The Effect of Age on Vessel Performance and Fleet Capacity

Technical Report No. 250

September 1984

SEA FISH INDUSTRY AUTHORITY
Industrial Development Unit

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SUMMARY

This report describes the development of mathematical models which demonstrate the effect of a vessel's size, age and fishery on its performance, expressed in terms of income and returns to capital and labour.

On the basis of these models, a fleet capacity simulation model, CAPSIM, has been developed, as described herein. This model is intended for use with simple available data to assess the impact on fleet capacity resulting from structural change. An example of its application to Humberside is presented.

In addition, in order to aid the EEC, who have supported this work, descriptive material covering the UK, Belgian, Netherlands, F.R.G. and Ireland is appended, and reported in terms suitable for use with this model.

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1 INTRODUCTION

The Fisheries Economics Research Unit (FERU) has negotiated a contract with the Commission of the European Communities (EEC) to undertake a study of the activities and performance of EEC fishing fleets, aimed at assisting in the determination of the affects of restructuring policies. The original terms of reference of this contract are given in Appendix I.

Based on these terms of reference the SFIA submitted a proposal to the EEC, a copy of which is attached as Appendix II, detailing the Authority's approach to this study. In order to assist FERU the Industrial Development Unit (IDU) agreed to undertake analyses for two sections of the proposal, namely Sections c, 'Productivity of Old and New Vessels under Similar Conditions', and d, 'Remuneration of Production Factors for Old and New Vessels under Similar Conditions'. In addition the IDU also agreed to assist in the production of some data tables giving information required under Section a, 'Description of Fishing Activities and their Results'.

This report gives the information derived for Section a, the description of the UK fishing fleet, activity and results, and describes the analyses conducted for part c-i, the formulation of a productivity model demonstrating the variation in productivity due to size, age, fishing method and random effects, and for d, measurement of the remuneration to production factors. In addition the derivation of a fleet capacity simulation model, CAPSIM, for Part c-ii is described, together with an example of its application to the Humberside based fleet.

In addition to the contractural requirements above, this report also presents summary data showing the results of the UK, Belgian, Dutch, West German and Irish fleets for 1977, 79 and 81, for each fishing area and fleet sector, to provide additional information for the EEC.

The data which have been used are the merged Scottish 1981 Cost and Earnings Survey and UK Vessel List File held by the Department of Agriculture and Fisheries for Scotland (DAFS), the merged 1982 Cost and Earnings Surveys for England, Scotland and Wales held by the IDU, and the International Council for the Exploration of the Sea's data tapes for 1977, 79 and 81. Details of the data are given in Sections 2, 3 and 5 of this report respectively.

In order to assist the reader a fold-out flysheet is attached inside the back cover giving a summary of definitions for reference.

This report is intended to fulfil a variety of purposes. It is issued to FERU as the final report covering the IDU's contribution to this project, and as such has been designed as a stand alone document, superseding IR 1165, and containing all the relevant information. It is also intended as part of an interim report to the EEC for Section a of the contract, and as a draft final report to the EEC for Sections c and d. In addition it serves as the IDU Technical Report covering the development of CAPSIM.

2 DESCRIPTION OF THE UK FLEET, ACTIVITY AND RESULTS

2.1 Data Definition

The data base used for this section is a file containing the results of merging the vessel list information covering all Scottish vessels, and all English, Welsh and Northern Irish vessels over 40 ft registered length, totalling some 3760 vessels. This file, which is held by DAFS, has had the total value, weight and days at sea recorded for Scotland for each boat, in 1981, added to the file, together with the results of the 1981 Scottish Cost and Earnings Survey.

The variables within this file of interest to this study are:-

Length:	The vessel's registered length measured in feet.
Tons:	The vessel's gross registered tonnage (GRT), measured under either Part I or IV of the Merchant Shipping Acts.
Basedist:	The vessel's base district (home port).
Reglett:	The vessel's port of legal registration.
Method:	The vessel's usual method of fishing.
Year:	The year in which the vessel's hull was constructed.
Totval: (Value)	The total value of fish sales in Scotland in 1981, measured in £ sterling, for each vessel.
Totwei: (Weight)	The total weight of fish landed in Scotland in 1981, measured in tonnes, for each vessel.
Totday: (Days)	The total days absent spent on trips landing in Scotland in 1981, for each vessel.
Power:	The vessel's installed main engine BHP.

Crew: The usual number of crew carried.

Insval: The insured value of the vessel, measured in units of £000 sterling, which has been taken as the measure of capital employed.

These variables have been used to derive the following output variables as shown in the tables attached as Appendix III. Length and Tonnage have had special adjustments made which are described in detail in Sections 2.3 and 2.2 respectively.

V/Day: Value (£) per Day Absent (Totval/Totday)

V/LBP: Value (£) per Metre LBP (See Section 2.3)

V/GRT: Value (£) per GRT (Totval/Tons)

V/Man: Value (£) per Crewman (Totval/Crew)

V/BHP: Value (£) per Brake Horse Power (Totval/Power)

V/Cap: Value (£) per Capital Unit (£000) (Totval/Insval)

Similar definitions apply to T/Day, T/LBP, T/GRT, T/Man, T/BHP and T/Cap, where T refers to fish weight in tonnes (Totwei).

It is intended that the tables presented in Appendix III, where each of the above variables is reported for groups composed of vessels similarly based (by Country derived from Basedist) of similar type (derived from Method), and of similar lengths and ages, should form the basis for EEC table 1 and EEC table 5.

2.2 Tonnage Adjustments

As demonstrated in Figure 1, two measurements of tonnage (GRT) are available to the British fleet, namely Part I or Part IV of the Merchant Shipping Acts, which, for vessels around 80 ft differ by a factor of about 1.5 on average, and commonly up to 2.

This would have made the reporting of average tonnage for vessels of specified length and age somewhat meaningless if a mixture of both types was involved, so an attempt to classify whether a vessel is registered under Part I or Part IV has been made.

This has been made on the basis of the regression lines fitted to a total sample of 210 UK vessels for which the registration was known, as shown on Figure 1 (drawn for 1970). The year of build was introduced into the equations as modern vessels tend to have higher beams and depths (hence higher tonnages) than old vessels.

The details of the discrimination of tonnages based on these regressions, together with the country of registration (derived from Reglett), which plays a part in determining the tonnage chosen by the owner for legal reasons, are shown in Appendix IV.

2.3 Length Adjustments

The EEC have requested that the tables be presented to them with vessels classified according to Length Between Perpendiculars (LBP) in metres, whereas the database only has Length registered (Lreg) in feet recorded.

In order to assist the EEC in determining the effects of different length measurements an attempt has been made to relate LBP to Lreg as shown in Figure 2. This is based on some 60 vessels for which both measurements were available.

The line shown, which has been placed by eye, is based on some knowledge external to the data, in that both small and large vessels tend to have larger relative overhangs (smaller LBP/Lreg) than vessels in the range 60-80 foot.

This line has been used to estimate LBP values for each boat occuring in the database, from known values of Lreg.

Two versions of the tables are presented in Appendix III, the first where length groups have been constructed on the basis of Lreg in feet, and estimated LBP in metres reported. In the second version the opposite tactic has been adopted, in that the grouping has been accomplished using estimated LBP in metres and Lreg in feet reported.

3 THE EFFECT OF VESSEL AGE ON PRODUCTIVITY

3.1 Description of Data

The data used for the present analysis consist of a total of 563 returns made to Cost and Earnings Surveys for the year 1982. Three independent surveys have been merged for this study.

The Scottish Cost & Earnings Survey is conducted each year by DAFS. The whole fleet is circularised and makes returns on a voluntary basis. Unfortunately the response is varied, with the highest proportion of the fleet making returns being based in the North East of Scotland.

Two English Cost and Earnings Surveys are now conducted each year by FERU, The Inshore Survey (vessels less than 80 ft, 24.4m) and the Deep Sea Survey. In these instances owners of vessels within the control period of Authority Grant and Loan assistance are requested to provide information. Although the Authority has a legal right to these data, they are not vigorously pursued at present, so the Survey assumes an effectively voluntary status.

It may be noted therefore that none of these surveys represents a truly random sample of the fleet population as bias is inherent in both methods of data collection. However since no estimate of the effects of this bias is possible, any effect has been ignored for the purposes of the present analysis.

The variables of interest to this study are:-

Sales: The total annual earnings from sales of fish (including shellfish) in units of £ sterling. Any operating subsidies and income from work other than fishing is excluded. Sales have been used as the measure of production.

Lreg: The registered length of the vessel in feet. The feet units have been retained as this measure of length is that legally used in the U.K. and is recorded for all vessels. It is defined as the distance from the fore-side of the stem to the aft side of the stern post or fore side of the rudder stock if a stern post is not fitted.

BHP: The vessel's installed main engine BHP.

GRT: The recorded Gross Register Tonnage of the vessel, irrespective of Part I or IV measurement.

Age: The age of the vessel at the time of the survey in years. Thus age equals 1982 minus the year the vessel was built, so new vessels (built 1982) have an age of zero years.

Days: The total annual days at sea. For the Scottish survey this is as reported by the respondents, and for the English Inshore Survey it is as recorded by the Ministry of Agriculture, Fisheries and Food (MAFF) inspectors. For the English Deep Sea survey both measures were available so the arithmetic mean has been taken. All these estimates are not particularly reliable, as many Scottish respondents tend to assume that each week of operation represents five days at sea irrespective of the actual voyage length, and the MAFF statistics only include voyages landing in England and Wales.

In order to obtain the effects of age on productivity of vessels under similar conditions the survey returns have been organised into groups on the basis of fishing method and base region, as shown in Appendix V, Table 1. The fishing methods considered were Demersal Trawl, Seine Net, Lines, Purse Seine, Pelagic Trawl, Pots and Creels and Shellfish Trawl. The regions of the UK were Scotland:- Forth, Grampian, Highland, Island, Clyde and England:- North-East, Humberside, East Anglia, South-East, South-West, Wales, and North-West. These regions are defined in Figure 3.

Fourteen fleet sectors of vessels fishing in similar conditions were identified from these groups, with some groups from nearby regions being pooled, where appropriate, to produce an absolute minimum sample size of ten vessels.

These Sectors are defined as:

No. 1: Grampian Demersal Trawl
2: Highland & Island Demersal Trawl
3: North East Demersal Trawl
4: Humberside Demersal Trawl
5: East Anglia Demersal Trawl
6: South West Demersal Trawl
7: North West Demersal Trawl
8: Grampian Seine Net
9: Humberside Seine Net
10: Grampian & Island Purse Seine
11: Grampian Pelagic Trawl
12: Humberside & North West Pelagic Trawl
13: Highland & Island Pots & Creels
14: Grampian Shell Trawl

Summary information for each of these fleet sectors is presented in Appendix V, Tables 2 to 15, which show the number of vessels in each sample, summary statistics for the variables under analysis, and correlation coefficient matrices for both linear and non-linear models.

No data suitable for the present analysis have been received for the Dutch and Belgium fleets, which have therefore been excluded.

3.2 Hypotheses

The most fundamental hypothesis is that the age of a vessel in part determines its productivity. This is founded on the belief that new vessels are more efficient, in both the level of their activity and the results of that activity, than older vessels, when fishing under comparable conditions.

Obviously such a comparison should be made not only between vessels undertaking similar fishing operations, but also between vessels of similar size. Two size variables have been used in this analysis, Lreg and BHP, and the effect of age examined after the effect of size has been eliminated.

The first type of model considered was a linear regression model of the form:-

$$\text{Sales} = A_o + A_1.\text{Size} + \text{Age}_2.\text{Age} + A_3.\text{Days}$$

where Size was taken to be either Lreg or BHP. The Days term has been introduced to examine the effect of differing activity, if discernable, after the effects of size and age have been eliminated.

Although this type of model is very useful to discover the existence of the effects sought, the value of coefficients A_o to A_3 probably have little general meaning, and the form of the equation may lead to absurd extrapolation. To illustrate this point it is of questionable value to express the productivity of a group of vessels as declining with age at a rate of say £1000 per year (A_2) as there is no indication whether this is a high or low rate, and if it is a high rate it may suggest say 10 year old vessels earn nothing, and older vessels have negative earnings.

To overcome these problems a non-linear multiplicative equation of the form:

$$Sales = B_o.Size^{B1}.e^{B2.Age}$$

has also been examined, where the decline in productivity is expressed as $100B_2$ percent (compound) per year.

Taking natural logarithms of the above expression, the following linear model is obtained:

$$\log_e(Sales) = \log_e(B_o) + B_1.\log_e(Size) + B_2.Age.\log_e(e)$$

or in the form of a linear regression equation:-

$$LogInc = A_o + A_1.LogSize + A_2.Age$$

where

$A_o = \log_e(B_o)$
$A_1 = B_1$
$A_2 = B_2$
and
LogSize = LogLen ($=\log_e$(Lreg)) or LogPow ($=\log_e$(BHP))

Two further hypotheses have also been examined, that is that there is a mutual relationship between Lreg, BHP and Age, in that the BHP of the engine fitted to a vessel of a particular size (Lreg) is dependent on the age; and that older and smaller vessels are less active.

The first of these has been examined on a similar non-linear basis to that shown above for Sales, i.e.

$$LogPow = A_o + A_1.LogLen + A_2.Age$$

where for the second a simple linear expression of the form:

$$Days = A_o + A_1.Lreg + A_2.Age$$

has been chosen on the principle that so many extra days at sea per foot of length, or so many fewer per year of age, appears to be a reasonable expression, and this is perfectly appropriate to investigate the existence or otherwise of the effect.

During the meeting held at the Commission on 5th July 1984 an alternative general hypothesis was proposed, in that the variation in productivity due to age and size could be considered as constant over different fleet sectors, with the effect of each sector being represented by a varying multiplicative constant, e.g. Sector 'A' is twice as productive as Sector 'B'.

This is equivalent to an equation of the form:-

$$Sales = B_i.Size^{B1}.e^{B2.Age}$$

with B_1 and B_2 constant for all sectors and B_i being the constant appropriate to the 'i'th sector.

This hypothesis has been examined by creating dummy variables D1 to D14, corresponding to the 14 sectors, which take only the values 1 and 0 depending on whether a vessel belongs to that sector or not.

Then the equation above becomes, upon taking logarithms, a linear regression equation:

$$\begin{aligned} \mathrm{LogInc} = {} & A_o + A_1.\mathrm{LogSize} + A_2.\mathrm{Age} + A_3.D_1 + A_4 D_2 + A_5.D_3 \\ & + A_6.D_4 + A_7.D_5 + A_8.D_6 + A_9.D_7 + A_{10}.D_8 + A_{11}.D_9 \\ & + A_{12}.D_{10} + A_{13}.D_{11} + A_{14}.D_{12} + A_{15}.D_{13} + A_{16}.D_{14} \end{aligned}$$

where

$$A_{i+2} + A_o = \log_e(B_i)$$

Summary statistics for the Combined Sample of All Sectors created for this hypothesis are given in Appendix V, Table 22, the size variables considered in this case including GRT.

3.3 Discussion of Results

All Tables referenced in this section will be found in Appendix V.

The regression analyses described above, covering six regression models for each of the fourteen samples of vessels, have been performed using the Statistical Package for the Social Sciences (SPSS) mounted on Hull University's ICL 2960/Harris mainframe computers. Summarised results are presented in Appendix V, Tables 16 to 21.

The first model, Sales with Lreg, Age and Days (Table 16) demonstrates the existence of an age effect, with age contributing strongly to the explanation of variance, even after the effect of length has been removed, in six of the fourteen samples. A weak effect is also present in a further four of the samples, but a weak effect opposite to that expected is shown by English pelagic trawlers and Scottish Creel boats. However these are both small sized samples, with the pelagic trawlers having a very small age spread (Table 13) and the Creel boats having a confounding correlation between length and age (Table 14). It should be noted that although the simple correlations between Sales and Days are generally quite high (Tables 2 to 15) the effect of activity after correction for length and age is normally small, except for English pelagic trawlers which have small age variation and a large variation in days.

The first non-linear model, LogInc with LogLen and Age (Table 17) confirms the importance of the effect of age, and using an equation of this form all but one of the samples shows a decline in productivity with age. The exception is again Scottish Creel Boats where increasing age goes with increasing length. The decline generally ranges from 1 to 5 percent per year compound, with an average, weighted by sample size, of 2.96%, over all samples.

The conclusion of the first two models is therefore that if vessel length is used as a size parameter, an age effect of a decline in productivity of some 3% per annum compound is established.

The next two models, Tables 18 and 19, are the same as the two discussed above, except that the size parameter is not Lreg but BHP. Here the opposite conclusion emerges as commonly age explains very little of the variance in Sales after the effect of BHP has been removed, and the sign of the age coefficient is inconstant. Thus when BHP is used as the size variable no effect with age can be established.

However, the question of whether the combination of Lreg and Age, or BHP alone, is a better predictor of Productivity remains. In comparing the total proportion of variance explained by linear models in eleven of the samples the combination of Lreg and Age is better, while for non-linear models this is confirmed by ten of the fourteen samples. In predicting the total production of a fleet the total BHP will be a better measure of capacity compared with the total Lreg (or number of vessels of average length) as performance appears to vary approximately directly with BHP, and with the square of Lreg. In other studies it has been found that GRT varies roughly with the square of Lreg, so for continental countries total GRT may represent some measure of total capacity.

The apparent lack of age affect when BHP is used as the size parameter, coupled with previous experience, led to the investigation of LogPow with LogLen and Age presented in Table 20. This shows, in addition to the strong Lreg effect expected, an entirely consistent reduction in BHP with increasing age for all fourteen samples. The average of this decline is 2.7 percent compound per annum, weighted by sample size. This corresponds very closely to the decline in productivity and explains why age is not required in a model based on BHP rather than Lreg.

The hypothesis that activity declined with increasing age and increased for larger vessels was then examined. The regressions of Days with Lreg and Age shown in Table 21 were therefore performed. These show no particular strong relationships, except for two small samples, but the trend in Days is generally positive with increasing size, and negative with increasing age, as expected. The result of this model must therefore be judged as inconclusive on these samples.

The results of the three regressions derived from the last, alternative general, hypothesis are presented in Appendix V, Tables 23, 24 and 25, and Figures 4, 5, 6, 7, 8 and 9.

The 'F' ratio values presented in these Tables show that all the regresssions are highly significant, and therefore that the use of this type of hypothesis is suitable for fisheries investigations.

When Lreg is used as the size variable a total of 79.54% of the variance in LogInc is explained, compared with 78.66% for BHP and 77.80% for GRT, when the effects of Age & Sector are included.

The age effect is shown to be -2.35% p.a. if Lreg is used, negligible for BHP and -2.12% p.a. for GRT as the size variable, confirming strongly the conclusions of the separate sample analyses.

The advantage of this type of equation is that the effect of each of the predictor variables can be demonstrated in turn easily by correcting the sample dependant variable to standard values of the other independant variables and producing a simple two dimensional plot as in Figures 4 to 9.

Figures 4, 5 and 6 demonstrate the variation of productivity with size, viz Lreg, BHP and GRT respectively, alone, while Figure 7 shows the main thrust of this study, that is the relative decline in productivity with age when Lreg is used as the size variable.

Figure 8 shows the relative productivity of each sector, for all size measures, and shows that, in general, which size measure is chosen does not greatly affect inter sectorial comparisons.

Figure 9 is a histogram of the proportional residual error of estimate when Sales is predicted using the regression equation of Appendix V, Table 23, based on Lreg, Age and Sector, together with a log-logistic distribution (as developed in Appendix VIII) with the same mean and variance of 1.093 and 0.264 respectively. This figure demonstrates the random variation to be expected between nominally identical vessels, generally due to skipper ability and enthusiasm.

4 REMUNERATION OF PRODUCTION FACTORS

All Tables referenced in this chapter will be found in Appendix VI.

For the investigation of Remuneration of Production Factors, that is Labour and Capital, variables representing these quantities are required, in addition to those described in Section 3.1. Those available in the database are:-

Crew: The usual number of crew carried on board the vessel as reported by the survey respondent.

