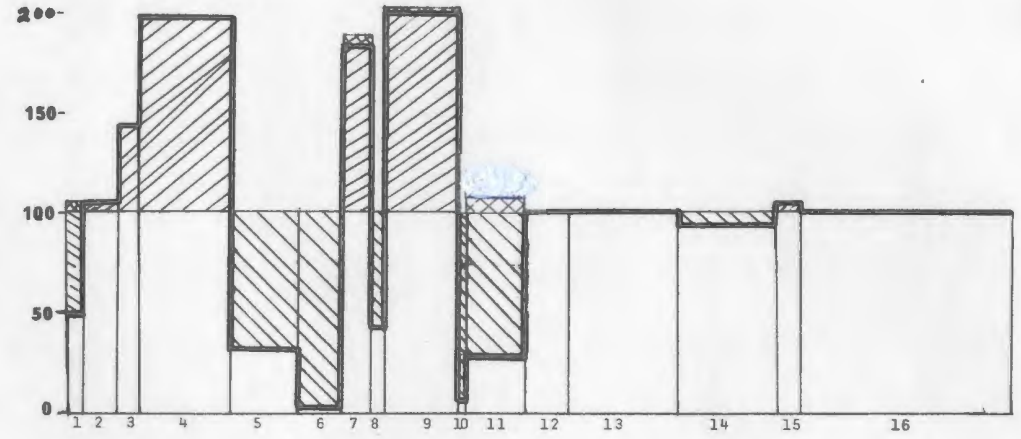
THE SKYLINE CHART

Establishment of these "growth areas" leads to a change in the structure of the Newfoundland economy. Especially important is the change in the relative importance of the primary and secondary sectors. The changes in the structure of the Newfoundland economy resulting from the establishment of these new industries are illustrated by a self-sufficiency or "skyline" chart, see Chart 5.1. This shows two skyline

CHART 5.1 IMPACT OF DEVELOPMENT ON REGIONAL STRUCTURE AND TRADE



TOTAL SUPPLY = $ 1,358,315,000



TOTAL SUPPLY = $ 891,517,300

percent of self-sufficiency

DOMESTIC PRODUCTION

DIRECT, INDIRECT AND INDUCED EXPORTS

DIRECT, INDIRECT AND INDUCED IMPORTS

1	Agriculture	
2	Forestry	
3	Fishery	
4	Mining	
5	Manufucturing	- Food
6	"	- Capital Goods
7	"	- Fish Processing
8	"	- Sawmills
9	"	- Pulp & Paper
10	"	- Boats & Shipbuilding
11	"	- Other
12	Construction	- Residential
13	"	- Other
14	Transportation	
15	Utilities	
16	Services	

charts, illustrating the difference in the structure of the economy before and after the development of these two "growth areas". For each chart, the vertical axis shows the percentage of self-sufficiency where self-sufficiency is defined as the output needed to meet intermediate plus final demand. The horizontal axis shows total supply of goods and services in constant 1960 dollars. The area of each bar up to the 100% line shows the amount that would have to be supplied by each sector if the economy were to be completely self-sufficient. To this bar is added an area that shows exports. From this is subtracted import requirements. The heavy black line denotes the actual domestic production of each sector. The lower chart is based on the 1960 ADB Input-output Table for Newfoundland (31 x 32). The upper chart projects the structure of the Newfoundland economy with the new industries, and their impact, integrated into the economic structure.

From these two charts it can be seen that the forestry sector more than doubles its output level. This is a result of the establishment of the new newsprint and linerboard mills. Mining, which was previously a net exporter, now becomes a net importer. This is due to the phosphate rock and coke required by the phosphorous plant and the crude oil imported by the petroleum refinery. The output of the pulp and paper sector nearly doubles, as does

exports by this sector, as a result of the activities of the new newsprint and linerboard mills. Other manufacturing increases by approximately four times, mainly as a result of the new petroleum and chemical industries. Also, the exports of this sector increase by nearly ten times for the same reason. The output of the utilities sector increases by about one-half. This is due to the increased demand for electricity by the new petroleum and chemical industries which are major consumers of electric power.

