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SELECTED FACETS OF THE FISHING INDUSTRY (EARLY 1963)

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A C K N O W L E D G E M E N T S

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To Dr. Douglas Sloan he expresses his sincere thanks. His propensity to listen, prompt, gently criticise and direct, as well as his willingness to invite wasteage of his time by initiating discussion during periods of apparent crisis, have been of immense value.

Mr. L.F. Jackson gave the writer a great deal of help in the computer work and he opened statistical analysis as a new field of interest. The production functions of Chapter Three would have been impossible without him. Mr. Young, Mrs. Vaney and Miss Cooper have been most helpful as have the staff of the Department of Statistics.

I would now like to thank my parents for tolerating a temperamental author and for the help and encouragement they have given me in all of my studies. I am grateful to Miss Valda Donald who, when writing her own thesis, was still able to discuss mine.

16th July, 1963. Ewen McCann.

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CHAPTER ONE

INTRODUCTORY

Consumer demand, retail distribution and the export trade are important aspects of the New Zealand Commercial Fishery which are outside the specific boundaries of this enquiry. It is a study in government intervention, price negotiation and supply. In analysing these three facets of the industry it was impossible to ignore the other three so they have been treated incidentally where a discussion of them was necessary to understand the central theme.

There is scope for additional research into each of the above topics, perhaps more especially into administrative decision making when non economic objectives are involved and also into the optimum scale of plant given the cost conditions that apply to the industry. However, it is hoped that this essay goes part of the way towards meeting the need for fundamental economic research into an industry which periodically attracts the attention of the public, policy makers and Government.[1]

An industry may be defined in a number of ways. Provided the product can be defined unequivocally, an industry may be specified in terms of the commodities it produces, or it could be designated by the raw materials it processes and the

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1. Parliament has set up three committees in the past twenty-six years to examine the industry.

production procedures it follows. If either of these methods were adopted in this analysis, fish, oyster and cray production would belong to different industries. These product variants interact with one another in many phases of the "industry's" activity and to treat them separately would be to ignore factors of considerable economic significance. Pragmatism has a number of disadvantages, a reduction in precision among them, but it does provide one with a wide area of consideration. Accordingly, in this paper, those factors which are of relevance to the study as a whole are considered to be part of the fishing industry. Such a definition of an industry is quite indefensible, but it may be that it is also almost unassailable.

Regional differences exist in the spelling of the names of some of the product variants so Marine Department spelling of fish names has been used throughout this essay.

CHAPTER TWO

SUPPLY

CHAPTER TWO

SUPPLY.

The product is perishable and can not be stockpiled for periods, at most, of more than a few months so production and consumption occur within a small interval of time. Statistics of the industry's output are available, but because of the non-durable nature of the product these equally reflect demand as they do supply. An export market taking 20% - 25% of the annual volume of the domestic output upsets the complete identity of the volume produced with the volume of local consumption and exporters, discriminating between markets on the basis of price, help preserve the overall demand or supply problem. Statistics of volume relating to a quickly cleared market present an impasse of demand and supply pressures which can be avoided only by sophisticated econometric techniques or by ignoring the data altogether. There is no clear solution and, although the writer has little by way of econometric facility, it is submitted that the statistics are too valuable to be cast aside and provided the supply or demand problem is kept carefully in mind, little damage results from using them. The issue is latent in this entire chapter, particularly when the relation between price and output is considered, in view of the seasonal characteristics of each which are most noticeable in ports in the Canterbury area. Price reactions of producers are discussed in more detail in other sections of this chapter. It may be mentioned that the individual producer is a

price follower (partly for reasons which emerge in Chapter Five) and the seasonal fluctuations in output which occurs at all ports is caused by the migrational movements of fish rather than price reactions by suppliers.

Section (i)

A COUNTRY-WIDE SURVEY

The overall picture for the period 1949-1961 is one of increasing output, at a simple average rate of 1½% p.a., to a level of 527,000 cwt. Annual value of producers' output has risen at a faster rate of almost 7% p.a. (simple average), or by 88% over the same interval, and reached £1.6m. in 1960 and again in 1961. Consumer action and the general inflation have no doubt contributed to the pressures which have raised unit prices and volume of output but precise evaluation of each appears impossible. To arrive at a simple average of price received by fishermen for the whole of New Zealand would be an immense task and in view of the seasonal and regional variations known to exist would not be very meaningful.[1] However, a type of weighted average price indicates that the increase in value is not solely due to rising volume and that prices to producers for the important product types have risen throughout.

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1. There is also a statistical problem in that fisheries statistics on value are the summation of producers' gross monthly income for each product variant, a procedure which provides an accurate total. When these totals are divided by quantities and the result compared with other years any movement does not necessarily reflect the trend in the price the supplier is receiving as the weights imposed by quantities vary with the producer's output even though his actual prices may not alter. e.g. compare these cases where weighted average price varies though actual prices are constant throughout. (See continuation following page).

This crude measure shows hapuka, gurnard, snapper and tarakihi to register substantial price increase in that order, between 1949 and 1961. The price of blue cod on the other hand appears to have been more stable and of the five product types it is the only one whose output has not changed, though tarakihi production shows only a small increase. (In the other sections of this Chapter "price" is an accurate simple average for all firms at the ports concerned).

Snapper, tarakihi and gurnard prices, on the basis of the imperfect measure of price, appear to have undergone changes of much the same magnitude and, more important, have improved their relative price positions over the years. As is brought out in the final sections of this chapter, this relative change is perhaps a more important factor than the absolute level of price in explaining the increases that have occurred in the volumes of output. Hapuka does not conform to the pattern. This product variant has retained its price position but there has been a noticeable decline in its output since 1949. Undue emphasis should not be placed upon the national price position of each product type, for, while some ports produce three or even four of these variants none produces the whole range.

Footnote 1. continued

	Price	Quantities	Value	Weighted Average
a)	£0.8	2 Cwt	£1.6	
	£1.1	3 Cwt	£3.3	
		5 Cwt	£4.9	£0.98
b)	£0.8	3 Cwt	£2.4	
	£1.1	6 Cwt	£6.6	
		9 Cwt	£9.0	£1.0
c)	£0.8	1 Cwt	£0.8	
	£1.1	1 Cwt	£1.1	
		2 Cwt	£1.9	£0.95

The composition of output has undergone a little change in the thirteen years ended 1961. The seven product variants which constituted approximately 85% of total production in 1949 have changed and the top seven of 1961 contributed 82% to the total output. As this would indicate insignificant increases are apparent in the less popular product variants. Snapper and tarakihi dominate the other thirty nine varieties of the product and together the volume of these two product types has been approximately 50% of total production over the years. Snapper is produced mainly in the upper half of the North Island, while tarakihi has a more general distribution.

An important change has occurred in the methods of production, in that 72% of total output was produced by trawl in 1961 (55% in 1949), causing the 9% drop in the percentage of seine output and 8% decline in line catch over the same period, see p.221 . Figures by value of output give different results because of the price changes mentioned above.

Another interesting change has occurred in the location of the industry. Each of the main centres (Lyttleton excepted) has become relatively less important both in volume and value of output and ports of the smaller towns have correspondingly moved up. The reasons for this are obscure but may be connected with a growth in population that city suppliers, with their present plant and fishing grounds, can not satisfactorily supply, so they supplement their own production with that of outlying ports which have access to hitherto unexploited beds. Some of these ports do produce for

export but the fluctuations in quantity exported have been such that it is difficult to assess the importance of this factor.

Nor is it easy to gauge the impact of imported product types which have been fluctuating greatly as a result of import controls. Quantitively, they reached 18% of total domestic production in 1955 and monetarily they are significant as their value was £917,000 in 1961 and was running at over £1.1m. in 1955-'56-'57. Whether these are product variants or different products, it is hard to say, but it is not likely that the individual producer regards them as strong competitors of his own output.

Section (ii)

SUPPLY AT TIMARU.

The value of catch at this port has steadily increased so that it has moved from New Zealand's fifth highest by value of catch in 1949 to second highest in 1957, a position which it has maintained.

The economic reasons[2] for this improvement appear to be:-

1. The port's geographic location.

   (a) The port is closer to the prolific grounds off mid-Canterbury than either Lyttelton or Dunedin.

   (b) This being so, vessels based on Timaru can spend more time fishing these grounds and less time steaming per voyage than vessels based on the other two ports.

2. Access to a market.

Christchurch provides a not too distant yet extensive market and it also links Timaru with the Australian export market. A substantial wholesaler, interested mainly in the export trade, has recently opened in Timaru, but this is more a result of than a cause of the port's growth.

3. Seasonality.

The output of each product variant is subject to very strong seasonal oscillations (see graphs 1, 2 and 3). However, by the accident of Timaru's location the overall effect of seasonality in output is reduced because the habits of the fish are such that for most months of the year at least one product type is at or near its peak availability. The output of four product types show peaks in

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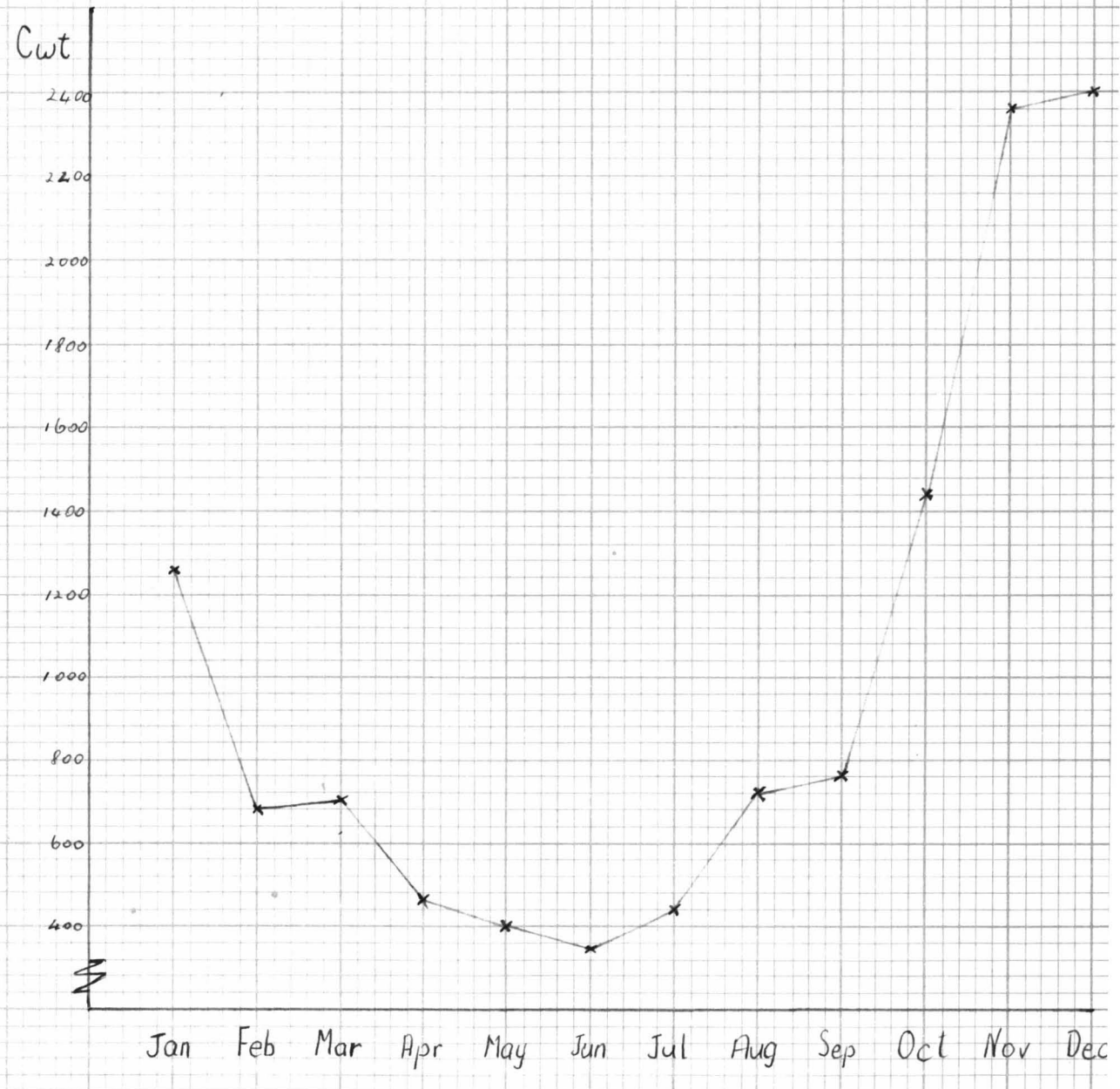
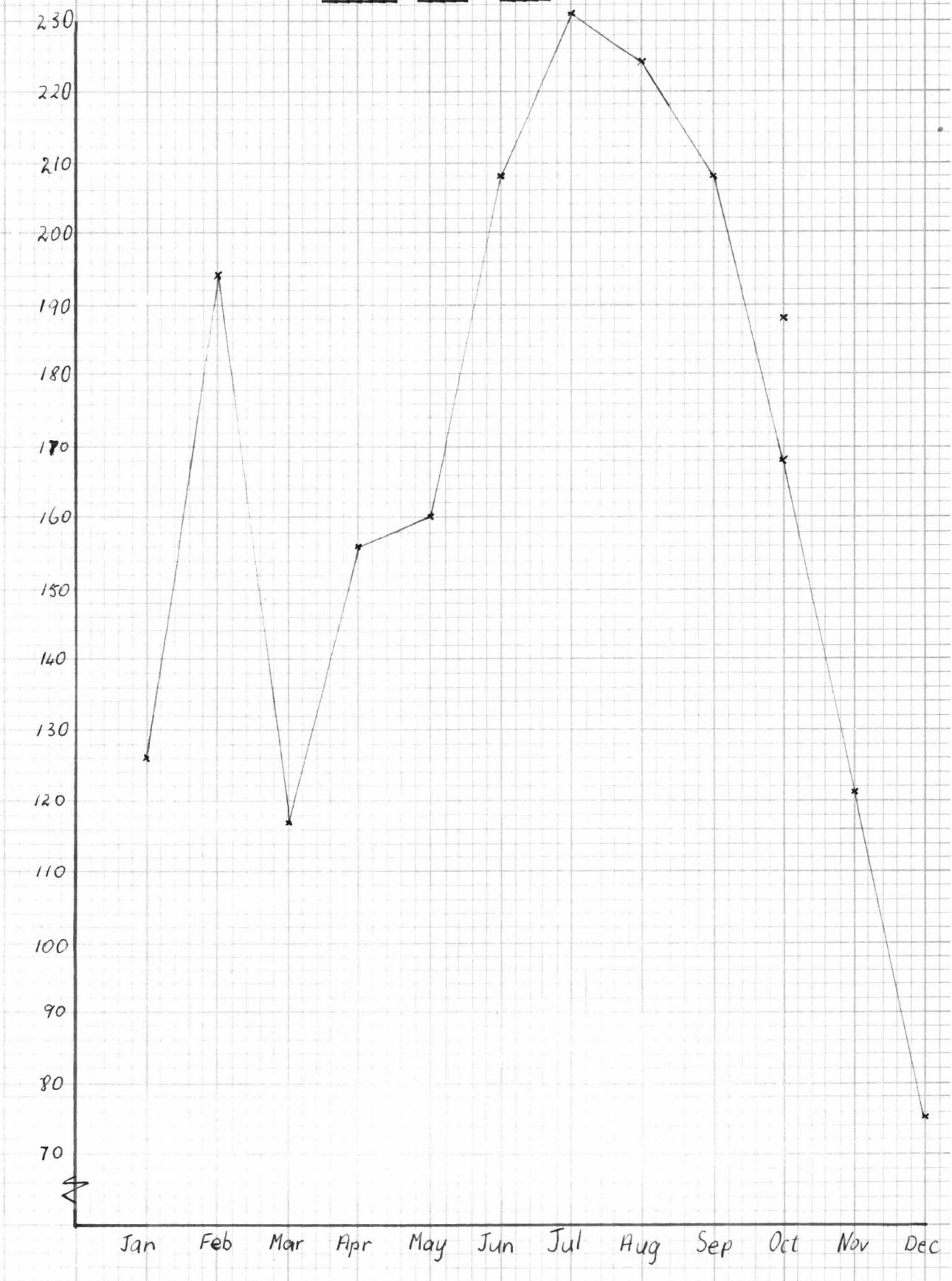
2. Some of the technical aspects of this question are discussed in Chapters Three and Six.

GRAPH 1.

AVERAGE MONTHLY OUTPUT
OF ELEPHANT FISH.
TIMARU 1957 - 1961

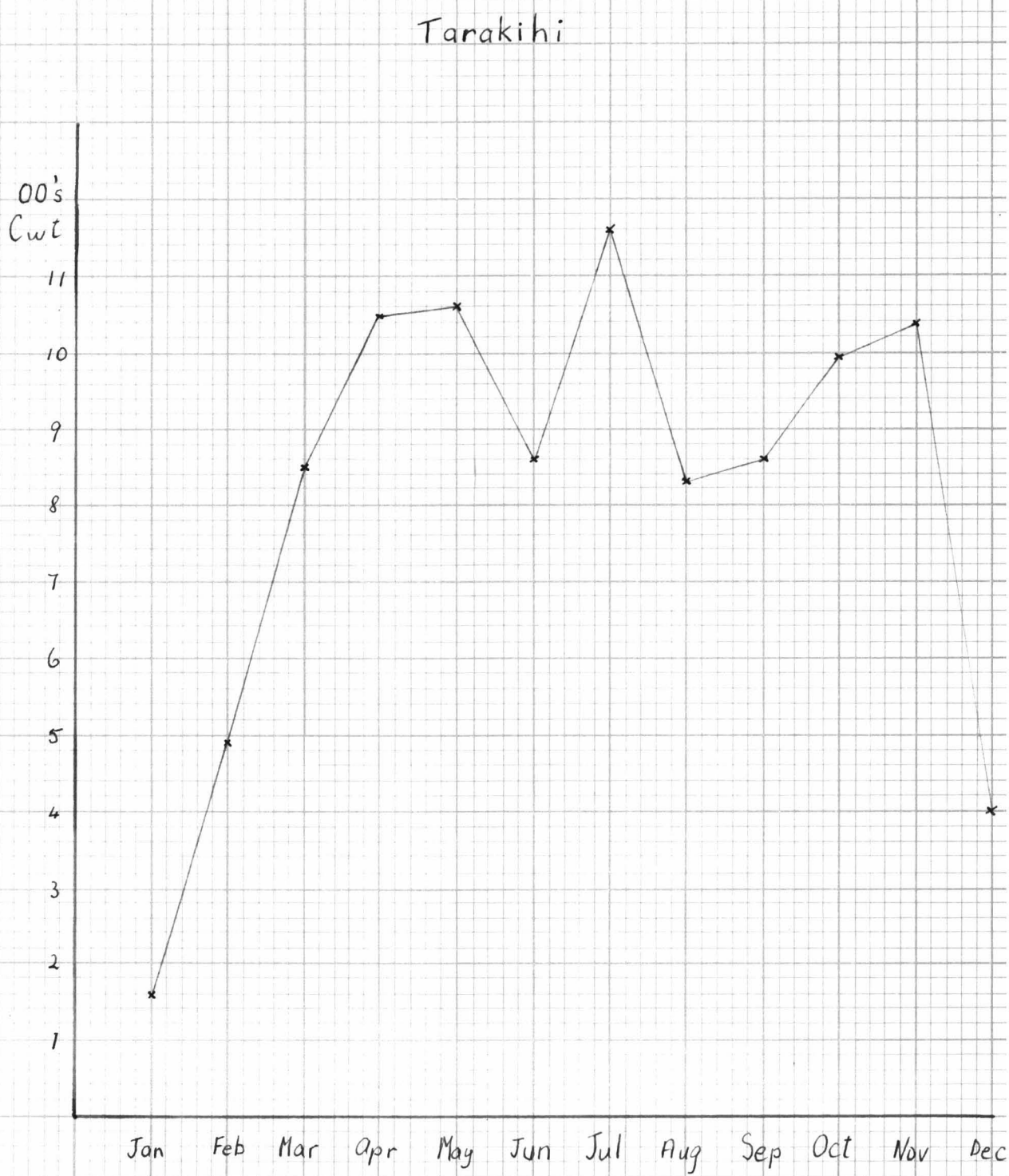


GRAPH 2. AVERAGE MONTHLY OUTPUT OF FLOUNDER TIMARU 1957 - 1961 inc.



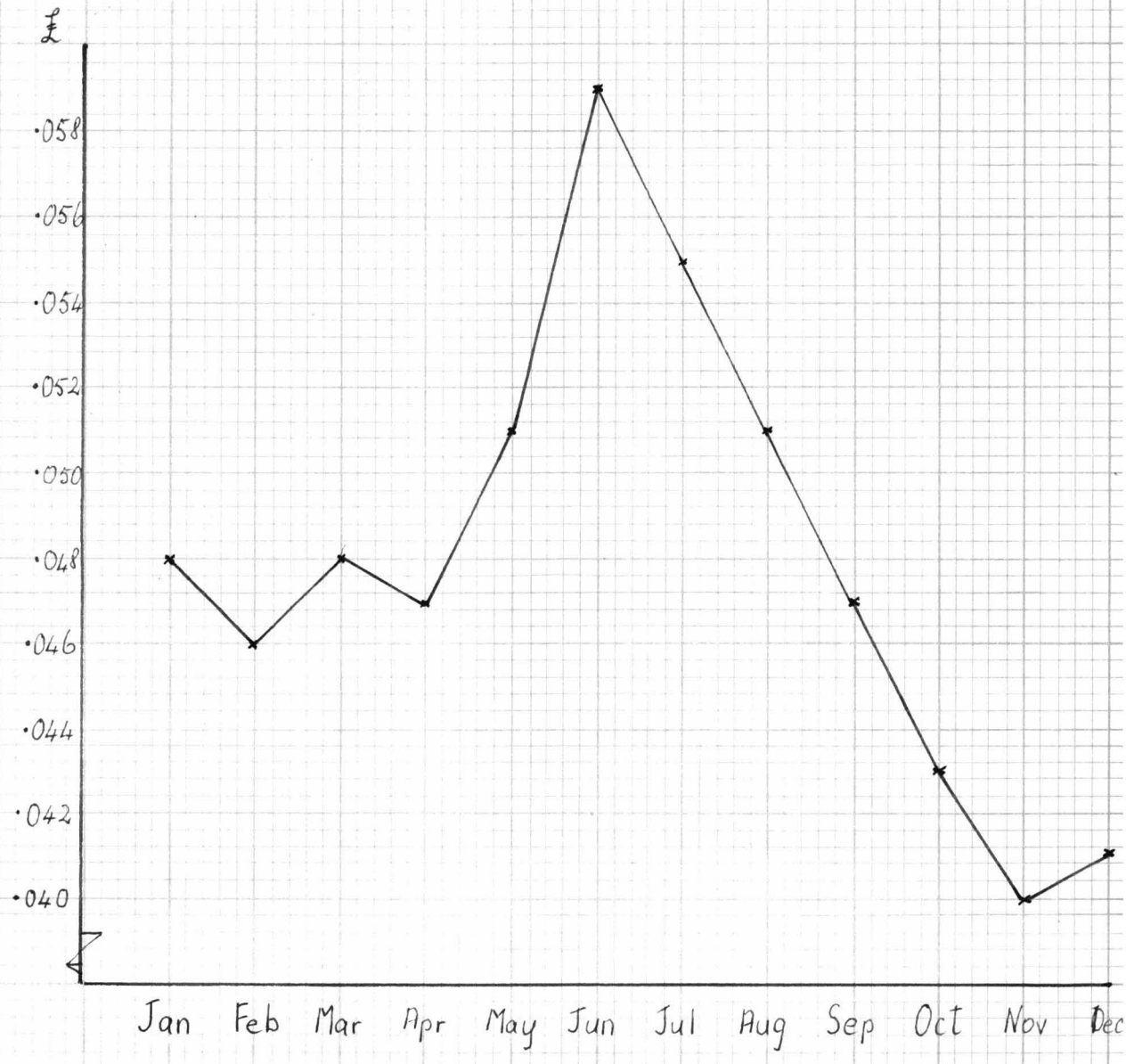
GRAPH 3.

TIMARU AVERAGE MONTHLY CATCH BY SPECIES '57-'61 incl.



GRAPH 4.

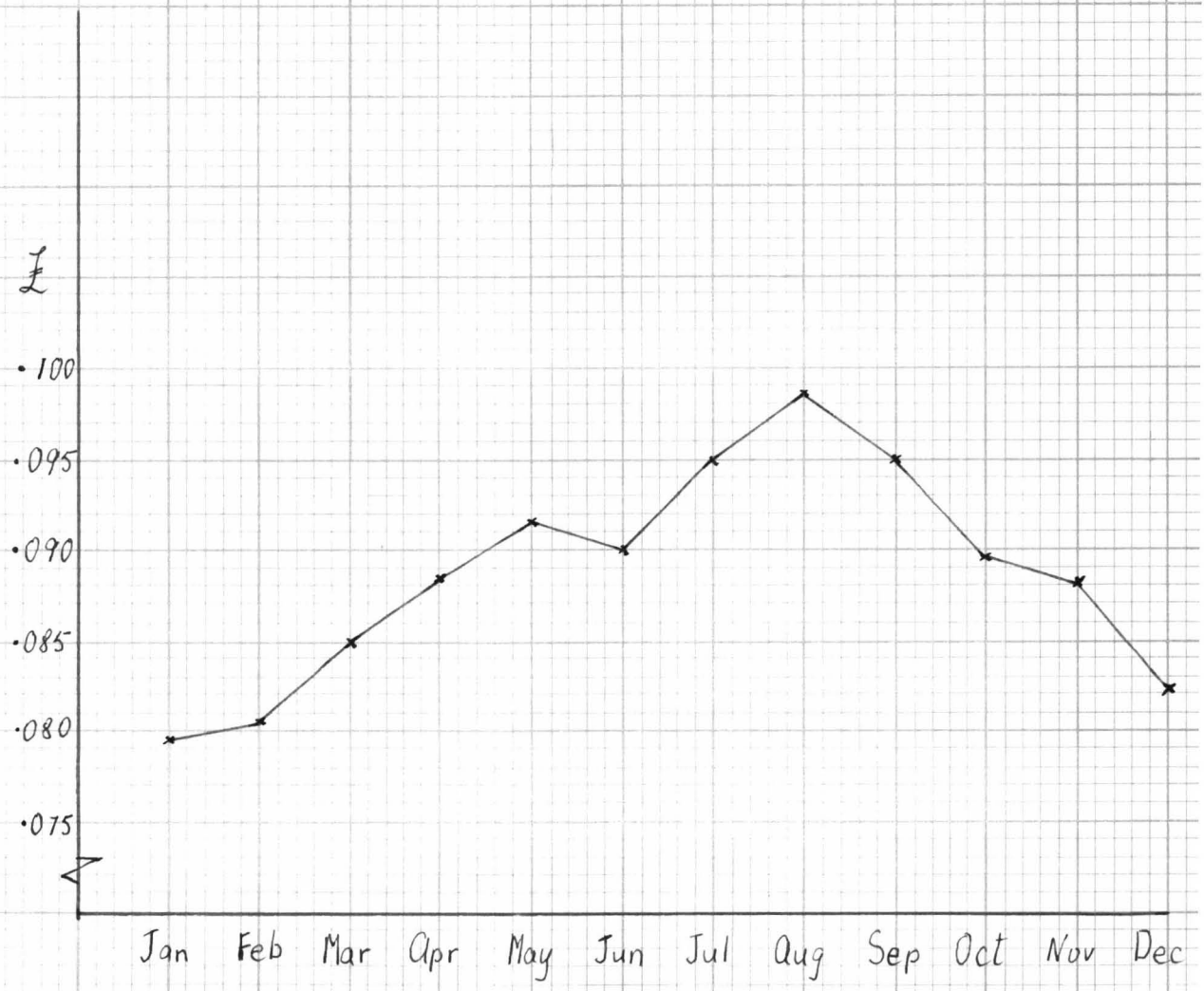
TIMARU
ELEPHANT FISH
SIMPLE AVERAGE OF
MONTHLY PRICES
1957-61



GRAPH 5.

TIMARU
FLOUNDER
SIMPLE AVERAGE
OF PRICE

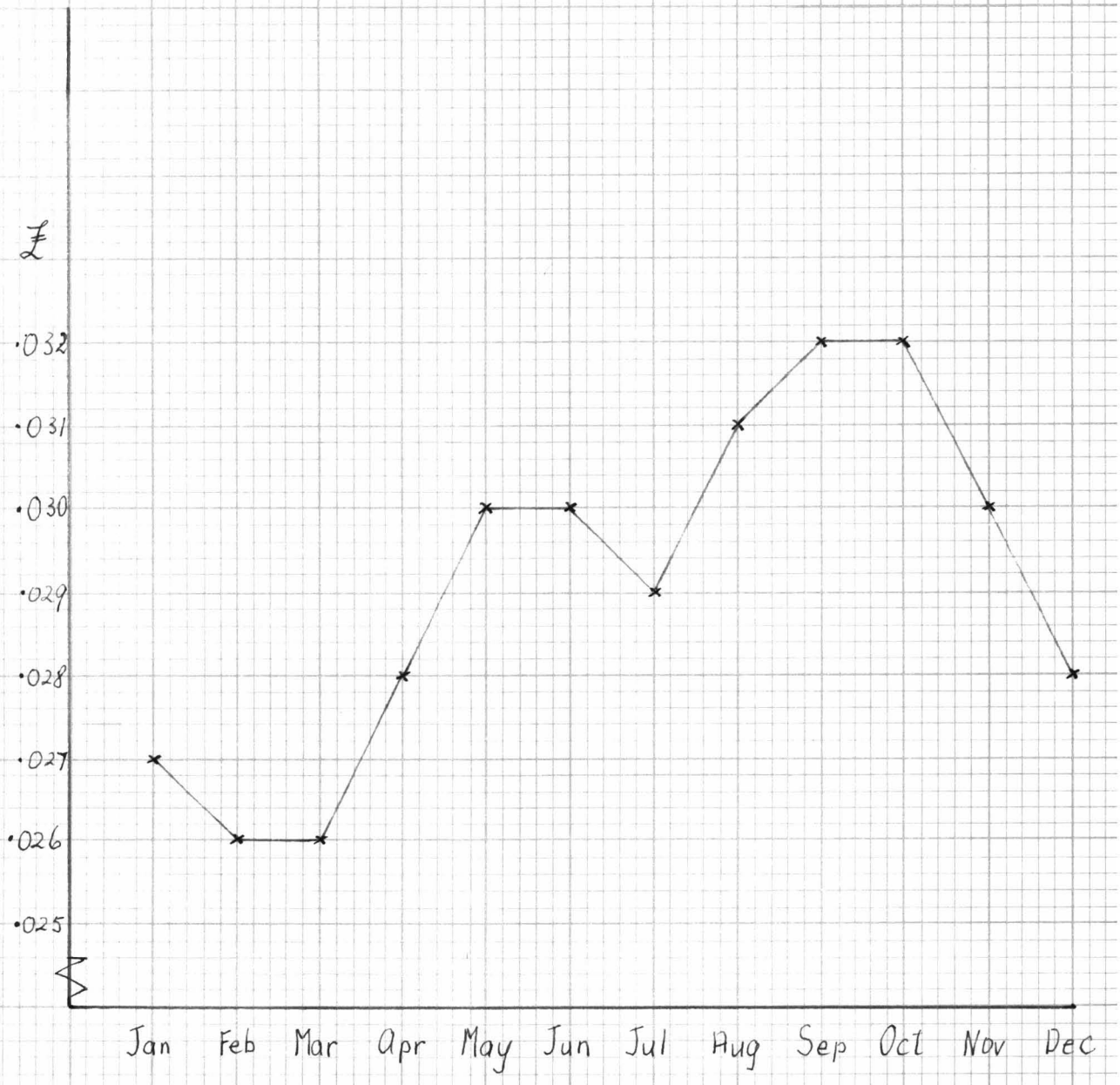
1957-61
incl.



GRAPH 6.

TIMARU
SIMPLE AVERAGE
OF MONTHLY
PRICE
1957-61 incl.

Tarakihi



the middle months of the year and by far the most important single product variant, then in its off season, reaches peak availability towards the end of one year and the beginning of the next. The production runs of each firm therefore show differences in composition throughout the year.

Prices of each of the products also have a seasonal pattern (see graphs 4, 5 and 6). Prices of all product variants are high in the middle months of the year. (Price here means the price which the producer receives for his product). Average revenue tends to be high in Timaru which is a contributory factor to the port's relative position within the industry since by volume of output it lay third and not second in 1957/61. (See graph 14, p.214 for the total production 1950 - 1959).

4. Cost Conditions.

Production occurs under conditions of decreasing unit cost (see page 33) and a feature of the industry is that a number of differentiated products are produced commercially by the same production process and may be called joint products. English sole, flounder and lemon sole are fish of similar habits and are caught with the same gear at Timaru.

5. Behaviour.

The attitudes of producers are such that once they are working and amongst fish they "haul them in" until their holds are full or they lose the shoal or they are forced back to port by weather.

6. Prices.

The role of price in determining quantity supplied appears to be subsidiary to the previous factors. Firms will produce the most

remunerative product variant by choice but a high price for one product type does not necessarily mean that all firms will produce it. This response to price is accounted for:-

(a) By the power of the vessel. Boats with small engines are not able to visit the distant fisheries with reasonable safety margins. Nor have they the hold capacity to make the longer journeys worthwhile as a small craft fishing close can make more landings per period from inshore grounds that it could if it were fishing further out. Consequently, in those months when the price of offshore fish is high, only firms with more powerful craft increase their output of those product types. The reverse action does not occur, since powerful vessels are able to work both offshore and inshore fisheries. An interaction of this nature is well demonstrated in the production of tarakihi, gurnard and flatfish. Gurnard is an inshore fish which is caught with the same gear as tarakihi which is an offshore species. Smaller vessels produce markedly more gurnard than they do tarakihi while larger vessels operating on both grounds produce good quantities of each. Flatfish are produced closer inshore with gear different from the other two species and the smaller vessels tend to produce large quantities of these as they have the necessary equipment. Technical factors of this kind reduce the influence of price. (Paragraph 6 (c) below, and the ones following it, explains the factors which prevent large vessels from investing in the equipment necessary to produce flatfish.)

(b) By the decreasing unit cost condition. A declining average cost curve increases the importance of quantity to producers. Under reducing unit costs, in contrast with the U shaped average cost curve situation, the greater the output the greater the profit, other things being equal. Beyond minimum average cost the firm's long run output moves in sympathy with price changes, when average cost curves are U-shaped. Where continuously falling average cost curves exist this automatic movement will not occur and the impact, in comparison, of price movements upon output placed on the market is reduced. Where the average revenue curve is horizontal or declines less rapidly than the average cost curve, negatively shaped average cost curves cause profits (beyond the point of intersection, if any) to move with output. So their behaviour reaction, together with the economic factor of decreasing unit costs, makes producers quantity maximisers.

(c) The previous paragraph explains how the role of price in relation to average cost is modified in the reducing unit cost situation, and in turn quantity maximisation partly explains why some firms do not necessarily produce the highly priced product variants. Flatfish at Timaru is a case in point. Over the year the average monthly price is higher for this product type than it is for any other. But all firms do not produce it because it is not available in quantities which are great enough to bring average cost

below average revenue for all firms. They prefer to produce those product types whose average revenue is lower but which are available in quantities sufficient to incur profits. A second illustration is provided by elephant fish. Over the five years studied the price of this product variant was high in those months when output was low and vice-versa. A possible reason for this high price/low output reaction on the part of the individual producer (who cannot influence price) is that the migrational habits of the fish prevent sufficient quantities being caught to pull average cost below average revenue and so provide the individual firm with good returns in the months when prices are high.

The general drift of the preceding paragraphs is that at Timaru price is not the only determinant of quantity placed on the market. Only if fish are in the adjacent waters are firms with given cost structures in a position to react to price, as a survey of the composition of the port's output shows. Five years figures for tarakihi and gurnard show that in those months when these fish are plentiful prices are high so there are two pressures contributing to a large output in these months. The first is the high price and the second is the dual pressure of the decreasing unit cost condition combined with the availability of the fish. Elephant fish and flatfish exhibit a different pattern. The low price high availability relationship for elephant fish indicates that only the decreasing cost pressure operates on output. With flatfish limited availability operating on the reducing unit cost function explains why the output

of this product variant is not higher in the face of the higher prices which rule throughout the year for this product type.

The limited availability of flatfish and the number of flatfish producers imposes a limit on the size of the units processing this commodity. One large specialised unit could perhaps produce the same quantity as all the smaller units if those smaller units were not operating. Small units hold raw material availability down to a level which keeps larger vessels out of this section of the industry, with the result that large vessels do not invest in the equipment necessary to produce these product variants.

Section (iii)

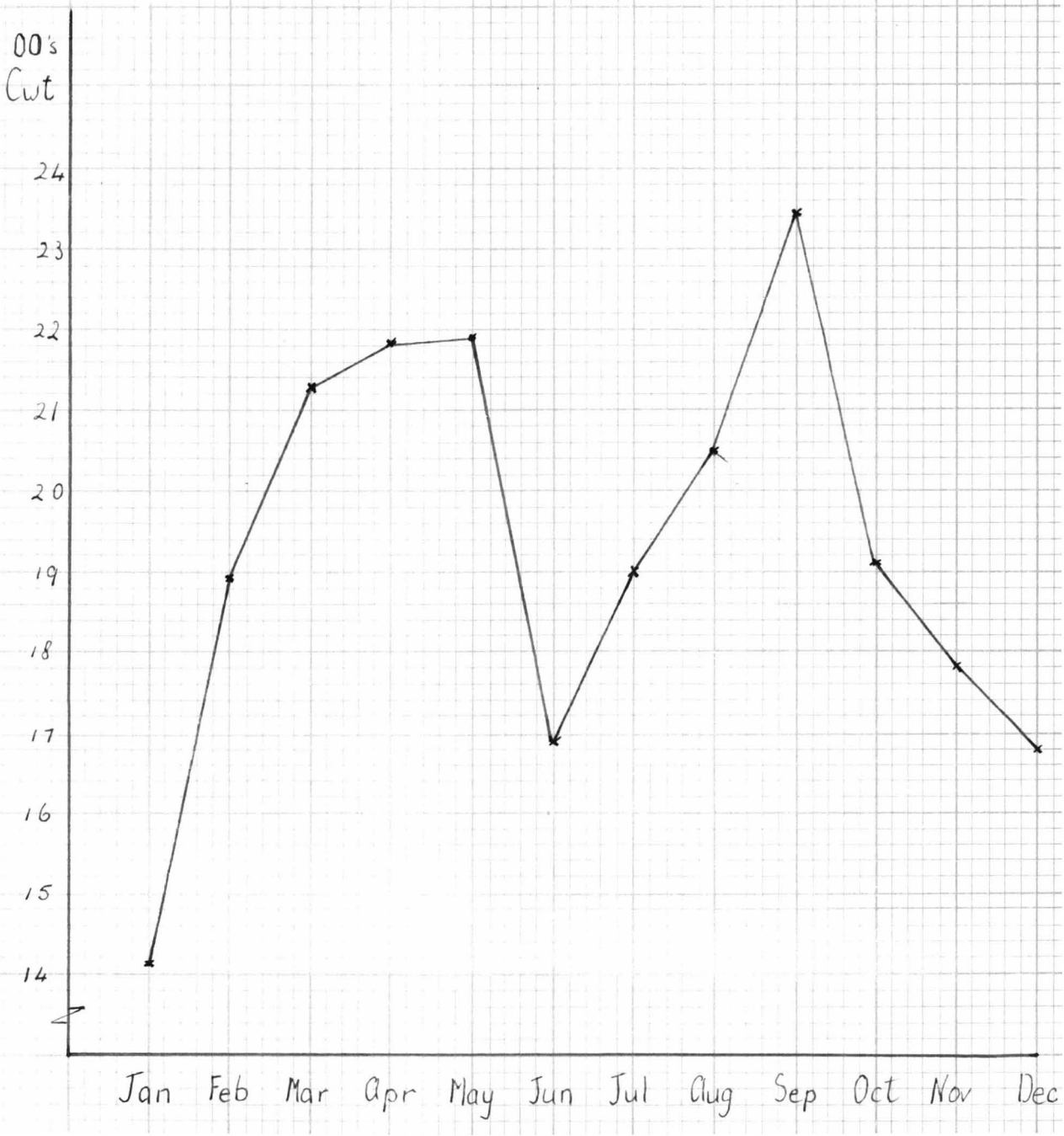
SUPPLY AT GISBORNE

Gisborne is another port which has grown in importance over the years. In 1951 and 1952 it held ninth and tenth positions by value of catch yet by 1960 and 1962 it had improved to fourth and fifth. Note is made of the general price level at Gisborne for, had the higher Timaru prices ruled there, Gisborne would have equalled Wellington in third place by value of catch in 1961. Total production increased by 60% during the 1951 - 1961 period and this is attributable to the 75% rise in output of one product variant - tarakihi. Such a skewed pattern of production contrasts greatly with Timaru where three product types are caught in roughly similar quantities.