Insval: The insured value of the vessel, measured in £ sterling, which has been taken as the measure of capital employed. It appears that, in general, vessels are insured for their total historic costs at the time of both purchase and improvements, ignoring any grant aid.

The returns to Labour (LabRet) has been defined as the Average Crewman's Share, calculated from the annual total labour share divided by the number of crew. The labour share for vessels under 80 ft Lreg is normally calculated as a percentage (nominally 50%) of the vessels earnings after deduction of running expenses (landing fees, harbour dues, fuel, ice and box charges, etc.) Different methods of crew payment are normal in vessels over 80 ft so these have been excluded from the analysis of LabRet.

The return to Capital (CapRet) has been defined as the percentage Operating Profit on Capital Invested (InsVal). The operating profit is taken as the gross margin after payment of running expenses, crew, and vessel expenses (fishing gear, vessel maintenance, insurance, etc.), but taxation, depreciation and loan payments are excluded from consideration.

As this study is concerned as much with productivity as profitability it was felt that an analysis of the productivity per unit of capital employed would be useful. Thus the variable TurnOv has been introduced, which is defined as the vessels sales income (Sales) divided by the capital employed (InsVal), or Turnover/Capital Ratio.

No a priori hypotheses of the variation of these three variables (LabRet, CapRet and TurnOv) were available so they were tested as linear functions of Lreg, Age and Fleet Sector.

The combined sample of all fleet sectors with Lreg less than 80 ft is described in Appendix VI, Table 1, and the results of the regression analysis for LabRet based on this sample are given in Table 2.

Although the total variance explained by this regression is only 53.95% the 'F' ratio shows the regression to be highly significant.

These results show, as illustrated in Figures 10, 11 and 12, that the returns to Labour increase significantly with size (Lreg), decrease significantly with Age, and vary significantly from sector to sector. This accords with the preconception that crewmen in large new boats will be better rewarded than those in small, old boats.

It will be noted in Figure 12 that sectors 10 and 12 do not appear as 60 ft. vessels did not occur in the samples for these sectors.

An interesting comparison may be made between the relative productivity of each sector (Figure 8) and LabRet (Figure 12) in that the very wide fluctuations in productivity are not accompanied by similar wide variation in average crewman's share. This is possibly the result of two factors, namely that the number of crew carried by a vessel is adjusted to the number that the vessel can effectively support, and that sectors with low productivities may well correspond to sectors with low running expenses, most likely small fuel bills.

The combined sample of all fleet sectors (including vessels over 80 ft) is described in Appendix VI, Table 3, and the results of the regression analysis for CapRet and TurnOv based on this sample are given in Tables 4 and 5 respectively.

As far as CapRet is concerned, the regression explains only 11.75% of the variance, although the 'F' ratio does show the regression to be significant.

As can be seen by examination of Figures 13, 14 and 15 no meaningful variation in relative profitability can be discerned for differing sizes and ages of vessel. However wide variations about the mean of 6.61% are evident depending on fleet sector.

The first two results suggest that the variation in value of boats with size and age is in line with their expected profitability. This is not true with regard to fishing method and area, presumably as vessels may be readily transferred between sectors, leading to similar values in all sectors.

For Turnover/Capital ratios (Turnov) the regression results presented in Appendix VI, Table 5 show that a total of 43.35% of the variance is explained by the regression, with a highly significant 'F' value.

These results show, as illustrated in Figure 16, 17 and 18, that although no relationship can be determined with Lreg, vessel age and fleet sector are significant.

This shows that the same investment in either small or large vessels is likely to produce similar results, which from quota and fleet management viewpoints suggest that there is no reason to encourage or discourage specific sizes of vessels.

However, as Figure 17 demonstrates, investment in older vessels will produce greater output than the same investment in new vessels. This is most likely to be because the value of older boats is in line with their profitability, and their profit/earnings ratios (gross margin on turnover) will be worse than new vessels due to high repair and maintenance costs.

Figure 18 shows that directing investment to particular fleet sectors would produce differing production, as would be expected.

5 CAPACITY SIMULATION MODEL (CAPSIM)

5.1 Description of the Model

The model is fully described mathematically in Appendix VII, and a flow-chart of the program implementing the model is reproduced as Figure 19. This section is therefore restricted to describing the basic philosophy of the model.

As shown in Section 3 of this report, productivity is, as would be expected, dependant on both vessel size and age, so that simple counting of vessel numbers, or summing gross register tonnage, is unlikely to produce reasonable estimates of fleet capacity as fleet structure changes. (However, in the event of no further information, total horsepower may be used to give a plausible estimate of changing fleet capacity).

If the changing structure could be expressed as numbers of vessels in groups formed of boats of similar size and age both before and after the proposed structural modifications, then it becomes possible to estimate the resultant change in capacity.

The model described in Appendix VII makes several assumptions, of which the major ones are:-

1 That individual vessel performance can be expressed in terms of an equation of the form:-

$$y = K.(ax^b+c).(e^{-dt}).(E)$$

i.e. in a manner as implied by fitting regression equations of the type demonstrated in Section 3.

2 That the random variation of performance between vessels (E) can be represented by a log-logistic probability distribution as described in Appendix VIII and demonstrated in Figure 9.

3 That vessels leaving the fleet are the worst performers in any particular group, thereby raising the average performance of that group when they leave.

4 That boats entering the fleet perform at the average level appropriate to their age.

The model has been implemented using the MSBASIC programming language and run on a Sirius microcomputer.

5.2 <u>Example Application</u>

As agreed between the IDU and EEC the example application presented here is the part of the Integrated Operations Study of Humberside being conducted for DG XVI which has been provided by the SFIA.

The consultants assumptions with regard to future fleet sector structure are:-

1 The planning horizon is five years from 1st January 1984 (data used for existing fleet is for 1983).

2 Five percent of the 'existing' vessels are lost accidentally in this period, corresponding to a mean rate of 1% per year. These have been taken from the most populous groups in each sector.

3 All the middle water trawlers are de-commissioned or transferred away from Grimsby.

4 The two accidentally lost Grimsby inshore vessels are replaced by two new 40-50 footers.

5 Four 45-60 year old, 50-60 ft Grimsby inshore vessels retire.

6 Four 55-70 and five 40-55 year old, 50-60 ft Grimsby seiners retire.

7 The total nett loss of 20 boats is replaced by either 20 new seiners or 20 new pair fishers, divided equally between the 60-70 and 70-80 foot classes.

8 Sufficient new seiners, divided equally between the 60-70 and 70-80 foot classes, are built to provide a 10,000 tonne p.a. (approx.) capacity for Hull. As no Hull data is available, Grimsby seiner data has been used.

With regard to the basic input data to the model, coefficients 'a' to 'd' and parameter 'E', which describe the variation in vessel performance due to size, age and random effects, have been taken from the results of the analysis presented in Section 3.

Parameter 'K' and the number of existing vessels in each group have been derived from the data describing the landings of the Grimsby fleet in 1983 supplied to IDU by the consultants.

The results of the runs of the model based on these assumptions are reproduced as Appendix IX.

It can be seen that the existing capacity of the total Grimsby fleet is some 36,000 tonnes and that replacing de-commissioned, lost and retired vessels by 20 new pair fishers would result in a capacity of some 35,500 tonnes. Alternatively if these 20 new boats were seiners then the capacity would be estimated at about 31,500 tonnes. About 27 seiners would be required to give Hull a capacity of some 10,000 tonnes.

5.3 Analysis of ICES Data

In order to both provide additional information to the EEC regarding the catches of different fleet sectors from different grounds, and also some guidance as to likely values of coefficients a, b and c for different countries, based on cod equivalent tonnes production and GRT, the abstraction of the 1977, 79 and 81 ICES data tapes presented in Appendix X has been made.

From average catch rate for each tonnage group defined as total catch from all grounds divided by total days at sea for all grounds, an estimate of the annual capacity of an average vessel has been made by multiplying by the following assumed mean days at sea per fully operational vessel:-

Tonnage Group	Assumed Days at Sea
1-25	160
25-50	180
50-100	200
100-150	220
150-200	240
250-500	260
500-1000	280
1000-2000	300
2000-4000	320

The results of these manipulations are presented in Figures 20, 21, 22, 23 and 24 for the English, Scottish, Belgian, Dutch, and West German fleets respectively. Also marked on the figures are suggested formulae of the form ax^b+c for the size term of the model equation.

If no further data become available, these coefficients, together with a value of 'd' of 0.0212 and 'E' of 0.221 taken from Section 3, could be used for first estimates of national fleet capacity. However parameter 'K' would need to be adjusted for each fleet to match existing capacity to existing fleet structure.

As requested at the meeting held at the Commission on 13th September 1984, a series of pictorial representations of the tables presented in Appendix X are included as Figures 25 to 32. These show the relative contribution of each ICES area to the total annual catch of each country, and how the total catch varied, for the years 1977, 79 and 81.

6 CONCLUSIONS

The analysis required for EEC Tables 1 and 5 under Section a, and that required for Sections c-i and d of the current contract with the EEC have been successfully completed, together with the Capacity Simulation Model for Section c-ii.

Where Vessel Length or Tonnage is used as a measure of size, and vessels are operating under similar conditions, a decline in productivity with vessel age of 2-3% per annum compound has been established as typical of a wide variety of fleets within the U.K.

If Vessel Power is employed to measure size, then this effect of age disappears, but the prediction of production of an individual vessel is less accurate when based on BHP instead of the combination of length and age.

It has also been found that age determines power and that for vessels similarly employed power installed has been growing at a rate of about 2.7% per annum compound. This may explain the lack of age effect apparent when power is used as a size parameter.

No relationship could be established between activity and vessel size and age.

The remuneration of production factor analysis showed that the return to labour varied with vessel size, age and sector, and that crews were best rewarded in large new vessels.

However the return to capital, or percentage profitability, was found to be invariant with size and age, although fleet sector was found to be a factor as would be expected.

Although productivity in relation to capital was found to be independant of vessel size, it was found to increase with vessel age, as well as varying with fleet sector.

A fleet capacity simulation model has been developed, coded and tested, and an example application to the Humberside fleet has been successfully completed, together with data analysis aiding application to other fleet sectors and countries.

APPENDIX I

TERMS OF REFERENCE

(Taken verbatim from EEC documents)

CONTRACT FOR CARRYING OUT A ESTIMATION OF THE FISHING CAPACITY FOR EEC

DRAFT

STUDY

The fishing activities and results for fleets in Denmark, Federal Republic of Germany, France and Great Britain for the years....

- under the view of "Internal Information on Fisheries No. 12,

- based on available empirical data,

- taking into account:
  1. technical
  2. biological
  3. geographical
  4. political
  5. economic
  6. social

  parameters as far by the national data allows.

The study shall be developed in collaboration between experts and the services of the Commission.

The study will be progressively composed according to the factual possibilities:

a) description of fishing activities and their results (in volume and composition) of a determined part of the fleet.

b) productivity of old and new vessels under similar conditions.

c) remuneration of production factors for old and new vessels under similar conditions.

d) relationship between the study and multiannual guidance programmes.

e) computerising log book data.

f) impact of political limitation in fishing quantity on the fleet.

g) social implication of the political and structural consequences.

APPENDIX II

S.F.I.A. PROPOSAL

(Presented to EEC 26th January 1984)

CONTRACT FOR CARRYING OUT AN ESTIMATION OF THE FISHING CAPACITY FOR E.E.C.

INTRODUCTION

The purpose of this brief paper is to outline the approach that the Sea Fish Industry Authority proposes to take in carrying out the contract for the study on the "Fishing activities and results for E.E.C. Fleets.". This paper has been drawn up following discussion between the various S.F.I.A. personnel to be involved in the project. As such, this proposed approach is presented to the Directorate-General for Fisheries for assessment prior to a meeting in Brussels between the consultants and DG XIV on Thursday, 26th January, 1984.

The study consists of a number of different sections which will present data to DG XIV on a number of factors influencing the decision makers on restructuring policy. These sections were outlined in the contract as

a) Descriptions of fishing activities and their results (in volume and composition) of a determined part of the fleet.

b) Analyses of factors contributing to fleet performance.

c) Productivity of old and new vessels under similar conditions.

d) Remuneration of production factors for old and new vessels under similar conditions.

e) Relationship between the study and multi-annual guidance programmes.

f) Impact of political limitation in fishing quantity on the fleet.

g) Social implications of the political limitations and structural consequences.

h) Summary report of Part I to IV.

The consultants understand from previous discussions that part (e) is a separate part of the analysis, and accordingly is not covered in this paper. Each multi-annual guidance programme of the Member States, when available, will be assessed by the consultants, according to the information available at the time. The consultants, in such commentary, would pay particular attention to what may happen in the post 3 year time programme.

a) **DESCRIPTION OF FISHING ACTIVITIES AND THEIR RESULTS (IN VOLUME AND COMPOSITION) OF A DETERMINED PART OF THE FLEET**

and

b) **ANALYSIS OF FACTORS CONTRIBUTING TO FLEET PERFORMANCE**

1 Objective

The purpose of these sections will be to provide commentary and analysis of the trends and present position of the fish catching sector in the United Kingdom, Netherland and Belgium. Analysis will indicate the effects of the fishing fleets of the three countries due to the ramifications of extended fisheries jurisdiction, and subsequent restrictions on fishing activity in the E.E.C.-pond. Gaps in data availability will be identified for each country.

2 Output

i Analysis for the U.K. will concentrate on vessels of 40 foot and over registered length. Whereas this differs from the 10m standard noted in recent U.K. legislation, this is the historic basis on which the fishing fleet has been categorised. Accordingly, Belgian and Dutch data will be analysed according to traditional classification.

ii There will be a description of the fishing fleet, with commentary on structural changes for the years 1975 to 1982 (or 1983 where available).

iii The relative importance of fishing grounds to the individual national fleets will be assessed, with details of how these have changed in the post-1977 era.

iv Historical catch levels will be compared with possible catch levels at the present and in the medium term according to proposed TAC's and quota allocations. This assessment will be disaggregated, where possible, to cover individual major species - especially the pressure stocks.

v Fishing effort by vessel group (unspecified at present) will be covered, with the associated costs and earnings data where available.

vi Analysis of factors contributing to Fleet Performance.

3 Methodology

Details will be gained through literature search and contact with national fisheries ministries, ICES, Eurostat and OECD.

4 Timing

These sections will be completed by mid-April.

c) PRODUCTIVITY OF OLD AND NEW VESSELS UNDER SIMILAR CONDITIONS

1 Objective

Given that there appears to be some overall requirement for a net decline in fleet capacity, but that member states need to maintain a modern, technologically efficient fleet, there will continue to be some demand for new vessels. Clearly, these should not represent an increase in fishing capacity, so the purpose of this section is to assess the capacity of new vessels and how this relates to old vessels.

2 Output

This section will consist of two parts:

(i) The first will use non-linear regression techniques to establish for the U.K. the relationships between productivity and vessel age for as many vessel categories as possible (i.e. with acceptable sample sizes).

Vessel categories are defined by the fishing method and a vessel size parameter. The fishing method division will be restricted to at most: demersal trawling, seine netting, line fishing, purse seining, pelagic trawling, potting, shellfish trawling, and others. The vessel size parameter will probably have to be a combination of GRT and HP, because these variables are known for the Dutch and Belgian fleet and are also used by ICES.

Productivity will initially be defined as the grossing expressed in £/year, and if necessary refined to £/day at sea, to be used in assesssing the effects of possible present underutilisation of the fleet.

Given data availability, this will allow the formulation of a productivity model which demonstrates the variation in productivity due to size, age, fishing method and random effects.

(ii) In the second part of this section this model, together with average performance of U.K., Belgium and Dutch vessel categories derived from ICES data, would be used as the basis of a fleet capacity simulation. Using the present fleets compositions the model will give a measure of their capacities. This measure of capacity will not be in absolute units, but can be used to judge the change in capacity inherent in the Member States restructuring programmes, by comparison with the base year.

The simulation will probably be based on direct calculation of expected cell frequencies using a probability distribution previously used in research by the consultants. An alternative is to use Monte Carlo simulation techniques.

3 Methodology

Data used will be from national vessel lists together with costs and earnings information where available. ICES statistical tables also present useful material.

4 Timing

Data preparation for the U.K. and the results of the regression model will be available end-March.

Simulation model by end-April (U.K.) Belgian and Dutch analyses available end-May.

d) REMUNERATION OF PRODUCTION FACTORS FOR OLD AND NEW VESSELS UNDER SIMILAR CONDITIONS

1 Objectives

The objective of this section is to measure the remuneration to production factors by the derivation of a production function. This will measure the contributions of various mixes of capital and labour to output, and indicate the different configurations between old and new vessels. The consultants foresee a problem in the application of traditional production functions to the fish catching sector and consequently may opt to use vessel characteristics as proxies for the normal variables.

2 Output

At this stage it is expected that a regression analysis will be utilised to relate vessel grossing to capital employed i.e. insured value, number of crew employed, age and fishing method. In addition, there will be other statistical analyses highlighting averages, variance and shapes of distribution etc.

3 Methodology

There are a number of difficulties in completing this task.

i There is a need to decide whether a narrower classification than old and new vessels is required.

ii There are possible differences between company owned and individually owned vessels.

iii There is a need to take some view on the relevance of enforced inactivity (especially in the U.K. with the purse seine fleet) on figures.

iv Units of labour may not be homogenous as between old and new vessels.

After guidance from D.G. XIV on such questions, vessel lists and cost and earning data will be used to complete the task.

f) IMPACT OF POLITICAL LIMITATION IN FISHING QUANTITY ON THE FLEET

1 Objectives

The aim of this section is to detail the effects of quota restrictions on vessels and by Member States on the Fishing Fleet of the individual countries. Hence there will be an assessment of the impact on cost and earnings of individual vessels and on the mode of operation of the national fleets. Past trends and future possibilities will be assessed.

2 Output

A number of factors will be covered:

i The measurable impact of the response to changed opportunities, with number/tonnage etc., of vessels displaced from distant water and other non-community fisheries.

ii A projection of what is likely to be the future response, with indication of how vessels have been profitably deployed in community pond.

iii Given the level of scrapping premia what is the likely response to this i.e. is the premium too low.

iv Take the effect of the Dutch scrapping programme in mid-seventies and assess the aims, the means, the response and the medium term result.

v Assess the impact on individual vessel operation due to response to quota limitation. e.g. shorter fishing trips, rolling over of quotas, alternatives to laying up.

vi Impact of domino-effect on fisheries, and the subsequent reduction of catch opportunities for all vessels.

vii Assessment of magnitude of laying up of community fleets. This will indicate involuntary inactivity, but will require some indication of that proportion of the fleet fishing sub-optimally.

viii Analysis of impact of quota limitations as investment decisions.

3 Methodology

Much of the data required will previously have been collected for parts (a) and (b). In addition there would be discussions with fleet owners, and usage of previously completed reports (e.g. Consultants report on Investment in the U.K. Fish Catching Sector completed for the White Fish Authority in 1979).

4 Timing

This will be available by the end of August.

g) SOCIAL IMPLICATIONS OF THE POLITICAL LIMITATIONS AND STRUCTURAL CONSEQUENCES

1 Objective

Due to its nature the fishing industry is an important source of income, if not in national economies then in localised communities. Decline of the fishing industry could therefore have notable effects in such communities. The requirement of this section is to define relevant indicators to assess these possible effects. Whereas the changed fisheries regime has had notable effects on the post-harvest sector, there will be no attempt to extend this analysis to take account of such variables.

2 Output

i The study will focus on the effects in specified communities. These will be Humberside, Fleetwood, Grampian and Shetlands, for the U.K., and the major ports in Belgium and Holland.

ii For each area there will be an assessment of changes in fleet structure and vessel landings.

iii New work and the results of previously carried out research will be used to assess employment, income and demographic implications.

iv There will be an assessment of changes in the vessel ownership, and the implications of this for the future development of the fishing industry.

v Perceptions about the future opportunities in the fishing industry will be assessed e.g. the demand for training.