It can be seen that while the primary sectors become relatively less important and the secondary industries become relatively more important, the absolute importance of primary industry increases greatly.

Sectoral Multipliers

In this section is calculated the direct, indirect, and induced output expansions in the economy resulting from a one dollar increase in the final demand for products of all industries. The industries in the two "growth areas" are assumed to be an integral part of the economy, but to be a region that is separate from the rest of the economy.

To calculate these expansions, which we will call sectoral multipliers, we need a transactions table that takes account of the flows between these new industries and

between this new region and the old region. This is shown in Table 5.1. In Table 5.2 the flow table is translated into a coefficient matrix.

Using this coefficient matrix, two sets of multipliers are calculated. The Type I multiplier only takes account of direct and indirect expansions in output. The Type II multiplier takes into account direct, indirect, and induced expansions. These multipliers are shown in Table 5.3. They show the economic impact of each industry in the economy when each is expanded by one dollar.

However, these multipliers must be interpreted carefully. It is not always true that the industry with the largest multiplier is the best industry in which to invest. For example, some of the service industries such as dwelling services (44), finance, insurance, and real estate(43), automobile operation(41), and wholesale and retail trade(40) have very high multipliers. However, it is not logical to try to develop the economy by investing in these sectors. They can expand only after income has expanded. Their growth is the result of development, not its cause.

The greater the degree of interdependence within the economy, the greater is the value of the multipliers. An industry with a small multiplier may be a strategic link between different industries. In this case by developing

TABLE 5-1

INTER-SECTORAL INPUT AND OUTPUT TRANSACTION TABLES

	1	2	4	7	17	22
1	1,079.0	260.0	0	0	0	0
2	45.0	-80.3	123.3	0	0	19,674.1
4	0	0	0	0	0	0
7	0	0	0	0	0	88.9
17	65.0	0	499.7	0	13.2	0
22	0	0	0	0	2.6	874.8
32	0	0	149.9	38.6	0	0
35	367.0	294.0	164.0	87.0	21.0	570.0
38	100.0	4.7	0	18.9	5.3	2,465.9
77	2,777.2	22,855.9	14,147.1	993.1	291.6	17,709.5
1	0	0	0	0	0	185.7
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
82	3,325.7	2,784.3	4,069.3	335.2	143.2	35,662.3
76	3,635.3	29,329.2	15,834.3	1,354.7	730.3	32,653.4
83	6,961.0	32,113.5	19,903.6	1,689.9	873.5	68,315.7

TABLE 5-1 (cont'd)

	32	35	38	48
1	18.6	0	0	10,870.2
2	0	0	0	2,449.2
4	0	0	0	0
7	0	0	0	0
17	0.9	0	0	0
22	0.9	0	0	0
32	82.6	654.5	1.0	193.5
35	14.0	23.0	55[illegible].0	0
38	15.1	212.5	0	3,781.1
77	739.8	35,296.3	2,260.0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	2,850.0	0
8	0	0	0	2,622.4
9	0	0	0	0
10	0	0	0	0
82	523.3	47,908.8	3,830.4	283,756.7
76	1,702.8	55,431.3	7,093.6	97,883.7
83	2,226.1	103,340.1	10,924.0	381,640.4

TABLE 5-1 (cont'd)

	1	2	3	4	5
1	0	0	0	0	0
2	0	0	5,658.1	18,238.6	0
4	0	0	0	0	0
7	0	0	8.9	0	1,680.0
17	0	0	0	0	0
22	0	0	0	0	0
32	0	0	0	0	0
35	0	0	0	0	0
38	835.0	835.0	1,031.6	2,408.8	1,875.0
77	458.4	607.7	1,599.2	1,919.0	1,750.0
1	0	9,440.1	49.4	0	0
1	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
82	1,293.4	10,882.8	8,347.2	22,566.4	5,305.0
76	129,774.8	22,237.2	7,719.2	16,933.6	23,495.0
83	131,068.2	33,120.0	16,066.4	39,500.0	28,800.0

TABLE 5-1 (cont'd)