As with Timaru, violent oscillations in the monthly output of each commodity class is observable at Gisborne (see graphs 7 and 8) although the impact of seasonality is of greater significance in the northern port. A five year average of monthly production for the principal product variants shows that the peak monthly output of each is likely to occur in September, October or November and total monthly output is also at its highest during those months. This grouped seasonal availability of all commodity types therefore humps total production towards the end of the year. A major production run of tarakihi occurs during March, April and May which reduces to some extent the effect of grouped seasonality in the other variants. September, on a five yearly average, has a total output which is 36% higher than the averages for February, June and December (whose outputs

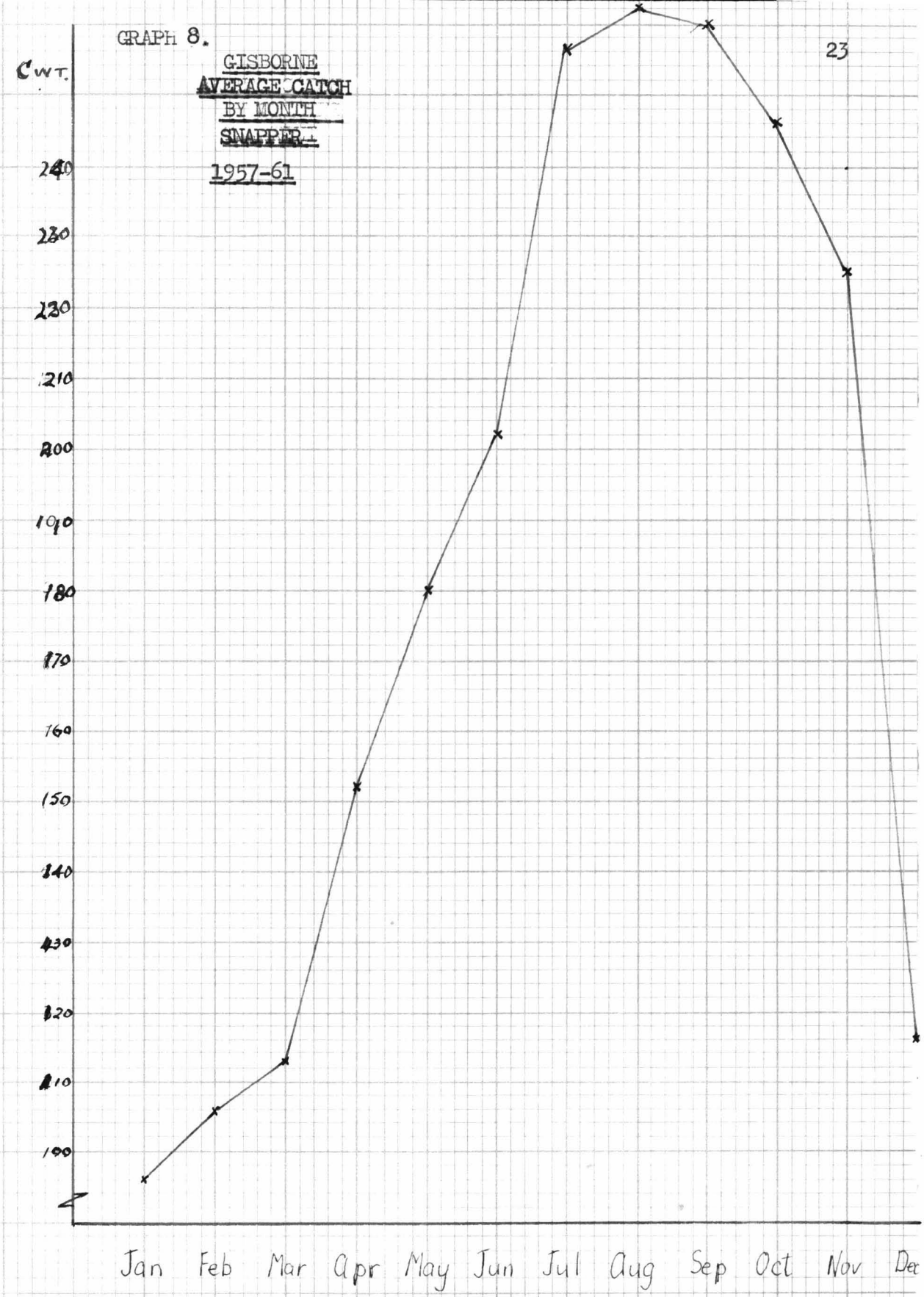
GRAPH 7.

GISBORNE
TARAKIHI
AVERAGE
MONTHLY CATCH
1957-61 incl.



GRAPH 8.

GISBORNE
AVERAGE CATCH
BY MONTH
SNAPPER.
1957-61



are of similar magnitude) and 86% higher than the average January production - although annual holidays exert some influence in January and December. Seasonal factors are therefore most important in the understanding of operations at Gisborne for, during four months of the year, firms at the port are operating at considerably less than their full capacity.[3] It will be remembered that Timaru registers seasonal fluctuations in all product variants but idle capacity is less noticeable there because the output of each commodity flows most strongly at different times of the year so grouped seasonality does not arise. Nor is Timaru reliant upon one product variant as is Gisborne which is therefore more vulnerable.

The precise meaning of full capacity is elusive in this context. Plant may be operated for the same number of hours in one month as it is in another but because it may be the off season the volume of output during the first month may be quite different from the total production of the second. Three important factors remain true of Gisborne despite this definitional problem. They are:-

(1) Fixed costs must still be met during the off months.

(2) Reduced availability of fish in certain months combined with the diminishing cost conditions means that such production as does occur in those months is at a high average cost.

(3) Notwithstanding (2) above there may be a tendency for firms to operate as though they have one average cost curve and produce joint products instead of operating as

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3. This term is discussed in the appendix to this chapter.

if they have an average cost curve for each product variant. By acting in that way the producers ensure that the continuous production undertaken during periods of reduced availability places the firm further out and down on a single average cost curve. Thus there is a transfer of overheads effect from one to all products collectively (and a product type loses its identity). This problem involves consideration of the production period and it is also a costing problem relating to the apportionment of overheads between products.

Each of these helps pinpoint this port's particular need for another product type and perhaps explains the interest the trade is taking in Watties Canneries Ltd.'s tuna investigations and the investigation of the prawn fishery.

The major product variants at Gisborne require similar production processes and this has caused most firms to invest in similar plant. It will be remembered that in Timaru the production process depended on whether the firm operated inshore and offshore and whether it produced flatfish or not. The similarity of equipment between Gisborne firms arises from the similar characteristics of gurnard, trevally, snapper and tarakihi in that they can all be produced by trawl in that area.

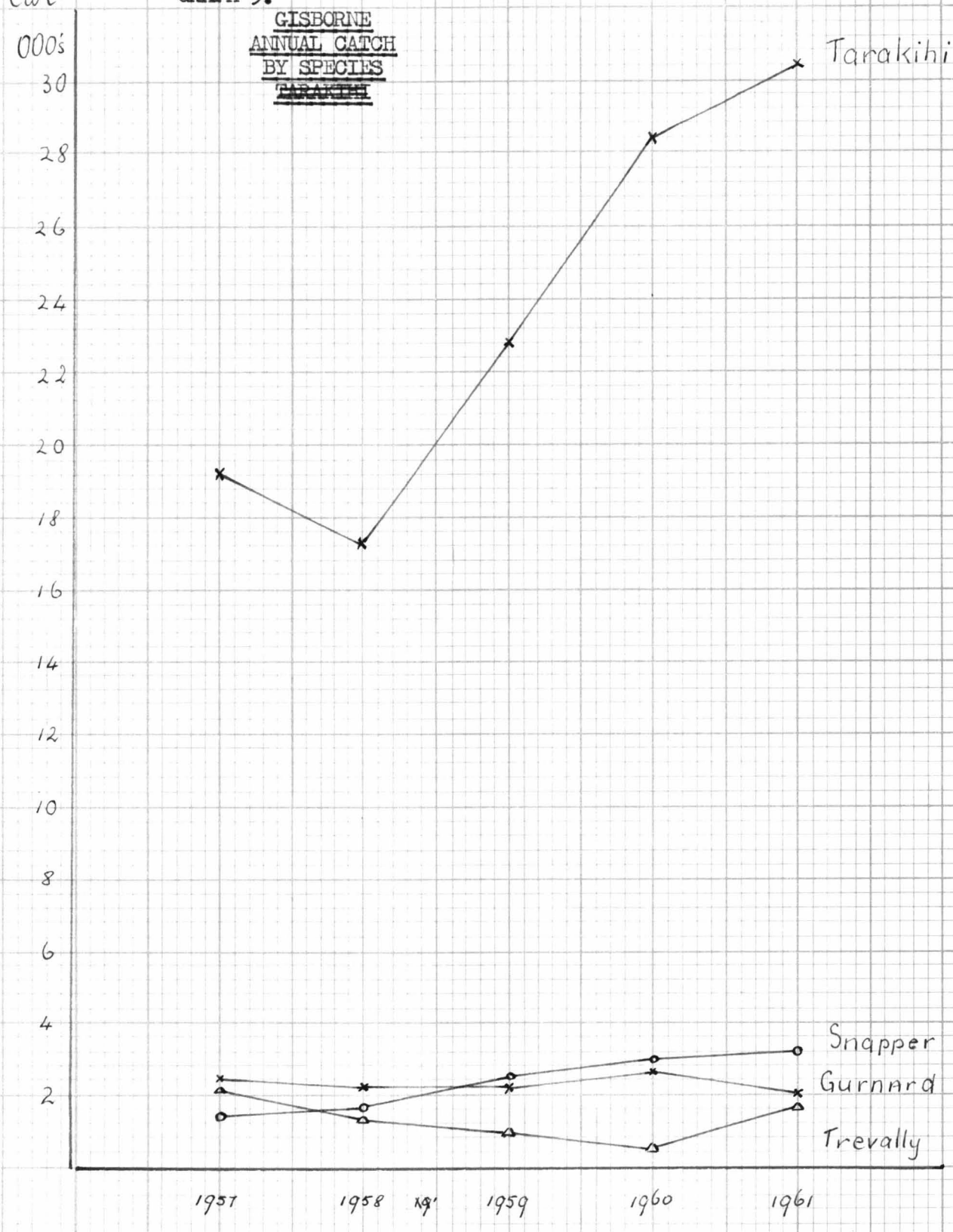
Identical methods of production yield joint products at Gisborne. Firms working certain important grounds in the area cannot be sure whether they will yield one or all of trevally, gurnard, snapper, tarakihi or a number of other varieties. It may seem, on these beds, that the role of price would be reduced in determining the quantity

supplied because of the likelihood of a mixed catch. This is not so. A complex of technical factors is introduced when the catch is mixed and through them price does play a part.

These technical factors are the freezing space each skipper has in his craft, the rate of deterioration and the range of the boat. A small vessel, because of its size will not be able to stay away from port long and it is also likely to have only a small freezer. If each small producer is to maximise his profits he must bring in a hold full of high priced fish. He, therefore, does not waste important storage space by taking on board his entire mixed catch, he tends to discriminate in favour of the more highly priced fish. Consequently tarakihi and snapper are taken instead of gurnard and trevally, and trevally and gurnard instead of other less saleable varieties. Effectively, these firms are sensitive to the structure of product prices and respond to the position of each product variant on the price ladder. Larger producers react differently with mixed catches. Their freezer space is considerable and they are able to stay at sea longer. But if they stay out too long deterioration sets in even with freezers. As a result, they must compare the value of their catch with the unused freezer space and the rate of deterioration. Therefore, especially as the time to return to port approaches, they tend to take the entire mixed catch without discriminating between product variants on the basis of price.

As an explanation of the steep rise in output of tarakihi since 1958 (see graph 9) Mr. Sorenson, of the Marine Department, has

GRAPH 9.


GISBORNE
ANNUAL CATCH
BY SPECIES
Cwt
000's
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
Tarakihi
Snapper
Gurnard
Trevally
1957
1958
1959
1960
1961

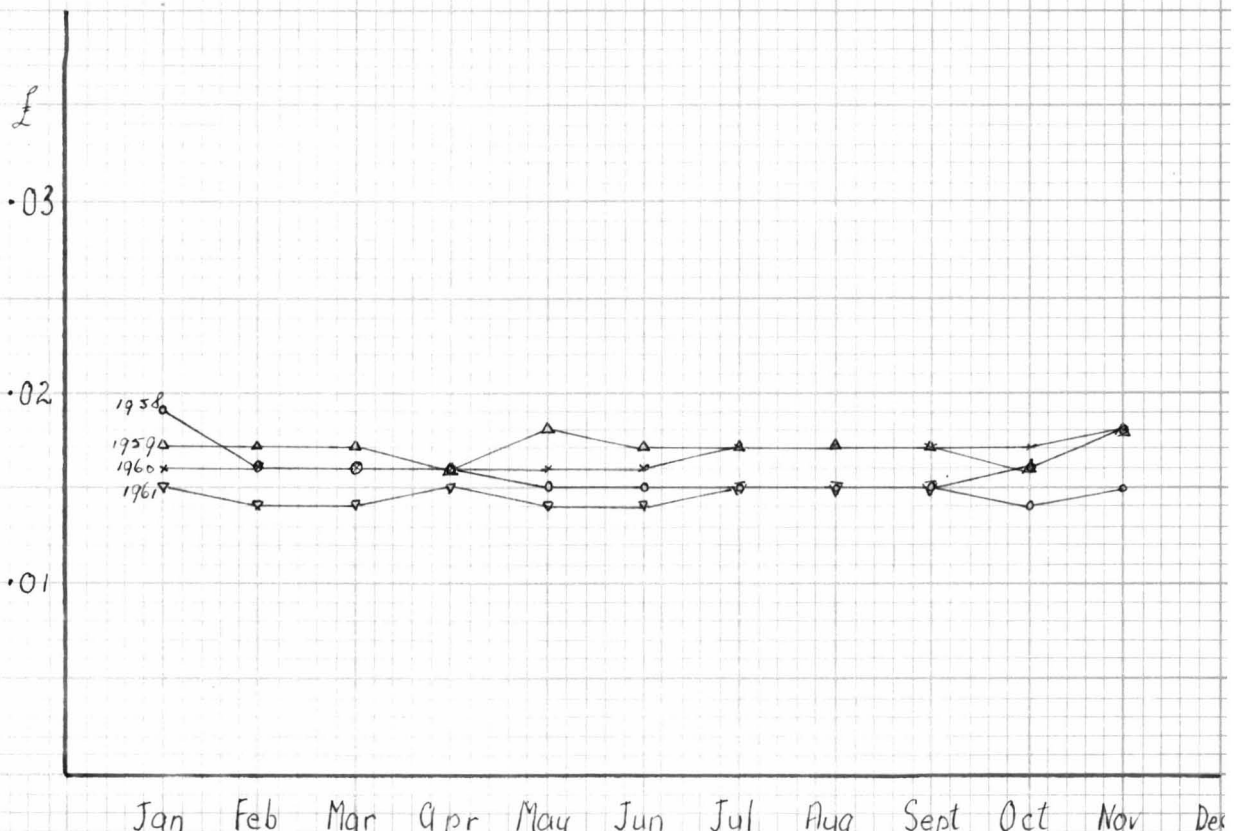
suggested that the answer may lie in the oceanographic factors. He has suggested to the writer that tarakihi may follow an isotherm. If for a few years these iso-therms move further south than usual they possibly bring greater quantities of tarakihi with them, which would partly account for the rise in the output of this product variant. Producers are aware of tarakihi movements and follow this fish during the season.

The writer accepts this expert's explanation and would add that the economic changes have not been great enough to account for the increase in output. This theory further underlines the vulnerability of this port.

Price determination is discussed more fully in Chapter Five, but the effect of price upon supply cannot be ignored and a brief comparison of the price structure at each port is of some value since the greatest difference in economic infrastructure between Gisborne and Timaru lies in the behaviour of average monthly prices. At Timaru seasonal fluctuations in price occur for all commodity classes. At Gisborne there are no periodic oscillations of prices. (See Graphs 10 and 11). Again, at Timaru prices for the most important product type have risen between 1957 and 1961 and the prices of the other important product variants have risen or remained constant (with the exception of gurnard prices which have fallen). Contrariwise, prices at Gisborne for all product types exhibit an annual downward shift. Prices there are lower and the range commodity prices smaller than at Timaru. The subsequent

GRAPH 10.

GISBORNE
TARAKIHI
SIMPLE AVERAGE
OF PRICE FOR ALL
BOATS BY MONTH
1958-61 inc.



GRAPH 11.

GISBORNE
SNAPPER
SIMPLE AVERAGE
OF PRICES, ALL BOATS
BY MONTH.
1959-61 inc.

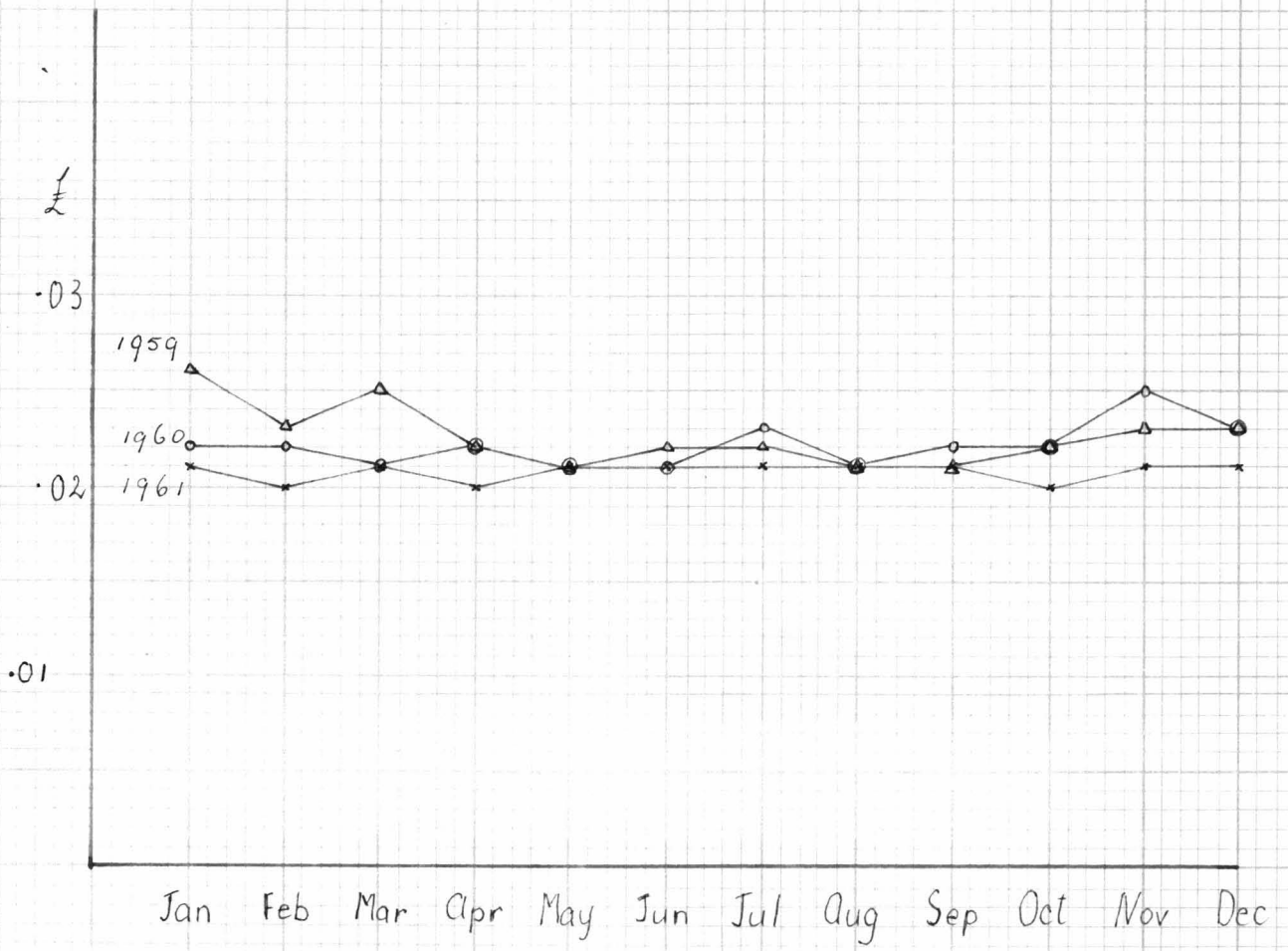


table illustrates these points which occur against a similar background of seasonality in output.

TABLE 1.

ANNUAL SIMPLE AVERAGE OF PRICE PER LB. OF THE PRINCIPAL PRODUCT TYPES FOR ALL FIRMS AT TWO PORTS

	TIMARU £					GISBORNE £				
	1957	1958	1959	1960	1961	1957	1958	1959	1960	1961
Gurnard	.034	.024	.016	.018	.021	.013	.013	.008	.008	.009
Tarakihi	.033	.028	.024	.028	.033	.022	.022	.021	.020	.021
Snapper	-	-	-	-	-	.022	.023	.021	.020	.021
Elephant	.044	.046	.041	.048	.053					
Trevally						.008	.008	.007	.008	.007

Source: Compiled from official records by courtesy of the Marine Department.

Low level uniform prices at Gisborne, and more especially a low uniform price level with a tendency to shift downwards annually, provide indirect evidence of the decreasing cost conditions of production within the industry. If prices were uniform but high, it is true that this could mean that average revenue exceeds the rising portion of the average cost curve at a given output and that average cost has not yet risen above average revenue. However, the fact that average revenue has shifted downwards annually reduces the force of this interpretation and the fact that average revenue was initially very low reduces it further. In addition to this it should be remembered that all firms have substantially increased

their output of one product variant over the four year period during which the output of the other product types has been virtually constant. If the increasing average cost situation applied, one would not expect to see such a massive rise in output[4] in the face of an already low price.

It is further suggested that the dimunition of unit costs is itself a contributory cause of the downward price drift. For, assuming the two wholesalers know of this general trend in the costs of production, they will be prompted to force lower prices upon the producers as output increases each year.[5] Furthermore, fishermen are in a position to accept such reductions if their average cost has fallen.

If the decreasing cost argument is accepted,[6] the observed constancy of monthly average prices also explains why firms are quantity maximisers because in these circumstances maximum production must be achieved before peak profits can be incurred. Mr. Sorenson's explanation of the availability of tarakihi when viewed in the light of quantity maximisation and constant prices accounts for the expansion in the output of this product type at Gisborne.

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4. The output of the nine firms involved in the production of tarakihi had risen by 13,000 cwt in four years to a 1961 total of 30,000 cwt.
5. If a wholesaler operates his processing plant with eventually rising costs per unit then this would provide him with an incentive to impose lower prices for his raw materials as his output rises.
6. A more detailed discussion of the shape of the average cost curve is contained in section (iv) of this Chapter.

Section (iv)

COST CURVES - A CONCEPTUAL DISCUSSION

Efforts to obtain cost data for particular firms were unsuccessful and so, unfortunately, a priori argument must suffice on this issue. Two approaches are used, firstly the average cost curves of the main items of cost are considered and after this a break even diagram is used to provide a graphical demonstration of the condition of decreasing unit costs.

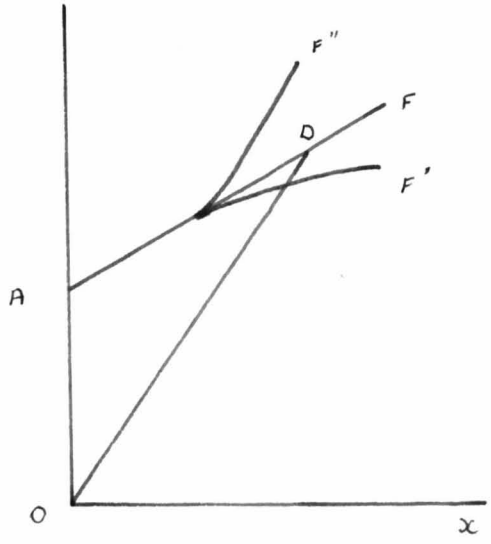
Repairs to and replacement of equipment as well as plant maintenance are major items of cost whose relation to output cannot be stated with confidence. Vessel maintenance cost is presumably a function of time but in a given time period it is determined by the age of the vessel and is perhaps a declining function per unit of the output of that time span. Totalmaintenance cost is likely to rise each period and therefore, while maintenance cost per unit of the output of a particular time span may decline, the entire average maintenance cost curve may shift upwards each time span and contribute to an upward drift in average cost over time. Repairs to gear is largely a random cost. A vessel may trawl for months without any loss of gear and thenmay, or may not, lose two nets in quick succession. Periodic replacement of the long wire ropes made necessary by corrosion, is a costly item which may be more closely related to time spent trawling than it is to output. However, if an allowance is made for, say, two replacements of net and rope per year, this expenditure becomes a fixed cost.

A more conclusive statement is possible on the behaviour of the other items of cost in relation to output. Many costs are independent of output. Such costs as wharf charges, stores, insurance, depreciation (by which is meant the annual recovery of the money outlay involved in the original investment) and administrative costs will be incurred and are unrelated to output. The cost of these items per unit of output will therefore decline as output rises.

No information on fuel cost was available and so no statistical analysis on the relation between fuel cost and output was possible. In considering the relationship it should be remembered that part of the outlay on fuel is not directly productive of output because it is incurred in steaming to and from fishing grounds. This will be higher in some ports than in others depending on their proximity to the grounds but in most ports some hours will be involved. It may take a Wellington trawler four to five hours to reach the Cape Campbell grounds at cruising spped, when fuel consumption is high by comparison with trawling speed. Ten hours travelling represents a considerable outlay on fuel for two days trawling. (Suppose a Wellington trawler works sixteen hours a day off Cape Campbell for two days. "Productive" time is thirty two hours, travelling time, out and home, may be nine hours, and the engine will be idling without trawling for eight hours each night. Thirty two hours "productive" fuel consumption therefore involves twenty five "unproductive" hours of fuel consumption. So in this actual case the fixed element of fuel cost is likely to be quite high in relation to variable fuel cost.) Let the amount of fuel cost which is

independent of output be represented by an amount OA. It is now necessary to examine the way in which the remainder of the outlay on fuel behaves in relation to output. In Diagram 1, it is submitted that a cummulative function rising as rapidly as AF" is unlikely since the writer has no reason to suspect that the marginal product of fuel declines rapidly. Similarly, AF' is rejected since the writer can see no reason to suppose that

DIAGRAM 1. Fuel Cost Function.

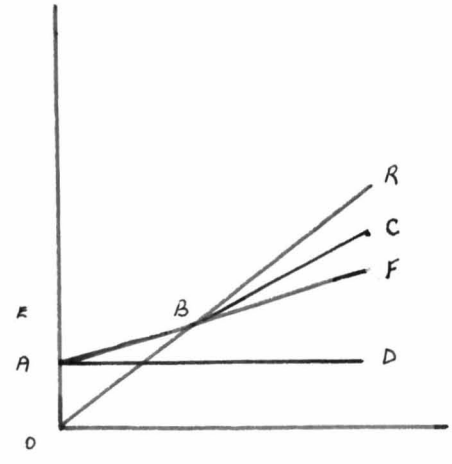


the marginal product of fuel consumed on the grounds would rise, so one is left with either a linear form or a slowly changing marginal product for which a linear cost function would be a fair approximation over a certain range of output. An approximately linear function appears to be a reasonable assumption, since OA aside, the fuel cost of a given vessel would probably vary with distance trawled once the grounds were reached and there is probably a relation which could well be linear between miles trawled and output, since hourly fuel consumption will not vary greatly at trawling speed. Returning

to the problem, it will be agreed that if an approximately linear function of the AF type describes the total fuel cost to output relationship, then average fuel cost per unit of output declines for all or some ranges of output as output increases because the tangent of the angle DOX declines as D moves from A to F.

Labour, with fuel, is a substantial item of cost to the individual firm. Where labour is rewarded on the basis of a share in the profits[7] average labour cost behaves in a fashion which is discussed more easily with the aid of Diagram 2. The diagram assumes that repairs and maintenance and replacement charges have been met so they can be treated as fixed costs along with the other truly fixed costs. It assumes that output is sold at an unvarying price per unit.[8] As Chapter Five shows, this is a realistic assumption for most ports, which also simplifies the discussion

DIAGRAM 2. Total Cost Function.

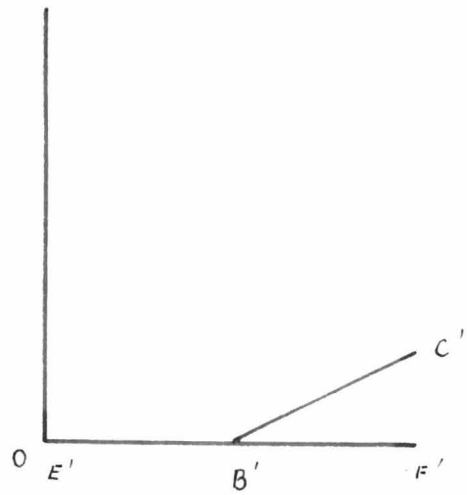


7. See Chapter Four for labour remuneration in the industry.
8. For the limitations of Break Even analysis see Dean, "Managerial Economics", pages 329 to 337.

without greatly affecting the outcome. OA is the fixed cost, including that necessary element of fuel cost which is not directly productive of fish. Assuming an approximately linear relation for the remainder of fuel cost, perpendiculars from AF to AD show total fuel cost for various levels of output. OR is the total revenue curve. Distances such as RF represent the return to the crew and owner, suppose the crew's share is such that it receives FC of this amount. The vertical distance between BC and BF is the total labour cost of the corresponding level of output.[9] Notice that only outputs greater than EB provide the crew with any return.

Transposing the line BC to a separate diagram (Diagram 3) and preserving the angle CBF and the level of output EB, labour cost per

DIAGRAM 3. Labour Cost Function.



9. Chapter Four (p. 108) discusses the effect of losses upon the remuneration of labour.

unit of output is seen to rise as output rises beyond B' because the angle formed by a ray from the origin steepens as the point of its intersection with B'C' moves towards C'.

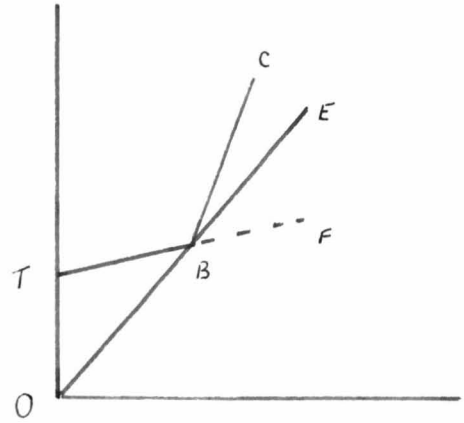
Average labour cost is zero until E'B' is produced.

The kinked curve ABC in Diagram 2 is a total cost curve only if amounts such as CF are regarded as a cost. If CF is treated as an appropriation of profit then AF becomes the total cost curve, the line CB disappears and with it the situation of rising average labour cost and the problems of kinked total cost curves discussed in the next paragraph but one.

Regardless of the definitions of costs and profits used, it can be shown that average cost per unit of output declines as output rises. That is to say, the tangent of the angle at the origin of any ray through the origin to line ABC (or ABF) becomes smaller as point C (or F) is approached. (see Diagram 2).

In order to show that a special case has not been presented, suppose that average cost, under a profit sharing system of labour remuneration, has a U shaped curve, In this case the angle of the ray from the origin to the total cost curve falls at first and then rises as it would do for TBC the total cost curve in Diagram 4.

DIAGRAM 4. A False Cost Function.



The kink in the total cost curve occurs because of labours' percentage - based reward, which operates only in the profit area beyond the break even output. Point B is therefore the break even point and OB must therefore be the total revenue curve. Labour receives no remuneration unless profits are incurred. TC is above OB throughout, therefore no profits are being earned. Consequently the labour cost element in TBC must be removed, i.e., the portion BC. The explanation of the TB section has been made above and since an approximately linear fuel function is likely the total cost curve must continue through B to F. So TBC is an impossible position for a total cost curve yet it is the type of total cost curve necessary to produce U shaped average cost curves. The type of kinked total cost curves necessary to provide declining average cost are those where the portion after the kink is below the total revenue curve i.e. the type in Diagram 2. In point of fact the kinked portion will always be below the total revenue curve because the kink arises through labour's share in the profits and profits will be earned only if total revenue exceeds total cost.

On vessels where labour is paid a flat wage, labour cost is constant for all levels of output and so average labour cost falls as output increases. Such vessels would not have a kinked total cost curve.

Producers are conscious of the break even level of output for they speak of the number "of cases (of output) necessary to run the ship before we earn any pay."[10]

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10. Former President of the Wellington Fishermens' Association.

The foregoing analysis suggests that cost per unit declines as output rises within a given time period. Strictly, this is distinct from a falling average cost curve in the economic meaning of that term. An accounting rather than an economic concept of cost was used to arrive at the curves of total cost in the diagrams above. As far as they are concerned the basic difference in concepts arise from the differences in the time period to which they relate. The break even diagrams covered the accounting or calendar period implied in the treatment of fixed costs. Average cost, in the economic sense, is concerned with costs in a period of time set by the scale of plant; calendar time is converted to time intervals called the short run and the long run.

Section (v)

PRICE AND ALLOCATION

In the absence of frictions variation in prices direct resource flows if marginal costs are eventually rising. However, finite capacity combined with reducing unit costs can impede this mechanism in a given time span. Producing firms in the fishing industry approximate this model of finite capacity and decreasing costs but it is not implied that price variation has no influence upon allocation within the industry, although it is true that licensing policy does constrain the flow of resources to it. The model in Section (iv) above neglects product differentiation and in the fishing industry the price pattern of the differentiated products is important in controlling activity since the cost conditions for many product types do not differ greatly for any one producer. And, while firms could incur profits producing variants with low price levels, the output of these groups is not maximised because other classes of the product with higher prices secure greater profits. Given the availability of the raw materials, there is a tendency for firms to produce those product variants at the upper end of the price range. Should the price patterns alter so that one product type is replaced by another, then resources shift. If prices change without any change in the position of each product type on the price ladder there is not the same tendency for plant to be diverted and for men to shift their effort. So, if buyers' preferences for a cheap, plentiful product variant like red cod were to change and its

price rise over a period the output of this product type would increase as it replaced others on the price ladder.

In practice the essential assumption of the previous paragraph may not always exist. That is to say, the fish may not be present throughout the year and the rising price/output situation brought about by the price ladder effect may not show up clearly. An indication of its existence is found in Timaru where the position of tarakihi on the price ladder has improved over the years and its output has also risen. At many ports it appears as though the price position of snapper, tarakihi and gurnard may have risen which would explain the increases which can be observed in their production totals.

APPENDIX TO CHAPTER TWO

THE MEANING OF FULL CAPACITY

The key place of full capacity in the decreasing cost argument calls for a closer examination of the meaning of this concept.

With a given state of technology output will be at a maximum in any period when an infinite volume of raw material is available to a continuously operating plant. This level of activity is the upper limit, and a theoretical meaning of full capacity. As the available raw materials are reduced below the volume which can be processed in this extreme situation, so total production declines; and this constraint upon maximum output must have a place in any workable definition of full capacity applied to a firm in the fishing industry. Even if vessels were able to fish non stop for a particular product variant the seasonality of this species would cause the screws to turn uselessly in some months, contributing little to total output, whilst in others the same vessels may be faced with a volume of raw materials too great to process.

Offsetting the seasonal impact one input variant exerts upon maximum output is the seasonality of the others which provide substitute inputs at different times of the year but which individually are subject to similar seasonal fluctuations. At Timaru, substitute inputs conveniently become available when the main input of the previous month or two is becoming scarce. During the year producers increase their output by switching to other product

lines; which is a major cause of the relatively consistent volume of monthly output observable at that port. Substitute inputs are less obliging at Gisborne and the monthly fluctuations in total output there as well as the semi-idle equipment of some months has already been noted (see page 24). This indicates that Gisborne firms suffer the input availability constraint upon theoretical full capacity to a greater degree than their Timaru counterparts.

Having tempered the theoretical maximum capacity with input availability we move to consider plant utilisation. Annual refits are an essential part of plant maintenance and whilst the vessel is on the slip, being careened and having an engine overhaul, its production ceases for perhaps a fortnight in the year. Usually the producer will try to repair his plant during the months when his combined output would otherwise be at its minimum, but this is not always possible, for, if he has a big vessel requiring the harbour board's slip he may have to wait his turn. Plant utilisation is reduced by the weather and in typical years output is also reduced by this factor (but see page 56). A good boat can operate with greater safety than a poor one in given weather conditions and this factor will contribute to different practical capacities between vessels. However, the issue is less clear cut than this because, though a good boat has a better safety margin than another it may still be affected by the weather to much the same degree because:-

(a) skipper B may be more prepared to accept risks than skipper C. Lore has it that the owner-skipper of a partly paid vessel

goes to sea more often than skippers or the owner-skippers of freehold vessels.

(b) of the difficulty in swinging the net on board with a swell running. Good and poor vessels are equally affected here.

So the problems of plant utilisation not only further reduce theoretical capacity but they make the meaning of practical capacity less precise and cause it to vary from firm to firm even though there may be no great differences in plant size.

The output of vessels of similar size, power and crew may vary because of differences in ancilliary equipment. The power of winches, the strength and length of cables and variations in the construction of the net as well as the way it is used can all alter output and are considered important determinants of a boat's potential in the trade. As was shown for Gisborne, the space available at sea to store the catch and whether it is frozen storage or not influences the time spent on the grounds. Consequently the output of a voyage is affected and, over a longer period, the firm's practicalcapacity. Other technical factors of importance are hull design, engine power and the type of propeller, for ideally, a vessel should be able to travel to and from the grounds at high speed in order to minimize unproductive time, and yet have the engine power to haul the net at slow speeds. Complexities of this kind noticeably affect a firm's potential output over say, a year.