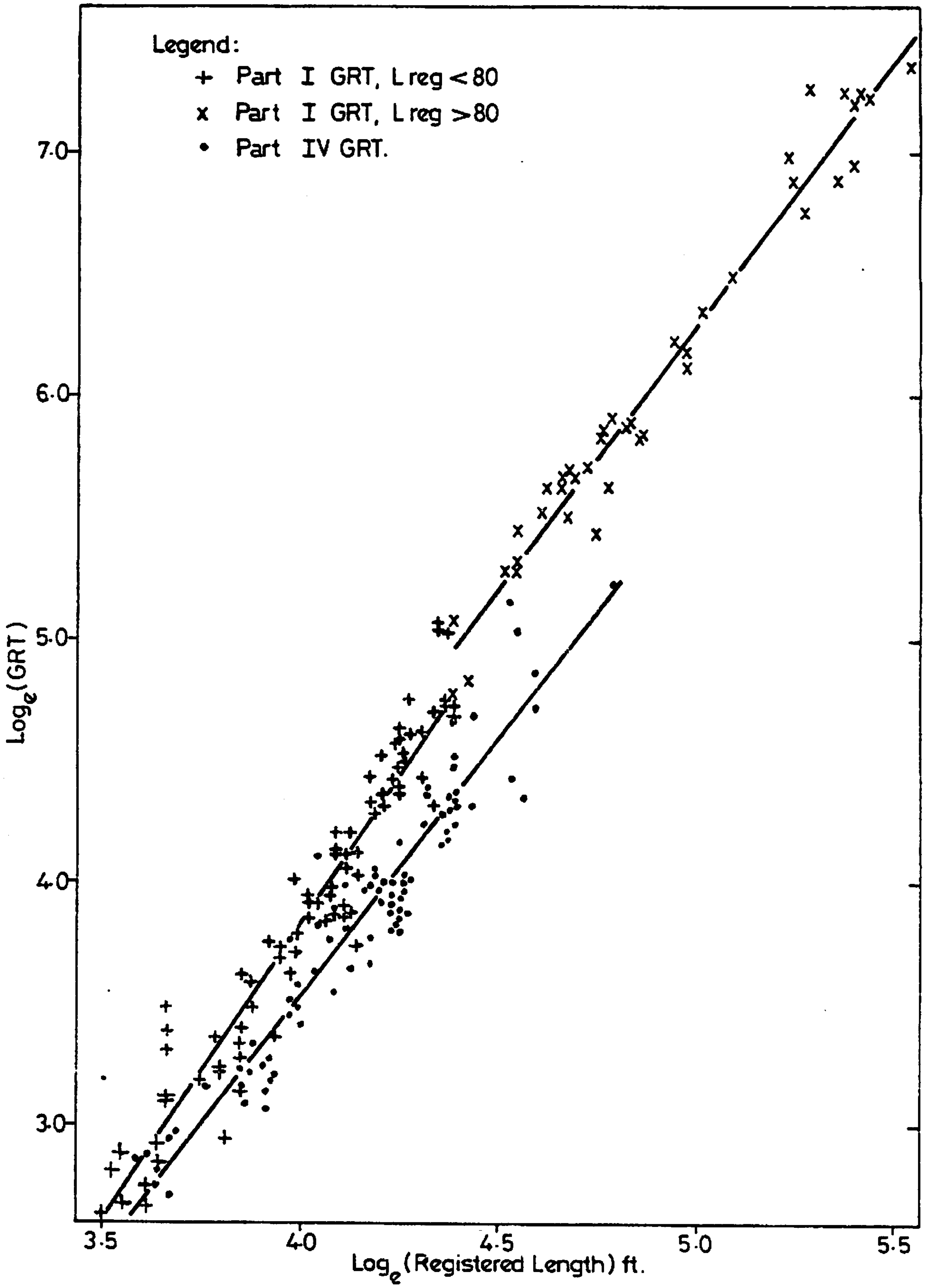
vi Identification of type of labour used in fishing activities and the effects on this labour of fleet restructuring.

3 Methodology

It was hoped initially to use the results of the "Lowestoft Fleet Management Model" to assess the implications of likely changes for the U.K. It appears that the results of this model will not be available, however it is hoped that the study will be able to provide some data, albeit less detailed, along the same lines as the model.

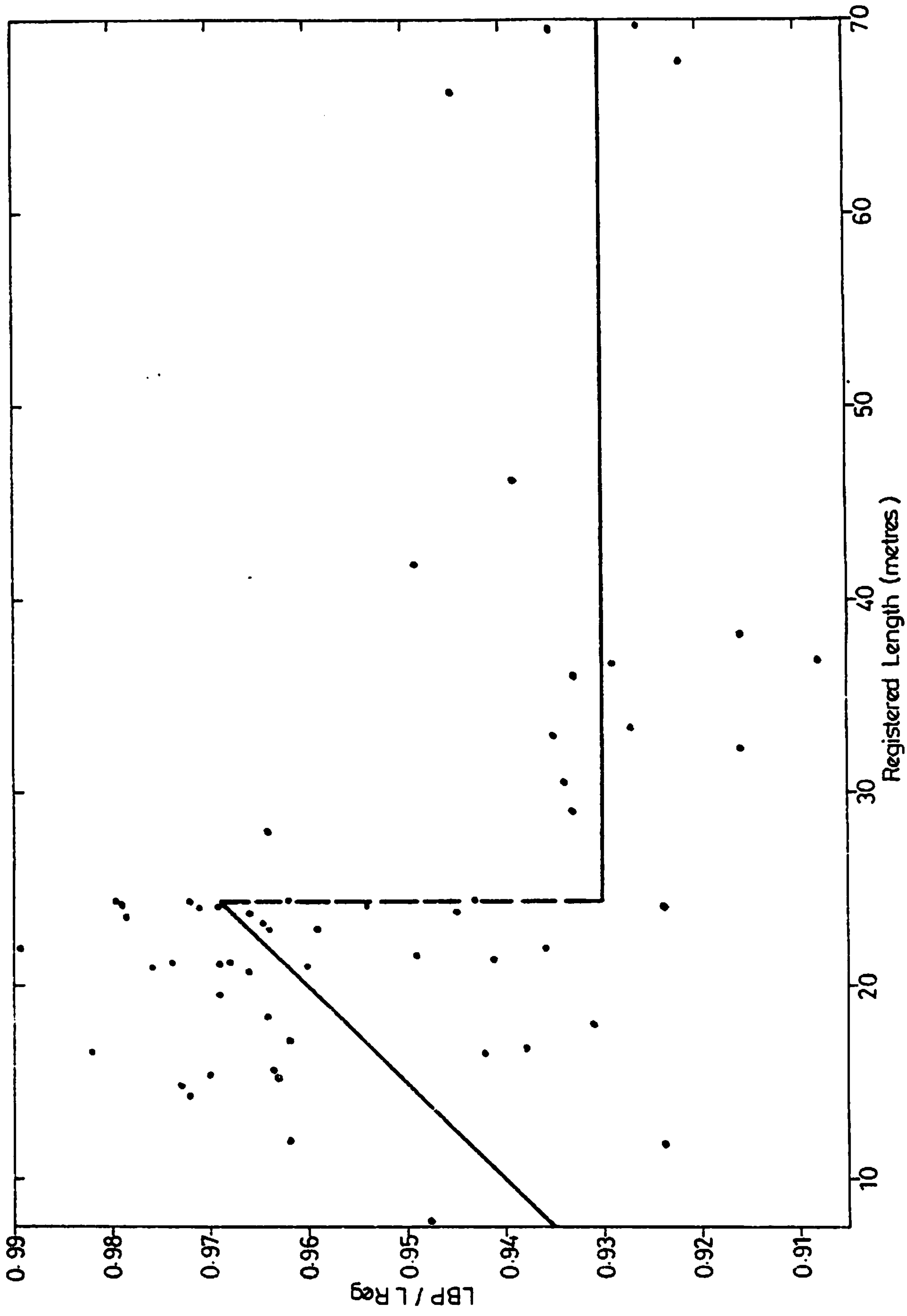
4 Timing

By end September.



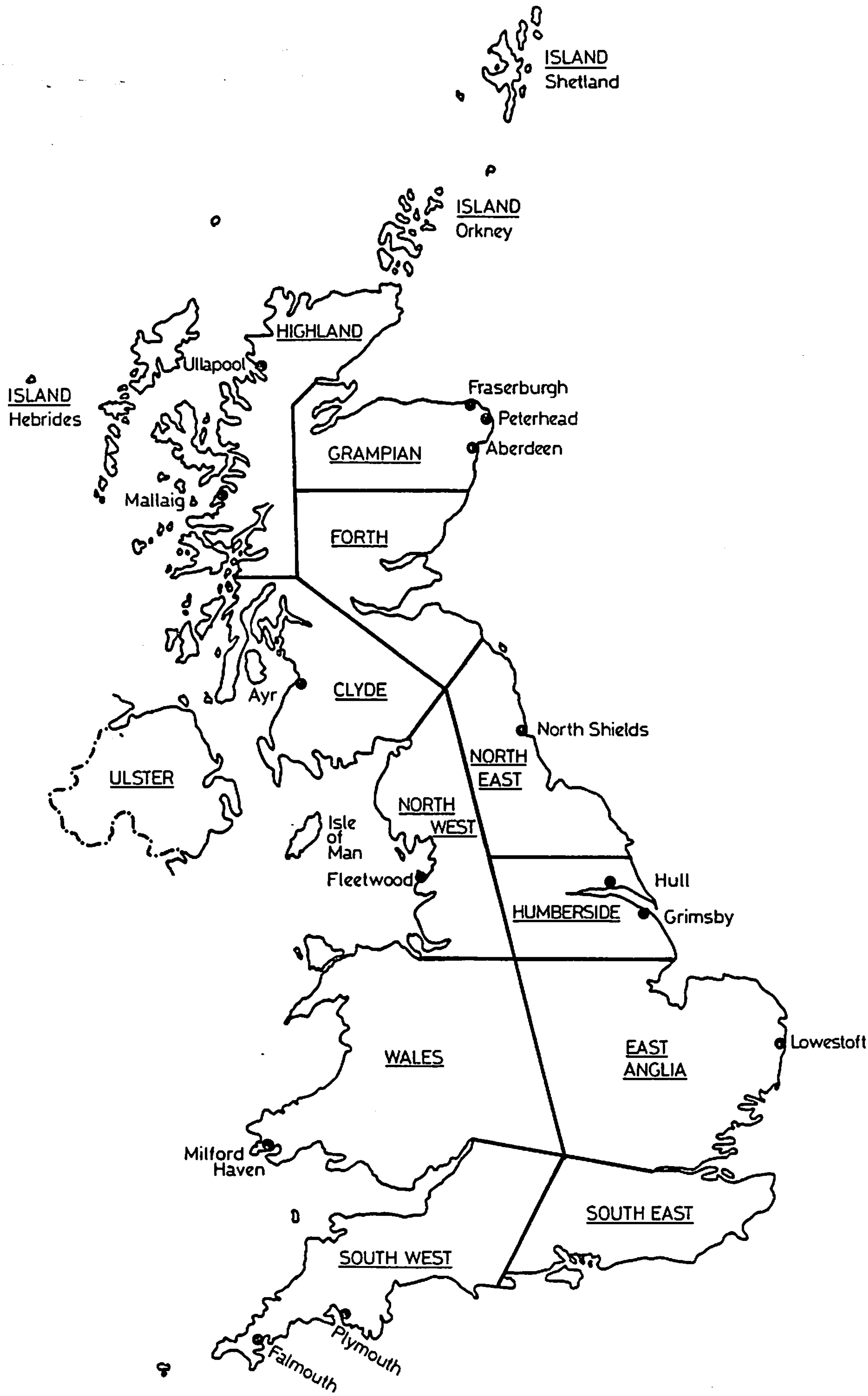
Variation of Tonnage with Length

Fig.1



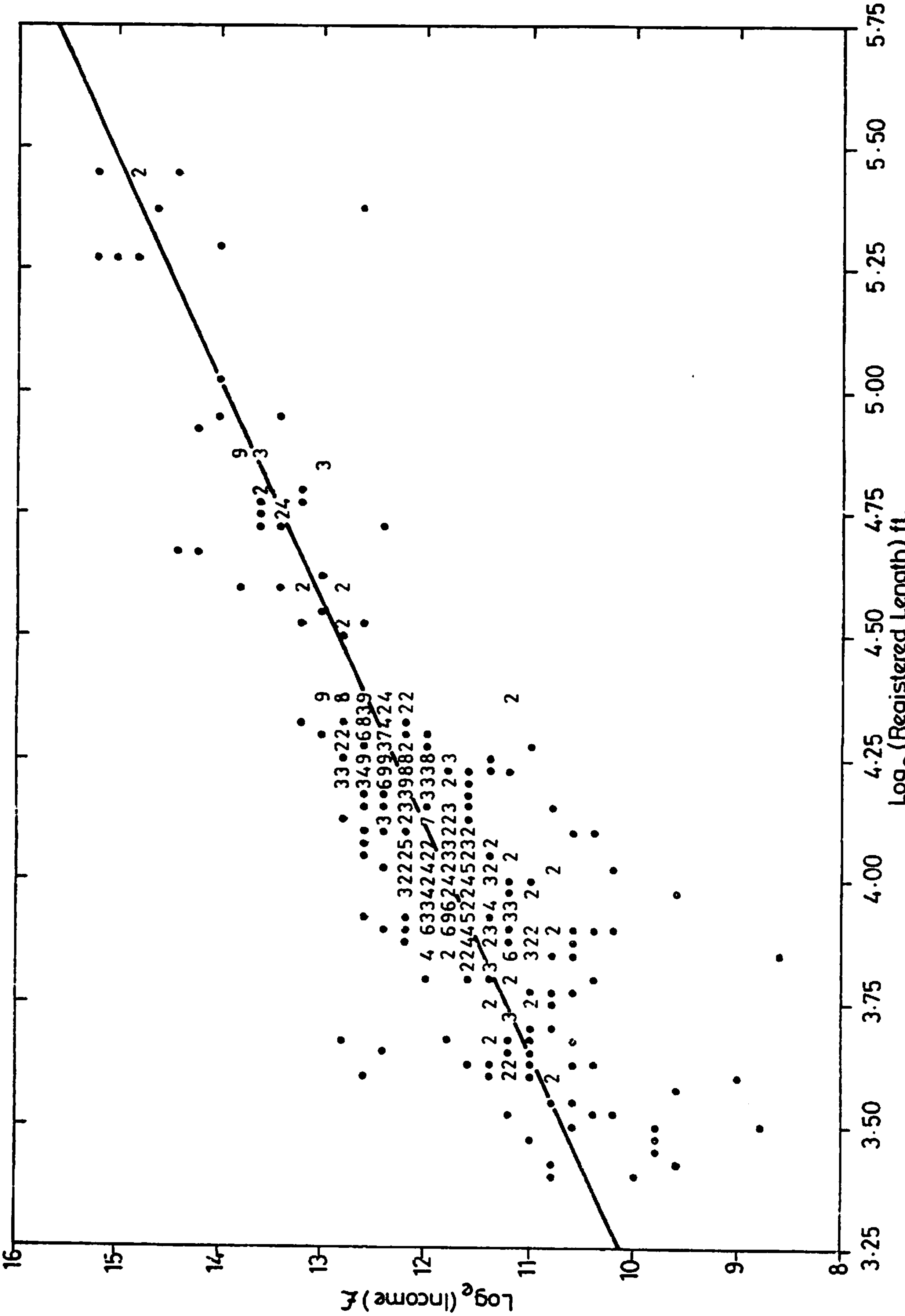
Relationship of Between Perpendiculars & Registered Lengths