	6	7	8	9	10
1	0	0	0	0	0
2	0	0	0	0	0
4	0	0	0	1,920.0	0
7	243.4	0	0	0	0
17	0	0	0	0	0
22	0	0	0	0	0
32	0	0	0	0	0
35	0	0	0	0	0
38	2.6	4.0	9.8	5.8	1.2
77	170.0	105.0	349.7	80.0	25.0
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
82	416.0	109.0	359.5	2,005.8	26.2
76	23,570.0	2,741.0	2,262.9	1,194.2	61.9
83	23,986.0	2,850.0	2,622.4	3,200.0	88.1

TABLE 5-2

STRUCTURAL MATRIX - INTER-SECTORAL COEFFICIENTS

	1	2	4	7	17
1	.1550	.0081	.0000	.0000	.0000
2	.0065	-.0025	.0062	.0000	.0000
4	.0000	.0000	.0000	.0000	.0000
7	.0000	.0000	.0000	.0000	.0000
17	.0093	.0000	.0251	.0000	.0151
22	.0000	.0000	.0000	.0000	.0030
32	.0000	.0000	.0075	.0228	.0000
35	.0527	.0092	.0082	.0515	.0240
38	.0194	.0001	.0000	.0118	.0061
77	.3990	.7117	.7108	.5877	.3338
1	.0000	.0000	.0000	.0000	.0000
2	.0000	.0000	.0000	.0000	.0000
3	.0000	.0000	.0000	.0000	.0000
4	.0000	.0000	.0000	.0000	.0000
5	.0000	.0000	.0000	.0000	.0000
6	.0000	.0000	.0000	.0000	.0000
7	.0000	.0000	.0000	.0000	.0000
8	.0000	.0000	.0000	.0000	.0000
9	.0000	.0000	.0000	.0000	.0000
10	.0000	.0000	.0000	.0000	.0000
82	.4782	.0867	.2045	.1984	.1684
76	.5218	.9133	.7955	.8016	.8316
83	1.0000	1.0000	1.0000	1.0000	1.0000

TABLE 5-2 (cont'd)

	22	32	35	38	48
1	.0000	.0084	.0000	.0000	.0284
2	.2880	.0000	.0000	.0000	.0064
4	.0000	.0000	.0000	.0000	.0000
7	.0013	.0000	.0000	.0000	.0000
17	.0000	.0004	.0000	.0000	.0000
22	.0128	.0004	.0000	.0000	.0000
32	.0000	.0371	.0063	.0001	.0005
35	.0083	.0063	.0003	.0504	.0000
38	.0361	.0068	.0021	.0000	.0099
77	.2592	.3323	.3416	.2069	.0000
1	.0027	.0000	.0000	.0000	.0000
2	.0000	.0000	.0000	.0000	.0000
3	.0000	.0000	.0000	.0000	.0000
4	.0000	.0000	.0000	.0000	.0000
5	.0000	.0000	.0000	.0000	.0000
6	.0000	.0000	.0000	.0000	.0000
7	.0000	.0000	.0000	.2609	.0000
8	.0000	.0000	.0000	.0000	.0068
9	.0000	.0000	.0000	.0000	.0000
10	.0000	.0000	.0000	.0000	.0000
82	.5220	.2351	.4636	.3506	.7435
76	.4780	.7649	.5364	.6494	.2465
83	1.0000	1.0000	1.0000	1.0000	1.0000

TABLE 5-2 (cont'd)

	1	2	3	4	5
1	.0000	.0000	.0000	.0000	.0000
2	.0000	.0000	.2171	.4617	.0000
4	.0000	.0000	.0000	.0000	.0000
7	.0000	.0000	.0003	.0000	.0583
17	.0000	.0000	.0000	.0000	.0000
22	.0000	.0000	.0000	.0000	.0000
32	.0000	.0000	.0000	.0000	.0000
35	.0000	.0000	.0000	.0000	.0000
38	.0064	.0252	.0396	.0486	.0651
77	.0035	.0183	.0613	.0698	.0608
1	.0000	.2850	.0019	.0000	.0000
2	.0000	.0000	.0000	.0000	.0000
3	.0000	.0000	.0000	.0000	.0000
4	.0000	.0000	.0000	.0000	.0000
5	.0000	.0000	.0000	.0000	.0000
6	.0000	.0000	.0000	.0000	.0000
7	.0000	.0000	.0000	.0000	.0000
8	.0000	.0000	.0000	.0000	.0000
9	.0000	.0000	.0000	.0000	.0000
10	.0000	.0000	.0000	.0000	.0000
82	.0099	.3285	.3119	.5801	.1842
76	.9901	.6715	.6881	.4199	.8158
83	1.0000	1.0000	1.0000	1.0000	1.0000