Labour input wields a powerful influence upon practical capacity as is shown on page 60 . As far as Timaru is concerned the income-leisure effect, which is said to operate in the industry,

is not shown by the figures to be of great importance since incomes, days spent fishing and output from 1957 - 1961 inclusive, all show rising trends. Gisborne, Auckland and Wellington producers also spend substantial periods at sea. Otherwise skill and local knowledge of the sea bottom, tides, current and seamanship act upon vessels' potential. Social pressures operate in that annual holidays and weekends are part of the New Zealand social milieu and have their effect upon plant and utilisation.

An alternative approach to this question of capacity would have been by way of an abstract discussion of cost curves but this can involve one in considering:-

(1) Coincident, vertical portions of average and marginal cost curves.

(2) The possibility of installing new plant (plant would not then be fixed) as an alternative to the possibility of sinking the vessel.

(3) Negative average cost in the linear case - a logical impossibility.

(4) Positive average cost and negative marginal cost, which is unlikely in view of the typical firm's cost structure.

(5) Non linear and declining asymptotic average cost curves. While these are possibilities they can not of themselves provide any concept of full capacity short of an infinite output.

(6) A number of other average cost functions which are thought to be irregular oddities.

The practical exposition is therefore preferred since it highlights real issues and adds life to the discussion. This is not

done without cost for instead of arriving at a neat definition of full capacity, where say, the cost curves become vertical, we have an imprecise analytical idea, differing from firm to firm, though set by the same factors, which remains an essence of practical importance and theoretical significance.

In summary it is concluded that within a given time interval firms are confronted with a finite capacity which is set mainly by:-

(1) Input availability and seasonal input substitutability.

(2) Plant utilisation, the nature of the ancilliary gear and hold space.

(3) Labour Input.

The less these factors vary for a given firm from one production period to another the more nearly will the full capacities of each period involve similar outputs.

CHAPTER THREE

PRODUCTION

Section (i) Fishing

(ii) Plant Organisation

(iii) Factors Affecting Output

(iv) The Inter-Connections of the Individual Firm's Inputs

(v) Some Production Functions

Appendix.

CHAPTER THREE - PRODUCTION

Section (i)

FISHING:

She is seventy five feet long and inaptly called the Golden Star and, it being Tuesday has just returned from sea, having left on Saturday. The skipper and his three crew are making ready to leave again tonight. They are replacing a trawl board weighing 7½ cwt, that had been lost and the foot and head ropes going round the mouth of the net had just been renewed. By 5.30 p.m. these jobs are done and the crew are away home to their families. Taffy is on board again to warm up the Lister Blakestone engine at 11.30 p.m. - one hour later we sail. Fishermen have little social life. As we clear the heads Jock hands the helm to Hughie whose watch it is, and the rest of us go aft to the crew's quarters and turn in around 2.0 a.m. Shortly before 6.0 a.m. we crawl out, and those capable (i.e. fishermen rather than economists) enjoy breakfast or scan the situations vacant column. We are at the grounds near Cape Campbell and the economist is told that the weather is perfect.

Six o'clock sees us shooting the gear to a shingly bottom in sixty five fathoms of water. The cod end goes over first and the 100' net suspended from floats starts drifting away from the boat. Once it is well clear of the propellers the ship starts to move,

with the two big winches running free and the wire ropes running through the gallows (pronounced "gallers") we leave the net astern. After forty fathoms of cable has run off the trawl boards are shackled on to the warps. These two boards, about 10' x 4'6" are attached at an angle to each warp, so that as the net is dragged they splay out and open the wings of the net. The angle the boards are to, and the distance they are from, the net are of great importance in determining how the net behaves, and knowledge of this is one of the things that distinguishes crew from skipper and better from poorer skippers. The boards are very heavy, they are lifted over by the winches with the warps around the gallows and they serve to keep the net on the bottom. Engines are stopped to lower the boards and care is taken to see that they do not foul the ship or cross as this would close the net. When wind and currents are in the wrong direction this is a very awkward business. But once the engines are started the winches are again spinning swiftly and Ron and Hughie are working the clutches to control backlashes. When sufficient cable to keep the net on the bottom has run out the warps are drawn together and held in the towing block near the stern. Steaming at 2 - 3 knots we are in production and by 6.45 a.m. we are back in our bunks and Jock is in the wheelhouse. He turns on the echo-sounder frequently to watch the depth of water, and he holds the boat on a course which keeps the net down.

At 10.0 a.m. the towing block is slipped with a clatter. The engines stop, the boat wallows with the sea and lists with the strain of the net as the big winches start to haul it in. The wings of the

net appear soon after the trawl boards have been made fast and all hands help haul the net on board timing the roll of the boat to help them. The odd hake caught in the square is removed and tossed overboard. Water boils 30' away as the cod end, fish swollen, surges to the surface and the seabirds have breakfast. To avoid splitting the net a rope is used to divide the cod end and the first half, swung on board with a boom, is held with a rope which prevents it from swinging. A strong jerk opens the end of the net, fish cascade in a silver shower on to the deck near the hatch forward of the wheelhouse and winches. When the cod end is empty, and a minor repair has been made to the net, the gear is shot and we are trawling again at 10.50 a.m. At 11.5 a.m., Hughie, Taffy and Ron each sitting astride a case start gutting with incredible dexterity. In four movements a fish is gutted. Thumb and forefinger pick a fish up by its eyes and slap in on the case. The knife goes quickly into the gills and quickly slits its belly. The entrails are severed from its throat and adroitly flicked out through the slit and the left arm throws the fish into the pond as it moves to pick up another. Four to six seconds might have elapsed. A great deal of time is lost sorting the fish at this stage and a good number of hake, many red cod and hundreds of ratfish are returned to the ocean dead. In all a third by weight is rejected. At 1.0 p.m. the gutting was done and we sort and box the fish, then we lower twenty, one hundred pound cases into the hold, fourteen of tarakihi, four of hake and two of ling. After the deck has been hosed and swept and the freezer defrosted we stop at 2 p.m. for kai and at 3.5 p.m. the towing block is slipped to begin the next haul.

It was 12.30 that night when we had cleaned up after the final trawl for the day. Jock had done 16 hours in the wheelhouse and gone below as soon as the last net came up. Ron and Hughie divided the night watch between them and the boat was allowed to drift. It had been an easy day because the weather had been "fine" and 70 cases was a satisfactory catch. We shot the gear at 5.0 a.m. the following morning, only because the fish leave the bottom during the night in that area.

Section (ii)

PLANT ORGANISATION:

Provided operations continue smoothly a rigid division of labour conceals the hierarchy of authority on a motor trawler. Captain Campbell's attitude was that a good team requires little leading and each of the crew was conscious that he was part of a tightly bound unit. The co-operative nature of their enterprise is partly the cause of this although the feeling of reliance upon one another, the trust that a good watch will be kept at night, the exposure to the common danger and a great similarity of personal interests build up an uncommon camaraderie that might equally be responsible for this group identification. Repetition ensures that each hand knows his own function and understands how it is related to the activities of the others. During shooting and retrieving very little is said, the occasional hand signal is all that is necessary.

Only the skipper is a fisherman. He is a craftsman who produces the commodity, but he requires the help of the hands to do so. He watches the net and understands its use. If it is fishing well he will not touch it, if for two or three trawls he lands nothing he examines it, it could have stretched in one direction, and so not drag properly, the foot or head ropes may require adjustment or the boards may not be properly set. Only he knows these things. It is he who pinpoints the grounds and guides the net in and around the contours of the ocean floor. It is he who, once he is on to a patch of fish, marks the area and goes back and forth through it. It is he who is able to navigate and holds the Ticket and it is very

much he who commands when routine is interrupted by a mishap. A good crew cannot make good catches without a good skipper.

Productive activities are minutely apportioned between crew members. The skipper steers the ship from the time the gear is shot early in the morning to the time it is hauled late at night. One deck hand controls the forward gallows and the other the after gallows. Despite the similarity of these operations the two do not interchange. The engineer does not spend a great deal of time below as the controls are in the wheelhouse yet only he operates the winches. Even small tasks occurring each haul are carried out by the same hand. The forward hand always jerks open the cod end. The after hand always manipulates the towing block. The engineer always defrosts the freezer, and operates the small hand pump outside the galley to clear the bilge. The deck hands always swab the deck, the same one using the hose each time. The forward hand always uses the rope and pulley to lower cases into the hold when the after hand has put the hook in them. The engineer stows the cases once they are in the hold. The only task that the whole crew performs is hauling the wings over the side. Everybody guts, apart from the skipper.

During the whole voyage of three nights not one command or request was uttered, so well does the productive process lend itself to regimentation and specialisation which, through repetition, promote integrated efficiency.

Section (iii)

FACTORS AFFECTING OUTPUT

The generalised and abstract theory of the firm needs must neglect factors influencing output of varying importance from industry to industry. For any firm within a given industry such factors may have an important impact on annual production[1] that is concealed beneath the term "the equilibrium level of output".

Before considering the place of these endogenous variables in the Fishing Industry, it is as well to outline these factors, which are ignored because of statistical and conceptual difficulties. It is assumed that:-

1. Management and labour is homogeneous throughout the industry, i.e. the skill of skipper and crew is identical between firms and knowledge of fishing grounds is common to all.
2. Plant is also homogeneous and methods of production are identical between firms, i.e. variations in the construction and use of gear are ignored. Also boats are the same shape - a necessary simplification in view of the index of size used (length x beam x draft) as tonnage data is not available.
3. Firms are equally sensitive to price and react to price movements which are beyond their control in the same, undefined, fashion.

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1. The appendix to this Chapter also considers this problem.

These assumptions appear formidable but for the Timaru section of the industry they do not strain the truth too greatly. For instance, knowledge of fishing grounds is difficult to hide as long as one craft can follow another. Skippers' and crew's skills undoubtedly vary, but once a man has spent half a lifetime in fishing boats his difference from others in skill is more likely to be one of degree only, since neither could be termed unskilled.

The importance of luck and weather cannot be denied, but they can be placed in perspective. Chance does play its part. In any one production run a good haul or a bad haul may occur, but as the the number of runs rises the probability factor evens out as successful hauls balance with the unsuccessful. Fishermen are a skilled group and their skill helps offset the role played by chance. Furthermore, they know their grounds, seasons and techniques, all of which go towards reducing the influence of random variation. Weather exerts a similar influence, the longer the period under review, the more valid is the assertion that fine days tend to bear a certain relation to the whole period. Consequently, chance's influence on the volume of production seems to be significant if one or a few production runs are considered but, as the number of production runs increases, so the power of the other factors governing production reduces it. Hence, it is concluded that the longer the time interval the less important does the random element become, and given its plant, the greater the skill of the skipper and crew the more control has the individual firm over the output it places on the market.

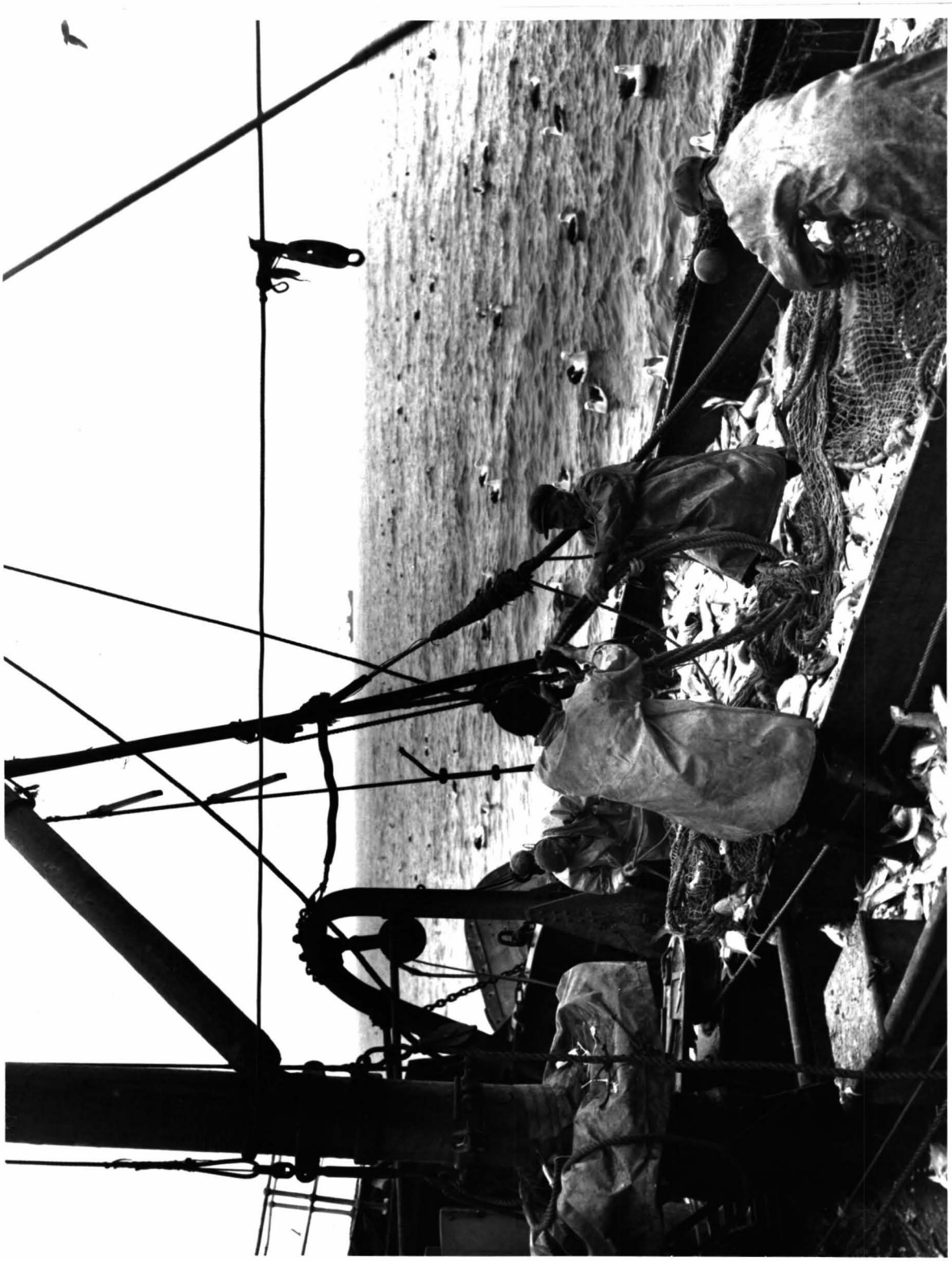
PLATE 1

A General Scene

"Number in crew becomes a factor here because the more often a full net is raised the more fish can be loaded into a hold. But one trawl can not be emptied onto the deck until the flapping contents of the previous trawl have been sorted, remunerative types from the unsaleable, perhaps gutted - a long process - boxed and stacked in the hold."

Page 60

The corner of a trawl board can be seen shackled to the forward gallows behind the hand on the left. A needle to mend the net is on the canvas surrounding the mast.



Notwithstanding these, it is submitted that the size of the vessel, horsepower, number of crew and days at sea have a definite bearing on the output of firms and the following table is used as the basis for their study.

TABLE 2

SCHEDULE CORRELATING STATED VARIABLES WITH ANNUAL CATCH. TIMARU 1959.

	Eng. Sole	Eleph. Fish	Gurnard	Tara-kihi	All Rounds
Crew (1)[a]	-0.69	0.83	0.89	0.81	0.87
Horsepower(1)[a]	-0.78	0.75	0.69	0.68	0.67
Index of Size(1)[a]	-0.78	0.74	0.65	0.64	0.79
Days Fishing(2)[a]	0.84	0.67	0.63	0.54	0.52

Source: Derived from monthly returns to the Marine Department by the 27 firms then in the Timaru section of the industry.

Notes: a.(1) At the 5% level 0.381 is significant for this value of n.

(2) At the 5% level 0.423 is significant for this value of n.

b.(3) The two levels of significance arise from statistical imperfections in the original data.

(4) In this table "all rounds" means elephant fish plus gurnard plus tarakihi and excludes English sole and other flats.

(5) "Crew" includes skipper.

Moderately good correlations, implying an association between variables, must be interpreted with care. This is true of Table 2, because of the multitudinous technicalities it conceals. In order to produce the table it was necessary to assume exogenous factors constant. In order to explain the relationships which the table indicates may exist we must fall back on those technical factors.

Safe generalisations from the table offer another problem for, while some 1600 observations lie behind the correlations, it is remembered that the table concerns only the major products of one port for one year.

Other things being equal, the greater the cross section of the net drawn through a stretch of water, the greater is the quantity of fish that will be caught. The resistance offered by any given net depends mainly on its mesh size, the size of its cordage, tide and the quantity of fish it encloses, so the power of the vessel, cet. par., determines the size of the net which can be used. Number in crew becomes a factor here because the more often a full net is raised the more fish can be loaded into a hold. But one trawl can not be emptied onto the deck until the flapping contents of the previous trawl have been sorted, remunerative types from the unsaleable, perhaps gutted - a long process - boxed and stacked in the hold. This labour intensive part of the production process accounts for the high correlations (0.83, 0.89 and 0.81) found between numbers in crew and the annual output of three product types and explains why three men in a craft would raise more fish than two in a given period.

Observation of the productive process offers additional evidence that crew size is an important determinant of output. All the vessels at Timaru haul their nets in over the side which is a heavy, time-consuming, task. As the net is being hauled in it is off the bottom and is not fishing and so the more rapidly a net can be hauled and shot away the more time is spent in production.

Consequently, the more men available to drag the net on board, once it has been winched to the side, the quicker will it be returned to the bottom and the more fish will be caught.

It could be argued that as larger crews are found on larger vessels and larger vessels can operate larger nets the relation between the crew and output is not direct, but one that is brought about indirectly by the larger boat which is the more important determinant of total production. This explanation has ignored the important problem of processing the catch once the fish are on board, which is a labour intensive procedure, and the real reason why crew and catch are closely correlated. If a large vessel hauling a large net were operated by three men they could process a greater quantity of fish per time interval than the same vessel and gear manned by a crew of two. Here, a layman might counter by propounding that it does not matter how long the processing takes on deck, because the net will be trawling all the time and in a longer period (brought about by two men gutting and sorting instead of three) will catch more fish per haul. Against this logic R.M. Cassie has stated that a net, say, one quarter filled will catch more additional fish in a given time than one which is, say, one half filled.[2] Therefore, it is advantageous, up to a point, to

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2. Ref. R.M. Cassie, "The Escapement of Small Fish from Trawl Nets", p.p. 10, 16 and 17. The reason being that as the net is trawled trapped fish offer a solid resistance to water, which is deflected outside the net, thus helping free fish to make their way through the side meshes. The fractions are mine and are illustrative not factual.

retrieve the net frequently - a task which requires more men to process the previous haul quickly. It can not be claimed that the good crew/output correlations exist because a large fifty-five foot motor trawler would require more men just to sail her than would a small thirty foot motor vessel, because this is not so, as each requires a man at the helm who also tends the engine. Finally, in defence of the larger vessel/large crew interpretation of the correlation, it cannot be posited that the faster a vessel crosses the grounds the more trawls it will make, hence larger vessels (with larger crews) would steam faster and therefore catch greater quantities. Experience disproves this, and shows that speeds within the range of all vessels produce the heaviest yields, i.e. smaller, and otherwise slower boats cross the grounds the same number of times as larger and otherwise faster vessels.

We therefore conclude that the high correlations (0.83, 0.89 and 0.81) between numbers in crew and the output of three product variants do in fact portray a genuine and direct causal link between these variables.

Annual output and number in crew has a negative and a weaker correlation for English sole. Chapter Two (p. 20) shows why larger vessels with bigger crews do not produce this commodity class and this fact influences the way in which this correlation (-0.69) should be interpreted. The conclusion that vessels with smaller crews produce more English sole is correct, and it is also correct to conclude that vessels with larger crews produce fewer English sole.

But the reason is not that larger crews are an impediment in producing this product group, it is that vessels with large crews do not try to catch this fish (Chapter Two pp. 20 shows why), hence the negative correlation. The other negative but stronger correlations for English sole occur for the same reason.

After the size of the crew, the horsepower of the vessel correlates most strongly with annual output of those product variants. Horsepower is connected with the size of the vessel, as the closeness of these variables' correlation with output may suggest. Noticeable, though small differences exist between their correlations, and the reasons for this again lie in the technical conditions of production. It has been noted above that a net offers resistance to water and by its nature partly determines the output of the individual firm. Therefore, though two vessels are of the same size, the one with the more powerful engine, cet. par., will haul the larger net and produce more fish. This explains the closeness of horsepower/output and index of size/output correlations and why they are slightly but distinctly different. Positive correlations of the horsepower and size - index factors with output are to be expected. They are important determinants of output because they influence the safety margins with which vessels can make longer voyages, remain at sea overnight, go out in heavy weather, as well as the capacity of the vessels' holds. It should be noted that some boats are better built and more seaworthy than others, and seaworthiness, though it affects the previous factors is not necessarily related to horsepower or size - so it contributes to the slightly different size index/output and horsepower/output correlations.

Correlations of days fished and output are the least significant which could mean:-

(1) that they do not greatly affect output or

(2) that they have an influence which is masked by the other factors.

English sole has a high days/output correlation because the smaller low powered vessels producing the bulk of this product type spend a smaller proportion of their time producing the other product variants. Consequently, the less time spent in this fashion and the more days spent dragging for flats the greater will be their output of English sole.

Another explanation of the less strong correlations for what one might expect to be an important variable lies in the statistical technique used. Days spent fishing are annual totals and each fish is markedly seasonal so many of the days spent fishing would not be utilised in the production of a particular product variant. So, if one correlated days fished in November and December with the output of elephant fish, at its peak in those months, one might find a stronger correlation. However, the weaker correlation between all rounds and days does not support this view as Timaru's fairly even monthly output in the aggregate should ensure a good days/output result on this basis.

Alternatively, the place of days spent fishing could be understated by the overall approach taken. If one took a cross section of firms with homogeneous plants and identical numbers of employees one might find a higher days/output correlation than is exhibited by the above table; a large vessel could weaken the correlation

by producing as much in one week as a small craft could in three.

A statistical imperfection is perhaps part of the explanation of this days correlation. For, if a vessel left port in the evening, fished the next day and returned to port early on the third morning it will have been absent from port for three statistical days and yet fished only one of them. If it had to shelter on that one day it, in fact, did no fishing in three days absence from port.

Productivity studies are complex, interesting investigations and have particular relevance to the Commercial Fishery because of the administration of licenses and the conservation issue. The results of this narrow survey are surprising; one would certainly expect horsepower and size to be important determinants of output. One would expect the number of the crew to have an influence, though hardly as powerful and perhaps not greater than horsepower and size as these figures suggest. The days at sea correlation is the most surprising.

Section (iv)

THE INTER-CONNECTIONS OF THE INDIVIDUAL FIRMS' INPUTS

The schedule presented in Table 3 shows the correlation coefficients between the inputs considered.

TABLE 3

CORRELATION COEFFICIENTS BETWEEN INPUTS.
TIMARU MOTOR TRAWLERS 1959

	Horsepower	Size	Crew	Days
Horsepower	-	.69(1)	.67(1)	.16(1)
Size	.69(1)	-	.63(2)	.26(2)
Crew	.67(1)	.63(1)	-	.25(1)
Days	.16(1)	.26(2)	.25(1)	-

Source: Derived from returns to the Marine Department by the 27 license holders then operating.

Notes: (1) At the 5% level 0.42 is significant for this value of n.

(2) At the 5% level 0.38 is significant for this value of n.

(a) The two levels of significance arise from imperfections in the original data.

(b) "Crew" includes skipper. "Size" means index of size.

(c) There was no significant change, in the data upon which this table is based, during 1960 and 1961.

In the first place one notices that, in general, the correlation coefficients between inputs are less strong than the coefficients of correlation between each input and output (shown on Page 59). At the 5% level the value of the inter input correlations involving days are not within the area of probability

and so it is submitted that days spent fishing were not regulated entirely by the size, power or crew of the vessels at Timaru in 1959. This is not surprising because of the nature of the production process. Once at sea, large boats will not be able to fish in weather a great deal worse than small boats, because all craft haul in over the side, which is equally difficult for large as it is for small boats. So although it may be possible for vessels large in size and with big crews and engines to put to sea in rougher weather than small ships, they do not do so because each size group encounters similar difficulties when fishing in rough weather. Hence days spent fishing are not determined by the size of the vessel or the numbers in its crew or its horsepower. A number of factors operate to influence days spent at sea. One of the most important of these is whether the vessel is run as a part time or full time business. It is not possible to distinguish these categories from available statistics but the extent to which full time fishermen operate smaller boats than their counterparts affects the relation between days, size, power and number in crew. The mercantile custom of the port plays a part in setting the number of days at sea. Customarily, producers bring their products to their land transport centres so that the market is supplied on two or three days in the week, and so all vessels regardless of size, crew or horsepower are organised to be in port on those days. This factor reduces the strength of the correlation between days and the other inputs. Another reason why the day inter input correlations are immaterial has to do with the production of flats. These fish frequent the

more sheltered areas and so, provided the small vessels operating these grounds can clear the heads, they may be able to fish in calmer waters while the larger vessels do not put out to sea. It is not possible to separate the influence of particular skippers on days at sea, because during the three years studied skippers did not change their craft and although certain skippers worked more intensively than others this can not be attributed to the size of the boat, crew or horsepower, since a hard working skipper was just as likely to be on a large as a small vessel. Neither can it be safely attributed to the attitude of the skipper, because no skippers changed to enable a comparison between "old" skippers and the "new" with the same vessels and crews. The lack of correlation between days spent at sea and the other independent variables, together with the weak correlation between days and production, lend support to the view that at Timaru days spent fishing is not as important a determinant of output as might at first be thought.

One can be slightly more confident of the reliability of the correlation coefficients of production with horsepower, crew, size and days after examining the inter input correlations.[3] For, although some of the inter input correlations are clearly significant, they are in general weaker than the coefficients of correlation between inputs and output. This would suggest that when inputs were correlated with output the good results did not arise through a close relation between inputs which would mean

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3. Ref. L.R. Klein, "An Introduction to Econometrics", p. 64.

that the one variable was being correlated, so to speak, twice. However, this is not to say that multicollinearity is absent, for the correlation coefficients of horsepower and crew (.67), horsepower and size (.69) and size and crew (.63) are significant and of similar values. While they are noticeable values they are not high correlations because at the 5% level 0.423 is significant for these values of n.*

The value of the horsepower/size correlation (.69) is worthy of note as it is the strongest of the inter-input correlation coefficients. This is to be expected because large boats require more motive power than small ones, although there is danger in too simple an interpretation of this coefficient. It could be that large sized boats have powerful engines because their hold capacity is great, so bigger nets and consequently more horsepower, are required to fill them rapidly. It could be that need of greater motive power as size increases is only part of the reason for the value of this coefficient. The extent to which it is not part reduces the multicollinearity component of the coefficient.

Relationships between horsepower and net size and crew and production have been discussed on p. 60 and in the light of those arguments one might expect to find some correlation between crew and horsepower, again because of an indirect link. Briefly, substantial horsepower rating enables a larger net to be trawled and a larger crew reduces unproductive time. Each of these has a bearing on output and so are indirectly correlated with each other.

*0.38 is significant for the size/crew correlation.

The horsepower of boats of given size does not of itself influence the crew they carry or vice versa, because one man is required to tend the helm of a powerful diesel just as one man is required to tend the helm and control a small engine. Nor does a large engine require more men to handle problems of seamanship, because it does not provide any additional problems of that type. So we may tend to the view that the horsepower/crew correlation is brought about indirectly through output, is not completely reliable, and so is not necessarily evidence of multicolliniarity.

The inter-input correlation coefficients in some cases indicate an absence of correlation and in general can be considered significant but not high. The highest of them, horsepower/size and horsepower/crew, are at least partially explained by indirect links. From this it could be argued that multicolliniarity is not an overriding cause of the values of the correlation coefficients obtained between production and, horsepower, crew, size of vessel and days.

Section (v)

SOME PRODUCTION FUNCTIONS

Part (1)

Access to the Department of Statistics' computer and the courtesy of Mr. L.F. Jackson provided the opportunity to test a number of production functions with the data for Timaru motor trawlers producing in 1959, 1960 and 1961. The Cobb Douglas form was fitted for elephant fish, gurnard and tarakihi for those years in an effort to discover something of the marginal productivity of each factor and to estimate the returns to scale effective during the period. A linear form was fitted as well in case this relationship described the production conditions of the industry. These functions were also used to facilitate comparison, should anyone wish to make it, with similar production functions for other industries. But it is felt that these forms do not meet the requirements of the Appendix to this Chapter in all respects in that they are not derived from observation of the conditions of production or from the pointers provided by Sections (iii) and (iv) of this Chapter. Accordingly, the less usual form discussed below in Part (3) is preferred as the explanation of the output/input relationship.

The Cobb Douglas form yielded the following values:

1959 $\log P_t = \log 0.0904 + 0.86 \log H + 1.15 \log C + 0.89 \log D - 0.036 \log S$

1960 $\log P_t = \log 0.0028 + 0.09 \log H + 0.93 \log C + 0.78 \log D + 0.91 \log S$

1961 $\log P_t = \log 0.2906 - 0.06 \log H + 2.01 \log C + 0.72 \log D + 0.36 \log S$

Where, P_t = the annual output of elephant fish plus tarakihi, plus gurnard, in hundredweight, of the vessel concerned at Timaru for the years specified

H = horsepower rating of the vessel
C = number in crew including skipper
S = "Index of Size" in cubic feet
D = Days absent from port during the year.

In the first place, one notices wide variations in the values of the constants and exponents from year to year, but before this is discussed an examination of their reliability is required. Table 4 below presents the standard errors of the exponents and constants.

TABLE 4

STANDARD ERRORS OF THE CONSTANT AND THE EXPONENTS OF STATED VARIABLES

		H	C	D	S	Log.Constant
a)	1959					
	Mean	0.86	1.15	0,89	-0.036	$\bar{2}$.9562
	Standard Error	0.43	0.86	0.39	0.34	0.218
b)	1960					
	Mean	0.09	0.93	0.78	0.91	$\bar{3}$,4403
	Standard Error	0.20	0.59	0.17	0.37	0.225
c)	1961					
	Mean	-0.06	2.01	0.72	0.36	-$\bar{1}$.4633
	Standard Error	0.25	0.64	0.10	0.40	0.266

Given normal distribution one can posit that the value of the population mean, of any exponent, will lie between $\pm$ 2 standard errors of its sample mean in about 95% of cases. The magnitudes of the standard errors present in Table 4 do not leave room for confidence in the values of the exponents. Only in six cases is the standard error less than half of the value of the mean of the exponents of the inputs i.e.

1959 Exponents of H & D

1960 Exponents of S & D

1961 Exponents of C & D

Indicating that the possible range of the population mean value of the other six exponents is too great for their sample means to be significant. Even the means of the exponents just quoted have standard errors which in many cases strain their reliability. The standard errors of the constants are not unduly large although in the case of the 1961 constant the confidence interval is quite wide in relation to the magnitude of the constant itself. Inter-input correlations were discussed in Section (iv) of this Chapter but calculation of the correlations between the logarithms of the inputs has not been made for this expression.

The t distribution is an indicator of the influence of random error in sampling and so is a useful test of the significance of the mean values of the exponents. The two tailed test for the relevant degrees of freedom was applied. Again the means do not stand up well because seven of the twelve mean values could have arisen from random errors in sampling. These exponents have mean values which are significant according to the t test:-

1959 exponent of D

1960 exponent of D & S

1961 exponent of D & C

TABLE 5

EMPIRICAL t FOR EACH EXPONENT AND THE MINIMUM SIGNIFICANT VALUE OF t WHERE P = 0.05

Exponent of	H	C	D	S	Minimum significant value of t
1959	2.018	1.342	2.285	0.010	2.110
1960	0.435	1.590	4.653	2.483	2.064
1961	0.247	3.171	7.464	0.898	2.056

PLATE 2

A Labour Intensive Part of the Process

"..... gutting with incredible dexterity. In four movements a fish is gutted."

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"This explanation has ignored the important problem of processing the catch once the fish are on board, which is a labour intensive procedure and the real reason why crew and catch are closely correlated."

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A number of tests can be applied to the function as a whole and the overall picture is more encouraging. Taken in conjunction with the appropriate degrees of freedom involved, the multiple correlation coefficients for the Cobb Douglas production function indicate definite correlations between all the inputs and output as is shown in Table 6.

TABLE 6

MULTIPLE CORRELATION COEFFICIENTS AND THE MINIMUM SIGNIFICANT VALUES OF R (P = 0.05)

	1959	1960	1961
R	.86	.88	.89
Minimum significant values of R	.46	.38	.38

From Table 6 it follows that the multiple coefficients of determination are also quite high which indicates that despite the unreliability of the exponents themselves, the selected inputs provide one with an explanation of a high percentage of the output of given vessels.

Table 7 gives the percentages to the nearest whole number.

TABLE 7

MULTIPLE COEFFICIENTS OF DETERMINATION (EXPRESSED AS PERCENTAGES)

1959	1960	1961
75	78	80

And the F ratios, which compare the variance explained by the regression equation and the residual variance are significant also

as Table 8 indicates.

TABLE 8.

EMPIRICAL F RATIOS AND THEIR SIGNIFICANT VALUES AT THE 95TH PERCENTILE

	1959	1960	1961
F	12.88	20.91	25.61
Significant values of F	2.96	2.78	2.74

In summary, therefore, one may be entitled to reject the values placed on individual exponents on the basis of their t distributions, but at the same time feel more confident of the overall significance of the Timaru Cobb Douglas production function on the basis of its F Ratios and multiple coefficients of determination.

Part (2)

In a linear form the Timaru data for 1959-61 inclusive provided the following expressions:-

1959 $Pt = 3.9H + 378C + 8.2\ D + 0.24\ S - 2189$

1960 $Pt = 3.0H + 330C + 5.1\ D + 0.17\ S - 1559$

1961 $Pt = 6.6H + 164C + 4.5\ D + 0.44\ S - 968$

A noticeable feature of this group is that its constants and coefficients do not, on the whole, vary as greatly as the exponents of the exponential expression. The standard errors of each coefficient are set out in Table 9 and apart from the coefficient of days they show that the values of the sample means are not significant.

TABLE 9

MEAN VALUES OF COEFFICIENTS AND CONSTANTS AND THEIR STANDARD ERRORS

		H	C	D	S	Constant
a)	1959					
	Mean	3.9	378	8.2	0.24	-2189
	Standard Error	4.45	383.40	3.35	0.167	589.3
b)	1960					
	Mean	3.0	330	5.1	0.17	-1559
	Standard Error	2.21	178.60	1.14	0.077	356.1
c)	1961					
	Mean	6.6	164	4.5	0.44	-968
	Standard Error	2.82	238.90	1.65	0.36	459.5

Again the confidence intervals of the constants are wide, wide enough to render the 1961 constant not significant and wide enough to limit the usefulness of the others.

Apart from the coefficient of D, the t distributions of Table 10 show that coefficients of the linear forms are not significant.

PLATE 3

Another Labour Intensive Part of the Process

"All vessels at Timaru haul their nets over the side, a heavy, time consuming task. As the net is being hauled in it is off the bottom and is not fishing and so the more rapidly a net can be hauled and shot away the more time is spent in production. Consequently, the more men available to drag the net on board once it has been winched to the side, the quicker will it be returned to the bottom and the more fish will be caught."

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"It was 12.30 that night when we had cleaned up ....."

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TABLE 11

MULTIPLE CORRELATION COEFFICIENTS OF THE LINEAR FUNCTION AND MINIMUM SIGNIFICANT VALUES WHERE P = 0.05

	1959	1960	1961
R	0.84	.91	.76
Minimum Significant Value of R	.46	.38	.38

significant, as are coefficients of multiple determination found in Table 12.

TABLE 12

COEFFICIENTS OF MULTIPLE DETERMINATION (EXPRESSED IN PERCENTAGE FORM)

	1959	1960	1961
R^2	72	82	58

The F Ratios presented in Table 13 are again favourable but less so than those of the Cobb Douglas production function.

TABLE 13

EMPIRICAL F RATIOS AND THE SIGNIFICANT VALUES OF F AT THE 95TH PERCENTILE

	1959	1960	1961
Empirical F	10.90	28.62	9.3
Significant value of F	2.96	2.78	2.74

Attention is now turned to the year to year variation in the exponents and coefficients of each input in both the linear and

Cobb Douglas production function. No reliance is placed on these values because of the size of their standard errors and the evidence of the t tests and it may be argued that because of this no great importance should be attached to the variation. Should an explanation of the changes be sought, however, it is thought that it could lie in fluctuations in raw material availability from year to year. Annual output of all product variants at Timaru was approximately 43,000 cwt. in 1959, 44,000 cwt. in 1960 and 43,000 cwt. in 1961, which assuming constant fishing effort indicates that raw material availability did not vary greatly in the aggregate. Fluctuations did occur in the output of the variants to which these functions relate. One product variant had a series of annual output over the period of approximately 12,800 cwt., 6,600 cwt. and 9,400 cwt. The series of another was 9,200 cwt., 9,800 cwt. and 10,800 cwt. while that of the third was approximately 12,400 cwt., 12,400 cwt. and 10,400 cwt. Now, the variations which have occurred in the year to year production of each product type would account for some of the annual variation in indices and coefficients of the functions obtained for the three together.

The possibility of variation in raw material availability for each product type pointed to the need to test each commodity separately over the three years. Both the linear and Cobb Douglas expressions were utilised for each product line but their standard errors, t distributions, F Ratios and multiple coefficients of determination proved such as to render the exercise meaningless.

Part (3)

The disappointing t tests and standard errors of the exponents

and coefficients of the linear and Cobb Douglas functions for Timaru, suggested that a larger sample and a production function more properly describing the technical relationship between variables was required.

The entire output of all motor trawlers at Auckland, Gisborne, Napier, Wellington, Lyttleton and Timaru was taken for 1961, which is a more comprehensive coverage than the smaller survey, as it covers all variants produced rather than just three product variants. The size of the sample was enlarged considerably to 110 producing units as compared with the 30 at Timaru in 1961. The ports mentioned included the five with the greatest output in New Zealand and the 110 vessels accounted for 59% of the volume of national output in that year.

Douglas' and Cobb's expression was applied for two reasons. Firstly, to check the inference of the Timaru results concerning input elasticities and secondly, because it has been frequently used in other investigations. However, the position taken here is that a production function should express the important technical relationship between inputs. Explanations of these technical relations are scattered through this Chapter and are drawn together, for convenience, to develop a production function for motor trawl producing units.

In the writer's view, of those inputs for which figures are available, a vessel's horsepower, the number in its crew, its index of size and the number of days absent from port are important

determinants of production. A significant relation for an individual vessel is that between its size index and its horsepower, because the greater a vessel's horsepower in relation to its size, the faster it will steam to and from the grounds and so spend more time actually in production. All vessels require a certain minimum motive power, but the greater their horsepower is in excess of this, the heavier is the gear and the larger is the net they can handle, and the less likely therefore are they to be hampered by loss of gear or towing it over soft bottom. For these reasons, the $(\frac{S}{H})$ ratio is significant. But $(\frac{S}{H})$ by itself is insufficient, for a small vessel may have the same $(\frac{S}{H})$ ratio as a large and yet produce a smaller output because it has not the absolute power necessary to haul a large net or the hold capacity to accommodate a greater volume. Therefore, H and S are significant of their own account. A vessel's mass and power are important for the reason that a small, low powered vessel will rise and fall with the waves and to a certain extent drift with them because it has not the power or momentum to punch through a swell. As a vessel lifts, so it stops going forward and so the net stops and tends to rise off the bottom and so fish intermittently. Furthermore, as a vessel tends to drift back, so the net tends to collapse and fish inefficiently. The greater a vessel's mass and power the less significant these effects will be in a given swell and accordingly, H and S have a separate place in the production function.