Fig. 2



U.K. Regional Definition

Fig.3

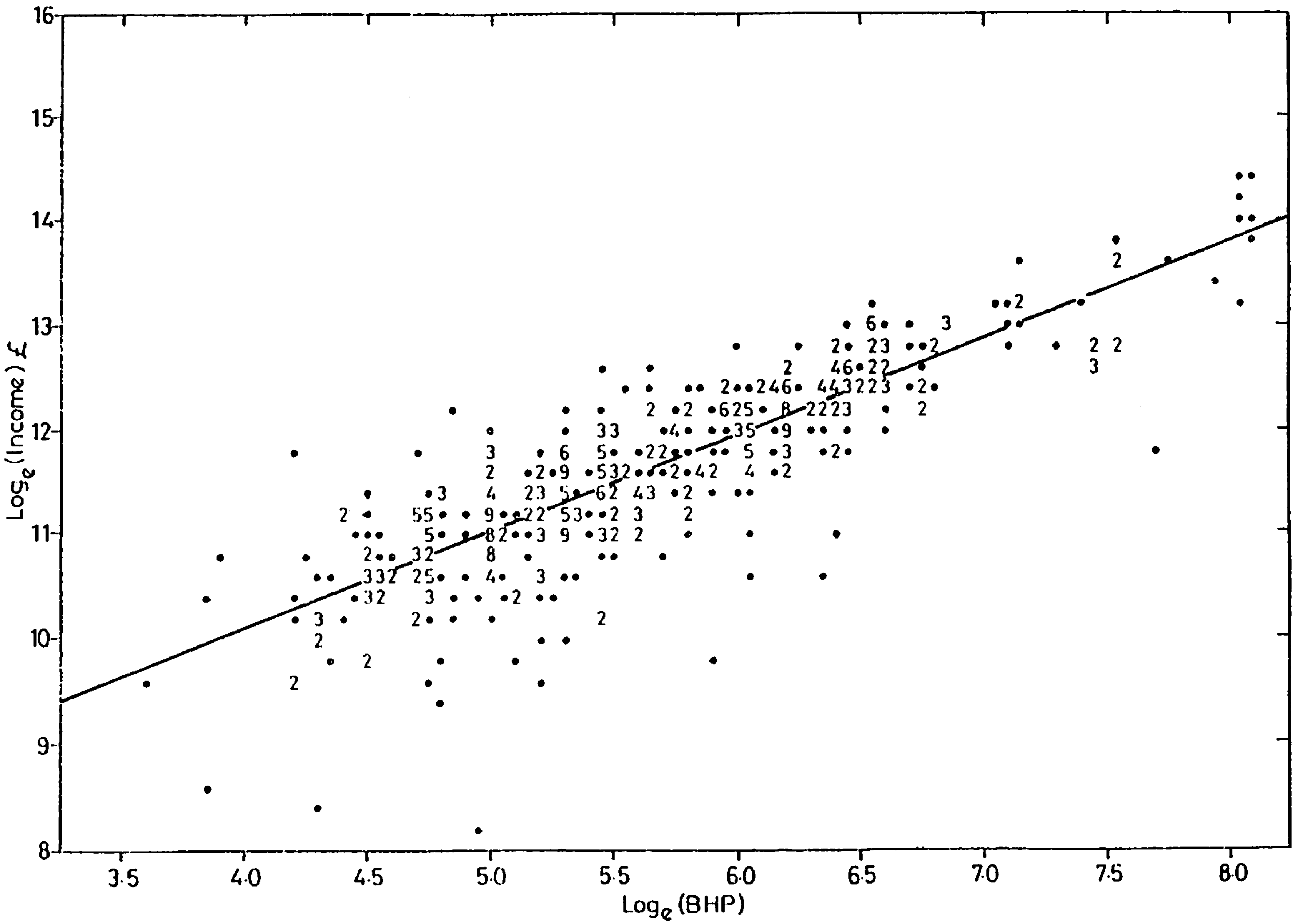


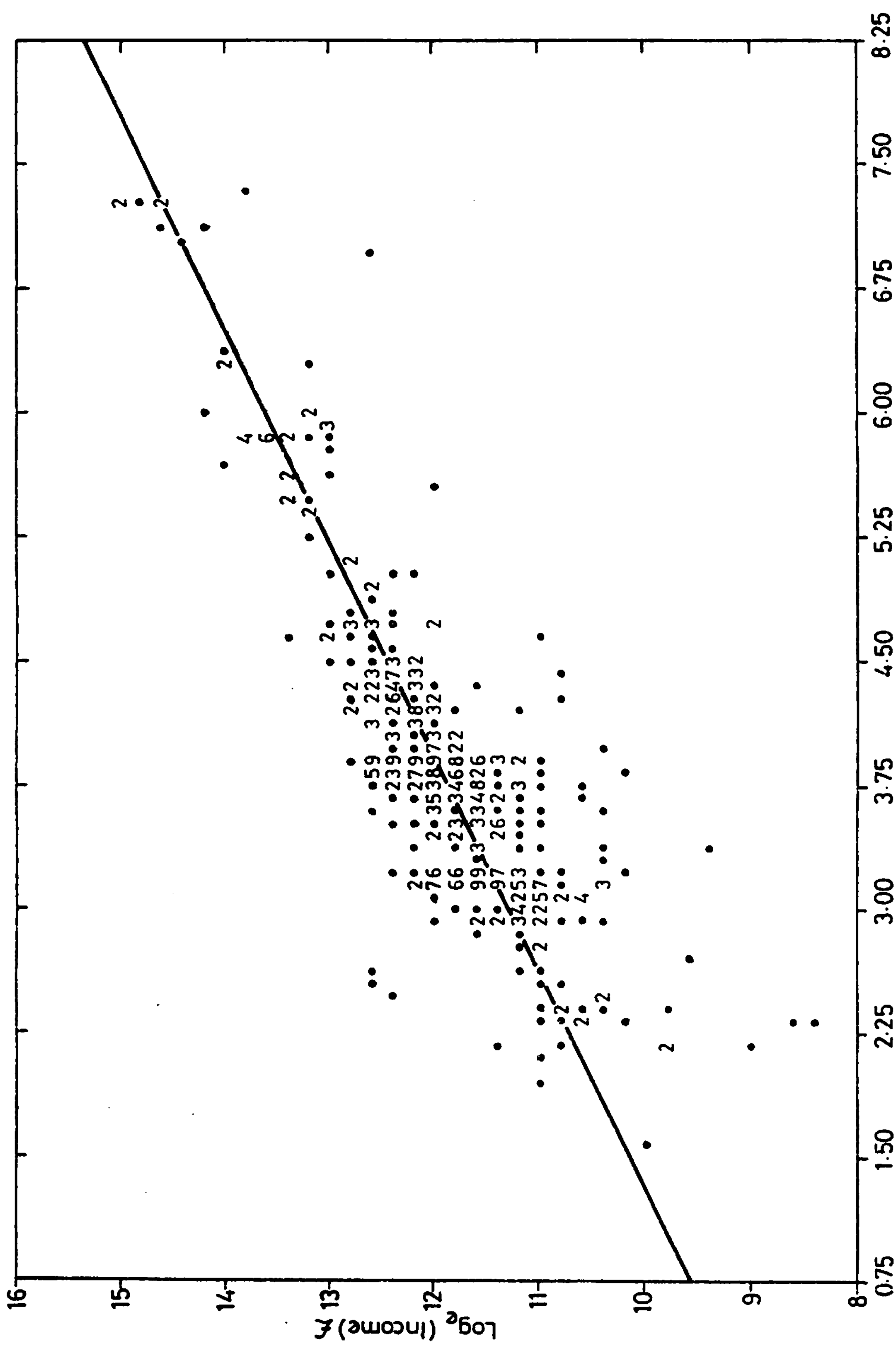
Variation of Productivity with Length

Fig. 4

Fig.5

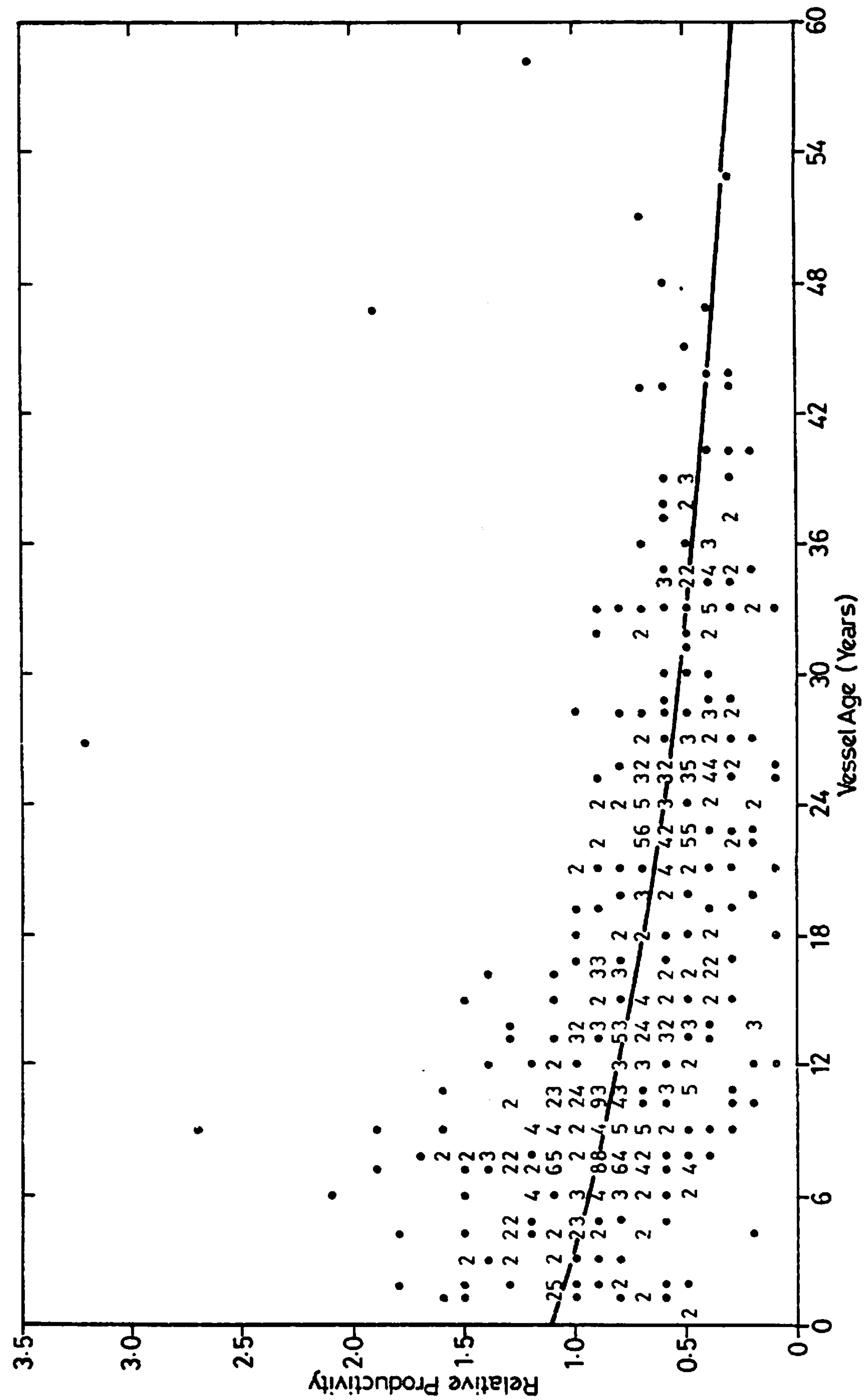
Variation of Productivity with Power





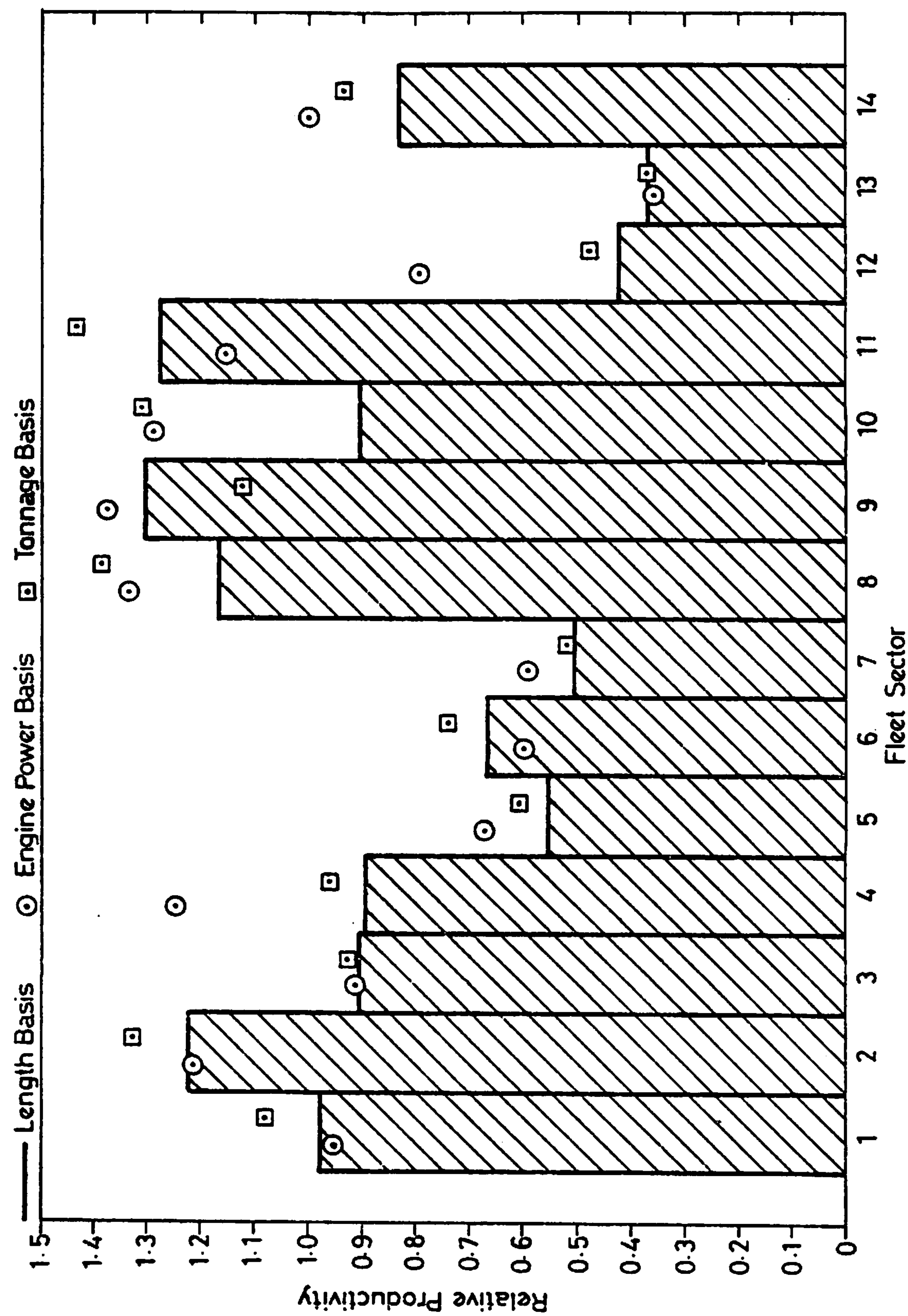
Variation of Productivity with Tonnage

Fig.6



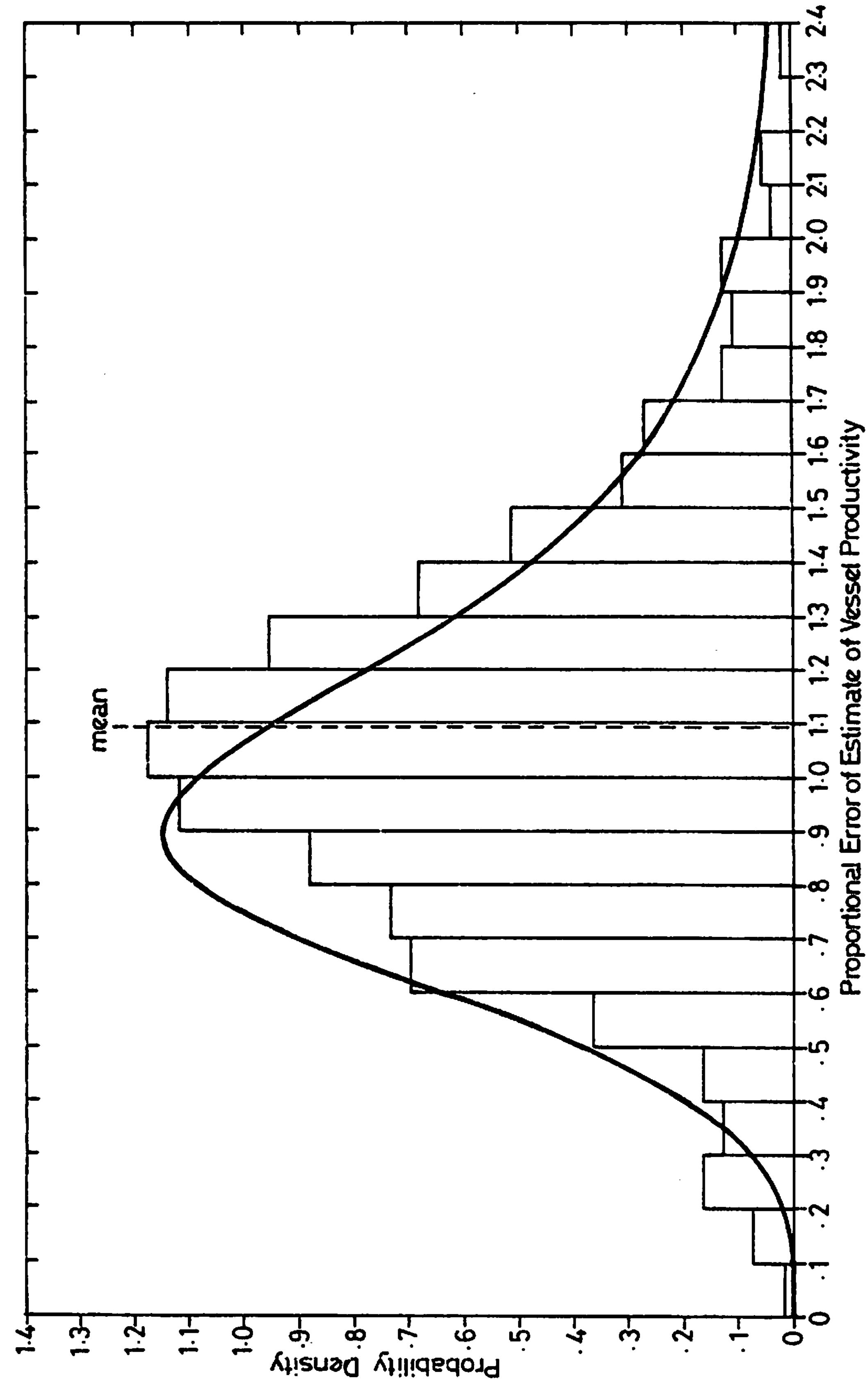
Variation of Productivity with Age

Fig. 7



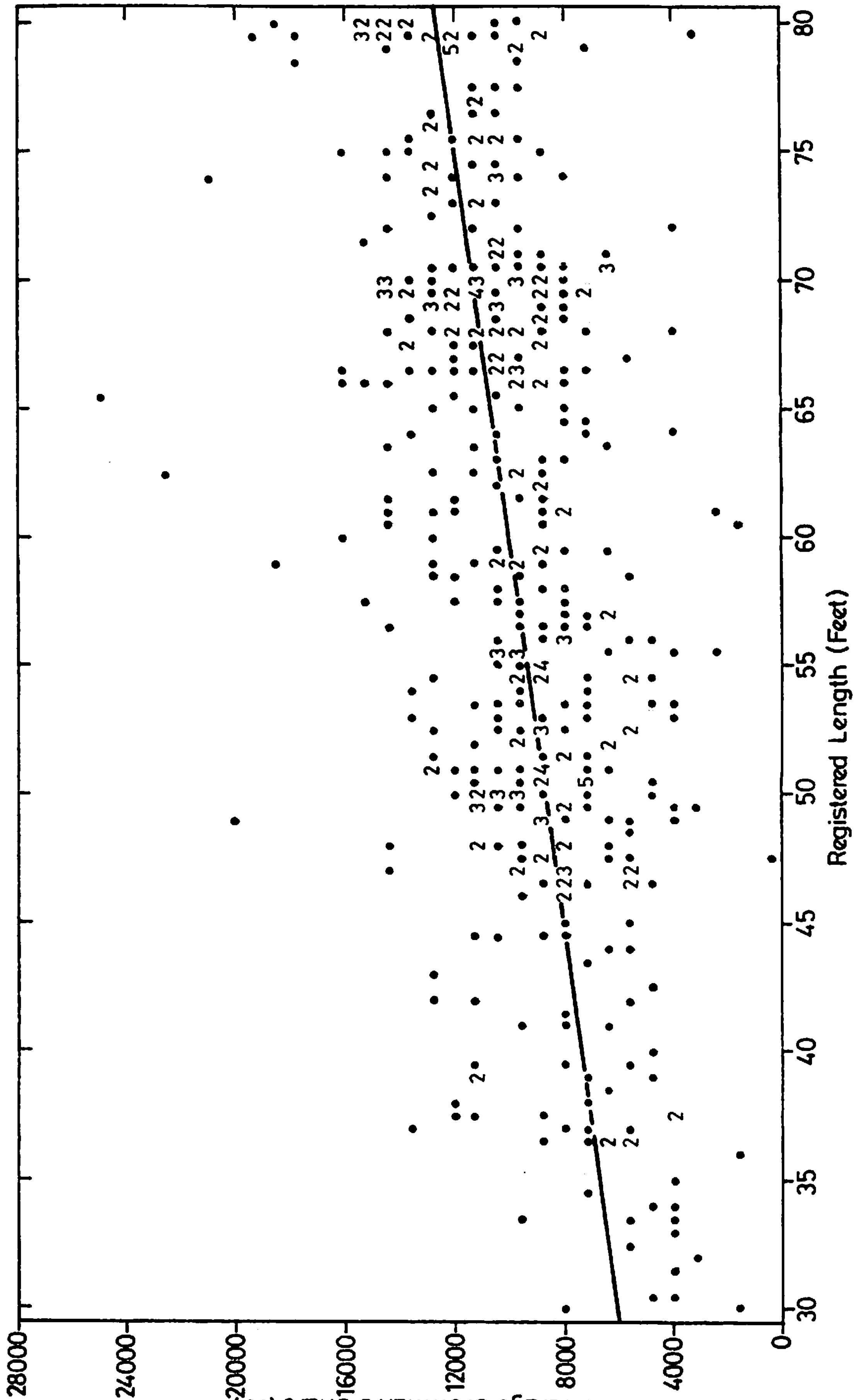
Variation of Productivity with Fleet Sector