TABLE 5-2 (cont'd)

	6	7	8	9	10
1	.0000	.0000	.0000	.0000	.0000
2	.0000	.0000	.0000	.0000	.0000
4	.0000	.0000	.0000	.6000	.0000
7	.0101	.0000	.0000	.0000	.0000
17	.0000	.0000	.0000	.0000	.0000
22	.0000	.0000	.0000	.0000	.0000
32	.0000	.0000	.0000	.0000	.0000
35	.0000	.0000	.0000	.0000	.0000
38	.0001	.0014	.0037	.0018	.0136
77	.0071	.0368	.1333	.0250	.2480
1	.0000	.0000	.0000	.0000	.0000
2	.0000	.0000	.0000	.0000	.0000
3	.0000	.0000	.0000	.0000	.0000
4	.0000	.0000	.0000	.0000	.0000
5	.0000	.0000	.0000	.0000	.0000
6	.0000	.0000	.0000	.0000	.0000
7	.0000	.0000	.0000	.0000	.0000
8	.0000	.0000	.0000	.0000	.0000
9	.0000	.0000	.0000	.0000	.0000
10	.0000	.0000	.0000	.0000	.0000
82	.0173	.0382	.1370	.6268	.2616
76	.9827	.9618	.8630	.3732	.1384
83	1.0000	1.0000	1.0000	1.0000	1.0000

TABLE 5-3

SECTORAL MULTIPLIER - INTEGRATED ECONOMY

	Type I Multiplier	Type II Multiplier
1	1.642	2.361
2	2.683	3.002
3	1.721	1.733
4	2.066	2.271
5	1.000	1.000
6	1.127	1.136
7	1.187	1.192
8	1.013	1.164
9	1.053	1.392
10	1.077	1.100
11	1.141	1.591
12	1.000	1.000
13	1.002	1.396
14	1.015	1.415
15	1.005	1.626
16	1.000	1.027
17	1.096	1.112
18	1.000	1.070
19	1.394	1.454
20	1.023	1.029
21	.967	.983

22	1.453	1.501
23	1.135	1.350
24	1.038	1.043
25	1.128	1.137
26	1.012	1.017
27	1.480	1.545
28	1.006	1.007
29	1.772	1.777
30	1.031	1.045
31	1.041	1.064
32	1.184	1.245
33	1.003	1.003
34	1.294	2.380
35	2.178	2.539
36	4.291	9.023
37	1.537	2.005
38	1.777	2.389
39	1.054	1.138
40	2.200	10.396
41	1.528	3.985
42	1.282	1.494
43	2.802	4.335
44	1.000	4.812
45	1.225	2.375
46	1.136	2.723
47	1.696	2.118

1	1.291	1.291
2	1.000	1.000
3	1.000	1.000
4	1.000	1.000
5	1.000	1.000
6	1.000	1.000
7	1.464	1.621
8	1.000	1.303
9	1.000	1.000
10	1.000	1.005

the industry with the smaller multiplier, overall development of the economy may proceed faster.

Since these multipliers are calculated on the basis of a picture of the economy as it stands, it does not take account of potential new industries that may be attracted by the establishment of some industry that supplies their inputs. For example, the multiplier for the petroleum refinery is 1.291, but this does not take account of the fact that the establishment of such a refinery may entice chemical industries that use its by-products as inputs.

Also, these multipliers change over time. Before they can be used to plan development it is necessary to know how they change over time. An industry that originally had a low multiplier, but one that increases over time would be preferable to develop than one that had a higher, but declining multiplier.

Finally, these multipliers do not take into consideration that there may be a limit to the degree an industry can expand. For example, fish processing(11) has a fairly high multiplier of 1.591. However, there are already too many fishplants in Newfoundland, so, establishing more would not help bring about development.