A large crew is necessary to sort, gut, box and stow the contents of one net rapidly so the net can be raised again, also, a large

crew reduces the unproductive time in shooting the gear and hauling it in. Crew size must be related to vessel size as there are limits to the number a vessel can usefully employ at sea, and the $(\frac{S}{C})$ factor is introduced for these reasons. A vessel of given H, S and C factors will produce only if it is at sea, so days absent from port is also an independent determinant of output. But a small, active, crew at sea in all weather, may, because of the amount of time spent in trawling raise an output as great as that of a larger crew unit, which works less intensively. So the crew-days factor (CD) should be included to allow for this possibility. The exponential form retained partly because exponential functions are useful in marginal productivity studies, but mainly because the relation between vessels' size and horsepower and their $(\frac{S}{C})$ and $(\frac{S}{H})$ factors is thought more likely to be logarithmic than it is linear.[4]

A production function for a typical vessel is therefore expected to be:

$$P = A \left(\frac{S}{H}\right)^{i} \left(\frac{S}{C}\right)^{j} H^{k} S^{l} (CD)^{m}$$

Where P = 1961 output of all product types in lbs.

S = index of size

C = number in crew

H = horsepower of vessel

D = days absent from port in 1961

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4. e.g. If one vessel's dimensions are double that of another's, then its cubic content is more than doubled, so it is likely that its horsepower will be more than double.

When the data for all of the 110 motor trawlers at six major ports in 1961 was utilised with this function, it yielded the following values:

$$\log P = \log 0.0865 + 1.0810 \log \left(\frac{S}{H}\right) + 0.0033 \log \left(\frac{S}{C}\right) + 0.0623 \text{ Log H} + 0.640 \log S + 0.5184 \log (CD)$$

Table 14 presents the standard errors of the coefficients of this production function.

TABLE 14

MEAN VALUES OF COEFFICIENTS AND THEIR STANDARD ERRORS

Coefficient of	$\text{Log}\left(\frac{S}{H}\right)$	$\text{Log}\left(\frac{S}{C}\right)$	Log H	Log S	Log (CD)	Log Constant
Mean	1.0810	0.0033	0.0623	0.6400	0.5184	-2.9370
Standard Error	0.0971	0.3127	0.3104	0.4151	0.3326	0.3430

Given normal distribution[5] one can posit that in about 95% of cases the population means lie within $\pm$ 2 S.E. of the sample means. For all other than the $\left(\frac{S}{H}\right)$ exponent these confidence intervals are too wide to suggest that the means are significant. High standard errors may also be evidence of multicollinearity, but this is discussed in connection with Table 16. The standard error of the constant, whilst it is not great enough to warrant the rejection of the constant is, nonetheless, a sizeable proportion of the constant itself. The t distributions of Table 15 confirm the conclusions made on the basis of the standard errors.

TABLE 15 t DISTRIBUTION FOR COEFFICIENTS OF STATED INPUTS (P= 0.05)

Coefficient of log	$\left(\frac{S}{H}\right)$	$\left(\frac{S}{C}\right)$	H	S	(CD)
t	11.12	0.01	0.24	1.55	1.55

Note:
a) 105 degrees of freedom apply to Table 15
b) at infinity 1.96 is significant
c) 2.04 is significant for 30 degrees of freedom

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5. See Appendix p.107

The pattern of results for the tests of the individual coefficients are similar to that of the conventional Cobb Douglas function when it was applied to Timaru. As with the Timaru conventional Cobb Douglas function, the overall tests of the six port complex production function show it to be quite significant. For 100 degrees of freedom where P = 0.05, 0.1946 is a significant value for the multiple correlation coefficient. The complex six port Cobb Douglas, with 105 degrees of freedom, has a multiple correlation coefficient of 0.86 and therefore a multiple coefficient of determination of 73.7%. The empirical value of the F Ratio is 59.02 for this expression and its significant value for 5 and 105 degrees of freedom at the 95th percentile is slightly less than 2.30.

As a check for multicollinearity the correlation coefficients of the logarithm of each input with the logarithms of the others have been extracted for this function and presented in Table 16.

TABLE 16

CORRELATION COEFFICIENTS BETWEEN LOGARITHMS OF INPUTS IN THE COMPLEX COBB DOUGLAS EXPRESSION

Log	$(\frac{S}{H})$	$(\frac{S}{C})$	H	S	(CD)
$(\frac{S}{H})$	-	0.126	0.521	0.300	0.345
$(\frac{S}{C})$		-	0.510	0.586	0.112
H			-	0.850	0.215
S				-	0.793
(CD)					-

Note: a) 105 D.F. apply to this table
b) for 100 D.F. 0.195 is a significant value of R, where P = 0.05.

All except two of the correlation coefficients of the logarithms of the inputs have significant values of R and some show strong correlations. Had the indices of the inputs been reliable the multi-collinearity present would have affected any interpretation of them. However, the significant inter-input correlations in this function is only to be expected since it was developed on the basis of the observed technical relations between inputs, thought to be logarithmic, which determine a vessel's annual output.

The production function

$$P = A \left(\frac{S}{H}\right)^{b} \left(\frac{S}{C}\right)^{e} H^{i} S^{k} (CD)^{l}$$

contains two apparent contradictions of the arguments presented elsewhere in this Chapter concerning the relationship between; S, H and C and P. But the divergence is only apparent and not real. Each exponent is positive which indicates that as each input increases output increases with it. That is to say as $(\frac{S}{H})$ and/or $(\frac{S}{C})$ increases P rises in the manner defined. Arguments have been advanced to show that P is an increasing function of S, so as S increases the two ratios rise and output increases, according to the expression, which is consistent with the content of earlier parts of this Chapter. But it has also been shown that output is an increasing function of H and of C yet, as these rise the ratios $(\frac{S}{H})$ and $(\frac{S}{C})$ decline and so annual output, according to the expression, falls. Mr. L.F. Jackson has kindly resolved this impasse with the following comment:

"Let us consider a simple model of production where

$$P = AS^{c} H^{d} \qquad (1)$$

and

$$P = B \left(\frac{S}{H}\right)^{e} \qquad (2)$$

Equation (1) determines the value of P as a bivariate function, whereas equation (2) determines the value of P as a function of a single variable determined by both S and H.

If the relations (1) and (2) are both satisfied then

$$B\left(\frac{S}{H}\right)^{e} = AS^{c}H^{d}$$

$$\text{whence} \quad S^{(e-c)} = \frac{A}{B}H^{(d+e)}$$

$$\text{or} \quad S = \left(\frac{A}{B}\right)^{\frac{1}{e-c}} H^{\left(\frac{d+e}{e-c}\right)}$$

i.e. the functions are identical if there is an appropriate relation between S and H."

The writer is grateful to Mr. Jackson for this explanation.

Part 4.

The values obtained for the conventional Cobb Douglas expression for the 110 producing units in 1961 were:-

log P = log 0.0980 - 0.0366 log C + 1.235 log D + 0.9721 log S + 1.109 log H

the standard errors for which are shown in Table 17.

TABLE 17

STANDARD ERRORS OF COEFFICIENTS OF STATED VARIABLES

Coefficients of	log C	log D	log S	log H	log constant
Mean	-0.036	1.235	0.972	1.109	$\bar{2}$.9912
Standard Error	0.147	0.334	0.153	0.099	0.3492

One may posit that given normal distribution,[6] the population mean of the exponents lies within the range of the sample mean $\pm$ two

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6. See Appendix p.

standard errors in approximately 95% of cases. The standard error of the coefficient of log C is too great to render $C^{-0.036}$ reliable. A conclusion which is reinforced in the light of observation by the unlikelihood of labour having a negative marginal product, even of small magnitude. However, there is some evidence of multicollinearity between log C and the logarithms of the other inputs of the expression which is discussed in connection with Table 19. Apart from the index of C, the coefficients of the logarithms of the remaining variables have standard errors which are small enough to define their respective population means within fairly small confidence intervals. The relation between the log constant and its standard error in the conventional Cobb Douglas production function is similar to that of the complex Cobb Douglas expression, i.e., the standard error is not large enough to refute the value of the logarithm of the constant but it is a not inconsiderable proportion of it.

TABLE 18

t DISTRIBUTION FOR COEFFICIENTS OF STATED INPUTS

Coefficient of log			
C	D	S	H
0.2482	3.688	6.51	11.18

Note:

a) the expression has 106 D.F.

b) for 30 D.F. 2.750 is a significant value of t where P = 0.01

c) for infinity 2.576 is a significant value of t where P = 0.01

Table 18 shows the coefficient of log C to be the only coefficient which does not meet the requirements of the t test.

The F ratio, for the conventional Cobb Douglas production function involving six ports, is 70.1 which, with a significant value of approximately 3.20 at the 99th percentile, is clearly significant indicating that the variance of the residuals and the variance of the estimated P are from different populations. The multiple correlation coefficient of the conventional Cobb Douglas equation in this case is 0.85 (0.25 is meaningful with P = 0.01 for the degrees of freedom involved) and the multiple coefficient of determination is 72.5% which is slightly below the value obtained for the complex function. Multicollinearity is not as marked in the conventional Cobb Douglas as it was in its complex form - as Table 19 shows:-

TABLE 19

CORRELATION COEFFICIENTS OF THE LOGARITHMS OF INPUTS CONVENTIONAL COBB DOUGLAS FUNCTION FOR SIX PORTS IN 1961.

	H	S	C	D
H	-	0.154	0.113	0.056
S		-	0.567	0.499
C			-	0.499
D				-

Note:

a) the expression has 106 degrees of freedom

b) 0.254 is a significant value of R where 100 D.F. apply and P = 0.01

The suggestion of multicollinearity prompted by the standard error of the exponent of C (Table 17) is confirmed, for, of the three correlation coefficients which are significant two involve the coefficient of log C. The other significant correlation coefficient is

between log D and log S. However, while the correlation coefficient of log C/log S, log C/log D and log D/log S are clearly significant; the remaining three correlation coefficients are not significant. So it is concluded that, although multicollinearity, is present in the conventional Cobb Douglas production function, it is not as noticeable as it was in the equation's more complex form. This is not surprising since the complex function expressed more accurately the technical connections between inputs which were thought to be logarithmic.

Part 5

Subject to the evidence of the Appendix (p.106) and the importance of the multicollinearity shown by Table 19, the conventional expression facilitates a tentative examination of the marginal productivity of those inputs which have significant exponents. Klein has shown[7] that in the Cobb Douglas production function a factor's marginal product is equal to its average product multiplied by its exponent. This calculation has been worked, but in order that the values of the exponent be not strained too greatly, the vessels selected were those whose estimated P using the conventional Cobb Douglas function was close to their actual P. It is thought that in these cases the estimates of the marginal products of the inputs are likely to be more accurate.

An Auckland vessel had an output of 395,700 lbs. in 1961. The estimated P of this trawler, using the conventional Cobb Douglas production function, was 392,400 lbs. It was a vessel of 114 h.p.,

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7. L.R. Klein, "An Introduction to Econometrics", p. 94.

it had a crew of three, and it was absent from port for 193 days of that year. Its index of size was 4,527 (it will be remembered that the index of size is an approximation of the volume of a vessel expressed in cubic feet). Had a very small change in this vessel's horsepower occurred, then the conventional Cobb Douglas expression indicates that its annual output would have changed by 3849 lbs., if the other inputs had remained unchanged. Had the number of days absent from port changed by a very small amount then, cet.par., annual output would have changed by 2532 lbs. Had the vessel's index of size changed by a very small amount then the year's output, cet. par., would have varied by 85 lbs.

Table 20 offers a selection of the vessels with the very best fits obtained by the conventional Cobb Douglas production function. It is reiterated that these close fits are presented not to show the accuracy of the estimate of P - the multiple coefficient of determination (72.5%) in a sense does that - but to place a less unreliable value upon the estimate of the marginal products of the inputs of the vessels chosen.

TABLE 20 ESTIMATES OF THE MARGINAL PHYSICAL PRODUCTS OF INPUTS, USING THE CONVENTIONAL COBB DOUGLAS PRODUCTION FUNCTION, FOR THOSE VESSELS WHOSE ACTUAL P WAS CLOSE TO ESTIMATED P.

Actual P (lbs.)	Est. P (lbs.)	$\frac{Pe}{Pa} \times \frac{100}{1}$	C	D	S	H	Mppd. (lbs)	Mpps. (lbs)	Mpph (lbs)
395700	392400	99.2	3	193	4527	114	2532	85	3849
363700	351700	96.7	3	227	8779	152	1978	40	2653
63000	61900	98.3	2	166	1332	86	469	46	813
271200	266700	98.3	3	168	3600	150	1993	73	2004
399300	368100	92.2	3	243	4777	114	2029	81	3887
515500	526300	102.1	3	260	4423	152	2449	113	3760
195900	199900	102.0	3	96	5200	158	2521	37	1375
109200	112300	102.8	2	201	1980	90	671	53	1346
349200	351800	100.7	2	179	7458	152	2410	45	2547
408100	398200	97.6	3	164	5383	55	3073	74	8227
84700	82500	97.4	3	144	2074	57	735	41	1647

The estimated marginal physical products of D, S and H are shown in the final three columns of Table 20. The estimates of the marginal products of C are not included because the exponent of C was not significant. The values of the exponents used in Table 20 are those presented in the function on P89 and no account has been taken of the standard errors in the computation of the marginal products.

Wide variation is evident in the marginal products of each input and the explanation of this lies in the nature of the function and the meaning of "marginal physical product". The concept of the marginal productivity of a factor recognises the existence of other inputs but specifies that they should be held constant. Associated with this is the fact that this production function relates to the individual producing unit each of which has a different input mix in Table 20. Although the concept of marginal productivity requires that other inputs be held constant, the nature of the production function allows inputs between firms to be held constant at different levels. The function thereby provides a wide variation between firms in the size of the marginal physical products of each input.

The behaviour of the marginal product of an input can be examined, as the amount of the factor increases, by resort to the partial derivative of the variable in the production function. For the Cobb Douglas expression, it can be shown[8] that the curve of the first partial derivative, in the case where the variable has a positive exponent greater than one but less than two, rises continuously at a decreasing rate and where the exponent is less than one, but greater

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8. The writer is grateful to Miss Valda Donald for the proofs she has provided.

than zero, the curve falls at a decreasing rate.

H has an exponent which is greater than one and the standard error of the exponent provides a confidence interval of 1.010 to 1.208, which suggests that the population mean value lies within this range in about 68% of cases. It is therefore concluded that the marginal product of this input is positive, and may rise at a declining rate. S and D have significant indices but their standard errors, with a confidence coefficient of 0.68 provide confidence intervals that could place the population mean values of their exponents above, equal to, or below unity, so a conclusive statement on the characteristics of their marginal products is not possible.

But the incremental approach is subject to certain limitations where indivisible inputs are concerned. The 1961 production function relates to the individual producing unit whose size is absolutely fixed and variation in its horsepower is not possible in the short run. Strictly, therefore, one may not be able to speak of the increment of S or H, although D is partially under the control of the entrepreneur. However, it is possible to interpret the increment in a meaningful manner. It is a property of the Cobb Douglas form of expression that the exponent of a variable reflects the proportionate change in P caused by a given proportionate change in the variable, other things being equal. Hence a 1% change in H, cet.par., can be expected to cause a 1.1% change in P. So given the size of and the importance (in terms of total output) of the sample; an investigator may posit that of two producing units identical in all respects other than size, the vessel with a size index 101% of the other could be

expected to produce an output equal to 100.972% of the output of that other - given the accuracy of the exponent of S in 1961.

Unfortunately, none of the vessels for which close fits were obtained (see Table 20) display any similarity of inputs so such a comparison of marginal products can not be made.

Predictions of output based upon massive changes in inputs must be treated with caution as well. A 300% increase in the index of size is not likely to cause a (300 x 0.972)% increase in annual output because a change in size of this magnitude would in all probability leave a vessel underpowered and shorthanded. Similarly, it is not meaningful to speak of a 100% increase in D for some vessels as they are already producing for over 200 days in the year. But as with the incremental approach massive changes can be made meaningful if they are interpreted in the light of the coverage of the whole sample. If a change in an input of a certain vessel keeps it within the range of the inputs covered by the sample then the formula may give an indication of the effect of such a change upon output. A compromise between the massive and incremental approaches is perhaps the safest way to use the function; changes in a vessel's inputs of 20-50% do not strain reality too greatly and these changes may be restricted to or extended beyond the range of inputs covered by the sample depending upon the caution of the investigator. A further limitation on the use of the function, which may be overriding, is that it relates to a given period, 1961, in which a given condition of raw material availability applied at each port, and a given number of producing units were in operation.

Part 6

Bearing in mind the limitations on the use of the functions (shown by the statistical tests applied, the Appendix p.106, multicollinearity and the problems of incremental and massive changes) an assessment of the overall results of each Cobb Douglas expression is of value. It will be recalled that, while in only one case was a majority of the indices of a function significant, in every case each equation was shown to be significant in the aggregate. This being so, some significance can be attached to the sums of the indices of each function which are drawn together for convenience at this point.

TABLE 21

SUMS OF INDICES OF EXPONENTIAL PRODUCTION FUNCTIONS

1959	Timaru Cobb Douglas	2.86
1960	" " "	2.71
1961	" " "	3.03
1961	110 Vessel Complex Cobb Douglas	2.30
1961	" " Conventional Cobb Douglas	3.28

The sums of the exponents in this type of equation indicate the proportionate change in P that can be expected for a given proportionate simultaneous change in all inputs. Taking the 1961 complex Cobb Douglas production function, a 1% increase in all the inputs of a given trawler can be expected to increase its annual output by 2.3%. Notice that the sum of the exponents is considerably in excess of unity in each case.

Hence:-

1) That is to say that the condition of increasing returns to scale applies to the selected vessels.

2) A condition of increasing returns to scale is consistent with the declining unit cost curves posited in Chapter Two if constant factor prices are assumed.

3) The 1961 110 vessel sample of six major ports is of sufficient size to warrant the use, with some confidence, of the condition of increasing returns to scale in the analysis of restrictive licensing policy which is made in Chapter Six.

APPENDIX TO CHAPTER THREE

The Concept of a Production Function

A production function is defined here as an expression showing a causal, technical relationship in a given productive process, between the independent variables, inputs, and a dependent variable, output.

Two points arise from this:-

(a) The meaning of the term "input"

(b) Methods of determining causation.

a) A broad definition of an "input" might be, anything which influences output. If this is accepted, then, inputs must be divided into two groups. Those that can be altered over any time span at the will of the entrepreneur and those which can not be so controlled. These non-controlled inputs to a large extent constitute the environmental framework within which production occurs and they are set by natural and social forces. They are likely to exercise a passive influence upon production and during some time spans they may take the form of a constraint upon output. For example, in the Commercial Fishery, weather, tides, currents, temperatures and salinity are non-controllable inputs (on this broad definition) which may hamper output during some runs. Non-controllable inputs can often be positive (i.e. favourable) in their effect on production. For short spans of time, whilst they can not be negative in the sense that they can reduce the volume of output which has already occurred, they can be passive in that they can hold current production to zero. Notwithstanding this, over a longer span of time the total effect of these non-controllable factors must

be positive otherwise no production would arise. A common characteristic of noncontrollable inputs is that they are not remunerated by the entrepreneur.

The distinction between controllable and non-controllable inputs stems from the broad definition of the term "input" used above. If that definition, as well as the definition of the production function, is accepted then non-controllable inputs have a place in the production function. On the other hand, so wide a definition of input may not be palatable and if this is so, then certain factors have no place in the production function as defined on P.99 It could be that an input is defined as a factor affecting output which can be controlled by the entrepreneur. Such variables are likely to be the ones for which payment is made, and they operate within the environment set by what we have previously called the non-controllable inputs. They will have a positive influence on production even in brief time spans in a way in which the environmental factors need not. Should the narrower definition of an input be preferred then the production function is better viewed as a relationship between independent variables and output with environmental factors held constant. However it should be noticed that environmental factors may have some impact upon the nature of inputs (narrowly defined) e.g., in the fishing industry net construction, boat design and horsepower are all influenced over a long time span by natural and social (legislative) pressures. For practical purposes the issue may be a Hobson's Choice because there may be insufficient data on the factors constituting the environment. This is in fact the case of the production functions in Chapter Three where it was assumed that the influence of environmental

factors had been constant and the term "input" was used in its customary, narrow, sense. In some industries the narrow definition may be quite sufficient because environmental influences are fairly stable over time. The term "input" was used in its narrow sense in Chapter Three because of the paucity of suitable data on the environmental factors and in deference to the conformity of meaning throughout the literature. But it is stressed that there are a number of factors outside this definition which have a greater effect on the output of the product of this industry than may be the case in, say, a manufacturing industry.

b) More than one function may describe a relationship between inputs and output, so a problem of selecting the "proper" function emerges.

On this problem of selection, some attention should be given to methods of deriving the production function, because these will partly determine the number of independent variables considered. If a production function is being derived for a given firm under test conditions, it may be possible to vary output by changing one variable at a time thereby gauging its impact for ranges about an initial level of output. However, this is not to say that such variations in one input will be of the same order of importance at all levels of output, consequently this input will have to be varied by the same amount at different levels of output. But then a fresh causation problem may be encountered, depending upon the nature of the input under consideration and the "discreteness" of the other inputs. If output can be varied through alteration in the quantity of one input only, this causation problem does not arise,

but if output can be varied only by altering the quantities of two or more inputs, one of which is the one whose impact over a range of outputs is being studied, the investigator may sometimes be in doubt as to whether the change is due to variation in input A, or input B, or both. It is formally impossible to attribute causation solely to one input in this case. However, the investigator's knowledge of the production process in such circumstances will often enable him to impute causation as some factors are "obviously" more important than others. Under these hypothetical test conditions the investigator may be able to consider a very large number of variables - if he wishes.

A more common method of discovering a particular production function is from collected statistics which may be in the form of a time series, or in cross sectional form, or a combination of each. These sources provide the same causation problem as the test method and add more of their own. A primary problem which they may provide is that of a limited number of variables. The investigator, though he may wish to, is simply unable to incorporate all the inputs which he considers important because he has no data. Alternatively, he may include some inputs which he "considers" to be less important simply because he has the data. He is hamstrung by the availability of data. He too, has a causation problem, and here too he is assisted by his knowledge of the conditions of production, which stems from the enquiries he has made, in assessing which are the dependent variables and which are the independent or casual variables.

A production function with numerical coefficients, constants or exponents is a multiple regression equation but the converse need not apply. In selecting the "proper" production function this one way relation is resolved by the investigator's knowledge of production procedures. There is no systematic method of deriving a production function. One possible way is to examine production methods to discover the independent variables, then to go to the statistics, see what information is available on the variables and assess the technical connections of the inputs for which data is available. From these relationships, equations can be developed showing how production, the dependent variable, is likely to be related to inputs. After this the techniques and tests of multiple regression analysis can be applied in order to assess the reliability of fit of the various equations. Because of the method used in their derivation the expressions thus developed are production functions and not simply equations of multiple regression. The investigator, after studying the method of production, decided which factors were important and which were not, he took statistics, where they were available, of those inputs and developed an equation linking them with output. The view taken here is that there is danger in regressing one statistic upon others and imputing causation without the intermediate link provided by knowledge of the conditions of manufacture.

Mention has been made of the "proper production function" and this too is interwoven with the investigator's familiarity with the

industry. A multiple regression equation may survive accepted statistical tests unblemished while a production function may emerge somewhat battered. Notwithstanding this, certain investigators would prefer the second to the first. In the same way one production function may be statistically more significant than another. Here again, if the investigator has reason, based on his observations of conditions, to be suspicious of the first he may accept the second in some circumstances. The view taken here is that it is permissible for the investigator to use the production function which best suits the nature of his inquiry. To illustrate this view of the problem take two production functions, one which includes input A and one which does not. Suppose the second passes the established tests of confidence and significance more satisfactorily than the first. Then, if a prediction of total output is required, it is suggested here that the second expression be used. But if a policy decision is being made involving input A then it is submitted that the first production function is appropriate.

It follows that one should consider the purpose of any inquiry to establish a production function for a firm or industry. There may be a number of reasons for studying the technical aspects of production. Firstly, the knowledge of the conditions of production may reinforce other discoveries concerned with the cost function of the industry; secondly, a good production function is potentially valuable to administrators in regulating the industry, should the regulations be considered necessary. Production functions can also impart exactitude to studies of factor rewards, and finally the study is of interest in its own right.

An examination of the primary statistics on which the production functions in Chapter Three are based and a short assessment of some of the advantages and problems these statistics offer to an investigator will complete this part of the appendix. Most of the data concerning inputs was collected from the official forms for the renewal of licenses. Statistics on days absent from port were aggregated from monthly returns which skippers of individual vessels file with the Marine Department. In effect, some of the data relates to a point in time and some concerns an interval of time. A comment of L.R. Klein's concerning this type of data may be of some interest, he writes[1]

"The most suitable cross section sample would seem to be a collection of output and input statistics for the individual firm in a given industry."

One of the advantages which this industry offers to those studying its productive process is that partly processed raw materials are not important inputs in the production of the commodity. The production functions do not have to take account of many of the products of other industries. Of major concern, however, is the problem of drifting constants and exponents over time. The 1959 - 1961 results for Timaru show that this has happened at that port. Changes of this sort, as far as that section of the industry is concerned are partly the result of variations, in the producers' attitudes, in the non-controllable inputs, the development of a market for what previously was an unsaleable product variant as well as changes in the availability of raw materials.

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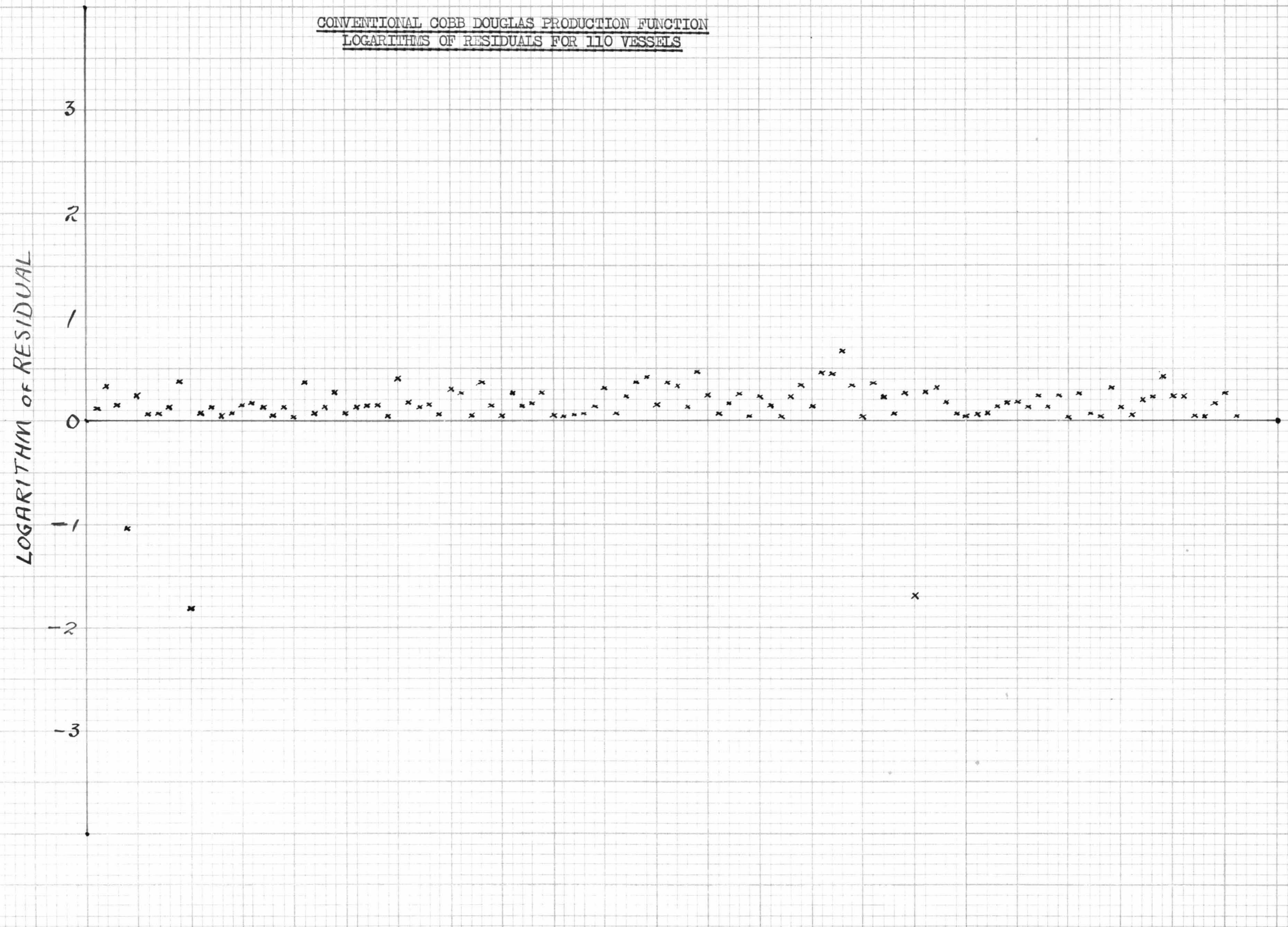
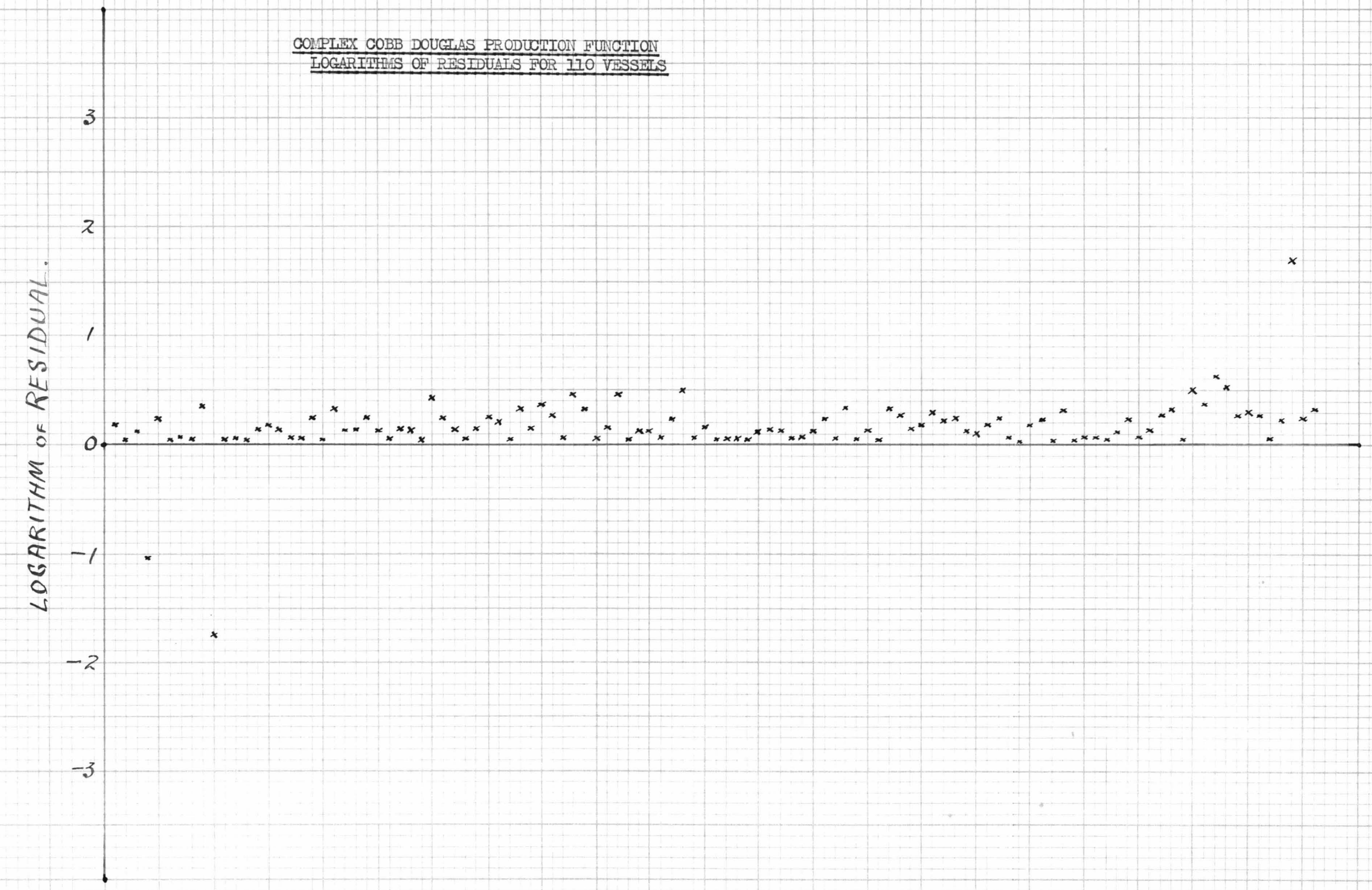
1. "An Introduction to Econometrics", pp. 89 -90.

CONVENTIONAL COBB DOUGLAS PRODUCTION FUNCTION
LOGARITHMS OF RESIDUALS FOR 110 VESSELS



COMPLEX COBB DOUGLAS PRODUCTION FUNCTION
LOGARITHMS OF RESIDUALS FOR 110 VESSELS



CHAPTER FOUR

THE FACTOR MARKETS

Section (i) Labour

(ii) Capital

(iii) Management and Finance

(iv) Summary and Assessment of the Capital Market and Financial Strategy.

CHAPTER FOUR

THE FACTOR MARKETS

Section (i)

LABOUR

There are forty eight fishing ports in New Zealand and the number of fishermen, including skippers, has varied about 2400[1] for the past ten years. Shifts in the regional distribution of labour have occurred. The number of fishermen here refers to those producing all product variants by all methods. The most notable increases in numbers employed have occurred at those southern ports where commercial crayfisheries have been exploited following the development of a lucrative export market for that product type. To a lesser extent cray production accounts for some of the shift in numbers to the Bay of Plenty - Poverty Bay area. A more important reason as far as ports like Gisborne, Whakatane and Tauranga are concerned, has been the realisation that prolific harvests of snapper and tarakihi can be made in that region where the industry is partly based upon production for export. The increase in numbers employed at certain burgeoning secondary centres has been offset by a decline in numbers employed at such ports as Auckland, Wellington and Dunedin.

An interesting shift in numbers employed and vessels operating occurred in the Auckland Province during 1957 and 1958. Up to

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1. Ref. "Report on Fisheries", 1951-61.

this time Auckland producers were becoming increasingly concerned with the deterioration in the effort to output ratio which was occurring in the production of snapper due, the Marine Department surmises, to overfishing and the consequent depletion of stocks. In the season before, a few entrepreneurs had been forced in their search for fish to the western side of the island, where they discovered new snapper beds. There was a rapid movement of men and vessels from the port of Auckland to Manakau[2] as a result of this discovery which perhaps indicates that in Auckland there is a high regional mobility of vessels and labour.

The industry's labour force is comprised of a number of ethnic groups, some of which are centred on one port. In Auckland, for example, there appears to be a number of Dalmations, who are mainly seine fishermen. Italians form an important part of the supply of labour on Wellington line vessels, though they work mainly with their own kind, and as one proceeds south the occasional Scandinavian name is encountered. The United Kingdom is a most important source of immigrant labour, and this is particularly so of Wellington, where New Zealand Fisheries Ltd., have pursued a policy of sponsoring and providing housing for skilled operators from Great Britain. It is not possible to say what proportion of fishermen now fishing in New Zealand came from the British Isles, but on Wellington trawlers, at least, this could be as high as 40%. There are many New Zealanders working fishing vessels. In ports

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2. This is a short distance as the crow flies.

serving the secondary centres they predominate and produce outputs equally as high as the immigrants in the metropolitan ports operating vessels of similar size. New Zealanders at such outlying ports sometimes have family connections with their vessels and have had the opportunity to learn the craft. City ports do not seem to follow this pattern and because there is no training or apprenticeship programme for intending fishermen New Zealanders do not, even if they were willing, have the opportunity of learning the work. The result is that those with experience in the United Kingdom form the nucleus of skippers at the city ports. As practiced in New Zealand motor trawling is scarcely reducible to a written procedure because it requires knowledge of the nature of the sea bed in the proximity of a certain port which is acquired but slowly, as the years of experience accumulate. This makes it more difficult for a person to eventually gain a command.

Those New Zealanders who are skippers for city wholesalers sometimes come from boats of their own, which they perhaps inherited and operated from a smaller port. Other than this there is little chance of a deckhand becoming a skipper because skippers themselves are reluctant to pass their knowledge on. Fear of future competition may be one reason for this, although it may be that some skippers are incapable of teaching. Fishing to them is second nature, which makes explanation difficult.

Some countries (e.g. Scotland, Russia and Japan) have training centres for those entering the industry but there is no such scheme

in New Zealand at present (1963) so hands in New Zealand gain experience by joining the crew of a vessel whose skipper is prepared to take them on. A skipper will prefer a hand with experience of the sea and for this reason many hands have served in the mercantile marine or on coastal vessels. A number of today's deck hands acquired their knowledge on the large steam trawlers which operated ten years ago. Such vessels, fast disappearing, operated on a weekly wage basis so new inexperienced crew members could often be found routine jobs on board and if they kept their eyes about them they learned a little of the work. However, there are only three such vessels operating in New Zealand now (1963) and skippers on the smaller vessels are finding it increasingly difficult to obtain trained deck hands. In the future, skippers may be forced to take an untrained hand to sea and teach him the craft, which according to the arguments of Chapter Three will seriously impair the productivity of vessels in the fifty foot to eighty foot range which have crews reduced to the minimum. An experienced crew is not likely to acquiesce to having an additional hand on board because of the reduction in member's own shares, so taking surplus untrained hands does not seem to be a likely solution to the problem.

The method of remunerating labour varies throughout the country according to the relation between vessel-owner and wholesaler. It is common for wholesalers, especially in the metropolitan ports,

to have an interest in a number of vessels. Where this is the case the method of "wage" payment differs according to the type of vessel. If the vessel is a large, steel constructed trawler, perhaps one hundred feet or more in length, the crew members are usually paid a flat weekly sum plus an amount per case caught. There are only three vessels of this type left in New Zealand, two of them produce very large annual outputs and are in good repair. Hands on the other vessel,[3] are not considered to be well paid and so this trawler attracts inexperienced hands or those who are too intemperate to be employed by other skippers. A comparatively high labour turnover of less experienced hands, and even of skippers, keeps catches below what would appear to be this vessel's potential and so wage levels on it remain too low to attract and retain men of better calibre.

Large (55' plus) wooden trawlers in the metropolitan areas are mainly in the hands of wholesalers. The method of remuneration is strange, but it operates well, having evolved with changes in the condition of the nation's labour market. Until the end of World War II most vessels hiring labour did so on a flat wage basis, though some offered an incentive bonus. With the relaxation of war employment regulations and the increasing attractiveness of high wages ashore, the industry began to notice a shortage of labour and wage rates began to rise. A sharp limit, to the extent to which the industry could follow wages ashore, was imposed by the seasonal nature of production. For, in the winter

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3. Which is at present (April 1963) tied up for an indefinite period.

when production declined, owners were unable to sustain the high shore-competitive wage payments; then quite quickly, probably within five years, direct profit sharing schemes became the most common method of fixing labour's reward. On most wholesaler-owned motor trawlers the skipper and crew take fifty per cent of the vessels' net profits.