Fig. 8



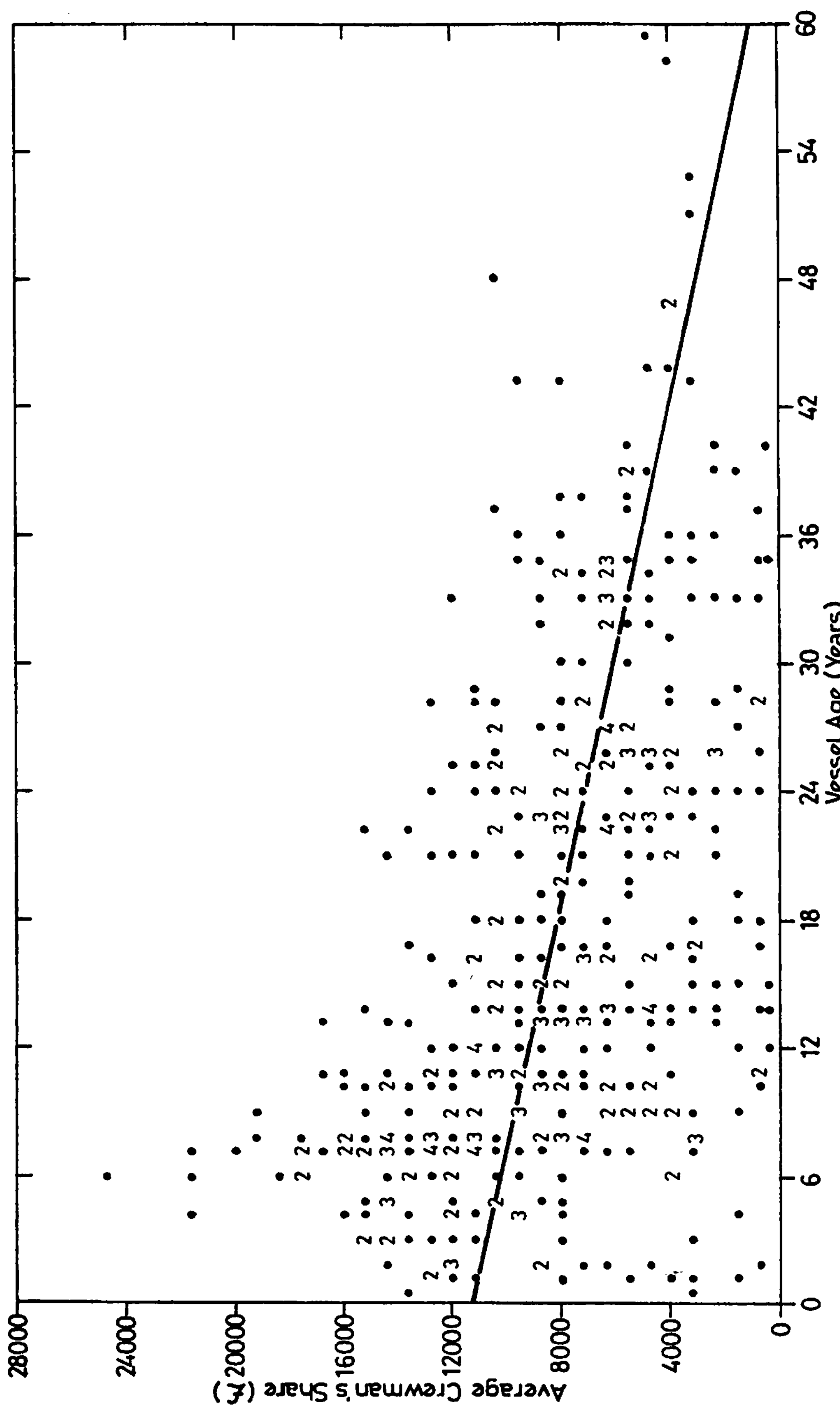
Random Variation in Vessel Productivity

Fig. 9



Variation in Labour Remuneration with Length

Fig. 10



Variation in Labour Remuneration with Age

Fig. 11

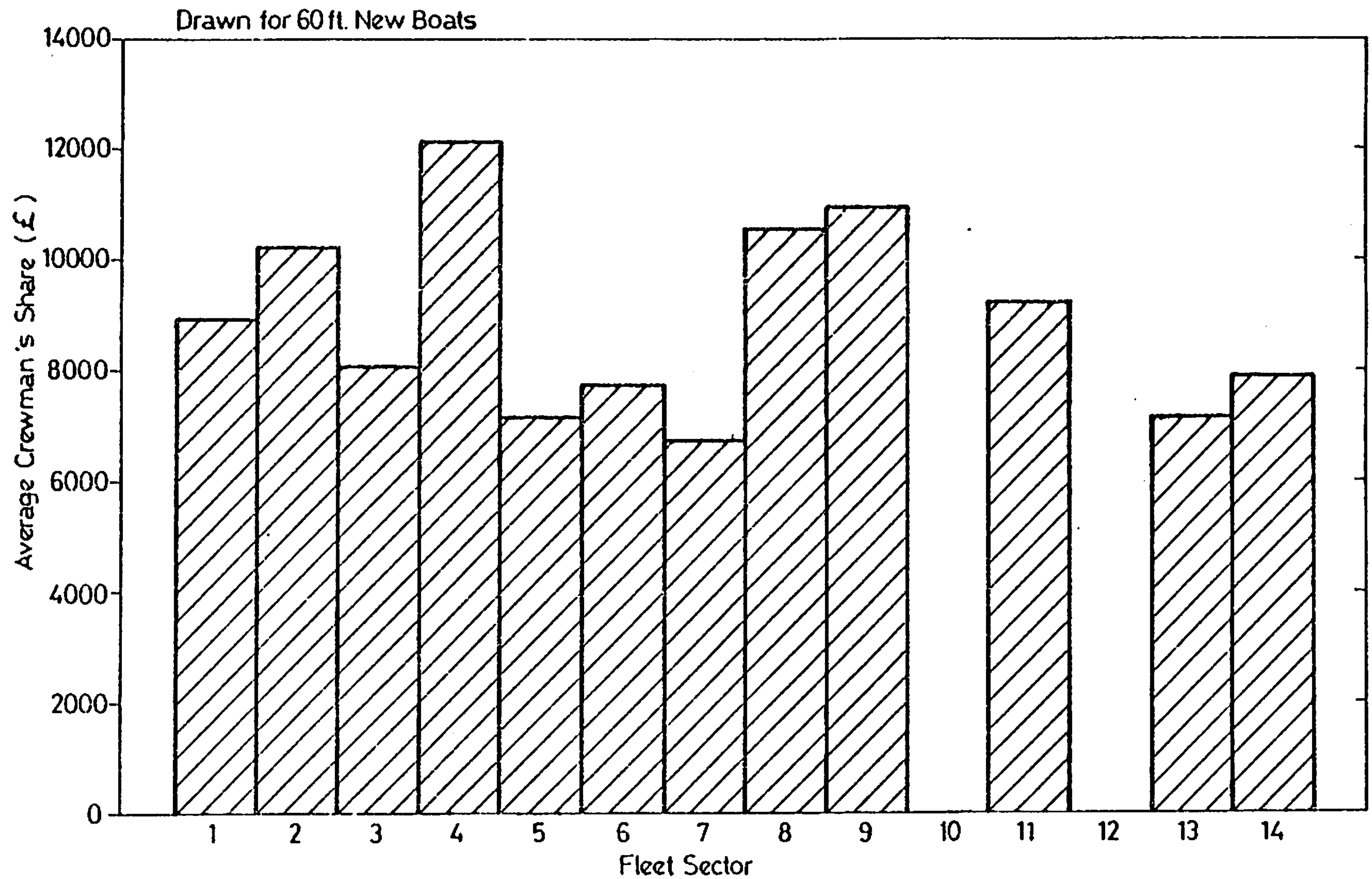
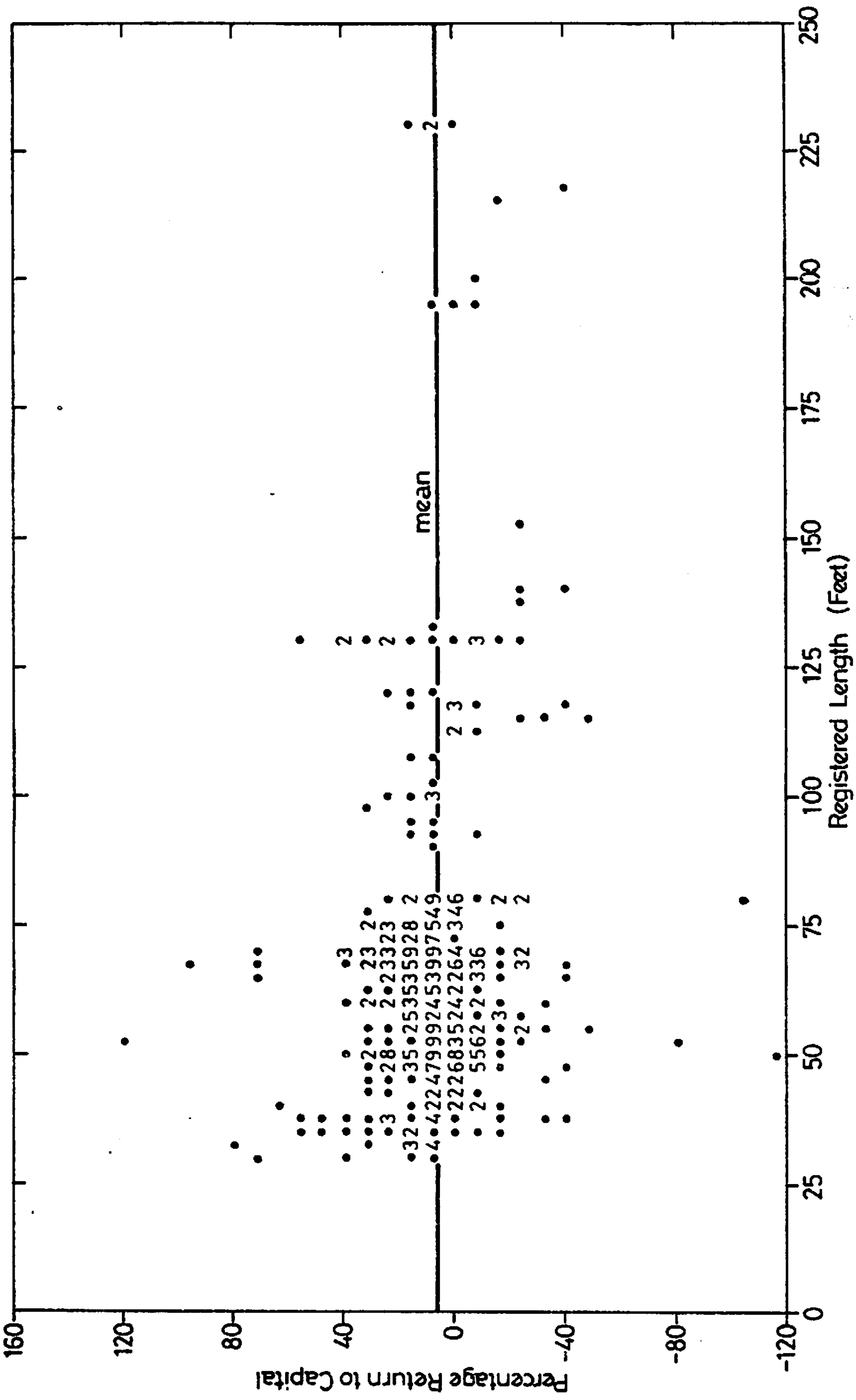
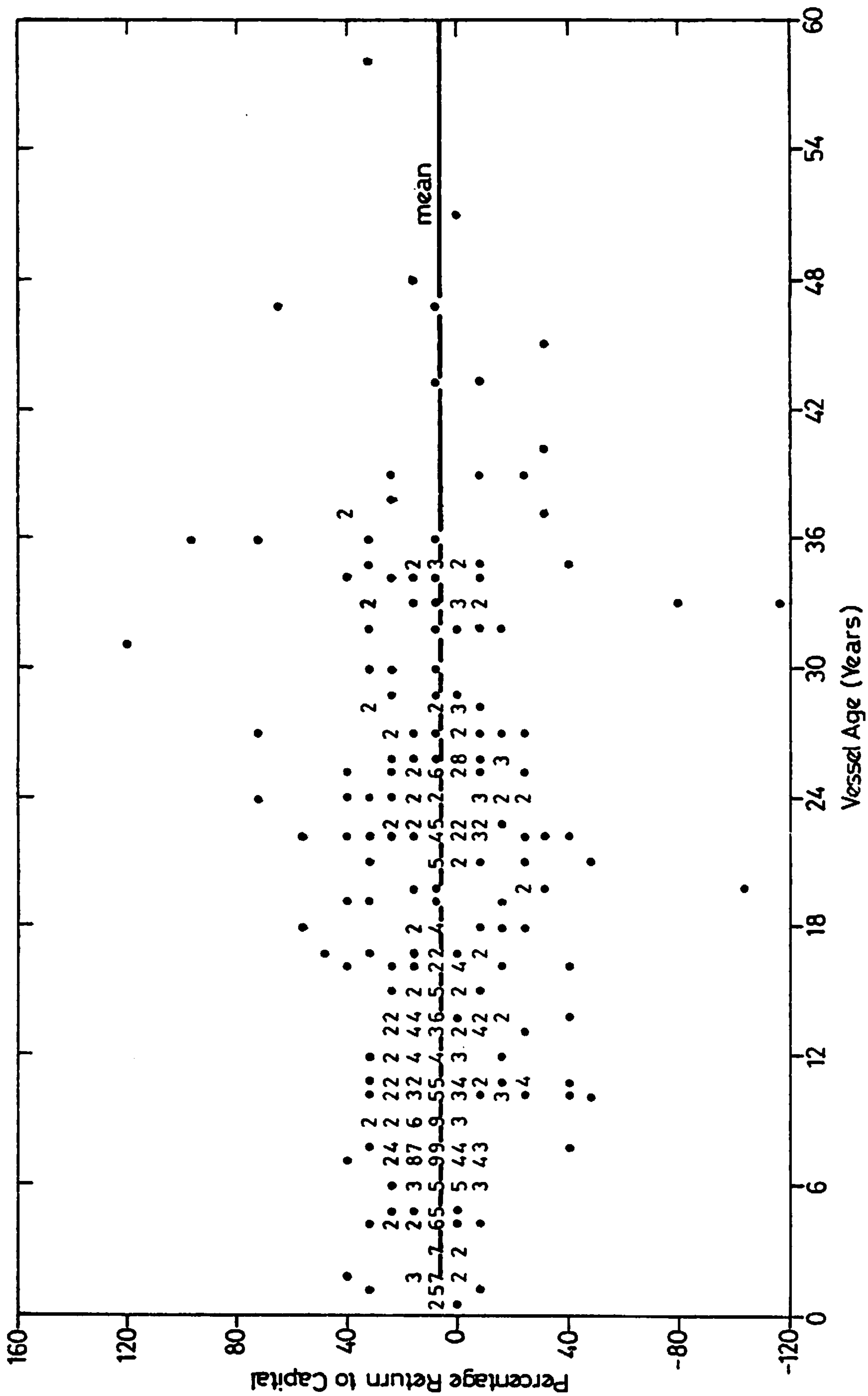


Fig.12 Variation of Labour Remuneration with Fleet Sector



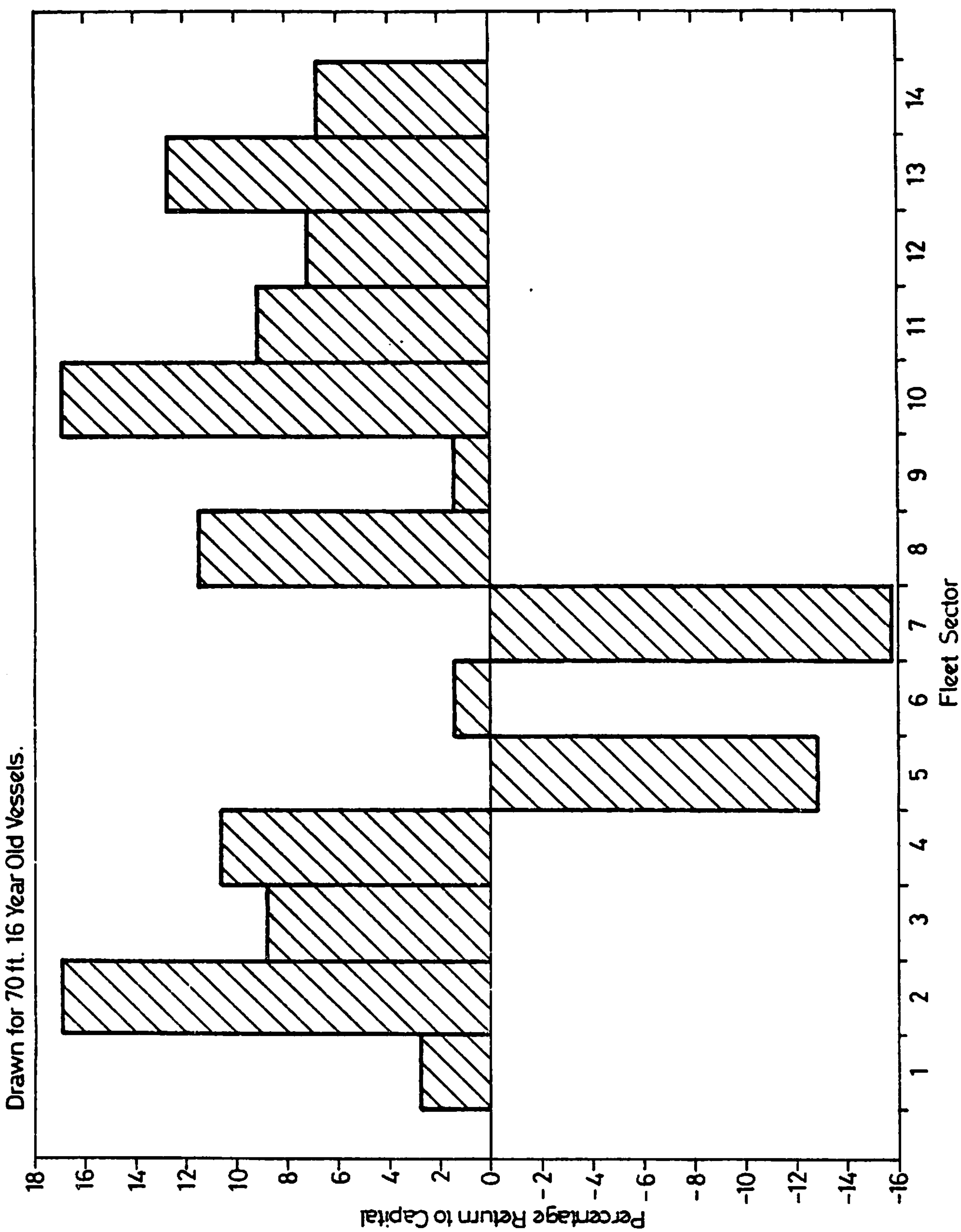
Variation of Capital Remuneration with Length