All of these restrictions on the multiplier do not mean that it can not be used for development planning.

It merely shows that more information is needed before they can be used. We must know more about the capacity of the economy to absorb a particular industry, the potential foreward linkages of a new industry, and the change in the multipliers over time. The multipliers alone do not provide enough information. However, together with the additional information they can be used to rationally plan economic development.

CHAPTER VI

CONCLUSION

The purpose of the establishment of "growth areas" is to bring about diversification in the structure of the Newfoundland economy and to make the economic structure more viable.

Superficially we could say that this policy has been successful in the two "growth areas" examined in this paper. The establishment of the ten new industries does bring a greater degree of diversity into the Newfoundland economy. These new industries are all in the manufacturing sector. As a result there is a change in the relative importance of primary and secondary industry. Since many of the new industries are large scale industries - petroleum refining, phosphorous, etc. - this shift is fairly large. The shift in the relative importance of primary and secondary industry is illustrated by Chart 5.1 (see page 97). As a result of the decreasing relative importance of the primary sector, the Newfoundland economy will not be as dependent upon fluctuations in the demand for primary products. Since the price of primary products tends to be unstable, dependence upon them creates economic instability in the form of fluctuating incomes or unemployment. With the greater importance of manufacturing, this price instability will not have as great an effect upon the economy.

As a result of these developments there is also a greater degree of diversity within the secondary sector of the economy. The secondary sector previously consisted largely of newsprint manufacture and fish processing. Now there is a large petroleum and chemical industry. There is also more diversity within the existing secondary sector. The pulp and paper sector, which previously manufactured only newsprint, now produces linerboard as well. In the fish processing industry we now produce fishmeal in addition to the traditional frozen fish blocks. Fishmeal plants are also being set up in a number of resettlement areas such as Isle aux Morts. Considering the size and instability of the fishing and the fish processing sectors, this program of diversification seems the most promising method of fisheries development.

As a result of this industrial diversification the largest manufacturing sectors are not as dependent upon the world demand for one particular product. This also helps to dampen some of the instability in the primary sectors. The pulp and paper and fish processing sectors provide the demand for the products of the forestry and fishing sectors. If this diversification helps dampen fluctuations in the former sectors, it will also help dampen fluctuations in the latter.

However, the establishment of these new industries does not significantly increase the number of interindustry transactions. Therefore, these developments do not

significantly increase the sectoral multipliers. This is due to two circumstances. One, most of these industries import most of their raw materials. The backward linkages with the rest of the Newfoundland economy is limited to the purchase of electricity and the hiring of labor. As a result there is no incentive for growth in other sectors of the province's economy. From Tables 3.2-1 to 3.2-10 (pages 56 to 65) we can see that the largest backward linkages are due to increased consumer demand out of the wages and salaries paid by the new industries. This fact points to a possible area of development. The establishment of small scale food processing industries, clothing manufactures, etc. to cater to consumer demand. This type of development has already been successful in three cases. The development of poultry processing, an industry to supply eggs, and beer manufacture has made Newfoundland self-sufficient in these three areas.

Also, most of the output of these industries is exported. Therefore, foreward linkages do not significantly increase. Most of the increases are in the final demand sectors - (i.e.) exports and consumption - not in inter-industry transactions. This together with the high import content of inputs severely limits the impact of these new industries. The establishment of these industries does not, in most cases, help bring about growth in other areas of the economy.

In the case of the new newsprint, linerboard and fishmeal industries there are some growth inducing aspects. These three industries do obtain their raw materials from existing sectors of the Newfoundland economy. As a result much employment is created in the primary sectors. However, incomes in these sectors tend to be lower than in the secondary or tertiary sectors. Jobs are being created but these are in sectors with low productivity and low incomes. Low productivity and low incomes can not bring about growth. Instead of establishing industires that bring more people into low productivity and low incomes sectors, the object of development policy should be to move people out of these sectors into sectors where their productivity and incomes will be greater.

The government policy of establishing "growth areas" has been only partially successful. A greater degree of diversification has been brought into the Newfoundland economy; however, it has not provided a basis for continued economic growth or development.

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