Owners and crew agree that the producing unit should be paid the wholesale rate per case (or basket) ruling at the port and it is on this figure that the net profits are calculated (see Chapter Five). A variation of this procedure is found in Lyttleton and other ports regularly supplying the Christchurch auction, where the owner accepts the auction price net of commission and crews share with the owner net profits determined on the basis of the auction prices which ruled during the week. Of these amounts the skippers receive the greatest shares followed by the engineers and then the hands. This in itself is interesting for it seems that the skipper is rewarded more for his skill than the responsibility of the vessel, which is ultimately his, because when he sleeps the hands tend the boat, and the differential the engineer receives is due to his opportunity cost of work ashore. The other half share "which goes to the boat" as they say in the trade, belongs to the vessel's owner.

This scheme is effective in the entire operation of the boat. Any repairs or maintenance, such as an annual refit, which the crew can be expected to undertake are done without remuneration by the hands themselves with material supplied by the owner, although if

a tradesman is required the owner meets this expense.

Profit sharing schemes enable owners to compete, at present fish prices, for labour with employers ashore and the operatives prefer it for they are prepared to accept, with the owner, the seasonal vicissitudes of catch. In the summer months crews receive high rewards which are offset by low incomes during the winter. Often during winter, especially if the vessels have to take shelter on a voyage, the crews have to share the net losses with the owner. Losses borne by the crew usually take the form of a deduction from their return on a subsequent profitable voyage. When at sea the trawler fishermen work very long hours, up to twenty hours per day in summer, and since crews are not employed on the customary hourly rate of pay basis the cost of overtime does not arise. This is doubly advantageous to the owners, who are saved this additional expense in winter when output is low. In a situation like this it may be thought that labour would drift into and out of the industry during summer and winter. This does not occur because the sections of the industry at each port are small enough for skippers and hands to be personally acquainted and skippers will not take anybody on who has once joined in summer and left the industry for the winter. Hands themselves have a nature which in many cases appears ill-suited to the regularity of shore work in the winter months and keeps them at sea in that season when output and "wages" are low.

Where a skipper is an entrepreneur on his own account, labour's reward is determined on a different basis again. Vessels whose skipper is the owner are usually small in New Zealand and are sometimes operated solely by the skipper. Where another is required to

man the vessel this may be a relative and if this is the case the relation is often rewarded on a profit sharing basis. Sometimes this may apply where the hand is not related to the owner, though in this situation flat weekly payments also occur.

Oystermen are remunerated on a different basis as they are members of the Seamens' Union. They have made an industrial agreement with the boat-owners, whereby they receive a flat amount of 2/8½ each per sack, (which they appear to have increased by direct action in most seasons) plus an incentive payment to the skipper of sixpence per sack and threepence per sack to the engineer.

Outside the metropolitan areas a great many craft are worked on a partnership basis but since this is a form of ownership rather than a method of remunerating labour it is not discussed in this section.

Trade Unions do not operate throughout the industry but many ports have Fishermens' Associations comprised of skipper/owners and deckhands. In some of the southern ports fishermen are affiliated to the Seamens' Union for historical reasons. Dissatisfaction on the part of the fishermen with the methods and achievements of the Union combined with the fishermens' reluctance to pay union dues caused the fishermen in other ports to leave the union many years ago. Wellington is an exception to the general statement in that whilst there is a Fishermens' Association there it is virtually defunct in that it has not met for over a year. In 1961 the Fishermens' Association was sufficiently powerful to cause a stoppage, but at that time the Secretary of the Association was

also Secretary of the Seamens' Union and was therefore able to form the fishermen into a formal association. The Secretary then lost his position with the Seamens' Union and went back to sea, about the same time as the President of the Association changed. These seem to be the reasons for the body's demise. The Association in Wellington lacked cohesion partly because all members were seldom in port at the same time, but mainly because of a division of interest within the body itself. The Association was comprised of owner/skippers as well as hands and with the loss of an interested outsider as Secretary the two groups were not able to present a uniform case to the wholesalers. Not only were there skipper/owner and crew factions, there was also a faction of skippers working for wholesalers. Added to this was a somewhat carefree attitude of all those involved and these factors contributed to the collapse of the group. The Association had no written constitution and there was a further cleavage on its objectives. The hands were interested in conditions of work at sea and the owner/skippers were reluctant to undertake the necessary expenditure to improve them. The owner/skippers were interested in raising prices to wholesalers, as to a lesser extent were the hands, but skippers employed by wholesalers were not quite so disturbed by wholesalers' prices.

The 1961 stoppage is interesting in that the Association was able to muster the power to keep all Wellington vessels in port for ten days. Hands dislike gutting at sea, an uncomfortable, unpleasant task, which is what the dispute centred around. Skippers were

indifferent, because they usually steer the ship during gutting and so are not involved. For this work the crew receives "an additional penny per pound" for gutted fish, but this, because of the way in which the additional amount is calculated, does not necessarily mean that a quantity of gutted fish brings a greater return than the same quantity of fish when not gutted. A case of fish is assumed to weigh 100 lbs. and in effect fishermen are paid according to the number of cases they produce. Now gutted fish occupy less space in a box than do non-gutted so the "additional penny per pound" does not always compensate for the reduced number of boxes. However, the dispute was less over price than it was over conditions. The hands wanted to stop gutting and the wholesalers refused either to accept non-gutted fish or to pay a higher price for gutted fish. The industry was idle for ten days while negotiations went on and as the wholesalers were showing signs of yielding to accept non-gutted fish the Wellington City Council pronounced that wholesalers would not be permitted to gut in city premises, so the vessels put to sea without any change in the original situation. The hands claim to have established the principle since wholesalers are accepting increasing quantities of non-gutted fish. This trend in non-gutted fish is likely to continue as filleting machines become more common.

Fishermen in many ports are dissatisfied with the prices they receive, though nowhere are they sufficiently united to force a different price pattern. Some fishermen in various parts of the country are conscious of the retail price of fish and consider

further increases in it undesireable, which indicates that they think the retail price elasticity of demand for the product is greater than unity. From past experience they expect any increases in their prices to be passed on to consumers. An exception to this general dissatisfaction occurs in fishermen selling to the Christchurch wholesale market. P. Feron and Son Ltd. operate an auction floor there and because they act as agents, trawler fishermen from as far south as Oamaru receive prices which are higher than those at other ports.

The market for labour in the industry is constrained by Government Manning Scale Regulations framed in the interest of the safety of lives at sea. Viewed in this light they are not unreasonable and provided the stream of suitable immigrants continues the requirement that vessels over sixty feet in length have qualified skippers should not cause embarrassment. However, one section of the requirements concerning vessels operating more than fifty miles off shore is illustrative of the difficulty of framing government regulations which satisfy economic criteria. The number of hands required on those vessels is linked to the vessel's tonnage and this is part of the reason why the large steel trawlers have virtually disappeared from New Zealand waters. Owners have been unable to substitute other factors for labour in the face of rising labour costs because of these regulations. Had owners been able to do this they may have been in a position to hire less, but better quality labour for the same wage bill and thus raise the productivity of their large capacity vessels. It has been noted on page 113 that some of these

vessels do not reward labour on a profit sharing basis and that in some cases they are "inefficient" partly because of the vicious circle of poor quality low paid labour. Another problem of the large steel trawler is that a crew of six to nine men requires a cook who is not productive of fish and who raises the labour cost, while the wooden trawler with up to four on board can operate without one.

The deterrent to factor substitution raised by this regulation has had a deleterious effect on these vessels from another direction. This particular regulation applies only to vessels operating more than fifty miles from shore so it can be avoided by not steaming that distance. One result of this is that the steel trawlers work the bottom, in areas where smaller wooden trawlers compete for the same fish population, instead of going further out and trying mid-water trawling which they have the power and size to undertake.

There is a consensus between the industry and the Government that a revision of the manning scale is necessary, but each party's submissions to the Fishing Industry Committee (1962) appears to be an extreme view. On the one hand the trade's recommendations probably minimise safety margins. On the other the Marine Department makes suggestions on the quality and size of crew varying in the complex fashion with the length and range of the vessel. The industry has not the training programme, the profit margins, nor the availability of labour, to sustain such a manning scale. On this matter the Committee has made recommendations which are simple and apparently drawn up with a view to the crews necessary to man vessels with safety, thereby leaving it to the entrepreneur to determine numbers necessary to produce the commodity.

Section (ii)

CAPITAL

Before examining the part wholesalers as a group play in financing the activities of producers, it is useful to assess the importance as a source of finance of the forty two merchants selected. A precise evaluation is not possible although the first useful fact in this regard is that ten ports in New Zealand with a total of 505 licenses produced 72% by value of the industry's entire output in 1961. It is conservatively estimated that 150 of these licenses are part time fishermen or small boat owners who are not highly productive. Now it has been established that these forty two wholesalers are centred around the ports just mentioned. This being so the extent to which they finance the (505-150) producers is a measure of their importance in financing 72% of the industry's output. In fact they are highly important because they financed fully or partly, 237 of these (505-150) vessels in 1961. It is thought that the merchants would not make advances to any of the 150 small vessels, indeed, the impression is that wholesalers lend mainly to the highly productive vessels so they are probably a more important source of finance than the $\left(\frac{237}{505-150}\right)$ index indicates.

Figures are not available on the amounts of money involved, which would be a better indicator than the number of boats, but a fishing vessel at these ports on current values could involve an outlay of between £10,000 if of moderate size and £30,000 if large. Even if it were possible to calculate a reliable average value for the (505-150) vessels this would be of no use unless the proportion

of total finance per vessel supplied by wholesalers was known.

This difficulty forces one back to a qualitative assessment of the place of wholesalers in the industry's capital market, based on the number of vessels instead of value.

Wholesale-financiers fall into three groups shown in Table 22 of which group (2) is the most important.

TABLE 22

WHOLESALE-FINANCIERS

Group	Number of Wholesalers	Boats Owned	Boats otherwise financed
(1)	23	53	-
(2)	10	74	66
(3)	9	-	44
TOTALS	42	127	110

(237 Producers involved)

A comparison of groups (1) and (3) indicates that the individual wholesalers in group (3) have, on the average, connections with more producers than those of group (1). But this is not to say that quantitatively such financiers are more important since the measurement is not in money value.

According to the index developed, of the nineteen wholesalers in groups (2) and (3) who financed, as distinct from owned, vessels by far the most important method of finance was by mortgage and guarantee as is shown in Table 23.

TABLE 23

FORM OF WHOLESALERS' ASSISTANCE

Form of Finance	Number of Wholesalers	Number of Producers Involved
Shares in Companies	3	5
Loan - Mortgage and Guarantee	16	105
	19	110

The small proportion of wholesalers who have assisted boat owners with share capital and the high proportion of registered charges indicates that these 110 producers are reluctant to admit wholesalers into their organisations or that wholesalers are reluctant to go into them. The second possibility is the less likely since the 110 firms are probably in the group of the most profitable producers in New Zealand. Further, wholesalers would be likely to exercise more control over the disposition of a firm's output as a shareholder than they could as a mortgagee. It is not possible to separate the number out of the 105 vessels tied by "mortgage or guarantee" to wholesalers who are linked by mortgage alone. The remainder is possibly a measure of the importance of outsiders in the industry's capital market since it is likely that, where a wholesaler has guaranteed a producer, the finance has been provided by lenders who are interested in the industry only as financial investors.

In a situation where one group of lenders is as important as the forty two wholesalers (who are closely related, see Chapter Five)

and where the borrower is engaged in a hazardous enterprise, one might expect high interest rates. This, as Table 24 indicates, is not the case for the sixteen lenders in Table 23.

TABLE 24

INTEREST RATES AND NUMBERS INVOLVED

Number of Wholesalers	Number of Vessels	Interest Rate %
3	9	5
9	60	6
4	31	$6\frac{1}{2}$
2	5	7
18	105	

(The apparent discrepancy in numbers is due to two wholesalers of Table 23 holding shares as well as acting as mortgagees).

One defect of Table 24 as an indication of exploitation in the capital market is that it takes no account of other rates ruling at the time the loans were made and Table 25 is an attempt to remedy this as it shows the periods for which the 105 loans were made.

TABLE 25

TERMS AND NUMBERS INVOLVED IN 105 LOANS

Terms in Years	Number of Wholesalers	Number of Producers
1	1	1
2	1	2
3	2	4
4	2	19
5	4	15
Indefinite	8	64
	18	105

Five years prior to 1961 rates of 5% - 7% would not have been considered excessive, by outside standards, for this type of investment. One therefore concludes that, despite the power and admitted collusion of forty two wholesalers (see Chapter Five), they do not abuse their position and charge excessive rates of interest to the producer. Some sixty loans in Table 23 were at 6% and Table 24 shows that sixty four loans were for an indefinite period which similarity of figures points to the possibility that the rate of interest on loans for no fixed term was often 6%. Loans for periods of one to five years were therefore often obtained at 5%, 6½% and 7%.

Of the 105 mortgages and guarantees referred to in Table 24, 44% are of the table type and the remainder are flat. Since advances by way of bank overdraft are customarily of the variable balance variety, these ratios give no indication of the extent to which bankers are involved in financing producers with wholesalers accepting the guarantees. Wholesalers themselves have had a marked prediliction for the type of arrangement they make for 68% of the wholesalers (as distinct from numbers of loans) were involved in flat mortgages in 1961.

Interest rates and amounts advanced each depend on the security offered as well as conditions in the wider market for capital and for this reason the ability of producers to repay is of consequence. While the amounts involved, the total number of financial arrangements made and the absolute number of defaults in the past five years is not known, it is known that a total of sixty eight producers have

honoured their commitments to wholesalers in that period. Fifty-three of these did so by repayment and fifteen firms did so by re-financing from sources other than wholesalers.

There is a possibility that the vessel will revert to the mortgagee if a producer fails to repay but it is not possible to say how frequently this occurs. With 1,350 producers the number of bankruptcies is not large - less than 1% in 1960 - so it would appear that mortgagees do not have this deliberate policy in mind when making advances.

The discussion on the market for capital has been restricted to the wholesalers as lenders and producers as borrowers of funds. Retained earnings are a further source of capital and in view of the fact that fifty three of the sixty eight repayments referred to above were made from undistributed profits it is thought that these are an important source of producer finance. It is not known how many producers are limited liability companies so accurate information on shareholders as a source of fresh capital is not forth-coming.

Section (iii)

MANAGEMENT AND FINANCE.

There is a fascination in the manner by which the industry is financed in the Port of Wellington, the region to which this section of the study is restricted. In order to appreciate the place of the financial ramifications it is useful to outline the commercial structure of the port. There were fifty-five vessels of all descriptions registered in Wellington in 1961, which, incidentally, represents a decline in numbers of 18% in five years. There were six wholesalers, of whom five were important, supplying thirty-three retail outlets and an unknown number of hotels, hospitals, homes and passenger ships which in total form a sizeable portion of their market.

This oligopolistic wholesale market is the fulcrum about which the Wellington branch of the industry pivots and it is of some moment to examine the composition of each firm.

1) Fish wholesaling is only part of Townsend and Paul Ltd.'s business whose activities are diversified over such other lines of food wholesaling as fruit, produce and poultry as well as flowers and auctioneering. This is a very old established family concern which is at present the most independent of all wholesalers and perhaps one of those most capable of surviving any economic war among the wholesalers. A private company, it has substantial city premises and has no financial charge upon its assets. One of the firm's directors, Mr. Stanely Paul, was a director of the Maimai Trawling Co. Ltd. in 1961. He, together with Townsend and Paul, owns 30% of

the share capital of the Maimai Trawling Co. Ltd. This fact accounts for the firm's independent position among wholesalers for the Maimai consistently brings in the highest annual catch of any vessel in the port. It provided approximately 40% of the entire production of motor trawlers in Wellington in 1961 - a volume which assures the company of an independent source of supply.

2) New Zealand Fisheries Ltd. is a public company, which also originated early in the century. It has an authorised share capital of £150,000, £4,793 of which is uncalled and only £2,000 of which is paid up in cash. The earning power of the company's assets has fallen since 1958. Nineteen fifty nine was the first year since 1929 that the Company incurred a net loss although for some years prior to this it had been returning to shareholders the low yields of 2½% - 3¾% on their investment. Shareholdings in this company are very widely spread both geographically and in order of size. The directors of the company hold 15% of the shares and although New Zealand Trawling and Fish Supply Co. Ltd. holds 12,800 shares, and an estate holds 17,731 shares and there is a joint holding of 20,685 shares, none of the other one hundred or so members hold substantial packets. A feature of New Zealand Fisheries Ltd.'s annual accounts is the prominence of a proxy form. Some pressure has been placed on the Board by the shareholders over the manner of the Company's operation but with little effect on yield.

Sanford Ltd. of Auckland holds a moderate parcel of shares in New Zealand Fisheries Ltd., and this is of interest as that firm is the major wholesaler in Auckland. It has expanded vertically and

horizontally and it has eight subsidiaries as well as shareholders' funds of £44,000 (1962) for the group and a group turnover which exceeded £1m. in 1957. It is also active in the export market and the New Zealand Wholesale Fish Merchants' Association Ltd.

Another shareholder in New Zealand Fisheries Ltd. is the New Zealand Trawling and Fish Supply Co. Ltd. Two directors of New Zealand Fisheries Ltd. are also directors of the New Zealand Trawling and Fish Supply Co. Ltd. The holder of the largest parcel of shares in this second company is also a joint holder of the largest parcel in New Zealand Fisheries Ltd. These interlocking shareholdings and directorships are part of the reason for the long terms of office which Messrs. Alward and Alward have enjoyed in New Zealand Fisheries Ltd. It is felt that individuals who are fellow-shareholders in the other companies would support them in an annual general meeting. This would account for the managerial importance of the two when they hold 9.6% of the shares.

Since 1958 New Zealand Fisheries Ltd.'s history has been one of retrenchment. In 1959 it incurred a loss and another in 1960, the year in which it realised some of its assets with considerable capital profits. The consequent reduction in wage bills and depreciation and maintenance charges contributed to a very small profit in 1961, but 1962 was a year of sizeable loss. The Hautapu is a large steel vessel operated by the company but this was tied up for an indefinite period in April 1963. This places the company in a position of dependence for supplies upon independent fishermen and/or other wholesalers, although the contact with Sanford Ltd. may be of value. As far as can be ascertained the New Zealand Trawling and

Fish Supply Co. Ltd. has no active interest in production. The Company (New Zealand Fisheries Ltd.), which has financial investments of £46,000, and unencumbered fixed assets has not utilised these items to provide security in a scheme of reconstruction to obtain independent sources of supply.

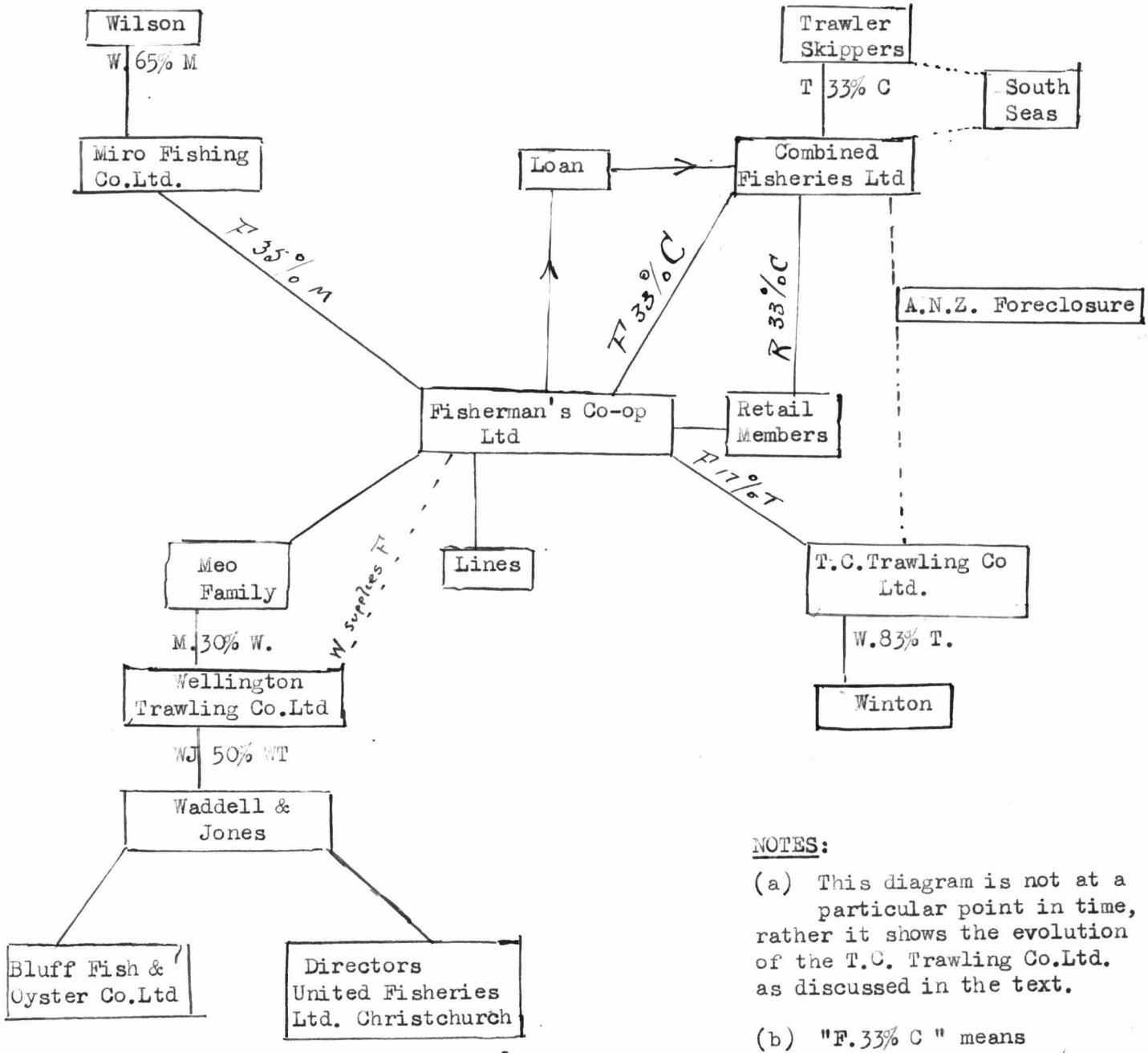
In summary, the future of New Zealand Fisheries Ltd. appears uncertain. Its trading record is poor but it has ample resources of a long term nature to provide for the company's continued existence. Immediate egress appears unlikely unless shareholders decide to realise the company's assets but eventual egress appears inevitable if the company does not secure sources of supply.

3) Another wholesaler, the Wellington Trawling Co. Ltd., is a private company with an authorised capital of £1,000. Five of its eleven shareholders bear the name Meo. This group supplied 30% of the total capital although more than £7,000 has been supplied by trading banks, an investment company and an individual - mainly on the security of property. A feature of the structure of this company is that 50% of the shares are held in Southland. The Southland members are the Bluff Oyster Co. Ltd. and Messrs. Waddell and Jones. These gentlemen are directors of United Fisheries Ltd., a firm of Christchurch wholesalers, and are influential in the oyster market. The Wellington Trawling Co. Ltd. was formed in 1947, and it undertakes line fishing off the Chatham Islands, and supplies the Fishermens' Co-op., Ltd.

3a) Diagram 5 pictures the associates of the Fishermens' Co-op., Ltd. for 1962. Over £32,650 of outside funds have been borrowed by

SCHEMATIC ILLUSTRATION OF THE CONNECTIONS OF THE FISHERMENS' Co-op. LTD. & THE WELLINGTON TRAWLING CO. LTD.

DIAGRAM 5:



NOTES:

(a) This diagram is not at a particular point in time, rather it shows the evolution of the T.C. Trawling Co.Ltd. as discussed in the text.

(b) "F.33% C " means "Fishermen's Co-op/Ltd holds 33% shares in Combined Fisheries Ltd." etc.

the Fishermens' Co-op., Ltd. compared with the company's total share capital, paid up in cash of £14,035. Governmental Agencies have contributed £24,000 of the £32,650 mentioned above and £14,000 is (1962) secured over property by the Government Insurance Commissioner. The other £10,000 is also secured over property by H.M. The Queen although it is not possible to verify which Government agency this is.

No other wholesaler in Wellington has utilised these sources of finance.

Some sixty shareholders comprise this public company. Fifty-one are from Island Bay and fifty-three from their names are of Italian descent. Some of the Meos, who figured in the Wellington Trawling Co. Ltd. also figure in the Fishermens' Co-op. Ltd. Of the £14,035 of cash-paid shares, the largest of the fifty-seven holdings is £300, and it appears from the Articles of Association that the members of the company were anxious to preclude any member from gaining a disproportionate number of shares. Voting rights on a poll are one vote per share held. In some ways this has been disadvantageous for it has left the company in the hands of managers who, while members, are more in the nature of professional managers than owner managers. Fractionalised holdings of people closely connected with production have caused divisions over management's policy in some periods of the company's history.

The great majority of the members are line and cray fishermen and as such account for most of the port's output of blue cod, haupuka and crays. This specialisation in itself has been a

contributory factor to the company's present weak position for, in those seasons when the output of line produced variants has been low, the company's sales have been reduced accordingly, but its administration and overhead charges have not declined in proportion, so losses have been incurred. Undue dependence upon line production is the reason for attempts at diversification through ownership of shares in and advances to two trawling companies, the Miro Fishing Co. Ltd. and Combined Fisheries Ltd. The Co-operative complained of the difficulty of obtaining licenses to trawl in one annual report.

3b) Miro Fishing Co. Ltd. was formerly owned by two Wilsons and the Company owned the Miro, a trawler which brought in a small proportion of the port's trawl output in 1961. One of the Wilsons withdrew from the business when the Fishermens' Co-op. Ltd. took £1300 of shares and the other Wilson took up the bulk of the remaining £3700. The reason for this move on the part of the Fishermens' Co-op. Ltd. was to obtain supplies of trawl produced product variants which assured the Miro Fishing Co. Ltd. of a regular outlet.

3c) The £5,000 investment the Fishermens' Co-op. Ltd. had in Combined Fisheries Ltd. represented 39% of Combined's paid up capital. Combined Fisheries Ltd. was not like the Co-op. in that its fishermen did not sell to it, they caught for it. The company had a most interesting capital structure. Formed in 1952, its authorised capital was divided into "A", "B", "C" class shares, each class with a nominal value of £5,000 and each share with one vote. It was provided that each class of share should be restricted to people engaged in a certain phase of the industry's activities. The "B" group was to consist only of producers, the "C" group only of retailers, and the

"A" group of the Fishermens' Co-op. Ltd., who are wholesalers. There was also provision to expel members who changed the nature of their business. Three or four trawl fishermen held the "B" shares and twenty-six retailers made up the "C" group. This indicates that the founders of the company and their advisers were endeavouring to promote a vertically integrated concern from a number of smaller concerns while preventing any one firm from gaining control.

It is noteworthy, that the Fishermens' Co-op. Ltd. is composed mainly of Island Bay line and cray fishermen and its shareholding in Combined Fisheries Ltd. provided it with trawl licenses at the same time as it brought some non Italians under its control. Some of the "C" retail group of Combined Fisheries Ltd. also had shares in the Fishermens' Co-op. Ltd. The common members of these companies explain the advance of £3,200 the Co-op. made to Combined Fisheries Ltd.

In 1961 Combined Fisheries purchased a vessel of seventy five feet which its skipper (a former shareholder) states was unprofitable. The A.N.Z. Bank Ltd. foreclosed on the Company and the vessel was sold at a capital loss of £9,000 in 1962. The Company went into voluntary liquidation in November 1962 shortly after its remaining vessel was sold.

Returning now to the affairs of the Fishermens' Co-op. Ltd., it should be mentioned that this company purchased a vessel which it anchored off the Chatham Islands in 1951 to store blue cod. A fire destroyed the vessel in 1958 and this loss affected the company's trading and financial position.[4]

4. See Annual accounts of Fishermens' Co-op. Ltd., 1958.

Between 1955 and 1960 small share allotments were made bringing in fresh capital from new members. The relaxation of Australian import regulations, which allowed other countries to export to Australia, aggravated the set-back to the Fishermens' Co-op. Ltd.'s trading caused by the loss of the storage vessel.

4) Jurie Fisheries Ltd. has a cash paid authorised capital of £10,000, of which £9,999 is held by Jurie Holdings Ltd., and £1 by James Jurie, who is the only director with a shareholding (1962). The connections of this group are depicted in Diagram 6.

Fifty-seven per cent of the voting power and fifty-three percent of the shares in Jurie Holdings are held by Rangatira Proprietary Ltd. whose holding amounts to 28,500 £1 shares. The Jurie family owns 21,500 shares and the remaining £5,000 of the company's cash paid share capital is held by Nelson Fisheries and Cool Storage Ltd. These are B shares with dividend but without voting rights.

Jurie Holdings Ltd. has no charges registered against it (April 1963) and fifty-five thousand pounds cash was paid to this company by members. Ten thousand pounds of this is invested in Jurie Fisheries Ltd. which has opened additional retail outlets and purchased a number of large motor trawlers in the past two years. This expansion of Jurie Fisheres Ltd. could account for the remaining £45,000 paid into Jurie Holdings Ltd. If the subsidiary has borrowed this, or part of this sum, it has done so without giving registered security to the holding company. A reason for this possible advance being unsecured is that the way has been left open for Jurie Fisheries Ltd. to obtain additional funds from the Bank of New Zealand Ltd., which holds a debenture over Jurie Fisheries Ltd.'s entire undertaking as security for an advance of an undisclosed sum.

The directors of Jurie Fisheries Ltd. are of interest:

Name	Occupation
Hugh A. Carter	Director of McKenzies Ltd.
James R. Jurie	Managing Director
Wm. Dee	Manager, Nelson Fisheries & Cool Storage Ltd.
R.J. Nankervis	Public Accountant
James N. Jurie	Manager

especially when they are compared with the directors of Jurie Holdings Ltd.:-

Name	Occupation
Hugh A. Carter	Director, McKenzies Ltd.
James R. Jurie	Managing Director
R.J. Nankervis	Public Accountant
James N. Jurie	Manager

and the board of Nelson Fisheries Ltd.:-

Name	Occupation
K.C. Campbell	Company Director
H.A. Carter	Company Director
W.H. Nankervis	Public Accountant
W.G. Taylor	Company Director
P.E. McDonald	Company Director
P. Vela	Company Manager
J.R. Jurie	Company Manager

The appearance of Wm. Dee, a shareholder in Nelson Fisheries Ltd. reflects the interlocking boards and common members of the three companies with Rangatira Pty. Ltd.. Rangatira Pty., Ltd. holds

49.9% of Nelson Fisheries Ltd.'s £104,000 issued ordinary shares. These together with those held by W.H. Nankervis, H.A. Carter and W.G. Taylor, who are directors of Rangatira Pty. Ltd., provide it with a controlling interest in Nelson Fisheries Ltd. Nelson Fisheries Ltd. is a public company which has had £128,608 (including £30,000 preference capital) cash invested in it by members. It was able to raise £10,250 in 1960, from individuals who accepted fishing vessels as security, as well as approximately £27,570 from banks. It has forty vessels fishing for it, twenty-four of which are owned by individual fishermen and sixteen are company owned. The Company has made advances to eleven of the individual boat owners so it has a financial interest in twenty-seven vessels in all. James R. Jurie holds 11.6% of the ordinary shares in Nelson Fisheries Ltd. and three others of his family hold a total of 14.5% of the ordinary shares.

Common directors and members makes the structure of the companies appear involved so Diagram 6 on page 138is presented in order to clarify the picture. It is worthy of mention that W.H. Nankervis is a Public Accountant in practice with R.J. Nankervis and others which provides a closer link between Jurie Holdings Ltd. and Nelson Fisheries Ltd. as these gentlemen are also directors of Rangatira Pty., Ltd. One further fact which brings Nelson Fisheries Ltd. and Jurie Fisheries Ltd. closer together is that the Golden Joy, owned by Nelson Fisheries Ltd., is operated from Wellington by Jurie Fisheries Ltd.

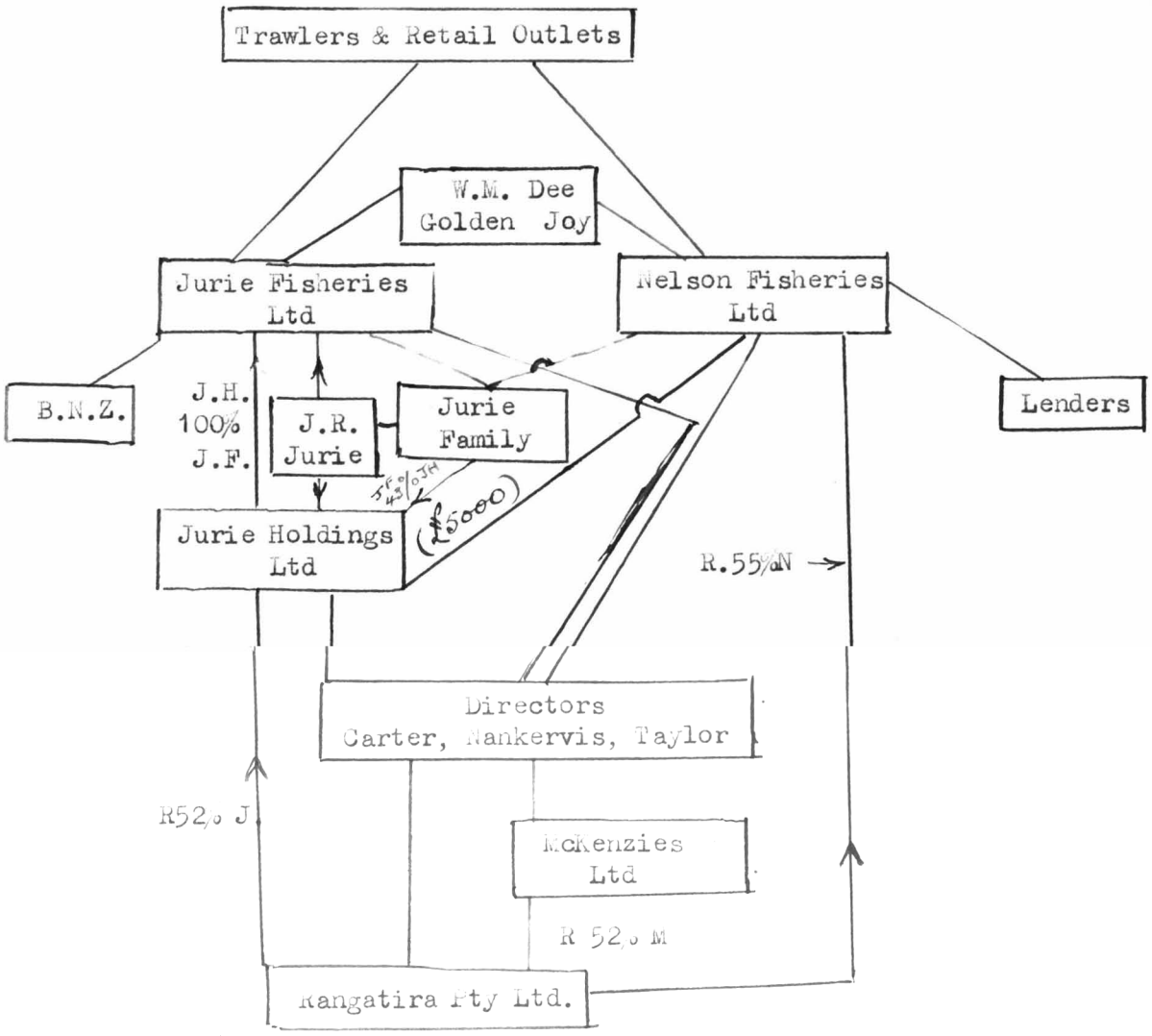
In summary, therefore, Rangatira Pty., Ltd. has a controlling

SCHEMATIC ILLUSTRATION OF THE

JURIE ASSOCIATES

MID 1962

DIAGRAM 6



NOTES:

(a) The diagram is explained in the text.

(b) The apparent discrepancy in the % of shares held by members of Jurie Holdings Ltd arises through non-voting shares.

interest in Jurie Holdings Ltd., in Jurie Fisheries Ltd. and effective control of Nelson Fisheries Ltd. Rangatira Pty. Ltd. administers those companies through their boards of directors. The Jurie family has a minority interest in Jurie Holdings Ltd., Jurie Fisheries Ltd. and Nelson Fisheries Ltd. and James R. Jurie is a director of the three last mentioned companies. W.G. Taylor is a director of both Nelson Fisheries Ltd. and Rangatira Pty., Ltd.

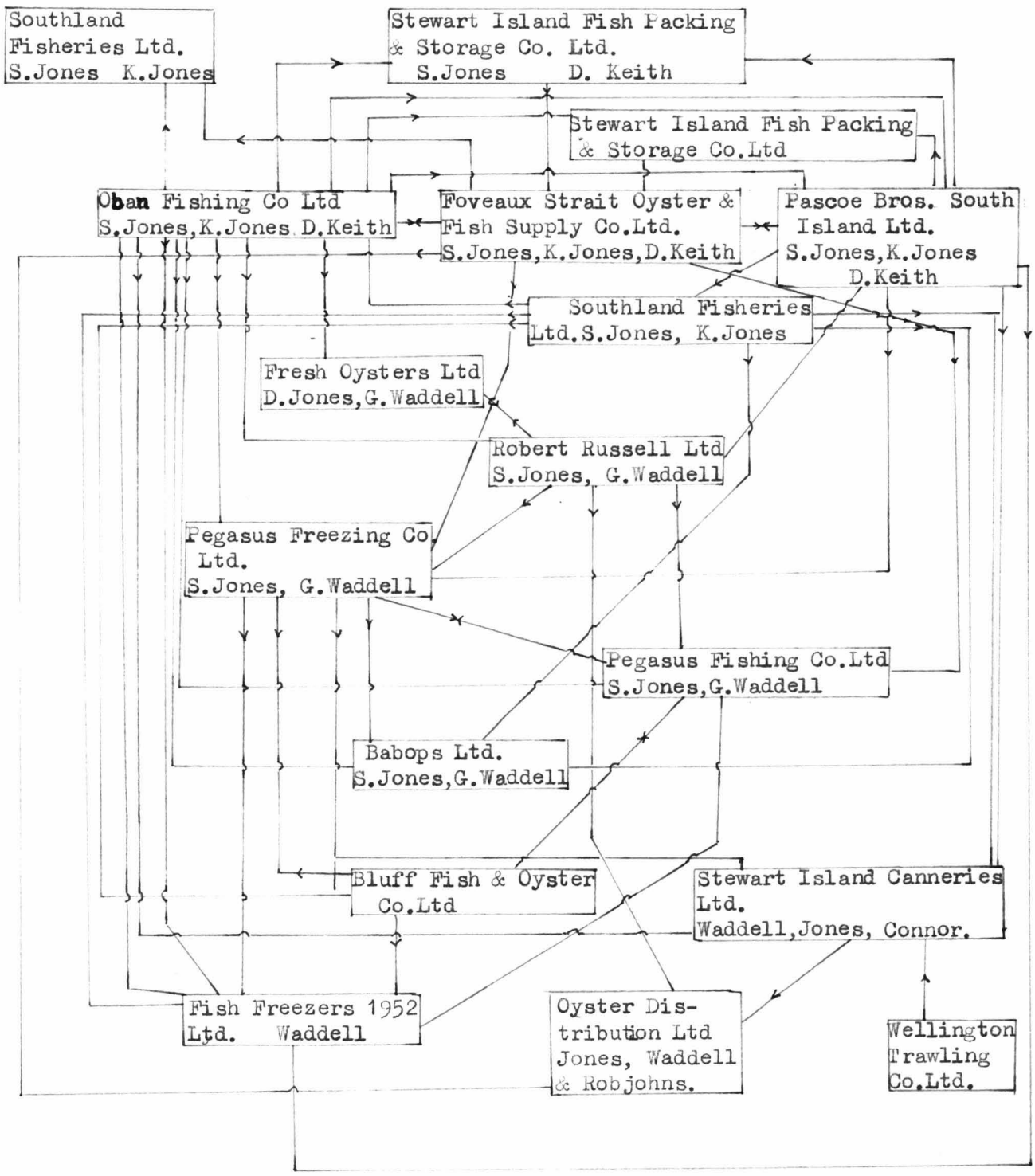
Rangatira Pty. Ltd. have the controlling interest in McKenzies Ltd., the chain store retailers, and Hugh A. Carter is also a director of McKenzies Ltd.