Fig.13

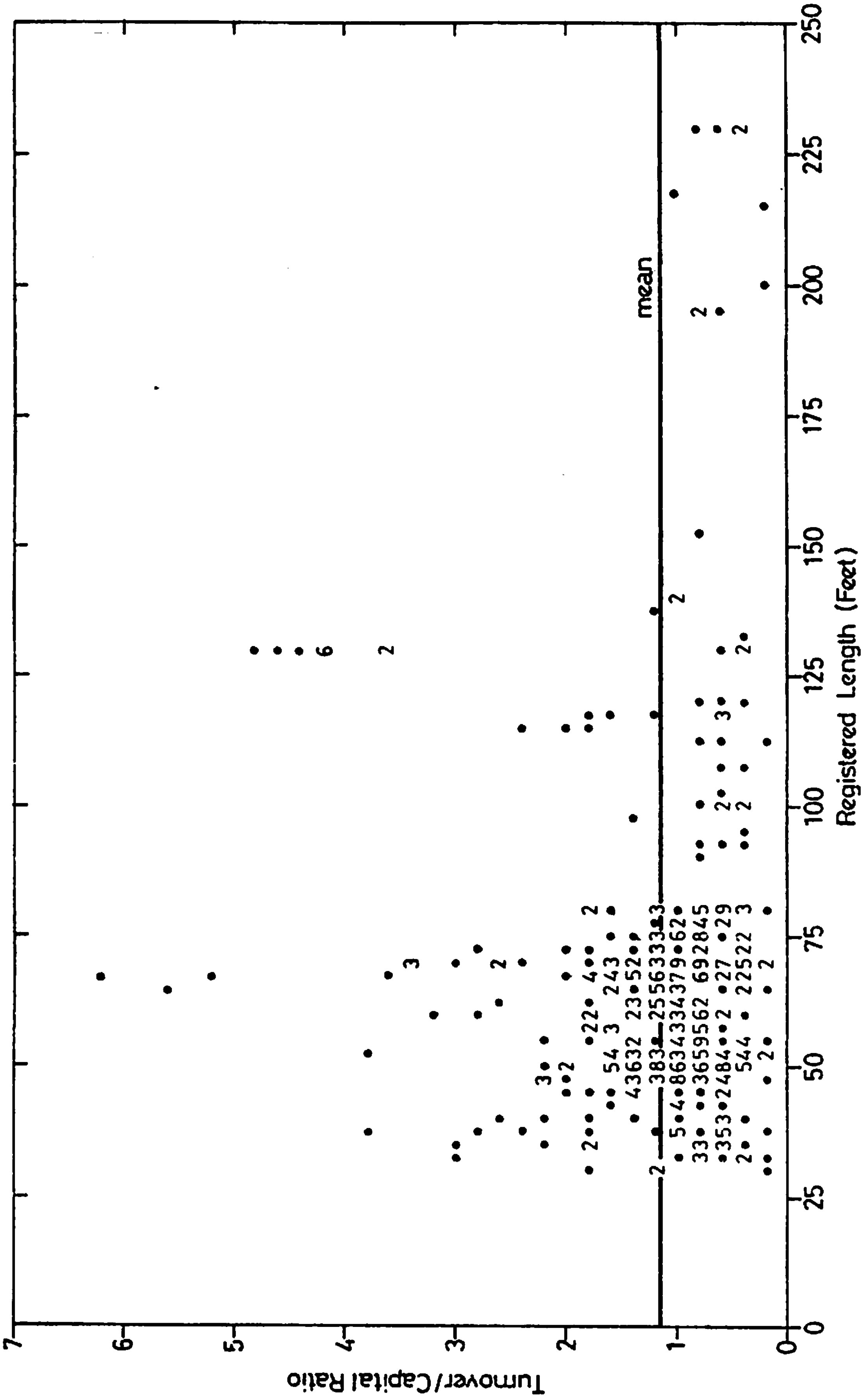


Variation of Capital Remuneration with Age

Fig.14

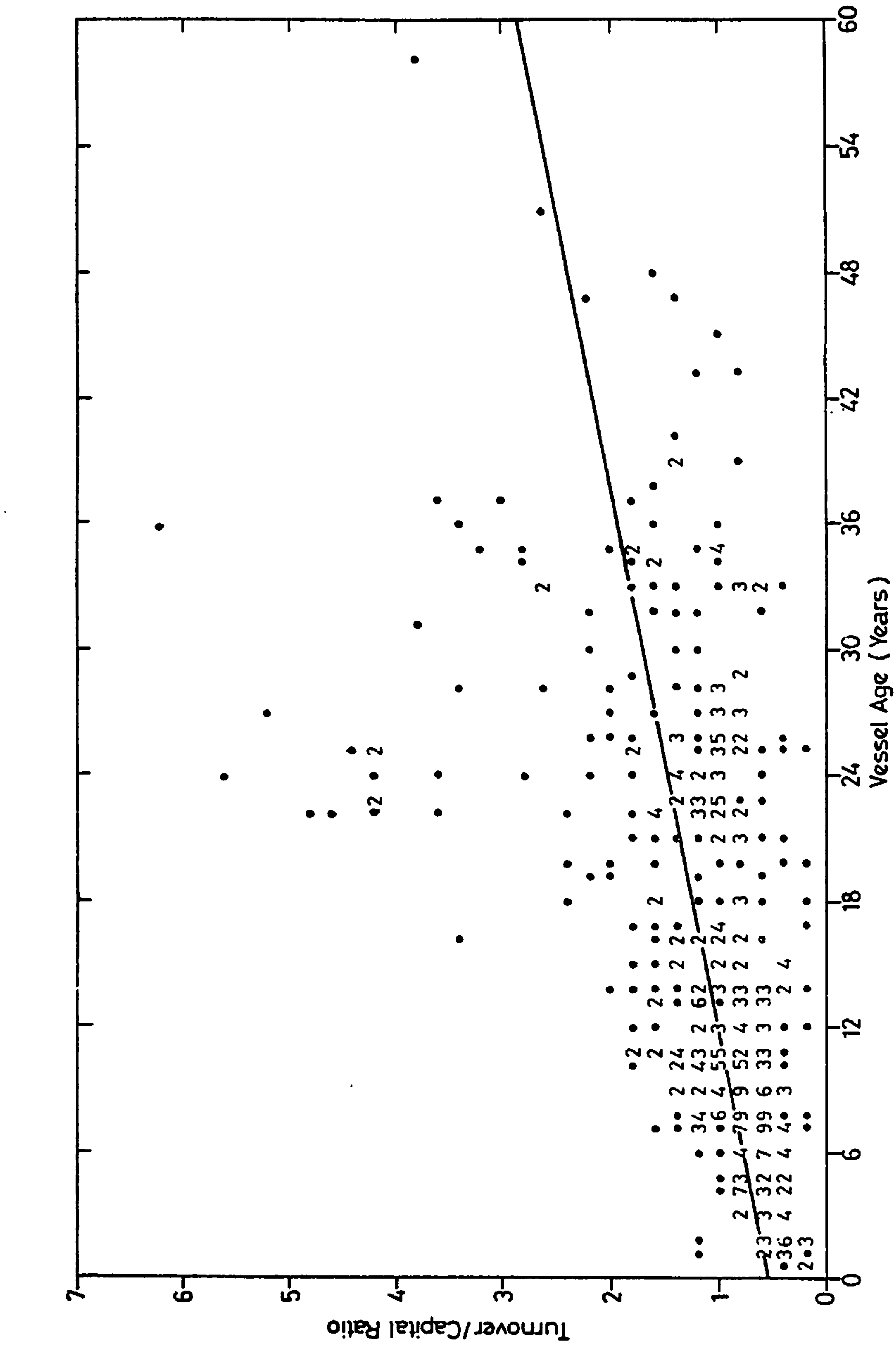


Variation of Capital Remuneration with Fleet Sector Fig.15



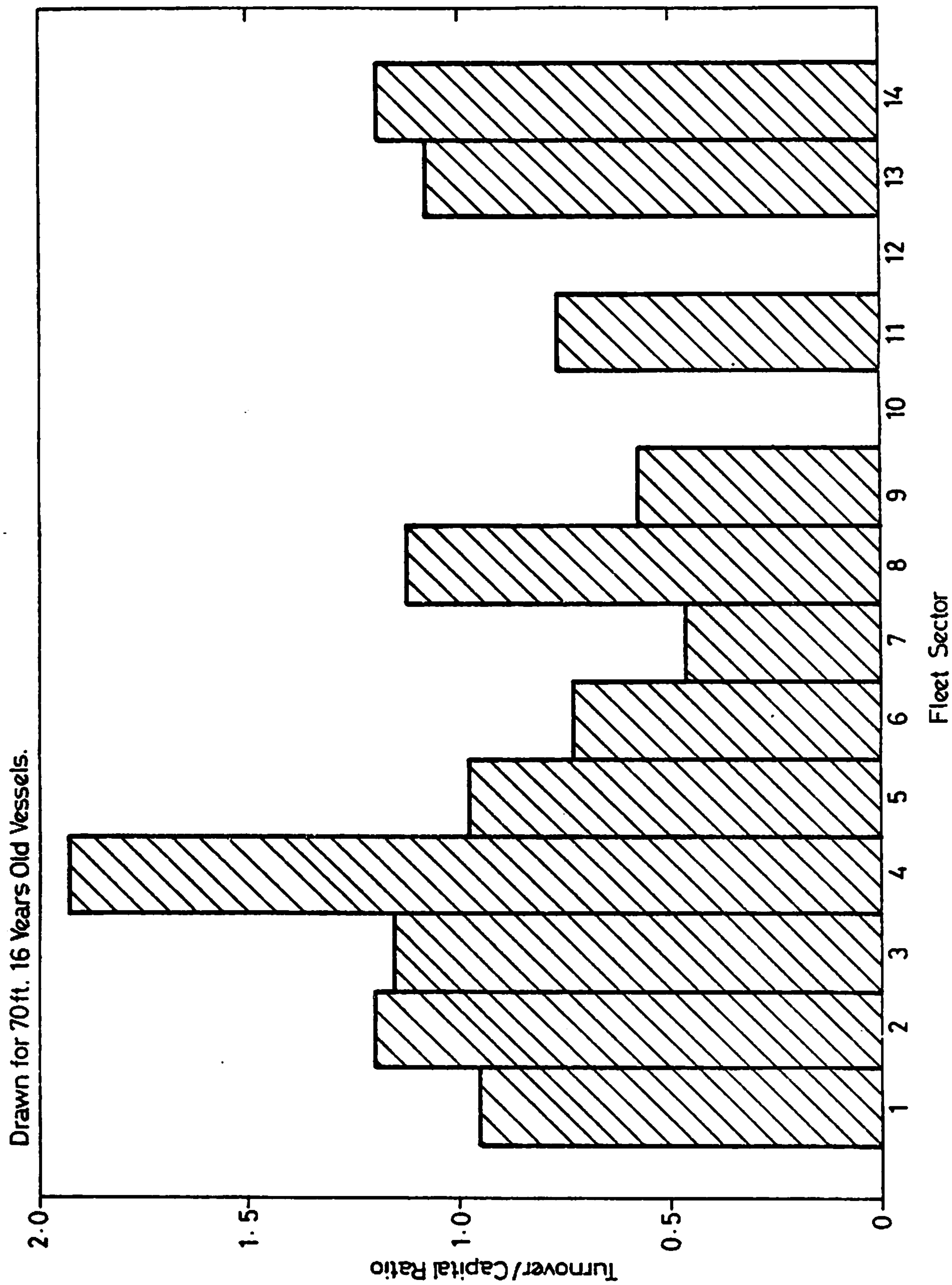
Variation of Turnover / Capital Ratio with Length

Fig.16



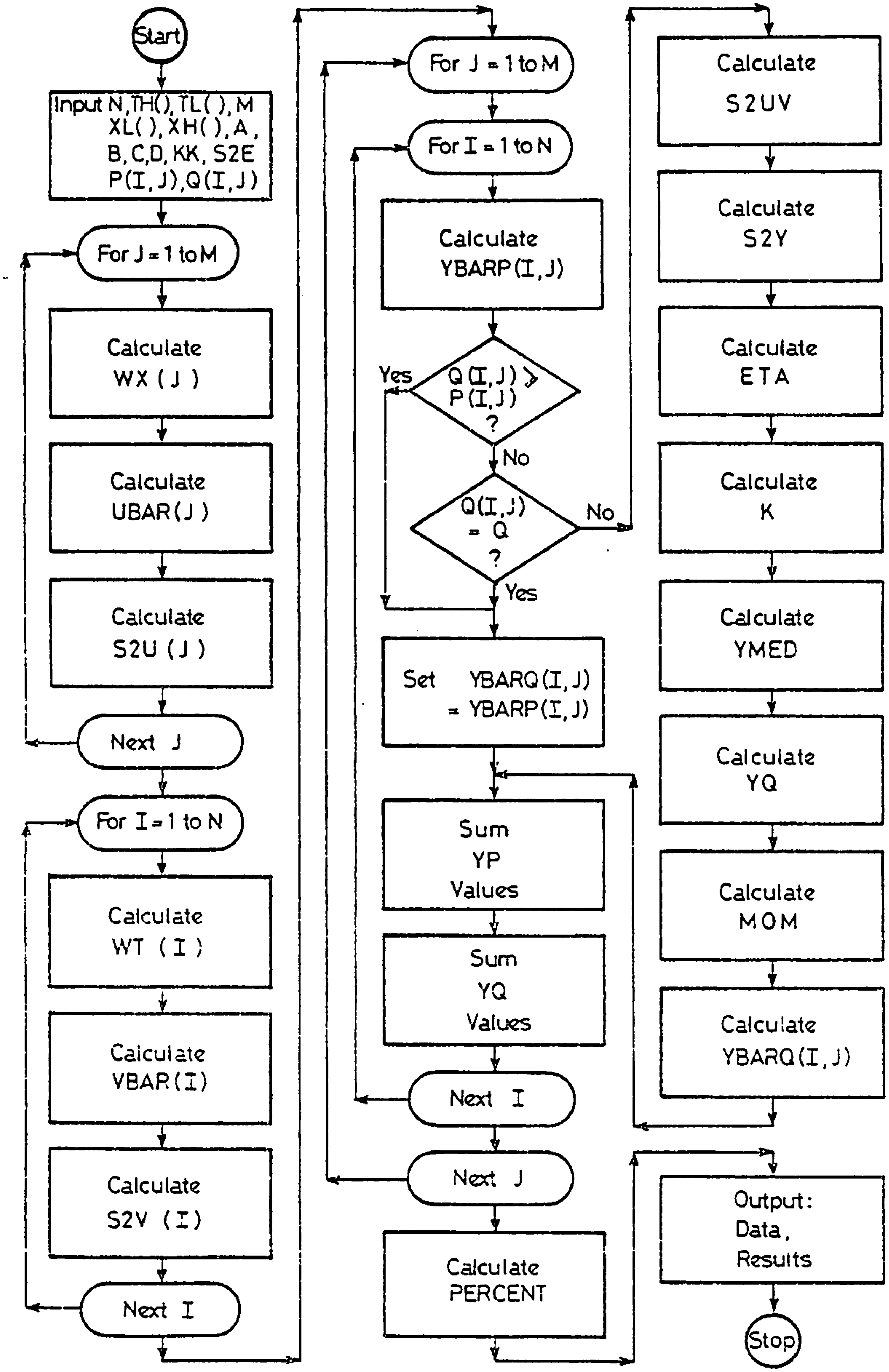
Variation of Turnover/Capital Ratio with Age

Fig. 17



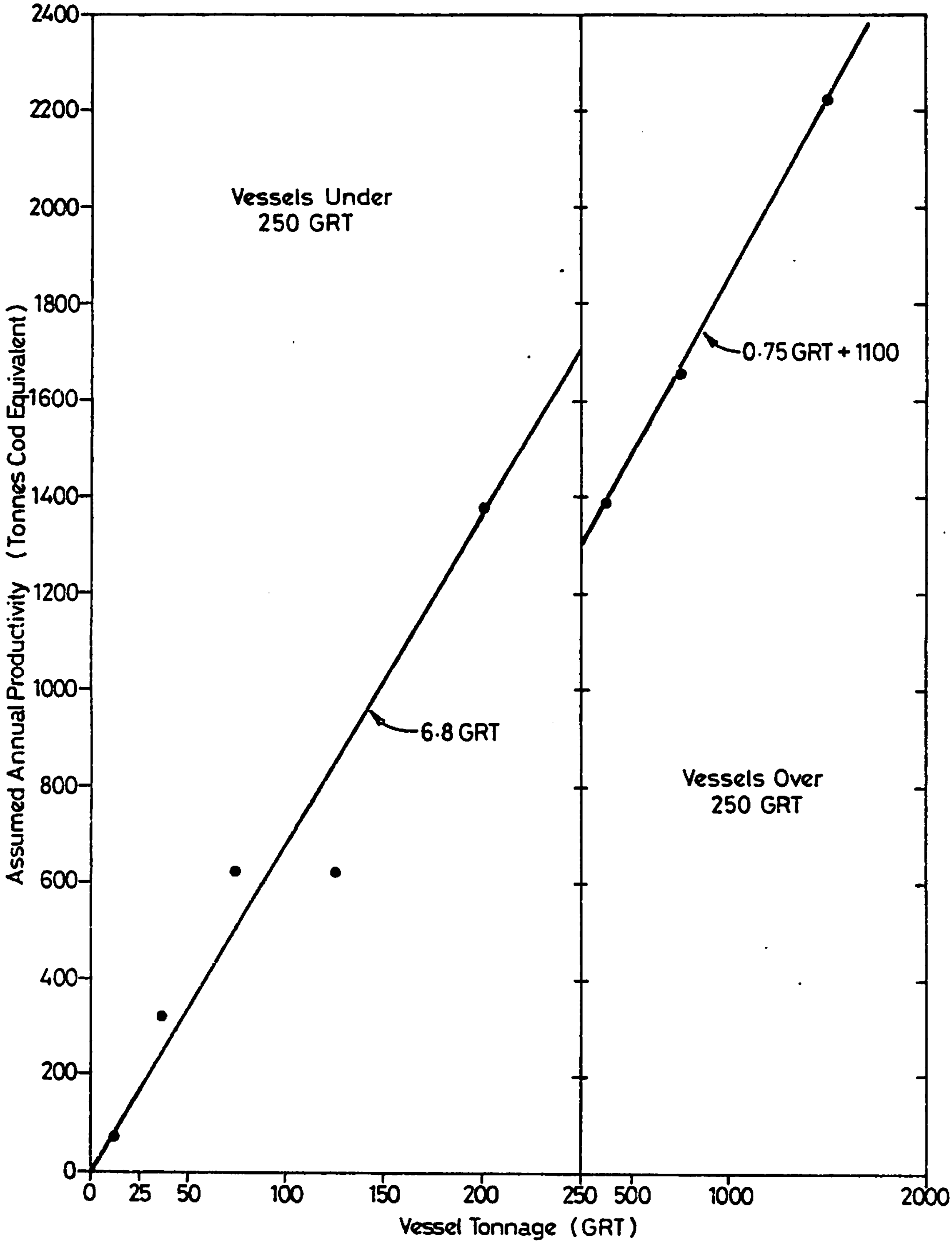
Variation of Turnover/Capital Ratio with Fleet Sector