Although this financial survey has been basically confined to the Wellington area, the inter company connections which are evident in that region are not untypical of other areas. Mention has been made of the eight subsidiaries of Sanford Ltd. in Auckland and though a detailed analysis is not presented of the structure of firms in the oyster trade, the complexity of this section of the industry is of passing interest and is a useful background in the interpretation of the publicity it receives from time to time.

Twelve vessels, based on Bluff, produced the entire output of southern oysters in 1961. (In Auckland, where there are pockets of rock oysters, production and distribution is strictly controlled by the Marine Department). These vessels are apparently owned and operated independently. In fact, this is not so. Five of them are under the effective control of the Jones-Waddell group of companies and four are under the effective control of Barnes Oysters Ltd. Some seventeen companies are involved in the operation and distribution of the output of the five vessels. Five companies are involved in operation and distribution of the output of the four vessels. The operation and

INTER COMPANY SHAREHOLDINGS OF THE JONES WADDELL GROUP IN THE OYSTER TRADE

DIAGRAM 7:



The direction of the arrows shows movement of cash consideration when shares were purchased.

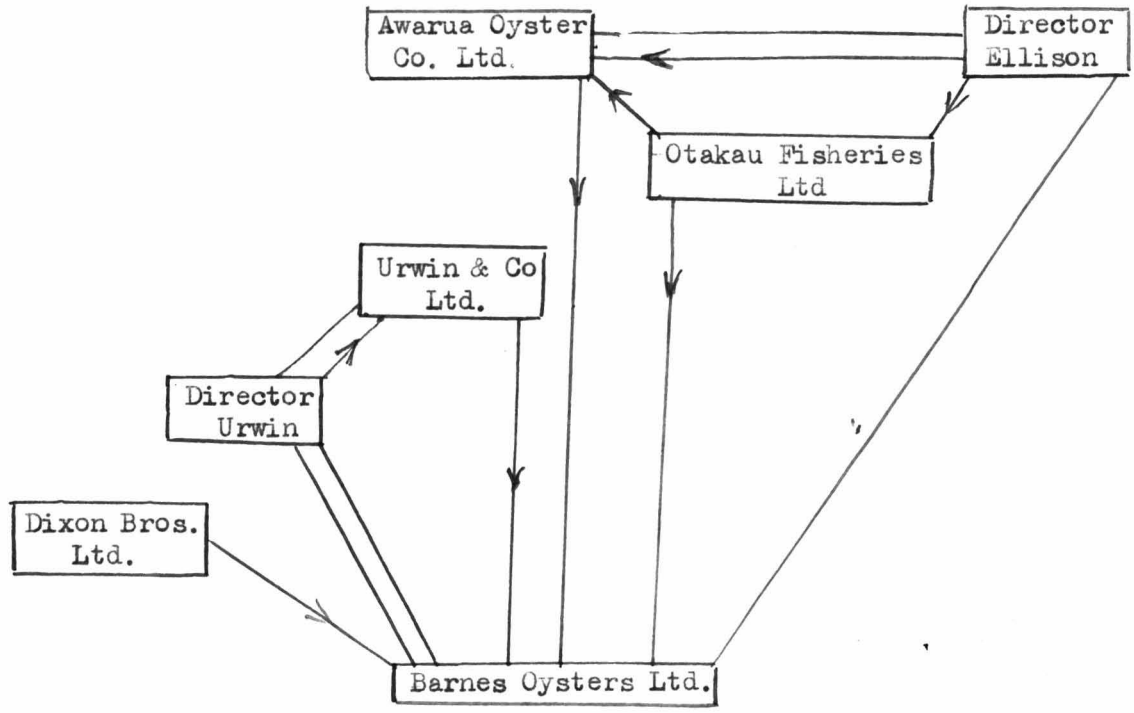
distribution of the output of the remaining three vessels centres around Mr. W.E. Johnson. Diagram 7 p. 140 shows the intercompany shareholdings of the Jones-Waddell group. The total number of shares of this entire group is 44,870 of which the combined holdings of Messrs. Jones and Waddell is 10,223 and in only two companies do they hold a majority of the shares. In eight companies they are the only individual shareholders. The remaining shareholders in any one of these eight companies is one of seven other companies of which Jones and Waddell are the only individual members.

There is a total of thirty-five directorships in the seventeen Jones-Waddell companies. These gentlemen hold twenty-six of the directorships between them. They are the only pair of directors of seven companies. Four of the remaining nine directorships are held by D. Keith. S.W. Jones, but not G.A. Waddell, is also a director of these four companies. Two directorships are held by other people without shares in the companies concerned and either Mr. Jones or Mr. Waddell is also a director of them. The remaining directors are members of the companies concerned who sit on the boards with either Mr. Waddell or Mr. Jones. Consequently, either one or the other or both of these gentlemen is on the board of directors of each of the seventeen companies.

Diagram 7 illustrates how this group is related, the percentages of shares held by each person or company in other companies are not presented as they are not reliable guides to control, because of the common occurrence of one company, not being a holding company, owning shares in another and vice versa.

THE STRUCTURE OF BARNES OYSTERS LTD

DIAGRAM 8:



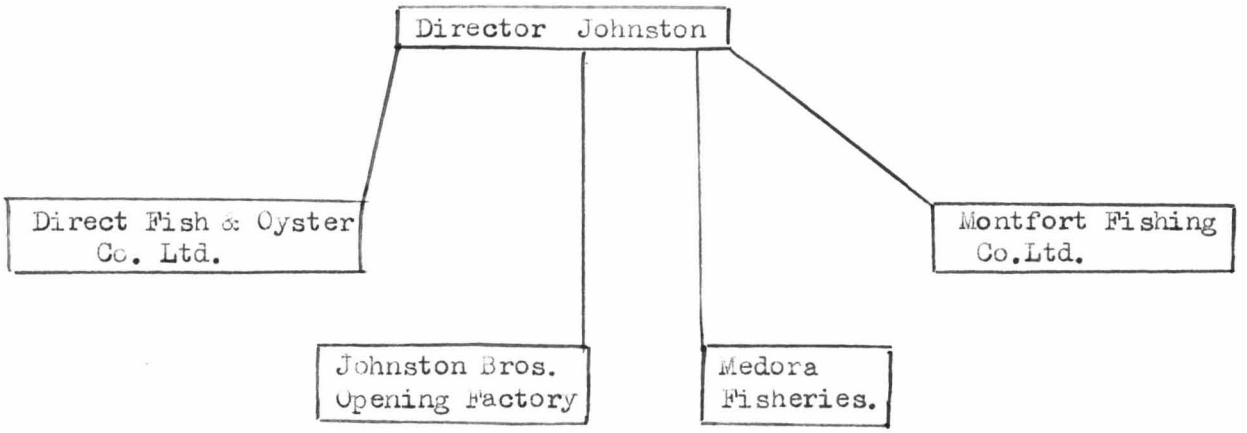
NOTE:

(a) Arrows indicate direction of flow of consideration for shares.

(b) Plain lines indicate Directorships.

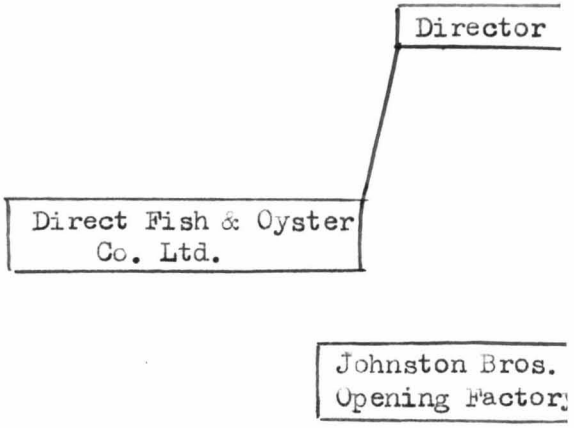
THE COMPANY CONNECTIONS OF MR JOHNSTON

DIAGRAM 9:



THE COMPANY CONNECT

DIAGRAM 9:



The group is fully integrated from production to canning to wholesale and retail distribution. The Wellington Trawling Co., Ltd., wholesalers in Wellington, hold a sizeable minority parcel of shares in one of the companies (Stewart Island Canneries Ltd.). The Bluff Fish and Oyster Co. Ltd. together with Messrs. Waddell and Jones hold the controlling interest in the Wellington Trawling Co. Ltd. Messrs. Waddell and Jones, with associates from their Bluff group, also hold 50% of the shares in United Fisheries Ltd., Christchurch. These people comprise half of that company's board of directors.

It was mentioned earlier (see p. 139) that the Jones-Waddell group of companies effectively controlled five oyster vessels and that the other seven were under effective control of Barnes Oysters Ltd., (which has four) and Mr. W.E. Johnson. Diagram 8 shows the connections of Barnes Oysters Ltd.. Mr. R. Ellison is a director of that company as well as the Awarua Oyster Co. Ltd. and Otakau Fisheries Ltd. of Dunedin. Otakau Fisheries Ltd. is a shareholder in Barnes Oysters Ltd. and the Awarua Oyster Co. Ltd.

Diagram 9 shows how Mr. W.E. Johnson is the link between the firms which control the three remaining vessels.

Some years ago, nine firms operated independently and supplied Bluff oysters. These firms were later organised by Mr. S. Jones to supply a combine with oysters, which were then sold at fourpence per sack. Later oyster canning commenced and the combine disintegrated, upon which Messrs. Jones and Waddell set up factories in Bluff, Invercargill, Timaru and Christchurch. Otakau Fisheries Ltd. set up

in Invercargill, and Johnson Bros. operated in Bluff and Christchurch. Six firms outside this group were also supplying. Concentration has occurred since that time.

This digression into the financial structure of the oyster industry is now complete and we return to the Wellington section of the industry.

Section (iv)

SUMMARY AND ASSESSMENT OF THE CAPITAL MARKET AND FINANCIAL STRATEGY.

The Wellington section of the industry is in a transitional phase, which is the result of the entry of a new combine.

McKenzies Ltd. via Jurie Holdings Ltd. and Rangatira Pty. Ltd. entered the industry in 1960. It has used opportunities to good advantage and has strengthened the market position of the subsidiary, Jurie Fisheries Ltd. Over-expansion by Combined Fisheries Ltd. caused the Australia and New Zealand Bank Ltd. to foreclose, which allowed the Jurie group to purchase a substantial vessel at a favourable price. The Fishermens' Co-op. Ltd. took the joint guarantee of Combined Fisheries Ltd.'s bank overdraft.[5] On the liquidation of Combined Fisheries Ltd., the "Thomas Currell", a big trawler, was sold to the T.C. Trawling Co. Ltd. which is one sixth owned by the Fishermens' Co-op. Ltd. and five-sixths by a Mr. Winton.

An important trawler which was owned by Combined Fisheries Ltd. and was producing for the Fishermens' Co-op. Ltd. is now in the hands of the Jurie Group. New Zealand Fisheries Ltd. is not operating the Hautapu at present (April 1963). The Wellington Trawling Co. Ltd. is small so the great bulk of trawl fish wholesaling is now in the hands of Townsend and Paul Ltd. and Jurie Fisheries Ltd.

The managerial strategy controlling the financial manoeuvering which has occurred in Wellington has had vertical integration as its objective. Jurie Holdings Ltd., which has achieved this, appears to be in a strong position with the sources of supply and capital, the

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5. See Fishermens' Co-op,, Ltd. 1962 Balance Sheet.

retail outlets and the connection of Nelson Fisheries Ltd. at its disposal. It may be able to undertake further expansion and so improve the returns accruing from its combined function of producing, wholesaling and retailing. Townsend and Paul Ltd. has achieved an independent source of supply, but so far as is known it has no retail outlets. The companies which have not attained this vertical integration are perhaps in the process of elimination. Combined Fisheries Ltd. did not own its own retail establishments or a wholesale business - these functions were carried out by its members - and it has gone into liquidation.

New Zealand Fisheries Ltd. has decided to discontinue the major part of its producing activities and so it must now buy from "itinerant" producers, of whom there are few, or from other wholesalers. This company has no retail outlets either and three of the past four years have been profitless. The Wellington Trawling Co., Ltd. and the Kilbirnie Fish Supply are not major producers, although this second firm is vertically integrated having established links with producers and retail outlets. Though efforts have been made the strategic objective of vertical integration has not, strictly speaking, been achieved by Fishermens' Co-op., Ltd. since its members rather than the Company own the retail outlets and many of the producing units. So the advantage of cumulative margins from production through to distribution has not been open to the company because of its internal organization. Its producer-members take the producers' margins out when they sell to the "Co-operative" and retail members themselves take the retail margins from the public. The company's source of supply was reduced when Combined Fisheries Ltd.

went into liquidation and now integration extends mainly to line and cray production. A one-sixth share of the capital of the T.C. Trawling Co., Ltd. and a 35% interest in the Miro Fishing Co., Ltd. assures the Co-operative of a supply of some trawl-produced product variants. It is concluded that the managerial aim of vertical integration has not been fully achieved by the Fishermens' Co-op., Ltd., and that it is in a weak position partly because its "co-operative" base has reduced the gains which would accrue to other forms of ownership.[6]

Comment is heard throughout New Zealand that the industry is hampered through lack of funds. This may, to some extent be true, but it is less true of the Wellington branch of the industry. A more accurate statement is that a part of the industry has difficulty in obtaining external funds because some commercial institutions are unwilling to make advances on such mobile and hazardous assets as fishing bottoms. Those finance companies which are prepared to lend to individual fishermen require a three to five year repayment period, which is too short for the majority of fishermen. For this reason small producers have difficulty in obtaining finance, if they have no real assets ashore. Potential investors may also be shy of the industry because of the difficulty of obtaining producers licenses, which prevents them from gaining control over a source of supply. In those cases where real assets are held ashore

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6. The foregoing analysis summarised the situation in early April 1963. Since that time the Fishermens' Co-op., Ltd. has gone into liquidation and the shareholders of New Zealand Fisheries Ltd. have decided to wind up voluntarily. Townsend and Paul Ltd. and the Jurie group remain as the dominant wholesalers.

financial houses are prepared to value them on their merits. While it is unwise to generalise from the Wellington experience it is safe to say that at that port concerns integrated wholely or partly from producer through to retailer are able to obtain mortgage and overdraft finance on the security of their shore assets.

CHAPTER FIVE

TRADE ASSOCIATIONS AND PRICE DETERMINATION

Section (i) Trade Associations in the Industry

(ii) Price Determination in Auckland

(iii) Price Determination in Wellington

(iv) Price Determination in Christchurch

(v) Price Determination in Dunedin

(vi) Price Determination in the Cray Market

(vii) Price Determination in the Oyster Market.

CHAPTER FIVE[1]

TRADE ASSOCIATIONS AND PRICE DETERMINATION

Section (i) Trade Associations in the Industry

Object (b) of the New Zealand Wholesale Fish Merchants' Association Ltd. reads, "To co-operate in producing a fair and reasonable price and to prevent unfair, disloyal, illegal and unjust practices in the trade," so the group clearly has a collective price objective. The New Zealand Fish Retailers Federation Inc. also has national price objectives as its objects include, "(b) To concert and co-operate with the producers through their representatives and others with the object of obtaining commodities upon such terms and conditions as will result in retailing such commodities to the public at an economic price." "(n) To supervise control and regulate members in the conduct of their business in the interests of the members as a whole." "(w) To regulate supplies of commodities to members and to assist in increasing their production and distribution."

The price objectives of the New Zealand Federation of Commercial Fishermen Inc. are more veiled and if they exist would come under object (1), "To secure to the Federation all advantages of unanimity of action," or object (3) "To undertake any arrangements for the benefit and/or protection of members." This trade group does not appear to be pursuing an active price objective at present (May 1963).

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1. In this Chapter, "submission" and "evidence" refer to the proceedings of the Fishing Industry Committee, 1962, Mr. W.J. Scott, M.P., Chairman. (Ref. Journal of the House of Representatives 1/12/61). The writer accepted as reliable only those statements which survived the Select Committee's cross examination.

Representatives of the producer, wholesale and retail sections of the industry meet regularly on a national level at the Fishing Industry Advisory Council (see p. 230) and also less regularly on provincial levels at the Regional Committees of that body. Each of the trade groups has its provincial branches though the retail and producer groups are less strong in some ports than they are in others. In Wellington where wholesalers do not have a common price policy in respect of producers or retailers, the three interests do not have militant objectives. The history of the organisations has not been traced in other ports so it is not known if their occurrence and activity is an example of original power being off-set by countervailing power.

The New Zealand Wholesale Fish Merchants' Association Ltd. has forty-six members throughout New Zealand.[2] They own 127 vessels,[3] and the group includes every important wholesaler with the exception of New Zealand Fisheries Ltd. and Jurie Fisheries Ltd.,[4] both wholesalers in Wellington. Subsequent sections of this chapter show how the members of this association carry out object (b) in several parts of their market so attention is directed for the moment to the Association's non price objectives.

Regular provincial meetings are held[5] and review of the Associations policy occurs at its Annual General Meeting. One of the Association's non price objectives is to shift the responsibility for quality back to the producer for it proposes that a Government Inspector should be appointed with power to reject produce of poor

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2. Submission 36
3. Submission 36
4. Submission 36
5. Submission 36

landed quality.[6] The group is also dissatisfied with present export licensing procedures and would like them modified. It is also concerned that wholesalers carry the stocks for the local market and would like to see retailers carrying more stocks for the off seasons.[7] Other non price objectives of the Wholesalers' Association are to obtain a revision of the current manning scale and relaxation of conservation measures.[8]

There is a degree of co-operation between the wholesalers' group and the producers' group at a national level and the precise reasons for this are obscure. There are some wholesalers who belong to the producers' group and vice versa. These are not important enough to account for the affiliation, as they are usually either small wholesalers or small producers and belong to both because they commenced business originally in one role and later moved to the other.[9] Chapter Four probably contains the reasons for the uneasy national alliance as it showed that wholesalers own vessels and make advances to producers.

Satisfactory data on the membership of the New Zealand Federation of Commercial Fishermen is not obtainable. The Federation had 244 members owning vessels out of a total of 410 members in 1961.[10] That is to say that the Federation represented

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6. Submission 36
7. Submission 36
8. Submission 36
9. Chairman, Fishing Industry Advisory Council
10. Submission 36

18% of the number of producers licensed in 1960. A reliable guide to the producers' views need not necessarily come from the Federation. For, it is noted that there are only ten members in Auckland, where there is over 160 licensed producers, and there are twenty-one members at Lake Ellesmere, where the value of the annual output was approximately 1.2% of the value of all producers' national output in 1961. Against this the Federation has 117 members holding trawl licenses[11] which is almost half of the number of trawl licenses current in 1960. However, with these reservations in mind, mention can be made of the objectives of this group. Firstly, the Federation advocates an extension of territorial waters.[12] Secondly, it has a non-price objective of lowering insurance premiums on fishing vessels. The group is opposed to the total de-licensing of the industry and it wishes to retain current landing regulations. The Federation has further non-price objectives of retaining control of the industry in the hands of New Zealanders and nationalised citizens as well as the prohibition of part-time fishermen.[13] Producers' groups are more active over local issues than they are at the national level. Bluff, Port Chalmers and Timaru are the only ports where local producer groups are vocal at the national level.

In the main centres, other than Wellington, retailers are confronted by wholesale organisations in a bargaining position superior to their own. This is partly due to the existence of an export market absorbing 20% - 25% by volume of the annual output which relieves the wholesalers of complete reliance upon retailers,

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11. Submission 36
12. Submission 36
13. Submission 36

but retailers are still reliant upon wholesalers. Retail associations exist in each centre. There is a national body which has not brought about a national policy. Reasons for this are because each of the city ports has a different method of setting price and also because in North Island centres there are large numbers of continental Europeans, apparently with temperaments not conducive to concerted and combined action,[14] engaged in retailing. The Auckland Retailers' Association with 120 members[15] excludes the wholesaler-retailer type establishment. Its principal non-price objective is the removal of the itinerant hawkers which operate in the area. The Wellington District Fish Retailers' Association has approximately twenty-five members[16] who have no stated non price objectives and who appear to be moderately contented with the trading conditions in the port. But the Christchurch Fish Retailers' Association, which has approximately sixty-five members,[17] is highly critical of the wholesale market there and advocates the complete abolition of the existing system of wholesale distribution. This is a non price objective but it has its basis in price determination. Christchurch retailers also favour the abolition of restrictive licensing and a change in the system of oyster distribution.[18] The Dunedin and Suburban Fish Retailers' Association has a principal object of achieving the issue of single product producers licenses for reasons discussed in Section (v) of this Chapter.

Turning now, from a discussion of the membership and non-price objectives of the trade groups in the industry, attention is directed to the determination of price which shows some variation

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14. President New Zealand Fish Retailers' Federation Inc.
15. Submission 4.
16. Marine Department 84x - 9.
17. Submission 42.
18. Submission 42.

in procedure in the main parts of the market.

Section (ii) Price Determination in Auckland

Prices are regulated in the Auckland area by the mutually agreed policy of six wholesalers, Messrs. Auckland Fisheries Ltd., Kia Ora Fish Market, Ocean Fish Co. Ltd., Pearl Fisheries, Sanford Ltd., and Waitemata Fisheries Ltd. Each of these is a member of the New Zealand Wholesale Fish Merchants' Association Ltd. This group is dominated by Sanford Ltd., which has a group turnover in excess of £1m., and the Kia Ora Fish Market. Sanford Ltd.'s preponderance arises from vertical and also horizontal integration through the ownership of an ice company supplying about 90%[19] of the port's ice requirements. It has an interest with Kia Ora in a firm of marine engineers which undertakes trawler repairs. Sanford Ltd. lets freezer space to a total of nine other concerns[20] and in addition operates one of the two fish meal plants in New Zealand on the waste of firms in the Auckland area. The company has branches at Melbourne, Sydney, Newcastle and Brisbane as well as agencies at Adelaide and Perth.

Uniform prices to fishermen and retailers rule between the Auckland Wholesalers, and this is taken to be evidence of collusion rather than proof of perfect competition between so small a number.

The price which members of the Auckland branch of the New Zealand Wholesale Fish Merchants' Association Ltd. pay to fishermen is negotiated with the Fishermens' "Union" in the area. This association is not a trade union and is not affiliated with the Seamens' Union.

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19. Submission 35.
20. Submission 35.

The method which these two groups have agreed upon in determining the prices of the major product types is in effect a sliding scale related to quantity produced. For the first thirty baskets the producers are paid six pence per lb., and for the next thirty baskets the price is five pence half penny per lb. and for amounts in excess of sixty baskets the crew receives a flat rate of four pence per lb.[21] However, all retailers in the area buy these product types at the unvarying price fixed by wholesalers of seven pence three farthings per lb. - regardless of the quantity they purchase.

In answer to criticism from the Auckland Fish Retailers' Association the wholesalers have defended their practice of not charging retailers on the basis of a similar sliding scale, on the grounds that the highly competitive conditions in the Australian export market make such a buying practice on their part essential if exports are to be maintained.[22] Since Sanford Ltd. exported 51% (52% in 1960) by value, of New Zealand's total exports in 1961,[23] it is likely that their buying policy influences that of other wholesalers. Although, this is not to say that they are leaders as far as prices to producers and retailers are concerned.

The sliding scale of producers' prices is closely connected with raw material availability during seasonal periods, which in turn contributes to further friction between wholesale and retail interests. Producers are paid the lowest price when a particular variety is near a seasonal peak and about this time cool storage capacity becomes

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21. Submission 4.
22. Submission 4.
23. Submission 35.

strained. Much of the stored goods would have been bought early in the season when producers were paid higher prices because fewer baskets were being landed. Once the freezers have been filled limits are imposed on the producers to discourage them from continued high output (Sanford Ltd. hold part of the stocks of nine other concerns in cool storage,[24] which indicates that this company plays an important part in the imposition of limits). Prices do not fall below fourpence per lb. because the Fishermens' "Union" will not accept further reduction[25] and also because it would not result in lower output since on the whole producers are quantity maximisers (see Chapter Two). Wholesalers in this situation are not prepared to reduce prices to retailers in an effort to quit stocks. This would involve them in a loss (or lower profit) on the volume already stored, which was purchased early in the season[26] when prices were higher and which has already incurred overhead expenditure. The Retailers' Association has not yet been strong enough to force lower wholesale prices from the wholesalers, perhaps because of certain wholesalers' interests in retail outlets, but it is anxious to accept the profit which would accrue to its members from lower purchase prices. Given the size of Sanford Ltd.'s freezers, which accommodate the entire exports of twenty-three producers as well as the surplus of the nine firms mentioned earlier, it is doubtful if Auckland retail establishments have the freezer capacity to accommodate gluts.

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24. Submission 35.
25. Submission 35.
26. Submission 35.

Notwithstanding this, Auckland Retailers are dissatisfied with the sliding scale system and they advocate price control at the producer, wholesale and retail levels.[27]

Limits are imposed in such a way as to ensure that the hands on large and small producing units still receive a good "wage".[28] They have been imposed by wholesalers mainly during the seasonal peaks of the summer months. Limits were particularly stringent in 1958 and 1959. The relaxation of Australian import regulations provided the opportunity for the lower priced, better quality product variants of other countries to reduce New Zealand's share in that market, thereby straining freezer capacity in Sanford Ltd.'s Auckland area. Limits were also imposed on producers during 1951, 1954 and 1956,[29] and have been especially heavy on snapper and trevally.

In Gisborne, East Coast Fisheries Ltd. have admitted indirectly[30] that wholesalers agree on price and agree not to undertake price cutting, but this company has not imposed limits on producers.[31] It operates a sliding scale of payment to producers for one product variant (five pence halfpenny per pound for the first three thousand pounds and fivepence per pound thereafter).[32] Gisborne Trawler Operators Ltd., which produces in the same region, has imposed limits on producers[33] at times because they would not accept a transference of the price reductions occurring on the overseas market.

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27. Submission 4.
28. Submission 35.
29. Submission 35.
30. Compare evidence $\frac{2F}{13}$ with submission 13 on the meaning of "orderly marketing".
31. Evidence $\frac{2c}{13}$
32. Evidence $\frac{2Y}{13}$
33. Submission 24.

Seasonal fluctuations in output brought about by regular variation in raw material availability is the root cause of the agreed price/output policy of Auckland wholesalers. Larger freezers would ease the pressure on storage capacity during peaks, but this would involve under utilisation in the off seasons. Price reductions are not an effective short run disincentive to producers and, in any case, such price changes lower the comparative return on existing stocks as would reductions in wholesale prices to retailers. The market power of the combined retailers is insufficient to lower price, which in this situation is determined by wholesalers acting in collusion.

A common structure of purchase prices probably caused Auckland retailers to collude between themselves over prices to the consumer, for it has been established that in 1953 a price list was issued by the Auckland Fish Retailers' Association - "only as a guide to members" - and another in 1959.[34] The price of snapper in the earlier list was 1/2d. per lb., and in the later list it was 1/4d. It seems reasonable to assume that other lists were issued during the six year interval. The Trade Practices Division requested that these lists be withdrawn[35] but it is possible that loose price arrangements may still exist since the Auckland Fish Retailers' Association wrote of them in the present tense after 1959. Retail prices have risen in Auckland since the withdrawal of the list[36] and so there is the interesting possibility of a price ring operating to keep prices down. This could easily arise if collectively the

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34. Submission 4.
35. Evidence 2Y/4
36. Submission 4.

members thought a price increase was undesireable, given the price elasticity of demand; yet individually members thought it necessary given their cost structures, but through fear of others not following, or of opening a hopeless price war one against the rest, each member kept to the agreed price.

Part of the accepted price policy in the Auckland area appears to be to pass cost increases on to the consumer. When the price of one product variant was increased to producers, wholesalers, and subsequently the retailers, raised their prices.[37] This incident illustrates the strategy and market power of the wholesale group. It rose from the action of Henderson Distributors Ltd., which has a small retail outlet and which exports quantities (£80,000 in 1960) of one product variant[38] to Australia independently of Sanford Ltd.[39] Before Henderson Distributors Ltd. commenced exporting, producers were paid two and one half pence per pound for this class of commodity. In order to obtain supplies the firm offered six pence per pound. Henderson Distributors Ltd. is not a member of the New Zealand Fish Wholesalers' Association Ltd.[40] This move would have been independent of the Auckland wholesalers who were faced with demands from producers, not supplying Henderson Distributors Ltd., for similar price increases which were granted.[41] Only two wholesalers in the Auckland-Thames-Tauranga district do not export

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37. Submission 4.
38. Submission 53.
39. Submission 35.
40. Submission 36.
41. Submission 4.

through Sanford Ltd.[42] (and it is thought, though not established, that these two do not export at all) so Henderson Distributors Ltd. was competing in the export market with the larger group. The producers supplying Henderson Distributors Ltd. found that ropes and other fishing materials were no longer available to them,[43] and Henderson Distributors Ltd. experienced difficulty in maintaining supplies. The Company has not been able to establish other sources of supply and a Director alleges that suppliers held a meeting, and resolved not to supply Henderson Distributors Ltd.[44]

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42. Submission 35 and 36.
43. Submission 53.
44. Submission 53.

Section (iii)

PRICE DETERMINATION IN WELLINGTON

Wellington has a market structure different from any of the three other metropolitan centres. The port has been slower to evolve with one firm as the dominant supplier and the port is less involved in producing for export than Auckland, Lyttleton and Dunedin. Price at export has less effect upon trading conditions in Wellington than it does elsewhere. The settled nature of the port's mercantile operations partly explains why the Regional Committee of the Fishing Industry Advisory Council, the Wellington Branch of the New Zealand Wholesale Fish Merchants' Association Ltd. and the Wellington Branch of the Fish Retailers' Association are comparatively inactive. Firms are accustomed to and accept the established trading pattern, unlike their counterparts in Auckland and Christchurch, where the exercise of market power by one group excites collective reaction from another.

In Wellington most vessels are line producers which in total produce a smaller annual output than do the few motor trawlers. Line producers are in the main attached to the Fishermens' Co-op. Ltd. group of companies and the common membership of producers and retailers in these companies has resulted in a range of wholesale prices lower than other wholesalers charge. The Secretary of the Wellington District Retailers' Association has said that were it not for the twenty retailers with interests in Combined Fisheries Ltd. (the President of the Wellington Retailers was a Director of that company) its wholesale prices would have been up to fifty per cent higher.[45] Price collusion does not occur between wholesale

45. Evidence 2F/84.

concerns in Wellington, as it does in Dunedin and Auckland, because of the existence of the Fishermens' Co-op. Ltd., and the "outside" (Rangatira Pty. Ltd.) interest in the Jurie Group. The Fishermens' Co-op., group of companies (see Chapter Four) with its retail and producer members is not prepared to collude with any concern against either of those parties. Jurie Fisheries Ltd., with powerful backing, is establishing itself as a market leader which leaves remaining only Townsend and Paul Ltd. and New Zealand Fisheries Ltd. The second named produces intermittently, because of its problems with the Hautapu, which leaves Townesend and Paul Ltd. without an important wholesale concern to link with, should it desire to do so. This lack of collusion and the different types of vessels owned by each wholesaler also accounts for the different methods of wage determination between the main wholesale owners. Wellington wholesalers compete for retail outlets between themselves and are especially vigorous in their competition to supply outlets such as hospitals, hotels, shipping lines and restaurants.

Even though Wellington wholesalers appear to be in competition with each other, as would be expected since each controls roughly similar amounts of the port's total output and there are approximately thirty-three retailers taking 95%[46] of their requirements from the wholesalers, the wholesalers there are price setters rather than price takers. The Secretary of the Wellington District Fish Retailers' Association has said that even though "wholesale prices vary considerably..... they fix prices when and where they like." For example, when one product variant started to sell well as a result

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46. Submission 84.

of an advertising campaign by wholesale and retail interests and the retailers decision to reduce the mark up from 50% to 25%,[47] the wholesalers raised its price. Retailers were not prepared to absorb the increase because of their already reduced return. Individual wholesalers have occasionally taken advantage of the unorganised producers for, sometime in 1958, heavy catches of hake were brought in so one wholesaler reduced the producers' price on the grounds that he could not quit large stocks at the former price. Producers, being quantity maximisers, continued to bring that commodity in until it returned to its normal state of availability. When this occurred and the wholesaler had sold his accumulated stocks, he did not raise the price to its former level.[48]

Wellington wholesalers have never imposed limits on vessels, because they are not geared, as yet, to the export market and also because in the winter months they are unable to supply the entire requirements of the district's retailers. Retailers then buy from Nelson, Napier and on accasions Gisborne and the Christchurch auction floor.[49] When buying at auction the usual procedure is for them to quote a price to the auctioneers who buy for them.[50] Some product variants such as hake and moki wholesale more cheaply than, say, tarakihi, which is the mainstay of the port's trade, but retail practice is not to sell these low cost goods to consumers at a low price, it is to exact a 100% - 150% markup instead. Consumers will

47. Marine Department 84x - 6.
48. Former President of the Wellington Fisherman's Association.
49. Marine Department 84x - 3.
50. Marine Department 84x - 3.

not then substitute the cheap line for blue cod and tarakihi, which have higher wholesale prices. Retailers who are members of the Fishermens' Co-op., Ltd., or Combined Fisheries Ltd., when it was operating, do not buy solely from that group because it is not able to supply sufficient quantities and also because most of the output of the trawl produced lines comes from other companies.

The Wellington Branch of the New Zealand Wholesale Fish Merchants' Association Ltd., does not count Jurie Fisheries Ltd. or New Zealand Fisheries Ltd., among its members.[51] The second company is outside the group because of the attitude of a previous managing director to such organisations. The Jurie Company is in the interesting position of being outside the Association, but with full knowledge of its proceedings for James R. Jurie attends the Wellington meetings as a representative of Nelson Fisheries Ltd.[52]

Wholesalers in Wellington have recently (May 1963) imposed a collective non-price term upon retailers. At present, in order to obtain one tin of oysters, retailers are obliged to buy one hundred pounds, weight, of snapper, which is a slow moving product type in Wellington.[53]

Retailers are price takers in Wellington, but there have been two cases since 1960 when they exercised control over the outlets which wholesalers supply. The most important of these directives concerned Woolworths (N.Z.) Ltd., which intended to enter the pre-packaged frozen fish trade in Wellington in September 1960. Preliminary enquiries during 1959 and 1960 indicated that Townsend

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51. Submission 36.
52. Private source.
53. President, New Zealand Fish Retailers'Association.

and Paul Ltd.[54] was prepared to supply at customary wholesale prices,[55] and New Zealand Fisheries Ltd. was also interested. These two firms quoted the same price to Woolworths (N.Z.) Ltd.[56] which is the only known instance of price collusion among Wellington wholesalers. Supplies were obtained and Woolworths (N.Z.) Ltd. retailed frozen pre-packed fish at prices 10% lower than other retailers, with a mark-up of 17½%. Stocks had been built up and the consumer response was favourable while stocks lasted. The Wellington District Retailers Association threatened to boycott Townsend and Paul Ltd. if it continued to supply Woolworths (N.Z.) Ltd. which then turned to New Zealand Fisheries Ltd., which had also undergone a change of mind. The Fishermens' Co-op., Ltd. would not supply the chain store in the interests of its retail members. Neither Jurie Fisheries Ltd. nor Nelson Fisheries Ltd. would supply because of their connection with McKenzie's Ltd. through Rangatira Pty. Ltd. Transport costs prevented Woolworths (N.Z.) Ltd. from obtaining supplies from other centres so the company was forced out of the fresh fish retail trade in June 1961.

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54. Evidence $\frac{2F}{36}$
55. Evidence $\frac{2Y}{1}$
56. Trade Source.

Section (iv)

PRICE DETERMINATION IN CHRISTCHURCH

The Christchurch branch of the New Zealand Fish Retailers' Association is in active opposition to the practices of the wholesalers in their market. There are four wholesalers in that city and one of them, P. Feron and Son Ltd., has financial interests in over twenty vessels.[57] (In 1960 there were twenty three vessels registered in Lyttleton). The producers, in fact, borrow from this firm's trading bank, paying current rates of interest, with P. Feron and Son Ltd. accepting the responsibility of the guarantee. P. Feron and Son Ltd.'s interest in this number of vessels ensures that it receives a very high proportion of the wholesale fish trade in that market and is thus placed in a virtually unassailable position because alternative sources of supply are not open to retailers. Additional producer licenses are not available for Lyttleton.

Other wholesalers in Christchurch buy from P. Feron and Son Ltd. and pack mainly for export though such volume as they do sell domestically[58] is sold at prices which are determined by the price at P. Feron and Son Ltd.'s auction.[59] This does not make P. Feron and Son Ltd. the absolute price leader in the market although the company influences the level of price by its sales policy.

Wholesale distribution at Christchurch occurs by way of auction. P. Feron and Son Ltd. are auctioneers and the company works on a commission basis taking 10% of the proceeds[60](plus freight) from

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57. Marine Department $\frac{xY}{27}$
58. Submission 42.
59. President, New Zealand Fish Retailers' Federation.
60. Evidence $\frac{xY}{27}$.

the sale of producers' output. Where the producer is involved with P. Feron and Son Ltd., the company takes 20%[61] although it has not been established whether the additional sum is credited to P. Feron and Son Ltd.'s Profit and Loss statement or whether the company repays its bank, which is the principal creditor, on behalf of the producer. The auctioneers, who have substantial freezer capacity, perform the function of holding stocks of some product variants over from the November-January season to the off-season.[62] These stocks are sold at auction in the off-season which does not necessarily mean that they are sold to retailers. P. Feron and Son Ltd. has never been able to see the trade over the whole of the off-season partly because of the difficulties inherent in future price estimation, but also because of the lack of knowledge of exactly when the fish will run again.

This practice is criticised by the retailers in the local market, who alledge that P. Feron and Son Ltd.'s actions are a result of the auctioneer's policy to maintain prices at as high a level as possible. This is probably an accurate statement but P. Feron and Son Ltd. incur the cost and risks of storage during the off-season for which it requires remuneration which, combined with the generally low levels of output during winter, causes prices to rise seasonally at auction.

Two disequiliberating factors disturb the system of distribution in the South Island. One of these is the export market and the other is that the Timaru, Dunedin and Invercargill markets do not

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61. Evidence $\frac{xY}{27}$.

62. Submission 27.

operate by auction. For, when there is a "short auction" i.e. only a small quantity placed on the auction floor, Christchurch wholesale prices rise. If this occurs during bad weather, as it often does, the retailers have very little prospect of obtaining supplies from Lyttleton for some days. This provides suppliers from other centres with sufficient time to freight their catch to Christchurch to take advantage of the high prices there,[63] which causes harder trading conditions in the more southern sections of the wholesale market. When supplies start to flow from Lyttleton again producers from other ports reduce the amounts they place on the Christchurch auction. As the auction prices ease with the resumption of production in Lyttleton, transport costs act to reduce supplies from the other ports, and consequently price does not fall as far at auction as it would if the more southern producers continued to freight their output to Christchurch. The influence of the Timaru producing sector is more constant in this, though not in other respects, since some producers at that port send their output to Christchurch regardless of price. The unsettling impact of the actions of the Timaru distributors is of a longer term nature. A concern, the Timaru Fishing Co., Ltd.[64] which commenced business five years ago, packs substantial quantities of fish for export. With the growth of this concern, which now handles a little over two million pounds of fish per year, the supply of Timaru fish to Christchurch has been declining, with consequent increases in the Christchurch auction prices. Before releasing any supplies to retailers P. Feron and Son Ltd. (Timaru Branch) first obtains by

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63. Evidence $\frac{2F}{52}$ and $\frac{2Y}{70}$.

64. Submission 52.

telegram[65] the prices ruling for the day at auction. Usually about 1.30 p.m.[66] the auction price is communicated to the Timaru Fishing Co., Ltd. whose producers require at least what P. Feron and Son Ltd.'s suppliers receive.[67] If the price is better than the ruling export price, and supplies are available, the companies sell. In this situation wholesale prices are set in Christchurch without the entire output of Timaru going to auction, so prices are high, and the Timaru prices are set by the wholesalers at that port on the basis of the higher Christchurch prices. Further, the practice of the Timaru Fishing Co., Ltd. in supplying two wholesalers (other than P. Feron and Son Ltd.) in Christchurch, who pack almost entirely for export, places greater control over the domestic market in the hands of P. Feron and Son Ltd., which therefore does not have to face competition of any importance.

The second important factor entering into the determination of price in the Christchurch section of the market is the export price.[68] Australia is New Zealand's principal overseas market for the product and apart from Sanford Ltd., which exports to its own branches, most New Zealand concerns now export to Australian fish merchants. The Australian merchants' requirements for New Zealand fish depends upon the conditions in the Australian market, that is upon Australian prices and the availability of Australian supplies.[69] Fluctuations in the Australian market are to some extent reflected

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65. Evidence 2Y/21.
66. President, New Zealand Fish Retailers' Federation.
67. President, New Zealand Fish Retailers' Federation.
68. Submission 42.
69. Chairman, Fishing Industry Advisory Council.

in the Christchurch auction for the reasons stated below.

Mr. Newman, a Director of P. Feron and Son Ltd., has stated[70] that export parity is the floor price at auction. That is to say that, unless the auction price reaches the F.O.B. price Christchurch, retailers cannot obtain supplies. On occasions the auctioneer has rung Australia before the morning's auction.[71]

So a variety of factors enter into the determination of the Christchurch wholesale price, not the least of which is P. Feron and Son Ltd.'s inventory management policy. For, when bidding is slack during the season, the company buys in at less than export parity, but in the off season, should auction prices exceed export parity, the firm releases some of its stocks.

As described above, the mechanism is precisely what theory would indicate and may not be economically undesireable. But the situation towards which some criticism can be directed isthat competitors are not free to enter the industry at will and so compete with P. Feron and Son Ltd. Control of a large number of producers places that company in an almost completely monopsonistic position, given the practice of present licensing policy. Retailers are precluded by licensing from gaining access to other sources of supply which allows P. Feron and Son Ltd. to be partial monopolists as well. A second restriction on entry into the business of auctioneering may be the lack of funds to finance producing units and off season inventory accumulation, and one reason for this inability to obtain finance may be the difficulty of obtaining control over sources of supply.

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70. Evidence $\frac{2Y}{27}$.

71. Private source.

Retailers, confronted with this pricing procedure, have a price policy which appears to be a reaction from it. Wholesale prices oscillate widely from week to week,[72] according to the play of pressures on the auction floor. They fluctuate so widely that the President of the New Zealand Fish Retailers' Association has claimed that some small retail concerns are unable to buy supplies on some days because of the high prices.[73] There appears to be some competition among retailers in that some variation in prices is apparent between shops in the city but the extent to which retail firms compete probably depends upon their freezer capacity which is not great. Retailers dislike fluctuating retail prices[74] and observe a common price policy to recover costs and incur a profit. When the wholesale price of one product variant may vary by six pence per pound from week to week, retailers protect themselves against loss by charging a uniform price from week to week (though not necessarily from season to season), which is based on the highest of the wholesale prices of a previous period.[75] With their limited ccol space the retailers are unable to carry large stocks and so cannot buy during the season for the off-season. Retail prices do not fall below export parity price because of the auctioneer's export price parity policy.

The President of the New Zealand Fish Retailers' Association and a spokesman for the Christchurch retailers have stated that[76]

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72. Submission 42.
73. Evidence 2F/14 and 42.
74. President, New Zealand Fish Retailers' Association.
75. Chairman, Fishing Industry Advisory Council.
76. Evidence 2Y/52 and 2Y/14 and 42.

their group is dissatisfied with the auction price system with its export parity basis. One the current objects of the provincial group is to obtain a wholesale price equal to the export price.

The group has written, "We suggest that the price should be fixed in the same way as it is elsewhere, by co-operation between fishermen, wholesalers and retailers...with a variation for seasonal conditions, bearing in mind the existing export price."[77] Canterbury retailers are prepared to meet export parity for supplies but they react strongly against acting as a buffer between the export market and P. Feron and Son Ltd.'s inventory policy.

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77. Submission 42.

Section (v)

PRICE DETERMINATION IN DUNEDIN

Prices are determined in the Dunedin area by a method which differs again from that of the previous wholesale markets. The export market is an important factor in the Otago wholesale market and it exercises more of a continuous pressure than it does in Christchurch and, by virtue of the procedure observed in the determination of price in Dunedin, prices do not fluctuate to the same extent. At the given price, particularly in winter, there may be little produce supplied to retailers.

The four important wholesalers in the Otago area are:

National Mortgage and Agency Co., of N.Z., Ltd.

Skeggs Fisheries Ltd.

Otakau Fisheries Ltd.

P. Feron and Son Ltd. (Oamaru Branch)

National Mortgage has made advances still outstanding of approximately £40,000[78] to producers, and has some of its own sixteen vessels working for it off the West Coast of the South Island. Otakau Fisheries Ltd. has an interest in twenty-five vessels, someof which are oyster dredges.[79] Skeggs Fisheries Ltd. is a concern which has an interest in eight vessels through an associate company and it supplies, in the main, the cray-export market. The effect the rapid growth of the cray export trade has had on the operation of the wholesale market must be borne in mind in analysing the interactions occurring in Dunedin. In the 1950-51

78. Private source.
79. Private source.

period crayfish prices rose to very high levels on the American market and firms in the Otago and Southland areas found the export of cray-tails lucrative. Because most trawl and hand line producers also held cray production licenses there was a marked movement out of trawl and line methods of production and into cray production. To some extent this was encouraged by wholesalers, who reduced the price of blue cod to producers.[80] This shift in the composition of the industry's output created quite severe shortages of line and trawl produced variants in the wholesale and retail markets, particularly in winter when weather in the south is unpredictable.[81] This is the reason for the retailers' recommendations for the issue of single purpose producer licenses. The Licensing Authority, taking the longer term view of the inevitable switch back to line and trawl production, which would be brought on by the depletion of the crays, declined applications for licenses to supply line and trawl product variants.

The Regional Committee of the Fishing Industry Advisory Council, which is composed of producers, wholesalers and retailers representatives[82] met in this situation. After negotiation it was agreed that the following list of prices[83] be paid by

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80. Evidence 27, 52
81. Chairman, Fishing Industry Advisory Council.
82. Submission 71.
83. Submission 71.

retailers to wholesalers and by wholesalers to producers in the area:-

TABLE 26

FISH PRICES AS FROM 7TH MARCH 1962.[84]

	To Fishermen	To Trade
Lemon Soles	1/5	1/8½
Flounders	1/5	1/8½
Brill	1/4	1/7½
Groper	1/1	1/4½
Blue Cod	10d	1/2
Rigs and Elephant	10d	1/1
Ling	6d	8d
Tarakihi	4½d	7½d
Gurnard	3d	5d
Green Bone or Butterfish	7d	9½d
Kingfish	10d	1/2
Crays whole[85]	1/5	1/5

This method of determining price is apparently quite satisfactory to the retailers, since the President of the New Zealand Fish Retailers' Association has said, "....in Otago prices were fixed by negotiation..wholesalers there are most co-operative..."[86] Mention has been made of the under supply which periodically occurs in winter in Otago and also of the

84. It is trade practice to quote prices per pound.
85. This apparent anomaly is explained below.
86. Evidence 2F.
52

effect producers have who freight part of their output to Christchurch, when a suitable price differential occurs. When local supplies are scarce some retailers in the Dunedin area are forced on to the Christchurch auction floor[87] so causing a hardening in that market and raising the wholesale prices they pay. Meantime, local prices remain as per the above agreement but supplies are short. In this situation Dunedin retailers sell the Christchurch-bought supplies at the customary Dunedin prices.[88] Dunedin retailers are not always as price conscious as this for, when wholesalers reduced their blue cod price by sixpence per pound there was no change in retail prices.

The export market absorbs a smaller proportion of the Otago output than it does in Christchurch so the local market for trawl and line product variants is relatively more important to Otago wholesalers than it is to their Christchurch counterparts. The result is that export parity does not have the same impact in the Otago section of the market as it has in Christchurch. Exporters in Otago pay the wholesale price for their exports. The disparity between wholesalers' quote to overseas buyers and the wholesalers' price to retailers per the above agreement is due to the additional charges and packing involved in an F.O.B. quote.[89] The operation of the agreement and the export/wholesale price relationship would suggest that the quantity exported by the Otago section of the industry depends more directly upon the Australian price than it does in Christchurch. In Christchurch the

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87. Evidence $\frac{2Y}{52}$.
88. Evidence $\frac{2Y}{52}$.
89. Submission 71.

disparity between auction price (i.e., New Zealand buyers eagerness, given supply) and export parity (i.e., Australian conditions) is of importance.

Scarce supply is a relative term in Otago. While no commodities are being trade on the wholesale market and supplies are scarce the potential output of producers can be quite high but this may be of certain product variants which, though consumed elsewhere, are regarded as inferior by Dunedin consumers. Some wholesalers (e.g. Otakau Fisheries Ltd.)[90] then place vessels on limits. Other wholesalers (e.g. National Mortgage and Agency Co. Ltd.)[91] have tried to force retailers to take quantities of inferior fish before they will sell prime fish. Limits have been imposed on blue cod, a prime product, in this area and wholesalers attributed this to relaxation of Australian import controls and greater competition from other countries' exporters in the Australian market. In assessing this explanation of the limits, one does well to keep the wholesalers' preference for cray tails in mind. Mr. John Graham, an Oamaru producer, has not been placed on limits since 1958.[92]

Though Dunedin retailers appear reasonably contented with the method by which their wholesale prices are determined, Mr. McDonald, of the Dunedin Retailers Association, has stated that his association is dissatisfied with the Dunedin type of export parity.[93] The group is pressing for a wholesale price which is below the current F.O.B. price by more than the packing freight and insurance charges.

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90. Evidence 2C/71.
91. Private Source.
92. Evidence 2C/100
93. Evidence 2Y/70

Provincial retail associations have no uniform price policy vis a vis their various wholesalers. In summary, the discussion has indicated that the Auckland retail group favours price control, the Wellington retail group is tacitly content with the wholesale market, the Christchurch group advocates negotiation between the sections of the industry and the Dunedin group is dissatisfied with export parity as it operates there.

Section (vi)

PRICE DETERMINATION IN THE CRAY MARKET.

In the north, cray production is a small scale loperation, although a high proportion of the licensees at many smaller ports are cray producers. Crays are eagerly sought by consumers both in New Zealand and in the U.S.A. and both domestic and export prices have risen greatly since 1950. The effect of the cray price increases in Otago was analysed in the previous section and it should be mentioned that the reduction in the output of blue cod, which they caused there, has adversely affected the export of blue cod. Overfishing has severely depleted crayfish stocks and throughout New Zealand there can be said to be an under-supply of crays at current retail prices which are kept low by the pressure retailers exert on wholesalers. This rigidity in the price structure prevents wholesale prices from rising as rapidly as the intensity of consumer pressure might lead one to expect.

In Auckland the recognised wholesalers also distribute the bulk of the crays although there is evidence that some retailers short circuit the normal market channels in order to obtain supplies by buying crays, quote, "..Through the back door..."[94] from producers. In Wellington, the Fishermen's Co-op., Ltd. is the major wholesaler because many small scale cray producers are members of that company which wholesales crays at 2/11 per pound.[95]

Pressure from retailers, and their determination not to pay overseas prices for crays, has resulted in an agreement between

94. Submission 4.
95. Private Source.

wholesalers and retailers in the Otago area over prices and quantities. This explains the equality between wholesalers' prices to producers and retailers shown in the price list on p.[177] . It is the southern retail organisation's adamant stand over the less than export parity principle for crays which has introduced the price rigidity mentioned earlier. The agreement reached between the three sections of the industry in 1960 was that four Otago and Southland wholesalers[96] would pay producers 1/5d per pound for 95% of their output and that producers would accept 1/- per pound for the reamining 5% of their output. The 5% of the producers' output was to be wholesaled at 1/3 per pound and was the estimated requirement of the local market. Prior to this agreement the wholesale price was 1/8d to retailers. The 1960 agreement, which therefore can be judged successful as far as the retailers were concerned, was in force for one year. It was found that the retail market was absorbing approximately 14%[97] of the annual output at the agreed price, which meant that the wholesalers were selling at 1/3d goods bought for 1/5d. A fresh agreement was made in 1961 by which wholesalers collectively agreed to provide the local market with supplies (in proportion to their individual purchases from producers) at 1/5d with no change in price to producers.[98] It seems as though after an initial gain in 1960 the retailers are losing ground, for the wholesalers concerned now state that "We..are prepared to sell at 1/9d" which it seems may cover their F.O.B. cost[99] though it may not be their F.O.B. quote to overseas buyers.

96. Submission 72.
97. Submission 72.
98. Submission 72.
99. Submission 27.

Section (vii)

THE OYSTER MARKET.

The distribution of oysters is in the hands of the small group discussed in Chapter Four. Intense pressure from domestic consumers, finite stocks of oysters and a legally imposed limitation on the number of producers have placed the group in an extremely powerful market position which it has used against retailers. The Southland Retailers' Association has stated that the oyster wholesalers have become very aggressive[100] and it appears that this aggressiveness has increased since Barnes Oysters Ltd. opened a canning factory in 1956.[101] The Jones-Waddell, Barnes Oysters Ltd. and Johnston Bros., groups of concerns are all wholesalers and between them they have complete control over the source of supply (see Chapter Four) though not all have retail outlets. Each company is concerned with, or has connections with, the distribution of crays and round fish.

Retailers prefer oysters in shell, partly because they are then remunerated for opening. Since the suppliers have interests in opening and canning factories, retailers outside Southland find it very difficult to obtain oysters in the shell. All retailers in Southland face the same price from oyster wholesalers of £2. 4. 0. per sack,[102] and retailers in other provinces pay £2. 4. 0. plus freight. The writer takes this as evidence of collusion over price between the three suppliers rather than evidence of perfect competition. One producer sends approximately one third of one vessel's output to P. Feron and Son Ltd.'s Christchurch auction

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100. Private Source.
101. Evidence 2X/76.
102. President, New Zealand Fish Retailers' Federation.

where prices are high for such a limited supply and often raised higher by special occasion buyers. It has been suggested to the writer that this Christchurch auction price is considered, when determining wholesale prices, by the group which is in a position to dictate price, availability, and conditions of supply.[103]

Public demand for oysters slackens towards the end of the season. At that time the weather may improve so the daily output of producing units is high and may strain the capacity of the several opening and canning factories to handle the increased volume. The suppliers in this situation cannot release oysters in shell because the sale of their tinned oysters would decline so, Mr. Jones has said, they place their vessels on limits.[104]

The market power of the oyster wholesalers exceeds that of the oyster retailers who therefore acquiesce to the wholesalers' practices. Retailers allege that retail outlets, having connections with suppliers, receive better quality goods. If a retailer is dissatisfied with one wholesaler he cannot change his supplier. Mr. Jones has stated[105] that wholesalers refuse to supply retailers who ask for supplies from more than one merchant. It appears from this that the Jones-Waddell group, Johnston Bros., and Barnes Oysters Ltd., are in collusion.

The Jones-Waddell companies do not employ trade union members in their factories[106] although the Oyster Openers' Union has about sixty members. A dispute arose between the union and employers because some employers were employing casual workers and at this time the Secretary of the Union was opening for the Clyde Fish Shop,

103. Private source and evidence 2X/42.
104. Evidence 2X/71.
105. Evidence 2X/71.
106. Evidence 2X/76

Invercargill. Mr. Dixon, a figure among oyster wholesalers, asked the manager of the shop, "Is it advisable to employ him?" and the manager agreed that it was not.[107] Later Mr. Dixon admitted that it could have been implied that supplies would be cut off had the Secretary not been dismissed.[108] Mr. Robertshaw, President of the New Zealand Fish Retailers' Federation, has stated that Mr. Jones once threatened to cut his supplies off.[109] Short measure from the wholesalers is a common complaint by retailers. Mr. J.R. Jurie of Wellington stated that after complaining of short measure in 1961 his supply of oysters ceased.[110] P. Feron and Son Ltd., has had its supply of oysters from Mr. Jones' group terminated for the reason that one cray producer had a disagreement with the National Mortgage Agency Co., of New Zealand Ltd., which caused him to commence supplying P. Feron and Son Ltd. with crays.[111] Shortly after this, that company opened a buying point for crays in Bluff and Mr. Jones stated that P. Feron and Son Ltd., were offering a price higher than the cray price ruling at the port, so the company's supply of oysters was terminated.[112]

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107. Evidence 2X/76.
108. Evidence 2X/76.
109. Evidence 2X/52.
110. Evidence 2X/89.
111. Private source.
112. Evidence 2X/71.

CHAPTER SIX

THE ROLE OF GOVERNMENT

Section (i) Conditions to 1950

(ii) Licensing Policy since 1950

(iii) The Administration of Licensing Policy

(iv) Entry and Commercial Practices under Restrictive Licensing

(v) Output related to the number of Firms under Restrictive Licensing.

(vi) Other Government Organisations and Regulations.

CHAPTER SIX
THE ROLE OF GOVERNMENT

Section (i)

CONDITIONS TO 1950

During the 1931-1935 period the industry was severely affected by the depression in that producers were unable to sell their produce at remunerative prices. Freezer capacity was strained and on occasions accumulated stocks had to be destroyed, because after two or three months in the cool stores of those days the product, for reasons of quality, was not saleable. After 1932 fishermen, being quantity maximisers, continued to produce large volumes which placed them further out on their reducing average cost curves, but it appears that storage and handling charges helped keep retail prices above the levels which consumers were prepared to pay in those times of reduced consumer incomes.

In the same period the Australian industry was adversely affected;[1] and there was a pronounced reduction in the quantity placed on that market by New Zealand exporters, which greatly aggravated the situation of over supply in New Zealand.

The state of the New Zealand industry at that time can be described as unprofitable and depressed. A Sea Fisheries Investigation Committee was appointed by the Governor General in February 1937 which was faced with the task of making recommendations on an industry in that condition. Prior to this the then Chief Inspector of Fisheries, who had a background of the fisheries in the United Kingdom and who was concerned about the depletion of fish stocks occurring in the North Sea through overfishing, had

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1. The reasons for the conditions in the Australian trade are outside the scope of this enquiry.

aroused some public interest in the problem of the conservation of New Zealand fish stocks. The industry was agitated by the problems of oversupply and required a solution before the Special Investigation Committee had had the opportunity to report. The Government was threfore subjected to some pressure from two directions and as a temporary measure, effective until the Investigation Committee had reported, the Administration introduced a policy of the restricted licensing of producers. By so doing it answered public demand for conservation and, through preventing the entry of new producers, protected the position of existing firms who already had a problem of oversupply. This problem would, it was hoped, be relieved by the recommendations of the Special Investigation Committee which, as it happened, did not recommend the cessation of restrictive licensing.

Two attitudes, explained by the foregoing historical sequence, as to the purpose of licensing have been confused by the trade and by government since the inception of licensing. The conflict this has caused became most noticeable in the 1950's and is discussed below.

A number of significant economic effects, operating over a long period of time, have resulted from the introduction of restrictive licensing and most of these are discussed later but one belongs here. When restrictive licensing was introduced for the second reason (to combat oversupply) new firms were barred from entry. This meant that the number of producers then at each port came to be regarded as the norm. Since then the confusion of attitudes noted in the previous

paragraph, has caused the 1936-1937 number of producers to be treated by Government and the trade alike as the basic number of producers. This is why the 1961 number of producers did not greatly exceed the number producing in 1937.

When restrictive licensing appeared imminent there was an influx of applications for licenses to produce, mainly by people who did not wish to be precluded from the industry when restrictive licensing became effective. This introduced some elasticity into the system since licensed non-producers slowly sold their under-utilised vessels and licenses became available to more efficient operators.

The authority to license producers was provided by the Industrial Efficiency Act 1936 and by that Act the Bureau of Industry and the Marine Department were to jointly administer licensing policy. It appears that, as a result of the overproduction problem, the Bureau was to consider the economic consequences of a new entrant; and that in deference to the conservation issue, the Marine Department was to consider the effect of a new entrant upon fish stocks. The Marine Department was represented on the Bureau of Industry. Under the early system of producer licensing the Bureau advertised the application and considered the application in conjunction with the objections to it. There was provision for appeal to a Judge of the Supreme Court and the appellant, as well as those objecting, had the right to be heard.

World War II eased conditions in the industry. The oversupply problem disappeared, partly because of the reduction in output

caused by war commandeer schemes. Vessels which could be converted for war purposes were so used and many of the steel trawlers which were operating at the outbreak of the war were seconded by the Navy. These vessels were highly productive and the reduction in their output was sufficient to remove much of the excess supply. As another war measure, export regulations were introduced whereby fish became a prohibited export. It appears that these were invoked to ensure the nation of a supply of fish in the face of reduced output; for, with the recovery of the Australian market, the export of fish had again become profitable.

When World War II ended vessels were returned to owners, with compensation, several years older and in various states of repair. It was necessary to re-engine some, re-deck others and make structural repairs to yet others. It took a number of years for the effect of war to work itself out, firstly because reliable boat builders were difficult to obtain and secondly because of the effect on all producers of the import controls operating at that time. Applications to import new engines were made to the appropriate Government Department and routed through the Marine Department where refusal, if it occurred, was based upon the intimate knowledge of the officer responsible. These time lags, when added to slow deliveries from the United Kingdom, lengthened the re-adjustment period after the war although the process was probably completed by 1950.

Section (ii)

LICENSING POLICY SINCE 1950.

Slow changes in the nature of the equipment used became noticeable in the early 1950's. One of these changes, thought to be of some importance, was the steady drift from line into trawl production which resulted in a higher proportion of total output being produced by trawl.[2] Another factor, perhaps related to the rise in trawl production, was the gradual increase in the horse-power of producing units[3] which seems to have occurred in the period. This allowed vessels to stay out longer, trawl further, and operate on grounds they did not previously work. This factor alone has had an impact upon official thinking on licensing policy, as the Licensing Authority now finds it difficult to refuse a license on the basis of the need for conservation at one port when vessels from other ports are working in that vicinity. Official policy seems to have been to allow the individual producer to progress gradually. That is, though the producer required the consent of the Licensing Authority to replace an old vessel, permission was usually granted to replace it with a vessel of larger dimensions and greater horse-power. An element of inconsistency appears here, in that if additional licenses at a port had been refused on the basis of the need for conservation, the upgrading of size on replacement should

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2. The graph of annual output (graph 12) shows a marked reduction in output between 1950 and 1953 much of which is attributable to the 1951 waterfront dispute and the consequent loss of the Australian market.
3. See Section (V) of this Chapter.

also have been prohibited for the same reason. Yet this very upgrading of size is one of the factors which have enabled vessels to operate near other ports. Refrigeration has also had an impact upon the distances steamed from home ports.

These pressures built up during the early 1950's and produced the situation which existed in 1955. Other anomalies were also becoming apparent, in that some licenses were not being utilised at some ports while applications by others to produce there were being refused. Partly for this reason an annual review of licensing was instituted in 1955, a practice which lasted three years. During this period licensees whose annual production was valued between £50 - £100 were warned and those whose annual production was less than £50 in value had their licenses cancelled. It was thought that this would provide an incentive to small producers at the same time as it would create vacancies for prospective entrants. Another pressure which may have been behind this procedure was that of the local fishermens' associations which continuously agitate against the part time producers who, they claim, enter the trade when the weather is good, and compete with regular producers, and desert the industry when weather deteriorates. This pressure exists still and the comment is partly true although it may be viewed as an attempt to eliminate competition. Annual reviews of licenses took place for only three years because of the administrative problem they posed and also because of their political repercussions. Many of those deprived of their licenses complained that their means of livelihood was taken from them and were thus able to regain them. Licensing reviews together with a

change in the statistical definitions account for the decline in number of producers in the 1955-1957 period in ways which are impossible to separate. The cessation of licensing reviews left the problem of achieving conservation through control of the number of the vessels, some of which did not produce.

Marine Department thinking was still in favour of restrictive licensing in 1956. About this period foreign fishing vessels commenced operations close to New Zealand. Thinking changed in view of the fact that even if conservation were necessary there was little point in controlling numbers of New Zealand producers, if the numbers of producers from other countries operating close to New Zealand could not be controlled.

Time references are being kept vague throughout since the changes in official attitude can not be linked to a specific date. However, despite variation in the say, post 1956 situation licensing remained restrictive but a waiting list of applications was instituted and as a license became vacant at a particular port the name at the head of the list received the license. This procedure shows clearly that the official view was still that of a "normal" (1935?) number of units for each port. It then became a matter of some importance for potential producers to be placed well up on the list and there seems to have been some commercial jealousy over the places of firms on the waiting list for licenses.

The Marine Department was subjected to pressure from those who considered they had a "better" case than others who, it happened to be rumoured, were higher on the list which was never disclosed to the trade. No legislative authority was found for these lists and they were discontinued in 1958.

In 1958/59 the Fishing Industry Advisory Council examined the question of licensing policy and while it was doing so very few licenses were issued. In early 1960, after a change in Government and the Council's deliberations, the practice commenced of advising wholesale associations of the vessel size, horsepower, and method of production, which an applicant intended using. Only the producers' associations had been notified previously.

The Licensing Authority was faced with an increasingly complex task as the 1950's wore on. He was required by law to take all factors into consideration at the same time as he was required to consider the need for conservation. Conflicting issues became a greater embarrassment with each decision which was to be on the basis of grant or decline. Licenses were being declined on the bases of the need for conservation and consistency, as well as equity to other unsuccessful applications, in deference to what may be called pressure from the commercial groups. Rapid increases in annual output were recorded after 1954 which cast some doubt upon the need for conservation.

The turning point in official policy seemed to occur with the decision in an appeal against the Licensing Authority's decision to decline a license. The application was declined on the basis of the need for conservation, which in evidence was not proven and also on the basis of "the economic well-being of others in the industry."[4] It appears that, in the appeal, the Licensing Authority's case was argued purely on the need for conservation.

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4. Quote from the judgement.

The appeal was successful because of the lack of scientific evidence on the need for conservation. It seems that the factors developing in the 1950's resulted in a change in official policy after mid 1960, the date of that case. The record of the increases in annual output (see graph 12 p. 211) since 1954, the presence of foreign producers, the administrative difficulty of coming to a decision because of the existence of irreconcilable pressures and the conclusion of the Sea Fisheries Licensing Appeal Authority that there was no scientific basis for restrictive licensing have each contributed to an increase in the numbers of licenses granted since mid 1960. An authoritative conclusion on the need for conservation may have been the statement for which the Licensing Authority was waiting. The 1960 case provided this and thereby contributed to a change of policy.

Section (iii)

THE ADMINISTRATION OF LICENSING POLICY.

It appears that the existence of the Sea Fisheries Appeal Authority has had an influence in the practice of licensing policy in that the likelihood of success at appeal has been a factor in considering an application. Licensing Authorities have had a continuous function, they felt the need to be consistent as well as to consider the problems of the future when reviewing any particular application. Consequently, if applications at a particular port had been refused in the not too distant past, they felt obliged to refuse current applications on similar grounds (e.g., conservation). Looking to the future one would expect they would see the protests (to politicians) of previously declined applicants as well as a flood of new applications if a license, involving a reversal of past policy, were granted. It may be true that the granting of one license at a particular port would make little difference to the fish stocks but if one application was allowed other applicants would see little reason why theirs should not also be granted. It may also be that a number of successful applications could make a difference to fish stocks whereas only one would not. In this situation it seems that any application had little chance of success. Should an unsuccessful applicant feel he had an exceptionally good case he may exercise his right to go to appeal. The Licensing Authority may probably know that the applicant has a better case than some others in the port but to maintain an appearance of consistency and to avoid future

difficulties he still feels the need to decline the application at the same time as he knows an appeal may be successful. Such an appeal could well be successful and the effect of the appeal procedure has been that the Licensing Authority has remained consistent in his attitude as far as others in the trade are concerned, and so he has avoided a flush of fresh applications, and yet an applicant with a "good" case has been able to enter the industry on the basis of the Court's decision. The goodwill of the Marine Department with the trade has not been affected since criticism can be directed towards the almost anonymous Appeal Authority. Of the twelve decisions made in the Appeal Court since 1950, four have been successful.

It would appear that the legislation has placed the Licensing Authority in an unenviable position. In the past the Licensing Authority has sustained criticism from the trade for taking conservation of fish stocks into account, as he is required to do by law, yet there has never been a complete scientific estimation of the quantity of fish in New Zealand waters. That is to say, the need for conservation may not have existed for the past twenty-five years but the Licensing Authority, without certain knowledge, is required to review this factor when considering an application. A person in this position, with a career in the Public Service ahead of him and also with family responsibilities, is not likely to abuse this responsibility. That is to say he may not take the risk of having the blame for a depleted fishery laid at his feet. Consequently the same person, if he were the Licensing Authority, might feel reluctant to grant licenses indiscriminantly.

A continuously applied, if properly selected, policy will achieve its ends only if the situation in which the policy is applied remains unchanged over time. One of the problems of administering any policy consistently would therefore be changes in the underlying infra structure and changes caused by successive administrators with differing attitudes towards the interpretation of policy as laid down by the legislation. It has also been shown that the object of consistency has itself provided problems in the administration of licensing. If one adds to this the vesting of indefinitely wide areas of consideration in the Licensing Authority then, as one factor concerning a particular applicant attains greater importance than it did in the case of other applicants, evidence of consistency may be difficult to find. Notwithstanding this the Licensing Authority in fact may have been acting consistently in as much as he has been doing what was required of him, viz., considering such other matters as he deems germane to the application.

The foregoing is an abstract statement of the operation of restrictive licensing policy in the commercial fishery. In relating it to practice the writer has been unable to find any long period of years during which the basic situation has been static. The common characteristic of all periods since the inception of licensing policy has been that conditions within the trade have been undergoing continuous change. A rigidity in the form of unchanged legislation has forced the Licensing Authority to try and adapt the interpretation of the Act to suit the changed conditions of the period. This seems to have occurred contemporaneously with

changes in the individuals constituting the Licensing Authority. In the writer's view, an important reason for changes in the application of policy only when personnel alters has been the need for consistency. For, once a change in personnel occurs the new group appears to review the situation and since a change has occurred they are not being inconsistent if they alter the interpretation of the Act. If the previous Authority had done this during his term of office he would have been open to criticism on the basis of a lack of consistency. Difficulties of this nature become all the more real when the scattered geographic distribution of the centres of production is considered. When a review of national policy takes place the change in policy affects individual ports - the producers at which do not necessarily appreciate the need for an overall change. If practices established over time are reversed, producers' plans and the trading situation are altered. Consistent application of one interpretation of the Legislation has probably prevented Licensing Authorities from reviewing their administrative practice during their terms of office when changes in the underlying situation may have made this desirable. Variations in administrative procedures are evident upon changes in the Minister of Marine.

Post depression recovery was the background against which licensing policy initially operated. Disruption due to war might be termed the second phase of licensing policy, after which a period of technical change occurred at the same time as restrictive trade practices developed, which have their basis in restrictive licensing policy. This is the situation at the present time.

Reference to graph 13 p.212 shows that the number of licensed producers declined during the war and a major cause of this is thought to be the number of producers on active service who would therefore not apply for renewal of their licenses. The personnel constituting the Licensing Authority changed in late 1945, when the Marine Department took over the administration of licensing, and a steady increase in numbers of firms can be seen until 1950/51. However, a number of applications were declined in this period and it seems that the need for conservation was a primary reason for refusal. It should be noted that the number of licenses issued in this period did not bring the total number of licensed producers up to the 1935 level, indicating that the number of producers operating before licensing was introduced was being used as a guide by the Licensing Authorities. It is useful to recall that until 1956 the various Licensing Authorities had had personal experience of the circumstances in which licensing was introduced and this would account for the apparent policy on numbers as well as the apparent policy on size of vessels entering the industry. Mention has been made of the confusion of the two basic reasons for licensing (conservation and overproduction) and it seems that the backgrounds the Licensing Authorities had in the introduction of licensing partly accounts for the size of those productive units which were allowed to enter the industry up until 1956. Faced with the obligation to achieve conservation and the situation of reduced numbers during the war Licensing Authorities achieved a

compromise. They increased the number of producers but permitted the entry of only the smaller sized vessels whose productive potential was not high and was therefore not likely to contribute to a depletion of stocks. In effect, a generalised description of the licensing policy in the 1945-early-1950's period is that where a vacancy for a license existed at a port, based on the pre licensing number of producers, the smaller of two vessls applying was the more likely to obtain the license. This policy has had some impact upon the scale of producing operations and has helped perpetuate small scale, high unit cost, producers in the industry.

Such an idealised outline of post war licensing policy should be viewed with some circumspection mainly because it neglects the impact which personal contacts have had in the administration of licensing policy. As an official moves through the hierachy of the Marine Department he is shifted from port to port. He builds up an intimate contact with producers which is later maintained by the regular reports to Head Office on conditions at the various ports by the appropriate District Inspector of Fisheries. Administrators, when out of Wellington, visit producers as do producers visit the Marine Department when they are in Wellington and in the case of the larger producers this may occur not infrequently. When there is a particular matter for discussion the producers will often make a journey to Wellington for this express purpose.

The intimate personal knowledge the various Licensing Authorities have had seems to have been of considerable importance

in the administration of licensing. Licensing Authorities have been quite entitled, perhaps even required, to take such knowledge into account when considering applications for licenses by the legislative provision that they shall take into account such other matters as they deem necessary.

Section (iv)

ENTRY AND COMMERCIAL PRACTICES UNDER RESTRICTIVE LICENSING

When considering an application for a license to produce the Sea Fisheries Amendment Act 1945 requires the Licensing Authority to consider:-

(a) "The desirability in the public interest of conserving fish stocks

(b) The desirability in the public interest of re-establishing.... discharged servicemen...."

(c) Such other matters as in his opinion are relevant to the application"[5]

Rehabilitation has never been an important reason for entry in terms of numbers, since those on active service who were previously fishermen automatically received renewal of their license upon return to New Zealand. In the 1950's, though the ostensible reason for granting or declining an application for a license was conservation, the underlying reasons appear to have been fundamentally economic. Objections to the prospective licencee are invariably received from the producers' association if the applicant is not a crew member of a local vessel. If the applicant has had no experience or experience elsewhere he is unlikely to obtain the support of the local association of producers. Producers' associations invariably argue that depletion is occurring and that an additional producer will aggravate the situation. They explain increases in output by the observation that they work longer hours.

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5. Reprint of New Zealand Statutes 1908 - 1957 - Fisheries.

Their opposition to wholesalers obtaining additional licenses is often openly stated to be based on the undesirability of wholesaler owned producing units. These allegations may well be correct, but there is also the possibility that those with licenses are endeavouring to protect their closed group. Cases are on record when the support of the producers group has been altered to opposition when the applicant opened a wholesale establishment. The wholesale groups will usually support an application if they believe it to be from one of their members, or if one of their members is financing the applicant but if they believe the application is from a retailer or an independent producer they generally oppose it on the ostensible basis of the need for conservation. The Licensing Authority is required to take the recommendation of these groups into consideration. Government seems to be the only body with a genuine interest in conservation. This is how the confusion over the purpose of restrictive licensing mention on page 188 is continued. Producers try to use it to prevent further entrants and Government has tried to use it to achieve conservation. One cannot estimate how successful each party has been since both the number of producers and output have risen over the years. Government is inevitably drawn into a consideration of the economic interactions of the industry when an application is being considered. The decision involves the weighing of many factors, only one of which is conservation. In this weighing process the supply of the product to the local market is important. If retailers complain of short supplies it appears as though a license may be granted. If

producers claim a very large vessel will affect their livelihood, a license may be declined, though conservation does enter into such cases. If it appears that the applicant could not earn a living with the type of craft and method of production he contemplates using he may be declined a license.

In considering applications for licenses the Department has occasionally pointed out unsuitable features of vessel design. This type of advice appears to have been well received and appreciated by the trade. On occasions the Department has granted long extensions of time for the completion of vessels, frequently on account of boat building difficulties, and occasionally on the excuse of insufficient funds to purchase a vessel. Cases are on record where companies have been granted a number of licenses and received extensions of time to commence production because they have been unable to finance new vessels. This has acted to keep other producers out of the industry. In one case the Department conditioned the issue of a producer's license to a company with the stipulation that the share structure of the company be divided in a certain fashion and remain that way. Later the company was embarrassed for want of finance and only one class of its shareholders was in a position to contribute to a fresh issue but because of the condition on the license they were prevented from so doing. The Department suggested that a dividend be paid to attract fresh capital which was to remain in the stipulated ratio. If a company was in need of finance the payment of a dividend would impose some additional strain upon its resources. The company eventually went into liquidation - with the original

share structure.

At the risk of excessive simplification licensed producers can be divided into two groups, those who are limited companies and those who are not. As one might expect in this situation applicants who apply as individuals and not as companies have sometimes approached, often through solicitors, their members of Parliament. One cannot say whether this method has been used more successfully than others because one cannot determine what the outcome would have been if this approach had not been made. On the other hand, given the very close liaison between the Licensing Authority and the Minister of Marine one would not expect the outcome or result of this approach to be any different, since the decision rests with the Licensing Authority whose recommendation is not customarily reversed by the Minister. Individuals who apply direct to the Department receive the immediate attention of the Licensing Authority.