Fig.18

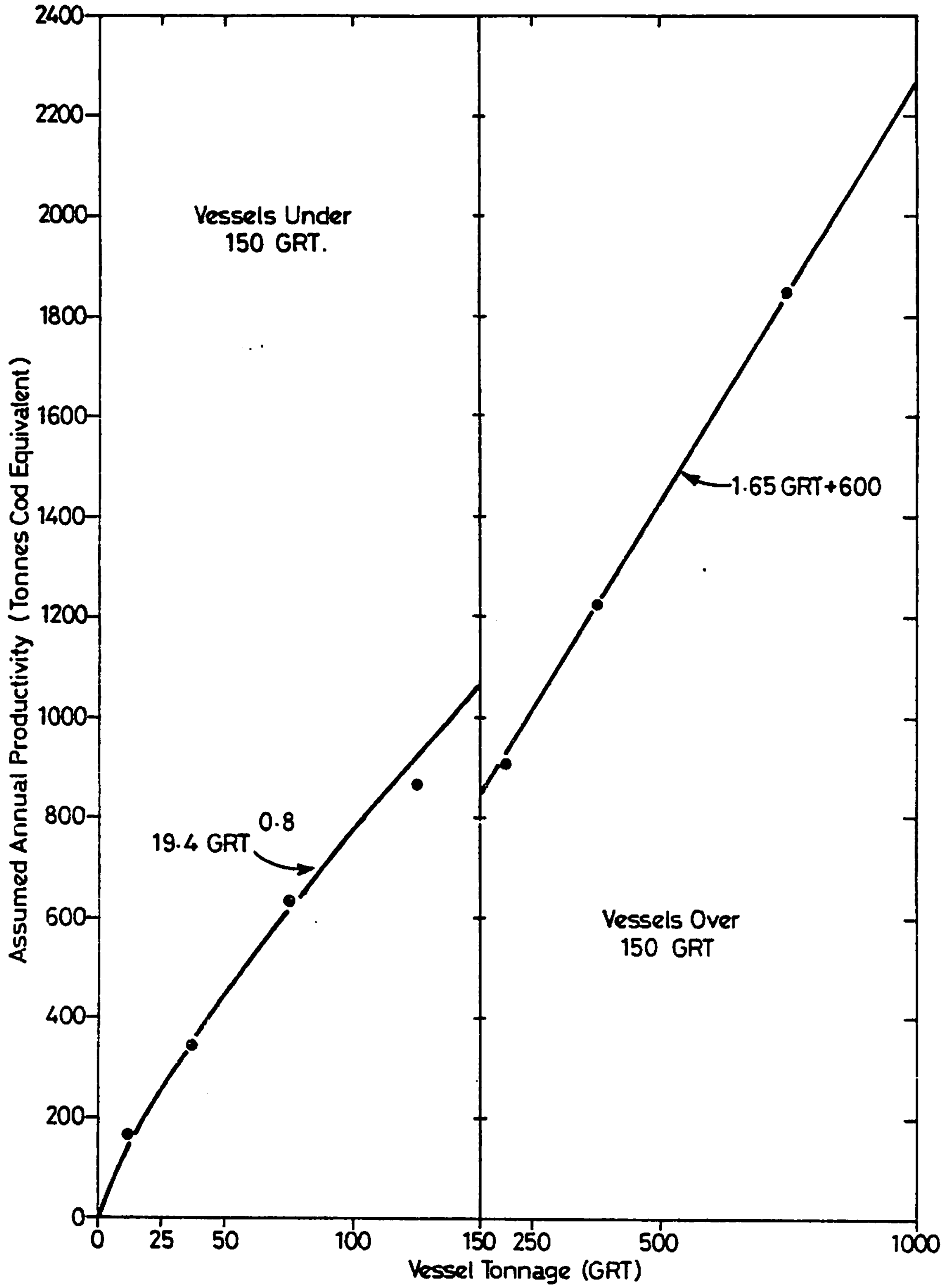


CAPSIM Flow Chart

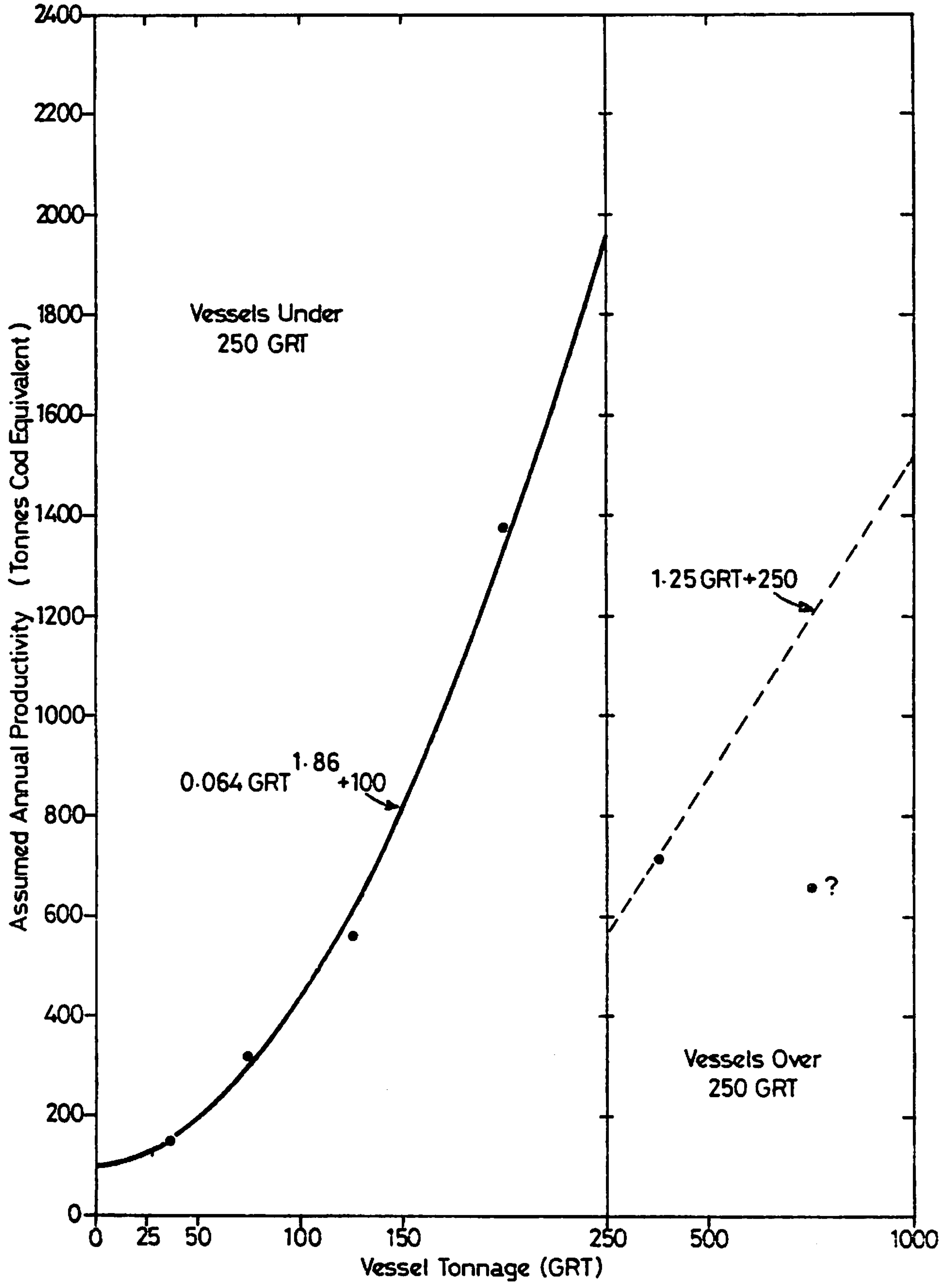
Fig. 19



Mean Productivity of English Vessels Fig. 20

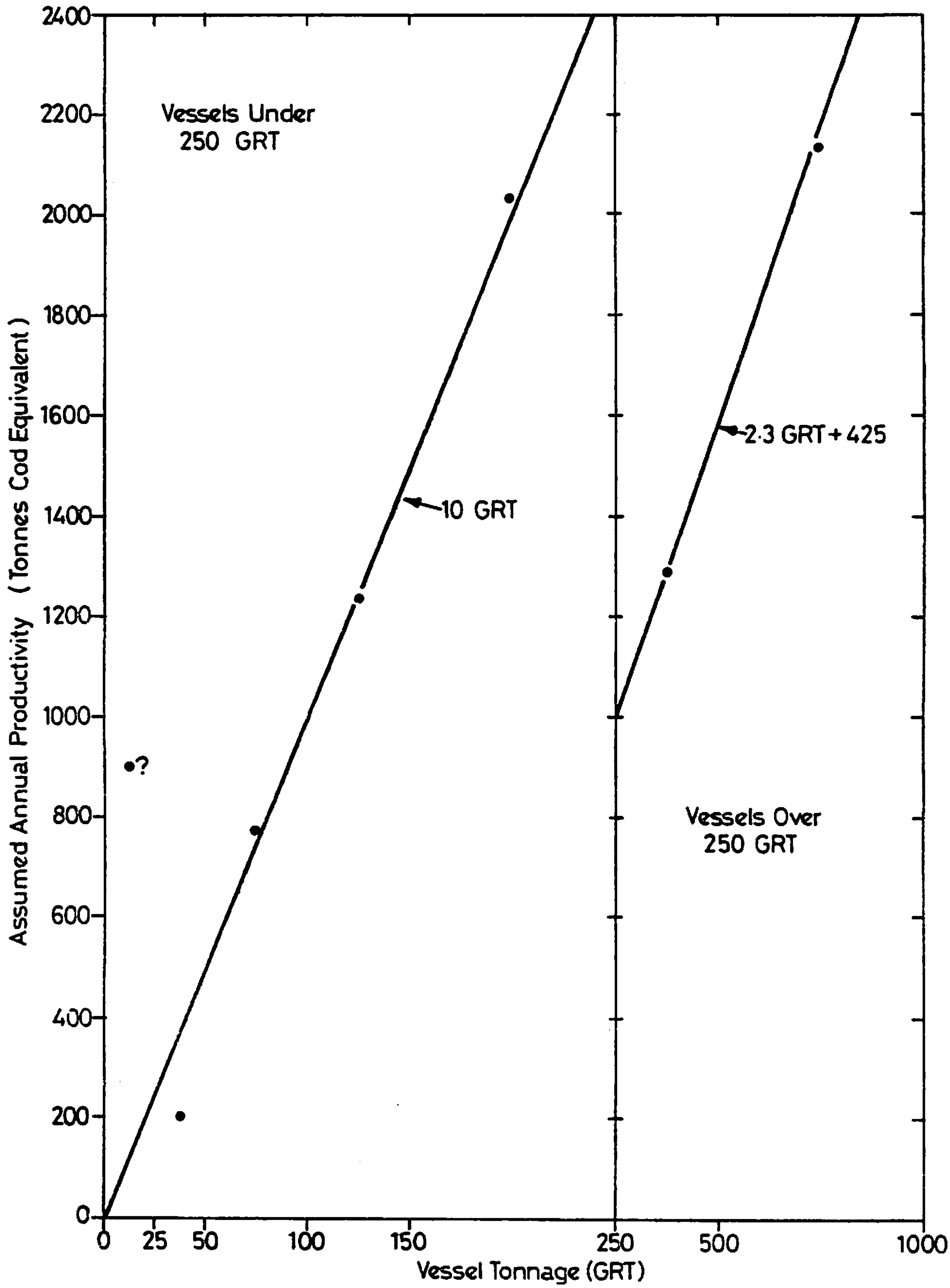


Mean Productivity of Scottish Vessels Fig.21



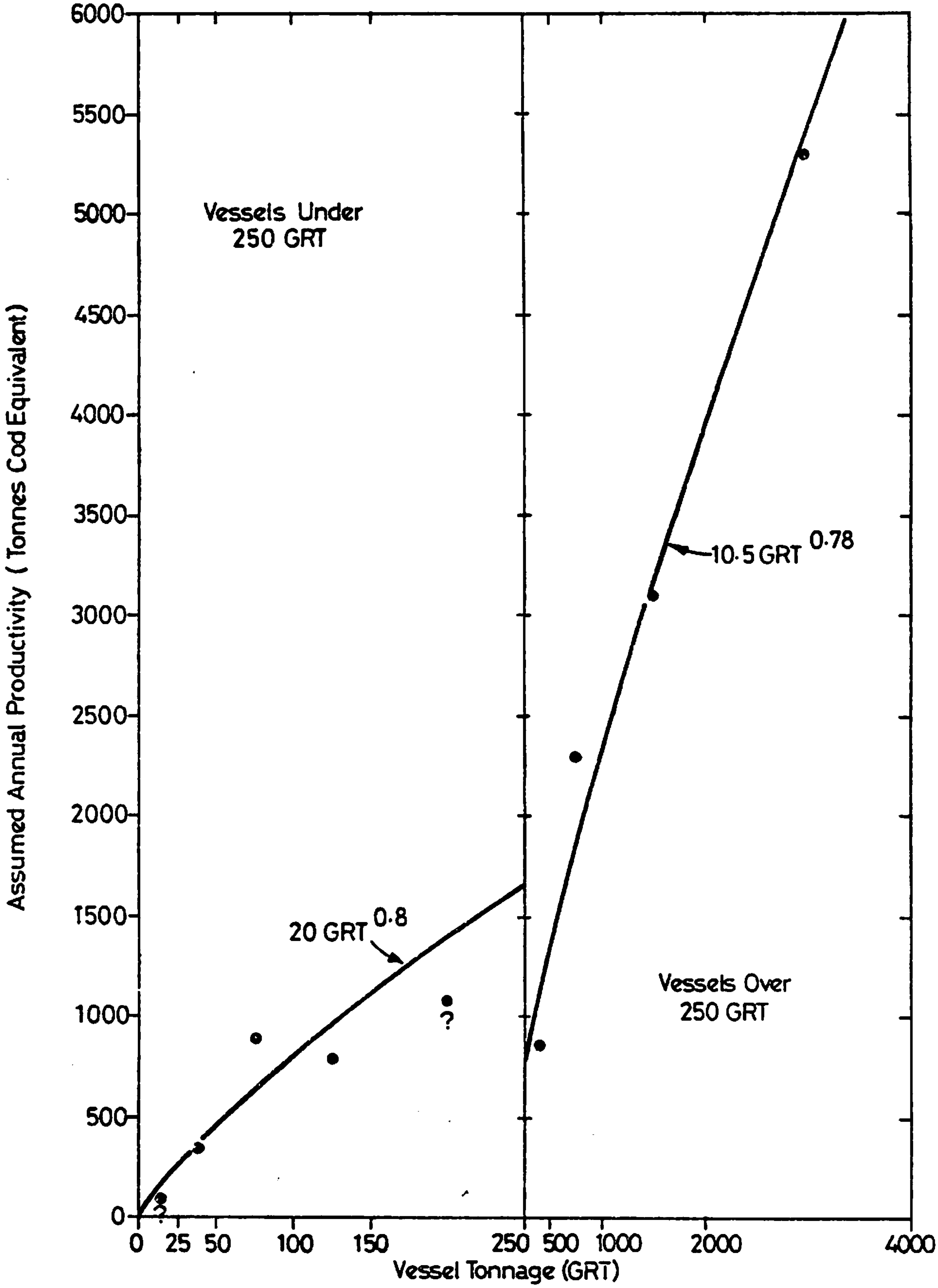
Mean Productivity of Belgian Vessels

Fig. 22



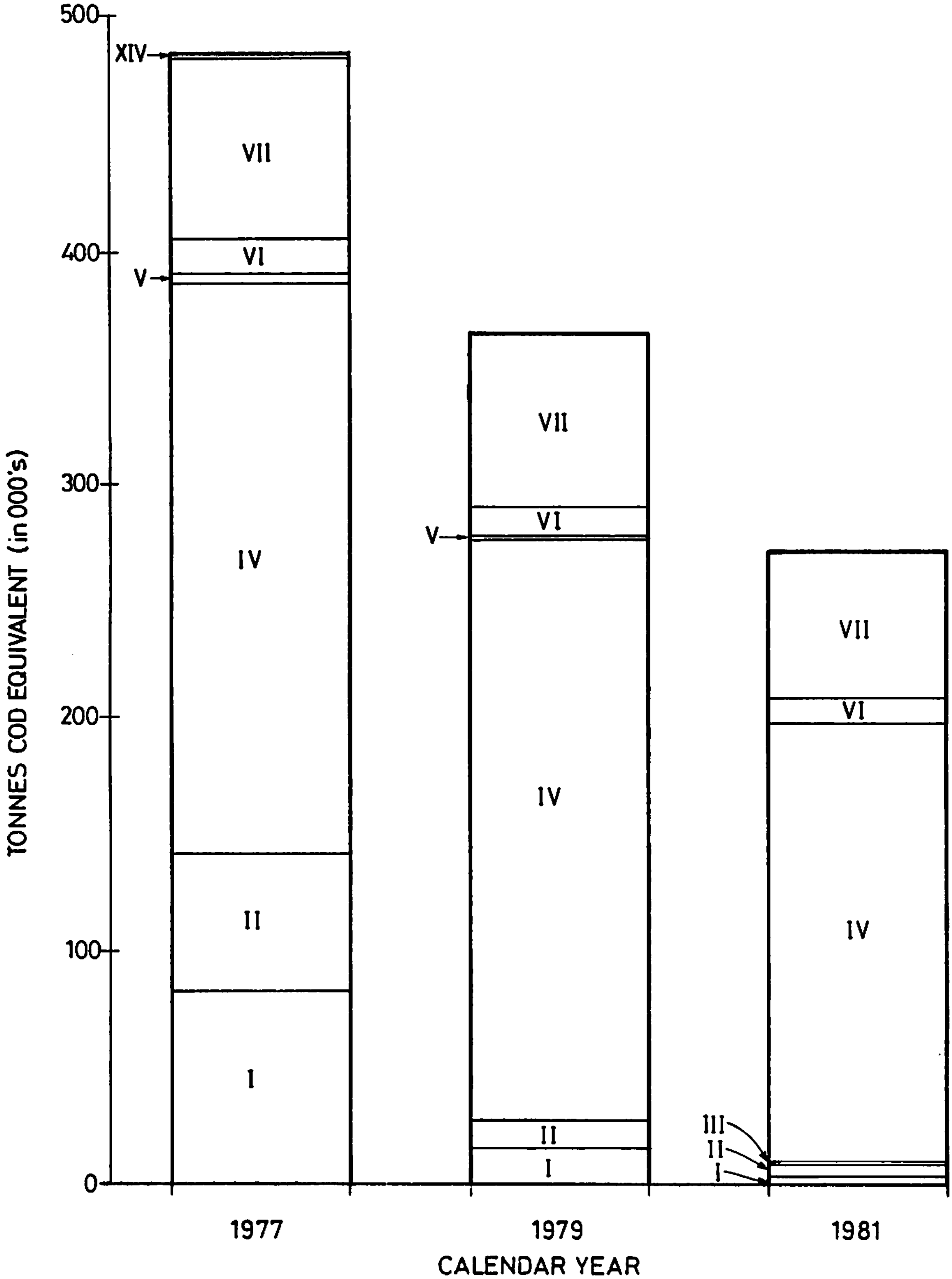
Mean Productivity of Dutch Vessels

Fig. 23



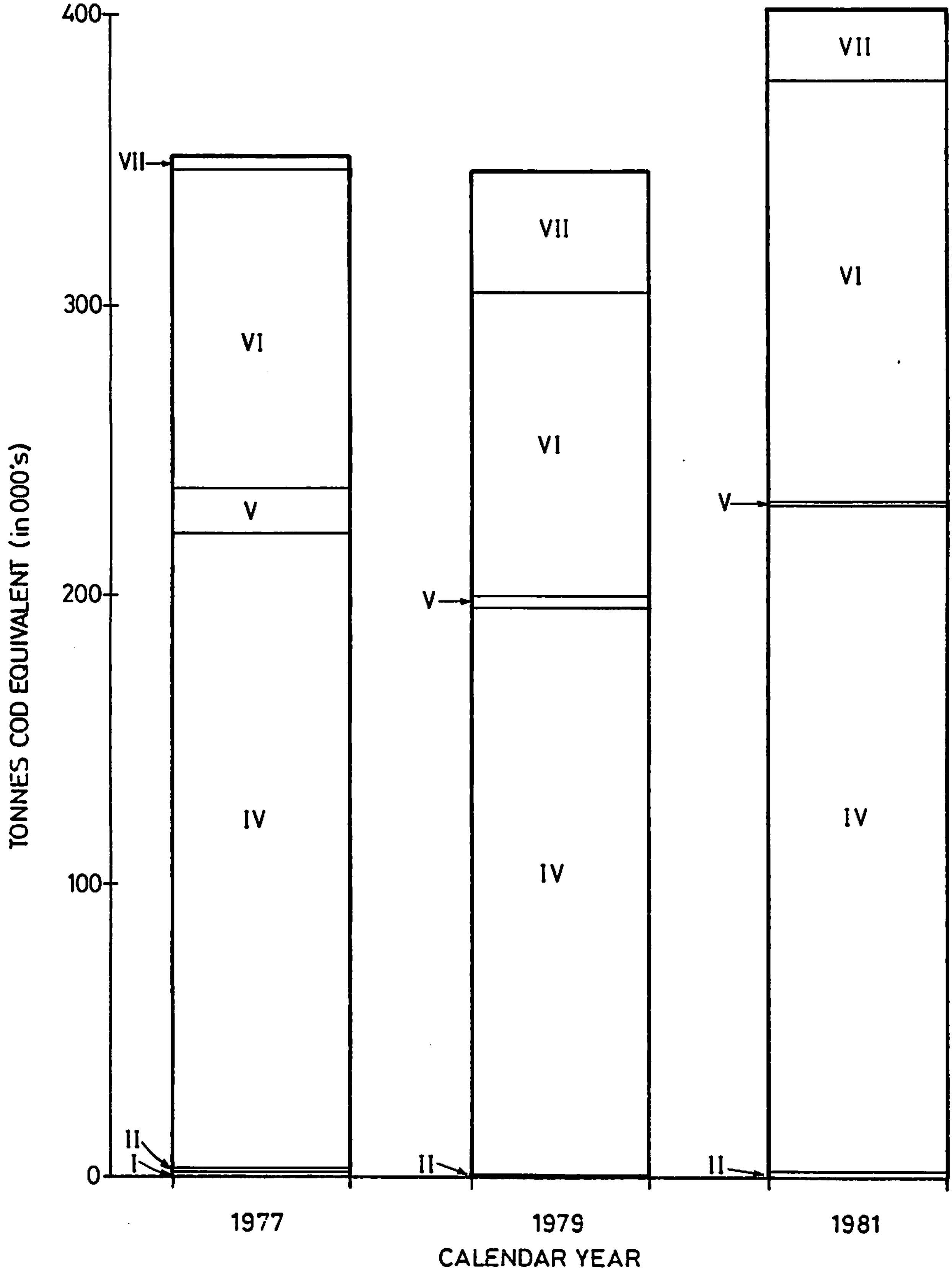
Mean Productivity of West German Vessels