Company organized producers adopt a quite different approach from individual producers. One man may hold only one license but for some reason limited companies have been permitted to hold licenses for a number of vessels. An individual producer once he has received a license does not therefore apply for another. A company on the other hand does, and being continuing organisations, it appears almost as if the larger of them pursue a policy of continually having an application for a license under consideration. In recent years these firms appear to have been looking further afield than their own ports. When a vacancy caused by say, the

retirement of one producer at a smaller port occurs they are quite likely to apply for the vacant license. It is not implied that their applications are likely to be any more successful than an individual's. What is implied is that by the sheer number of their applications such companies have a good chance of obtaining licenses, when the Licensing Authority is disposed to grant one at given ports, and so the steady increase in their productive potential is maintained. Reasons for applying for licenses are more veiled in the case of companies than in the case of individuals. Individuals want merely to earn a livelihood. Companies want to reduce, or protect themselves from, competition as well, and since it has long been accepted throughout the trade and government that the number of licenses at a port should vary but very slowly, such companies by having applications continually pending may prevent rivals from entering their area.

Another method by which companies, very often wholesale companies, have increased their control over sources of supply has been by a policy of buying vessels as they come on the market. The accepted practice has been for the Licensing Authority to issue a new license to the buyer if the seller is prepared to cancel the license he previously held. This applied only when buyer and seller were at the same port, in which case no change occurred in the number of vessels at the port. Little change in the output of a port results from this practice although it has caused marked changes in the concentration of ownership and the control over supply at some ports. It is illegal to trade in or to sell licenses[6]

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6. The writer has not traced the reasons for this clause in the legislation.

and licenses have been cancelled when such trafficking has taken place. However, the practice of the automatic reissue of the seller's license to the new owner when a vessel is sold often has the effect of the sale of a license since the value of the license has been reflected in the amount of the consideration for the vessel. When vessels are in bad repair companies are often prepared to buy them, subject to reissue of license, at prices which are in excess of the value of the vessel. It is a common and accepted practice for the buyer and seller to write to the Marine Department requesting the cancellation and reissue of a license upon sale. Companies commonly run such vessels for a season, to avoid a charge of transferring a license and then, having secured the license, replace the old with a larger vessel.

A reliable estimate of the effect restrictive licensing policy has had upon the number of firms is not possible. No records are available, prior to 1960, of either the number of applications or the decision in each case. "A good number" of applicants apply informally through the District Inspector of Fisheries at the port concerned but it has been the practice to dissuade these enquirers from lodging a formal application. Others apply informally, to the Head Office of the Marine Department, who are dealt with informally i.e. by letter. It appears as though more licenses were refused than were granted in the 1950's.

A conservative estimate of the effect restrictive licensing policy has had upon the entry of producing units is provided by the "Waiting List for Licenses" which operated between mid 1955 and mid 1958.

Table 27 sets out the numbers involved for each year.

TABLE 27

NUMBER OF FRESH APPLICATIONS PLACED IN THE WAITING LIST COMPARED WITH THE CHANGES ON THE NUMBER OF PRODUCERS.

	Total	2nd half 1955	1956	1957	1st half 1958
No. Placed on Waiting List	201	29	43	82	47
Changes in Number of Producers	-162*	-165*	+5	+52	-54*

* Whole year

Table 27 greatly understates the number of prospective producers declined entry because it is concerned only with those who were persistent enough to make formal application and were not deterred by the Department's informal notifications that licenses would probably not be granted. It will be recalled that licenses were reviewed annually during the currency of the waiting list.

Section (v)

OUTPUT RELATED TO THE NUMBER OF FIRMS UNDER RESTRICTIVE LICENSING

This section surveys the changes in output which have occurred during much of the period when the government's policy of restrictive licensing has been effective. Graphs 12 and 13 indicate the changes in total production and the number of producers and together, they show that although the total numbers of producers in 1960 was only 2% greater than the number licensed in 1950, total production increased by 23%[7] during the period. A pronounced variation in the number of producers occurred during the decade for reasons which were discussed earlier in this Chapter.

A complete explanation of the changes in total production would involve a port by port analysis of the forty-eight ports operating in 1961. Such a detailed analysis of numbers of producing units and annual output has not been carried out, and if it had, it could be imprecise because figures are not available on all the seasonal variations and other factors affecting output. The production functions presented in Chapter Three may not be an accurate method of quantifying the changes in total output. Even if the necessary calculations were made for each vessel and the results aggregated it appears as though the constants and indices might shift over time, if the three years' equations tested for Timaru are any guide. Notwithstanding the possibility of annual variation of this nature, it is felt that the production functions applied to the 110 vessels

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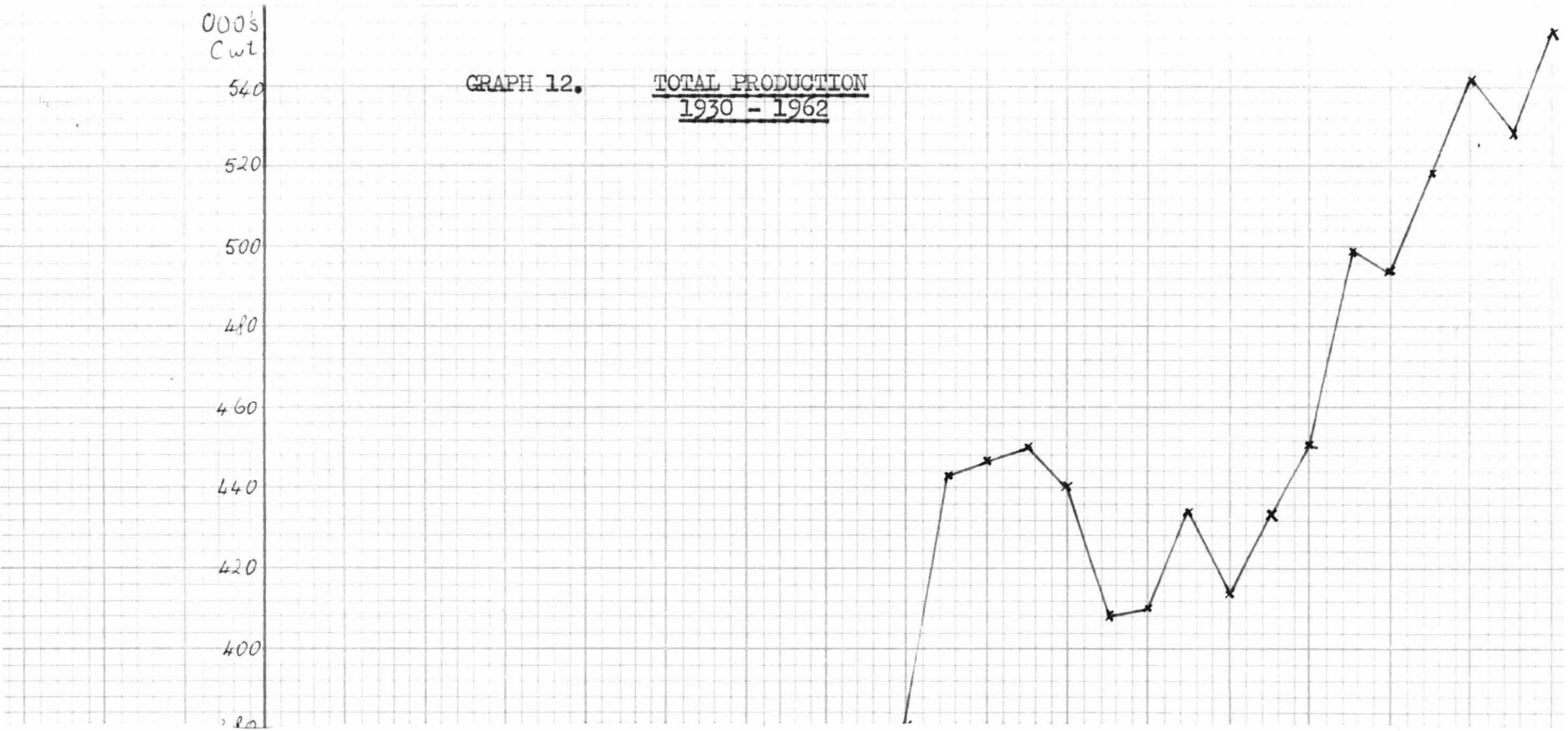
7. The figure of 1½% p.a. in Chapter Two p. 5 relates to a different period.

GRAPH 12. TOTAL PRODUCTION
1930 - 1962



GRAPH 13.

NUMBER OF LICENSED PRODUCERS

in Chapter Three go part of the way toward explaining the increase in output which has been accompanied by a very small net change in the number of firms in the 1950's. The functions showed that the condition of increasing returns to scale applied to the individual producing unit. Inasmuch as the indices and constants of those functions apply to other years, the relationships they describe between inputs account for that part of the increase in output attributable to firms which have varied their input mix over time by increasing the quantities of the factors they employ.

A detailed analysis of the supply of the product at Timaru was conducted in Chapter Two (pp. 9 to 19) and it was shown how economic conditions induced marked increases in annual output at that port. Economic forces promoted the increases in yearly production and they operated by changing the technical factors which determine output. Some of these technical conditions are expressed in the production functions and the series of the inputs at that port are presented below.

Graph 14 shows total output at Timaru, which is being used as a case study of the effect of restrictive licensing upon output. Output rose noticeably in Timaru between 1950 and 1959,[8] as it did in the whole of New Zealand, while the number of producing units declined. There was only a small increase in the total number of producing units licensed throughout New Zealand in the same period.

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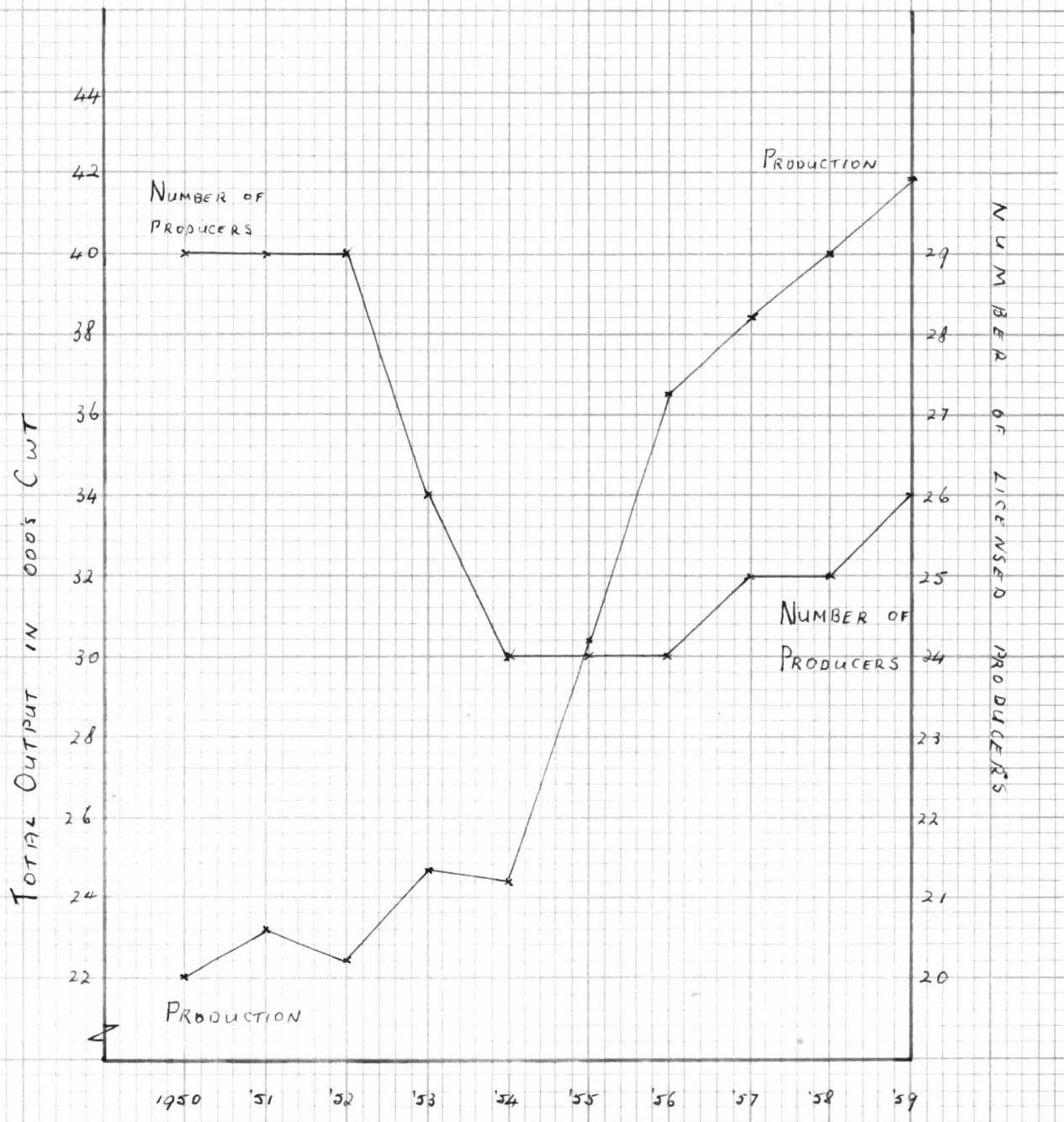
8. Output did not rise as rapidly in 1960 and 1961 as it did in the 1950-1959 period.

GRAPH 14

TIMARU, TOTAL PRODUCTION AND NUMBER OF LICENSED PRODUCERS 1950-1959



The exponent of the number in crew was not reliable for the Cobb Douglas function so it is impossible to assess the effect of the changes which have occurred in this variable even if it were assumed that its exponent does not change from year to year. However, Table 28 shows that the average number of men per vessel has undergone a distinct increase.

TABLE 28

AVERAGE NUMBER OF MEN PER VESSEL
TIMARU 1950 - 1959

Year	Number	Year	Number
1950	1.97	1955	2.20
1951	2.07	1956	2.08
1952	1.90	1957	2.28
1953	2.11	1958	2.36
1954	2.13	1959	2.42

Standard deviations are not presented in this section because some of the data is skewed and although the data relating to crew is less skewed than some of that which follows, a frequency distribution relating to crew size is presented rather than standard deviations for the sake of consistency. See Table 29.

TABLE 29[9]

FREQUENCY DISTRIBUTION OF NUMBER OF VESSELS
AT TIMARU WITH VARIOUS SIZED CREWS

	1 man	2 men	3 men	4 men
1950	4	22	3	
1951	2	23	4	
1952	6	20	3	
1953	3	17	6	
1954	4	13	7	
1955	2	15	7	
1956	4	14	6	
1957	2	14	9	
1958	3	12	8	2
1959	2	13	9	2

9. Any discrepancy between the totals of the tables and the Marine Department Annual Report is due to the figures of the latter being for the year ended 31st December.

The indices of the days, size and horsepower inputs appeared more reliable than the exponent of crew in the 110 vessel Cobb Douglas production function. Part of the explanation of the increase in total production can be found in the changes that have occurred in those inputs.

A substantial and consistent increase in the average horsepower per vessel has taken place at Timaru each year. This is shown in Table 30.

TABLE 30

TRENDS IN HORSEPOWER AND NUMBER OF LICENSED PRODUCERS. TIMARU 1950 - 1959.

Year	Total H.P. of all vessels	Number of licensed Producers	Average H.P.
1950	1946	29	67.1
1951	1843	29	65.3
1952	2229	29	76.9
1953	2252	26	85.6
1954	2200	24	91.7
1955	2295	24	95.6
1956	2508	24	104.5
1957	2638	25	105.5
1958	2718	25	108.7
1959	2985	26	114.8

Some discussion of the place of a vessel's horsepower in determining its output was made in Chapter Four. For the reasons stated there, the increase in average horsepower shown in Table 30 is thought to be a factor in explaining the increases in output at Timaru. Table 31 contains a horsepower frequency

distribution by way of a substitute for standard deviations.

TABLE 31

FREQUENCY DISTRIBUTION OF NUMBER OF VESSELS OF VARIOUS HORSEPOWER AT TIMARU 1950 - 1959

	Less than 40 H.P.	41-80 H.P.	81-120 H.P.	121-160 H.P.	161 H.P.+
1950	11	8	8	1	1
1951	9	11	7	-	2
1952	6	11	9	1	2
1953	3	9	10	1	3
1954	3	6	11	1	3
1955	3	5	12	1	3
1956	1	4	14	1	4
1957	-	5	13	3	4
1958	1	6	11	3	4
1959	1	3	14	3	5

Perhaps of similar importance to the increase in average horsepower at the port has been the change in total horsepower. To emphasise the magnitude of the change, Table 30 sets out total horsepower as well as the number of licensed producers which is seen to decline.

The production functions relating to the 110 vessel sample gave a moderately reliable indication of the part played by the index of size in determining a vessel's annual output. This index was constructed by multiplying length, breadth, draft for each vessel. The length component imparted the greatest weight of any one of these dimensions and as length increases so does the index of size. In practice an increase in length will often involve some increase in the other two dimensions which would contribute to a greater increase in the index of size. A series

of the average length per vessel at Timaru is presented, as a guide to the trend in the index of size, for the years under review in Table 32.

TABLE 32

AVERAGE LENGTH OF VESSELS OPERATING FROM TIMARU 1950 - 1959

Year	Length in Feet	Year	Length in Feet
1950	40.33	1955	42.10
1951	40.95	1956	42.60
1952	41.70	1957	42.99
1953	41.70	1958	43.05
1954	42.13	1959	43.34

The frequency distribution shown in Table 33 is of interest not only as an indication of skewness. Table 33 more so than any other, shows how the composition of the producing units has changed at the port, and to some extent it shows how the fleet has been modernised. Crew, horsepower and days absent from port can be varied quite readily by the entrepreneur. Variation in length indicates that the entrepreneur has invested in another plant. The trend has been to invest in larger plant as both changes in average length of vessel (see Table 32) and the shifts into higher class intervals as Table 33 suggests

TABLE 33 FREQUENCY DISTRIBUTION OF NUMBER OF VESSELS OF DIFFERENT LENGTHS. TIMARU 1950 - 1959.

	Less than 35'	35-40'	41-45'	46-50'	51-55'
1950	3	13	8	3	2
1951	3	12	9	3	2
1952	-	14	10	3	2
1953	-	13	8	3	2
1954	1	10	7	3	3
1955*	1	9	7	2	4
1956	-	11	6	3	4
1957	-	12	5	3	5
1958	1	10	6	3	5
1959	1	9	8	3	5

* Length of one vessel not available for 1955.

The input which remains to be analysed, before bringing the effect of changes in all inputs together, is number of days absent from port. The production function for the large sample showed that the exponent of the number of days was reliable in the Cobb Douglas form. Table 34 shows that the average number of landings per vessel has undergone a distinct increase.[10]

TABLE 34

AVERAGE ANNUAL NUMBER OF LANDINGS PER VESSEL LICENSED AT TIMARU 1950 - 1959

Year	No. of Landings	Year	No. of Landings
1950	120.4		
1951	127.6	1955	162.3
1952	111.4	1956	137.6
1953	138.6	1957	142.4
1954	136.7	1958	152.0*

*Number of days absent from port for the twenty-two vessels in the 1959 Production Functions.

The frequency distribution for Table 34 is scheduled in Table 35.

TABLE 35

FREQUENCY DISTRIBUTION OF VESSELS WITH GIVEN NUMBERS OF LANDINGS. TIMARU 1950-1959

Year	Vessels with this number of landings per year				
	Less than 50	51-100	101-150	151-200	200+
1950	4	6	7	12	-
1951*	3	5	8	10	1
1952	7	4	10	8	-
1953	3	3	4	15	1
1954*	2	2	5	13	-
1955	1	3	5	14	1
1956	-	2	5	13	4
1957	-	5	9	11	-
1958	2	4	9	7	3
1959*	1	2	7	7	5

*Number of landings not available for two vessels in 1951. Landings for two vessels in 1954 not available. in 1959 figures relate to days absent from port for the twenty-two vessels used in the production function for that year.

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10. Number of landings is a close approximation to days spent fishing for the 1950-1959 period because nearly all vessels at Timaru came back to port each night. A change in the method of compilation of statistics occurred in 1959 since which year days absent from port have been more readily available.

In the writer's view, because of the possibility of shifts in the entire production surface and variation in the pattern of demand thought to have occurred for the commodities produced at Timaru, there is danger in trying to quantify the effect of the changes in input mix shown above with the aid of the production functions of Chapter Three. Although, the statistical significance of those functions makes a qualitative assessment of the changes valid. It will be recalled how Chapter Three showed that production occurred under conditions of increasing returns to scale at a rate in the order of a 2%-3% increase in output for a 1% increase in inputs for the years tested. Between 1950 and 1959 noticeable increases have occurred in the average length, horsepower, crew and days absent from port at Timaru. It would appear that these increases, combined with the operation of increasing returns to scale, have more than offset the reduction in the number of firms and contributed to the 87% increase in annual production which occurred at Timaru in the 1950 to 1959 period of licensing.

It would be unsound statistical technique to generalise for the whole of New Zealand on the basis of the partial explanation of the increase in annual production disclosed by the Timaru case study. National series of all the inputs discussed above have never been prepared and even a sample based nation wide analysis is not possible. However, figures are available for total numbers employed but these have not varied greatly from about 2,400 between 1949 and 1961 and little can be inferred from them.

Inasmuch as other ports conform to the Timaru pattern of variation of input mix, this will go some considerable distance in explaining the increase in output evident in Graph 12. The Licensing Authority, as Graph 13 shows, has allowed some new entrants and this also has a place in explaining the increase in output despite the overall constraint he has placed on the number of firms. To this must be added the effect of innovation. Technical change has had an impact which it is impossible to quantify, were a method available, because no series exist. Nor is it possible to place an exact date on which the new techniques began to effect total production although it appears as though the years 1949/50 and 1955/56 may have been significant. Three changes in the method of production have occurred which have contributed to rising output in the face of a stable number of firms, (1950-1960). These are the shift from line and seine to trawl production, the introduction of refrigerated holds and the introduction of sonar sounding devices.

A gradual change from line and seine to trawl production has been noticeable for a number of years and line and seine production has declined both absolutely and proportionately in relation to total production. Between 1949 and 1961 line and seine production fell from 169,224 cwt. to 110,843 cwt., which represents a decline from 38% to 21% of total production. In the same period trawl production rose from 55% to 72% of total output. A complex of factors, not analysed in detail, such as the rise in cray production, possible shifts in consumer tastes, fewer independent producers and the cost of equipment, may explain this trend.

Refrigerated holds, it appears, may have been on the increase in the 1950/51 period and most of the larger trawlers are thought to have installed freezers by, say, 1958. Refrigeration reduced the deterioration problem. By reducing the necessity of daily journeys back to port many vessels, formerly day boats, now stay out longer, go further afield, and reduce unproductive steaming time. Of course many vessels, even with freezers, still make daily trips to the grounds and many still use the less effective icing down method of forestalling deterioration. Echo-sounding equipment which has become common since, say, 1955 has enabled skippers to work in fog when land marks cannot be used to pinpoint grounds. It has also helped skippers, who use it as an aid to keep the net down, learn more of the grounds they work.

Restrictive licensing practice by government, it may be concluded, has not operated to reduce or stabilize total production. The similarity in number of producers in 1950-1960 brought about by the practice of licensing policy has been offset by changes in the composition of producers constituting the total, upward trends in the inputs they have employed and innovation. Each of these has contributed to the annual increase in production shown in Graph 12.

Section (vi)

OTHER GOVERNMENT ORGANISATIONS AND REGULATIONS

At present the Marine Department is required to make an annual survey of certain classes of fishing vessels and to enforce manning regulations in the interest of the safety of lives at sea. These are primarily non-economic objectives. It also enforces export regulations which have economic implications but which, as they are administered, involve non-economic value judgements and consequently fall short of successful economic intervention. It is also responsible for achieving the conservation of fish stocks. Each of these, whether based upon economic considerations or not has economic implications and is discussed below.

A) Survey, Manning and Landing Regulations.

The requirements of annual survey are that vessels in excess of sixty feet in length should undergo annual government inspection and that those under sixty feet are exempt from the survey regulations. The manning requirements are considerably more complex than this and the number of men a fishing vessel must carry varies with its horsepower, tonnage and the distance off shore it steams. Vessels less than sixty feet in length are exempt from the manning requirements.

It is the view of those in the trade and Government that the fishing fleet has been built up of vessels of less than sixty feet in length to avoid these requirements.[11] No series of boat lengths over the years is available but it appears, from an

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11. The Fishing Industry Committee 1962 concurred with this view, see its report, p. 25.

inspection of the primary data, that there are comparatively few vessels in excess of sixty feet. Entrepreneurs have thereby avoided the maintenance cost of keeping vessels up to the high standards of the survey requirements. High labour cost would appear to be part of the reason why owners prefer to avoid those classes of vessels subject to the manning scale. Large vessels are required to carry certificated skippers and engineers and the number of men with these qualifications in addition to fishing experience is small. They therefore command a high price. The alternative is for a boat owner to take a fisherman without the certificates on, in addition to seamen with the necessary qualifications. This also is expensive and is thought to have been a factor, along with the survey requirements, in keeping vessels below sixty feet since such units are exempt from each regulation. The economic effect of these regulations has been a preference for investment in small scale plant with high unit costs of production.

Other reasons may also contribute to this pattern, one was discussed in connection with licensing policy on page 188 but the others stem from import regulations and the availability of finance. At times import regulations have not encouraged the purchase of fishing vessels from overseas. The cost of constructing such vessels appears to be higher in New Zealand than elsewhere and a lack of finance accentuated by high construction costs may have forced New Zealand producers to invest in smaller vessels.

In brief, the landing regulations require that output be landed at the port of registry only. Their original purpose was to ensure that vessels would not work too far from their home port - so the administration of licensing policy would be eased - in that vessels would not overlap and cause depletion of fishing grounds closer to other ports. A secondary reason for their introduction was to promote stability into the market at each port by preventing larger vessels from flooding a localised market. The present effect of the regulation is that it causes vessels working grounds far from their home ports to return to them thereby increasing unproductive steaming time. Wholesaler boat owners, whilst not completely in favour of the regulation point out that it enables them to control the disposal of their vessels' output more easily by ensuring that the full quantity is accounted for and goes through their own channels.

Units from some ports operate close to their markets but the landing regulations force them to return to their home port and freight their output through. As a consequence, their costs of distribution are raised, as it is by the prohibition of the transfer of catch between vessels at sea.

B) Export regulations.

The product is a prohibited export under the Customs Export Regulations 1953, which confirmed, as far as this industry was concerned, practices which developed as war time measures. Exporting does occur, however, and the effect of the regulations is that a license is required from the Customs Department which acts

on the recommendation of the Marine Department.

Applications for permission to export the product show the number and description of packages and the quantity, value and type of product as well as the destination and the name of the exporter. This application is required to be lodged one week before the goods are shipped.

The criterion applied as to whether permission to export should be granted or declined is non-economic. It is based upon the requirement that the local market should be "satisfied" before export takes place. Reasons seemed to have changed for this attitude but they stemmed from the report of the Sea Fisheries Investigation Committee 1937, which traced much of the industry's difficulties of over production to the failure of the Australian market to take continued high quantities. The Committee therefore considered that the industry was more soundly based upon production for the domestic market rather than production for export. War time export regulations were outlined in Section (i). After the war the view that the export market held little long term prospects because the rising New Zealand population would eventually take up the entire output became common. The present attitude among administrators appears to be that the New Zealand consumer has a prior right to the output of the industry. That is to say the official view is "....export is confined to that which is surplus to New Zealand requirements..."[12]

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12. Marine Department's submission to the Fishing Industry Committee, 1962.

The Marine Department administers the regulations and protects the local market interests by requiring all exporters to make weekly returns of their freezer inventories. Provided all merchants in the area are holding sufficient stocks to meet the immediate needs of the local market, a particular application for a license to export will be granted. It appears as though the needs of the local market is an estimate known to both the trade and Government which includes provision for periods of reduced output in the event of bad weather. A variation of this procedure occurs in Canterbury where the Regional Committee of the Fishing Industry Advisory Council must also approve of the application to export. In Otago there is a total ban on exports during the winter months, unless the Regional Committee approves, because "shortages" are common at that time in that area.

It is not possible to judge the extent to which this regulation has retarded the export of the product. The Marine Department has not refused many applications but this is not to say that the Regional Committees in the South Island have not. In view of the retail representation on the Regional Committee it is possible that some applications have not been approved because it is the retail section which is adversely affected by the export trade as was shown in Chapter Five.

The Marine Department has not found the regulations easy to administer and it appears that the difficulty stems from the practice of determining the quantity necessary for the local market without reference to the price which the local market should pay. Retailers complain of "shortages" at the same time

as local stock requirements are being met by wholesale-exporters, but wholesalers are not prepared to release them because of their export parity price policy outlined in the previous Chapter.

"Requirements of the local market" has been liberally interpreted by the Marine Department in that if there is a "shortage" in, say, Wellington, Auckland exporters may be asked to offer their stock to Wellington merchants. It seems to have been accepted that the export price plus transport cost should be the purchase price in these circumstances. Periods during which "shortages" have developed in one section of the market have on occasions involved the Marine Department as a "passive partner" in business operations. Cases are on record where one firm has suggested to the Department that since it, at the Department's request, is meeting domestic requirements from its export stocks, competing firms should be declined permission to export.

There is a second part of the export regulations, which again has had an unassessable effect, relating to the type of fish exported. The regulations require that "rough" fish and "prime" fish should be exported in equal quantities. That is to say fish readily saleable at home must be exported with similar quantities of fish which is less readily saleable at home. The intention is to stimulate the production of other product variants but the efficacy of the regulation depends upon the extent to which overseas merchants are discouraged from taking prime fish by the presence of rough fish. If they are not discouraged then the regulation is economically desirable in that it creates a market for hitherto

non-produced variants. On the other hand it may be that the development of markets for additional product variants is more effectively left to the individual exporters who, it appears, are sensitive to a need for diversification.

Following the recommendation of the 1956 Caucus Committee, the Government set up the Fishing Industry Advisory Council, a body responsible to the Minister of Marine which acts in an advisory capacity. Close liaison is maintained between the Council and the Marine Department although the organisations are quite distinct. The Chairman of the Council is appointed by Government and the present Chairman, who has held the office since 1957, resigned as Chief Inspector of Fisheries to take the position. The Council has no powers, or written constituion, the authority to act coming from a letter in broad terms to the Chairman from the Minister of Marine. Three other members representing the three sections of the industry constitute the Council. The accepted view in the trade appears to be that while the Council may not have achieved any specific objectives because of its constitutional lack of authority, it has served as a useful body for the airing of opposed views. The Chairman regards this as its greatest contribution to the industry. His greatest difficulty is to reconcile entrenched and opposed retail and wholesale interests. At the national level the Council has examined the problem of licensing policy and is at present examining export and crayfish regulations. It is also involved in matters of considerable detail such as, for example, the price, quality and terms of delivery of wire rope supplied by the New

Zealand manufacturer. One point of interest, concerning the Council's activities, is that it has not become involved to any great extent applications for licenses.

Regional Committees have been set up by the Council in various areas. Otago and Canterbury have the most active Regional Committees and it may not be a coincidence that there is disagreement between the interests in those ports over export policy. In particular there is disagreement there over the quantities of the product to be supplied to the local market. In Auckland the friction between retailers and wholesalers is due more to price than quantity. In Wellington there is little disagreement between the groups, partly because the export market is less important to the trade there than it is elsewhere. There is no Regional Committee in Wellington and the Committee in Auckland is less active than those in the South Island. Trading matters are discussed at the Regional Committee and notice was made in Chapter Five of the part the Otago Regional Committee plays in price determination.

The Fishing Industry Advisory Council is an attempt by the Government to bring the interested groups into harmony. It may not have been entirely successful in some areas where powerful wholesalers have not been particularly co-operative and its success in other areas may be limited in that it provides members with information in respect of other members which may tend to foster collusion rather than competition.

A number of Government Departments have had a pervasive influence on the structure of the industry. Regulations affecting

the industry are administered by the Department of Industries and Commerce, including its Trade Practices Division, H.M. Customs, the Transport Department, the New Zealand Railways and the Department of Health. Of these, the transport regulations may have been more deleterious than others since they prevent producers and wholesalers from transporting their produce themselves from one port to another market. The impact of the Department of Industries and Commerce has been negligible since the Bureau of Industry went out of existence. With H.M. Customs, that Department has probably had an effect on the industry by way of import controls and it has done some descriptive work on the industry, primarily by way of an examination of the industry's export potential.

The role of government has been narrowly conceived in this Chapter and the treatment has been confined to routine functions of the Marine Department. Emphasis has been directed towards the routine activities for two reasons. Firstly, because "random" interventions are not continuously recorded and secondly, the recorded information on routine matters facilitates a qualitative assessment of the impact of Fishery Regulations. Assessment is not possible in the case of nonrecurring actions, which are made on the basis of individual merit rather than in the light of continuing policy.

Government's most important contact with the industry is via the Fisheries Section of the Marine Department. The function of Fisheries Section is to undertake marine research and to regulate fishing effort. Previous sections have shown how the Department

has been drawn into the economic affairs of the industry and it would seem that the deeper it has become embroiled in trading operations the less successful, judged by economic criteria, has its ministry been. A major reason for this would appear to be the responsibility of carrying out imprecise legislative directives which have been based on doubtful premises. Another reason for the Department's failure by economic criteria to successfully regulate the industry, has been consideration of non-economic criteria, which ultimately involve issues of political significance, forced upon the Department by pressure from the factions in the trade.

Epilogue.

EPILOGUE

Section (i)

There is a temptation to forecast a trend towards vertical integration for an industry marked by strong wholesalers. The commercial fishery has this characteristic and because the company-organised wholesalers have already gained control of a substantial proportion total output it is possible that wholesalers will move further into the producing section of the industry. If this does occur, it may do so at a rate determined by future licensing policy and the availability of finance to provide vessels and extensive shore facilities, as well as the growth in the demand for the product.

As far as can be ascertained there has been no extensive movement into retailing by wholesalers in the past decade. The 1958 Census of Distribution showed fish retailers to have very low average turnovers which may suggest that average profits are not high in this part of the industry. It would appear that consumers are price sensitive and if this is correct movement by wholesalers into the retail field could be influenced by future retail price levels. Whilst the writer has done no systematic research into the product's retail price elasticity of demand, it appears as though retailers act as if the demand for their product is price elastic. Future retail price levels will depend in part upon future wholesale price levels. If wholesalers act on the expectation that they can increase

turnover by entering the retail field and reducing retail prices they may find their ability to do so restricted by their costs of producing the product at sea. On the assumption of a retail price elasticity of demand which exceeds unity the movement by wholesalers into the retail trade may be limited by the extent to which they control low cost producing units, perhaps of the type taking advantage of the condition of increasing returns to scale suggested in Chapter Three.

Retailers themselves may try to enter the production side of the industry although in the past they have not filed a great number of applications for licenses to produce. It appears as though future licensing policy and lack of finance, and perhaps lack of technical skill, may keep retailers off the fishing grounds, and although co-operatively organised producing companies would enable retailers to pool their finance the success of such companies in the past does not augur well for their future. A complete change could occur if chain stores and nationally organised grocery firms became interested in the retail trade.

EPILOGUE

Section (ii)

In summary, the essential findings of this essay have been that increasing returns to scale apply in the industry and that the control of supply by wholesalers, made possible through the legal restrictions on entry, has resulted in price agreements rather than competition.

The Fishing Industry Committee 1962 recommended that the existing system of licensing be abolished.(1) Under certain conditions, the entry of new firms would cause a variation of the procedures in the present markets for the product. In most parts of the market a single wholesaler characteristically dominates the trading practices in his section of the industry. Wholesalers are able to do this by virtue of the number of licences they hold, the producers to whom they have advanced finance and the established channels of supply and distribution they have developed over time. Their importance as a source of finance and an entrenched part of the organisation of the industry suggests that a proportion of the producing units entering on delicensing would either be owned or financed by wholesalers or will supply them. The extent to which this occurs will act to maintain the present market power of wholesalers and perpetuate the present pricing procedures. So the abandonment of official restrictions on entry, though it may be

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(1) See Report of the Fishing Industry Committee 1962, p. 73.

desirable on other economic grounds, will not necessarily alter the pattern of price determination.

The Fishing Industry Committee recommended also that a Development Corporation be set up by Government.(2) Such a corporation could be effective or not according to the policies it pursued. Reluctance to compete has caused practices and rigidities which, as argued above, may not be removed by the abolition of restrictive licensing. Collective advancement, through price competition in an expanded market rather than collusion over existing profits in a given market, might take place as result of directives from a proposed corporation. Yet on the other hand, if existing firms are unwilling to compete, as appears to be the case, informal arrangements may defeat the purpose of the corporation's price directives. Alternatively, the corporation could enter the industry itself and by following an appropriate strategy it may remove the systems of price setting outlined in Chapter Five. If the corporation followed a policy of buying quality goods from any producer and selling quality goods to any consumer, retailer or exporter, then, on de-licensing, new entrants need not be controlled by wholesalers, and retailers would have alternative sources of supply available to them. Such a corporation could enter at any level of the industry's operations to provide dissatisfied private units with alternatives to their present opposites.

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(2) Report of the Fishing Industry Committee 1962, p. 73

A corporation could foster innovation (and obtain sources of supply) by using vessels of a type which take advantage of the economies of scale shown by Chapter Three to operate. It could influence producers', wholesalers' or retailers' prices by the prices it offered itself and reduce collusion in this way. Forcing firms to engage in price competition could result in the less profitable firms leaving the industry instead of continuing by virtue of the present price agreements. Allocation might then improve a de-licensed industry.

Section (iii)

Micro-economic theory shows how the price mechanism ensures that resources are optimally allocated in accordance with consumer demand under perfect competition. Cost curves of a particular shape are a necessary part of that argument. This paper has shown that average cost curves of producing firms in the fishing industry decline. Inasmuch as it does this it suggests that some consideration might profitably be given to the impact of price upon resource allocation in the reducing unit cost situation.

Micro-economic theory is becoming increasingly directed towards decision making at various levels and in various situations. The essay has indicated that Government decision making is of considerable importance to the industry and it has outlined some of the problems involved in coming to an administrative decision where more than the maximization objectives of economic theory are involved. Perhaps there is scope for additional work in this field.

BIBLIOGRAPHY

Beach, E.F. "Economic Models".

Brennan, M.J. "Preface to Econometrics".

Bryant, E.C. "Statistical Analysis".

Cobb and Douglas "A Theory of Production", American Economic Review 1928.

Department of Statistics
Report on Industrial Production Statistics 1948/9-1957/8.
Report on Population, Migration and Building Statistics 1953/4-1960/1.
Report on Prices, Wages and Labour Statistics 1953-1959.
Census 1945 and 1951.
Report on Income and Income Tax Statistics 1950/1-1957/8.

Douglas, P.H. "Are There Laws of Production?" American Economic Review 1948.

Frankel, M. "The Production Function: Allocation and Growth" American Economic Review December 1962.

Gladstone, P. "Native Indian and the Fishing Industry of British Columbia" Canadian Journal of Political Science, Volume 19, 1953.

Jackson, G.E. "The Labour Exchange and the Fisheries". Economic Journal Volume XXI, 1911.

Johnston, J. "Statistical Cost Analysis".

Klein, L.D. "An Introduction to Econometrics".

Marine Department Annual Reports. Departmental Files.

Mayo, H.B. "The Economic Problems of the Newfoundland Fisheries" Canadian Journal of Economics and Political Science, Volume 17, 1951.

Mutri and Sastry "Production Functions for Indian Industry" Econometrica 1957.

Select Committees
Caucus Committee into the Fishing Industry 1956.
Proceedings of the Fishing Industry Committee 1962.
Report of the Fishing Industry Committee 1962.
Report of the Sea Fisheries Investigation Committee 1937.