Fig. 24



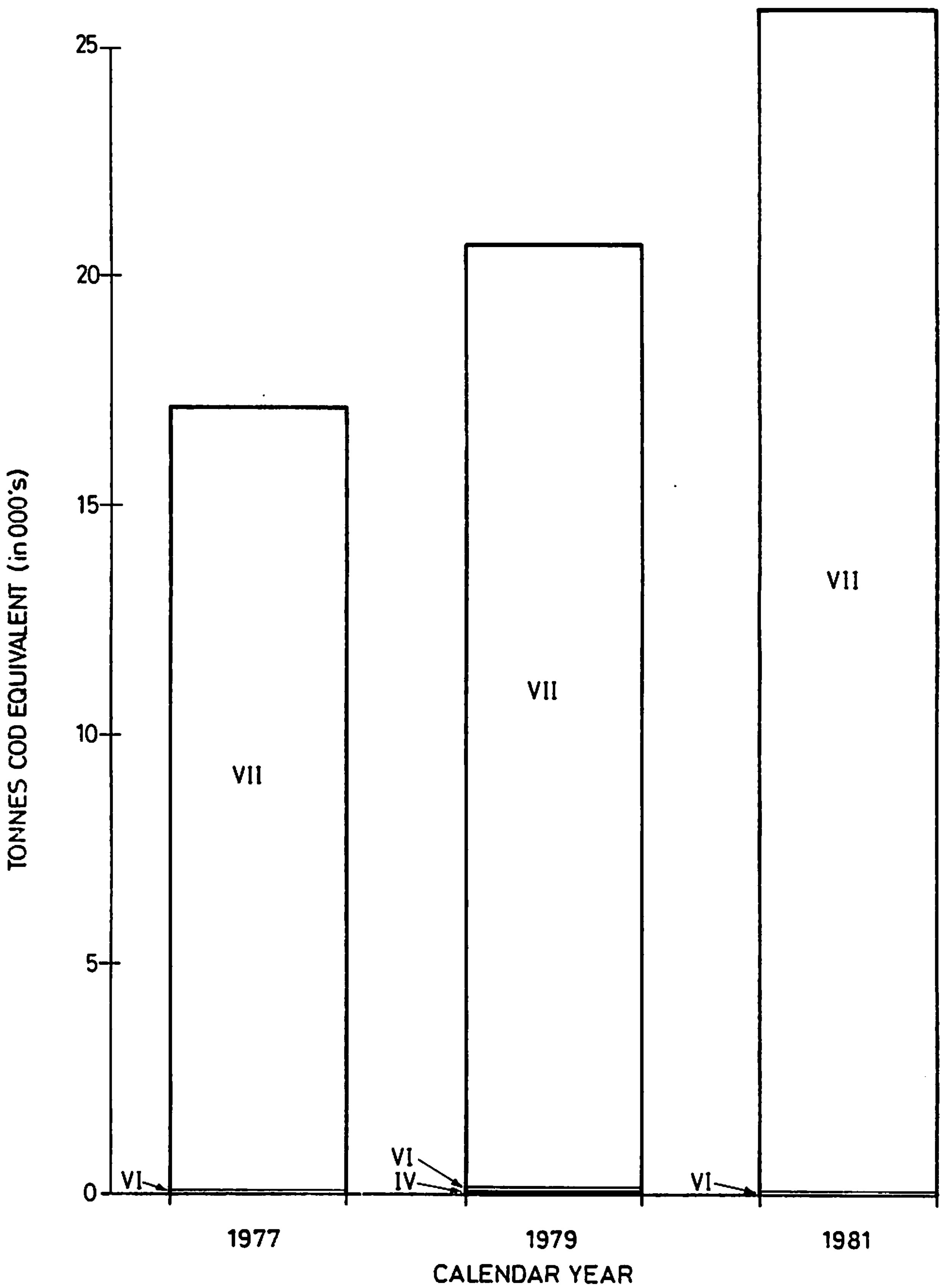
ENGLAND and WALES
TOTAL ANNUAL CATCH

Fig. 25



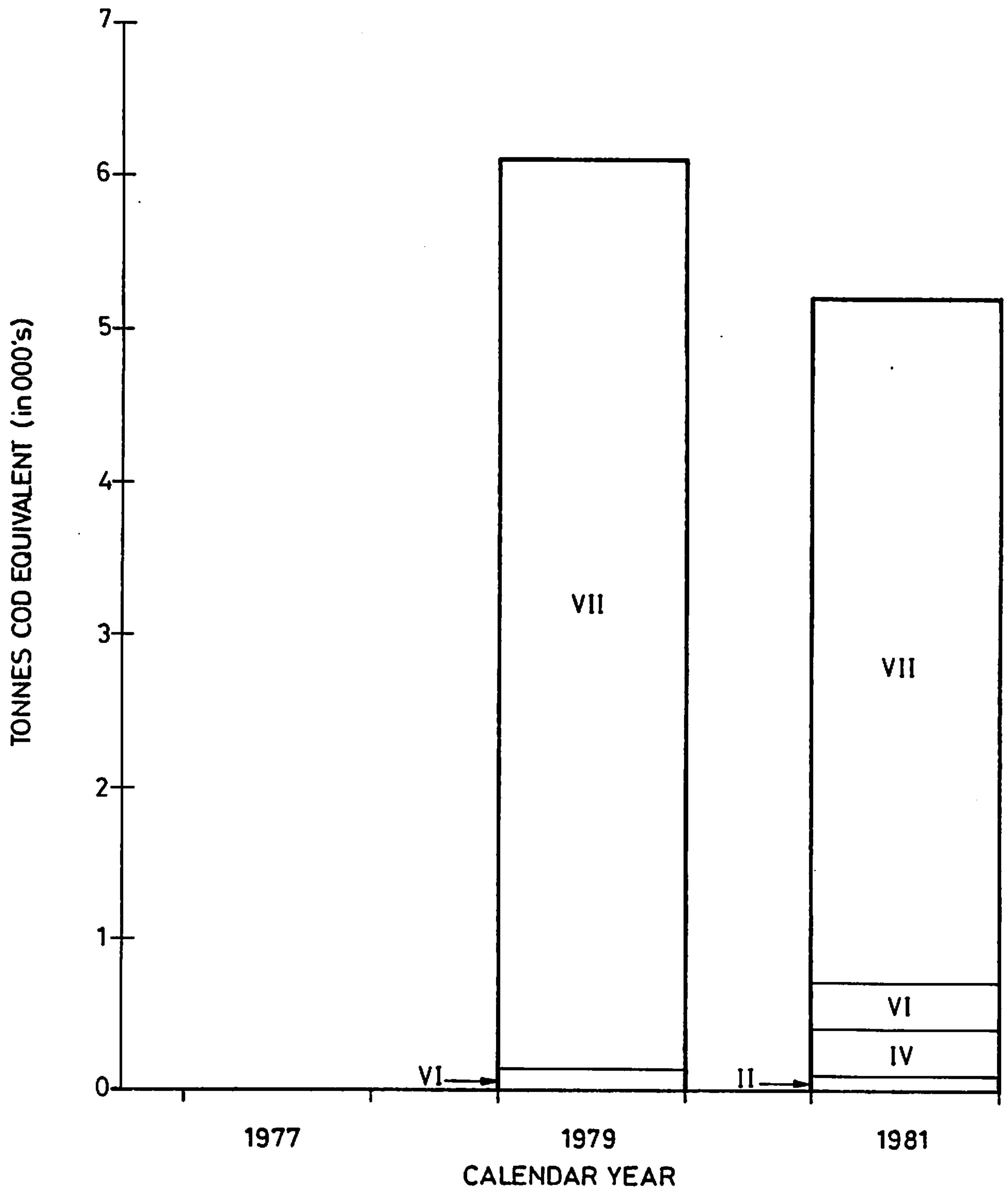
SCOTLAND
TOTAL ANNUAL CATCH

Fig.26



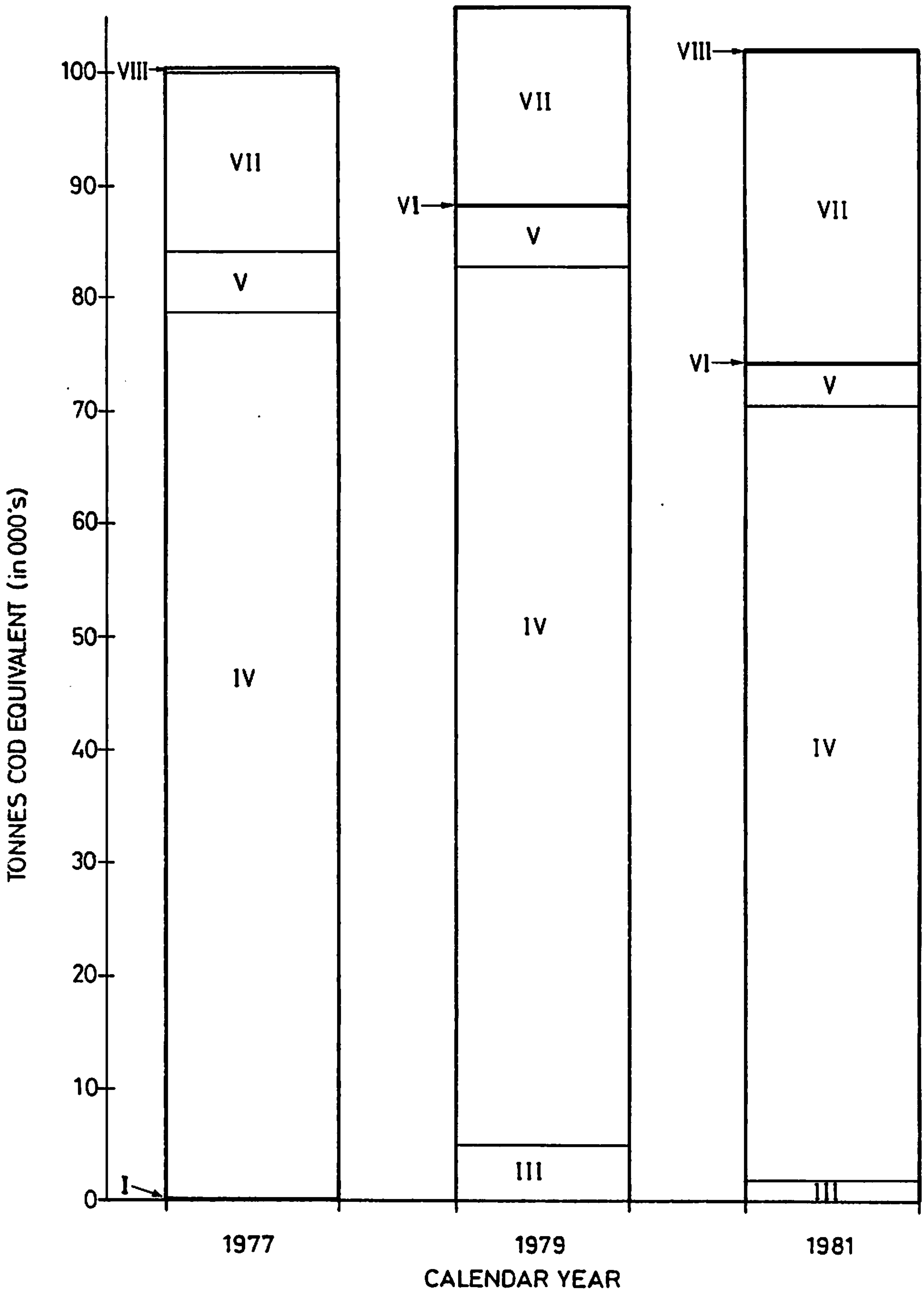
NORTHERN IRELAND
TOTAL ANNUAL CATCH

Fig.27



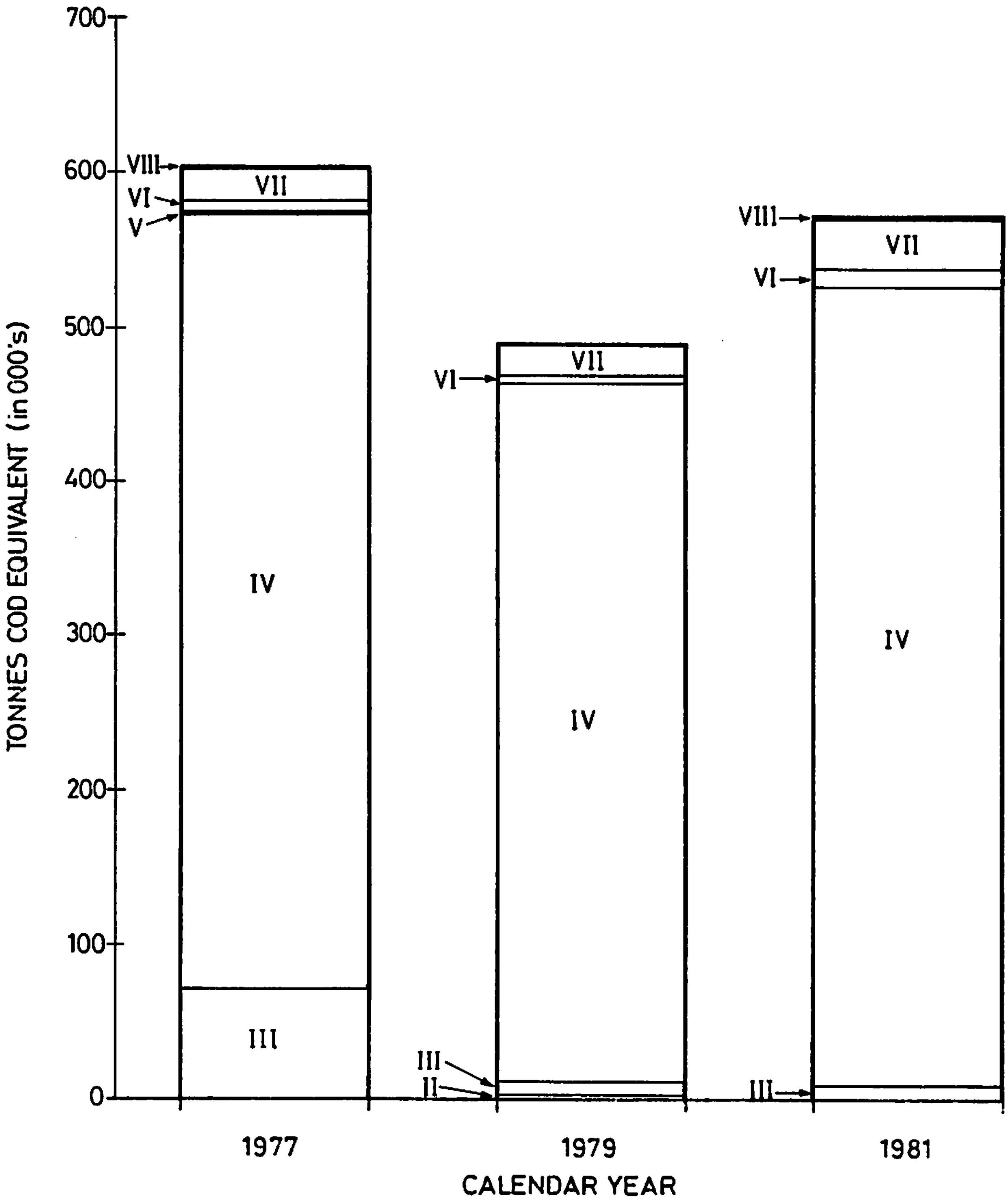
ISLE of MAN
TOTAL ANNUAL CATCH

Fig.28



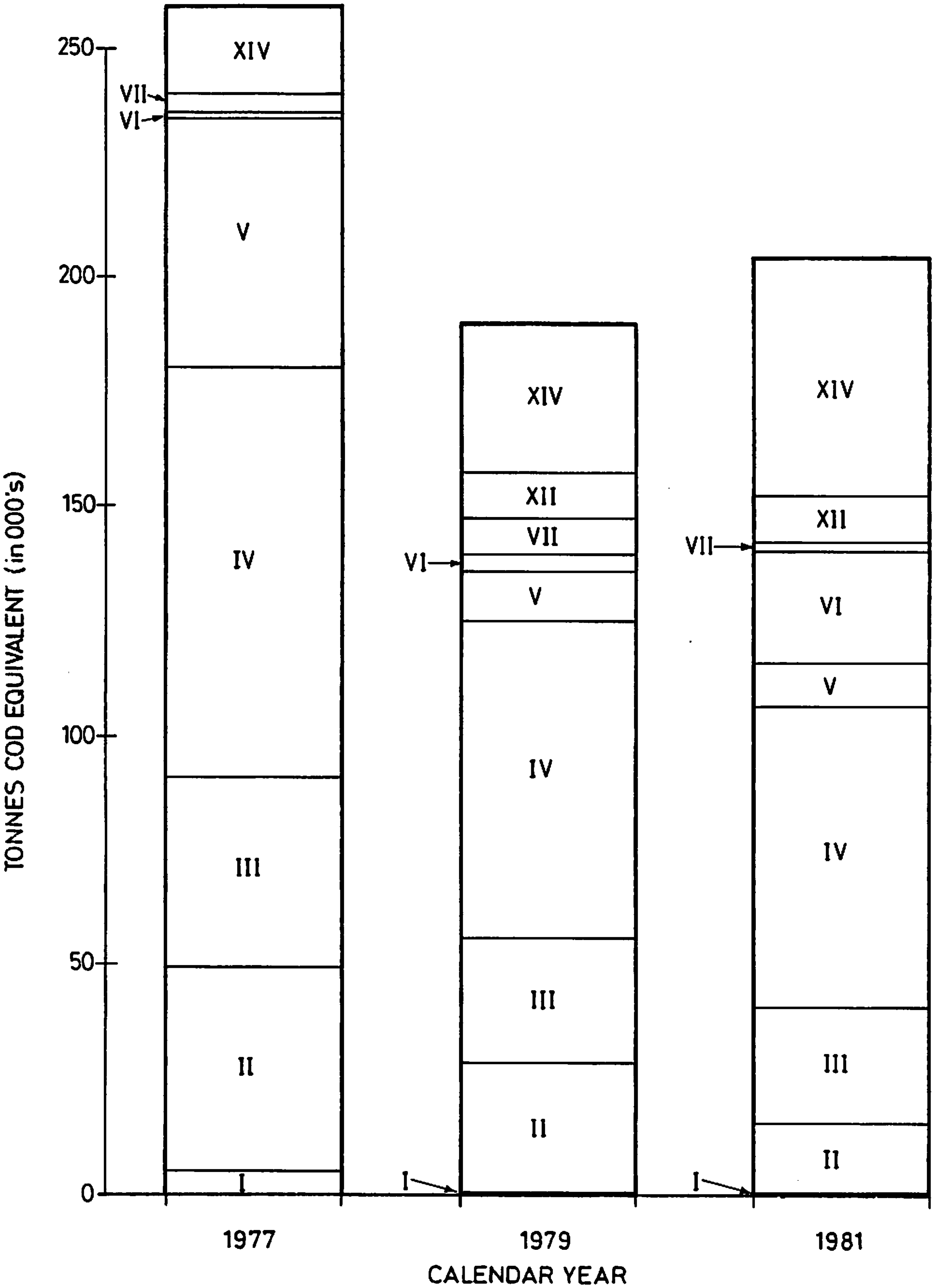
BELGIUM
TOTAL ANNUAL CATCH

Fig.29



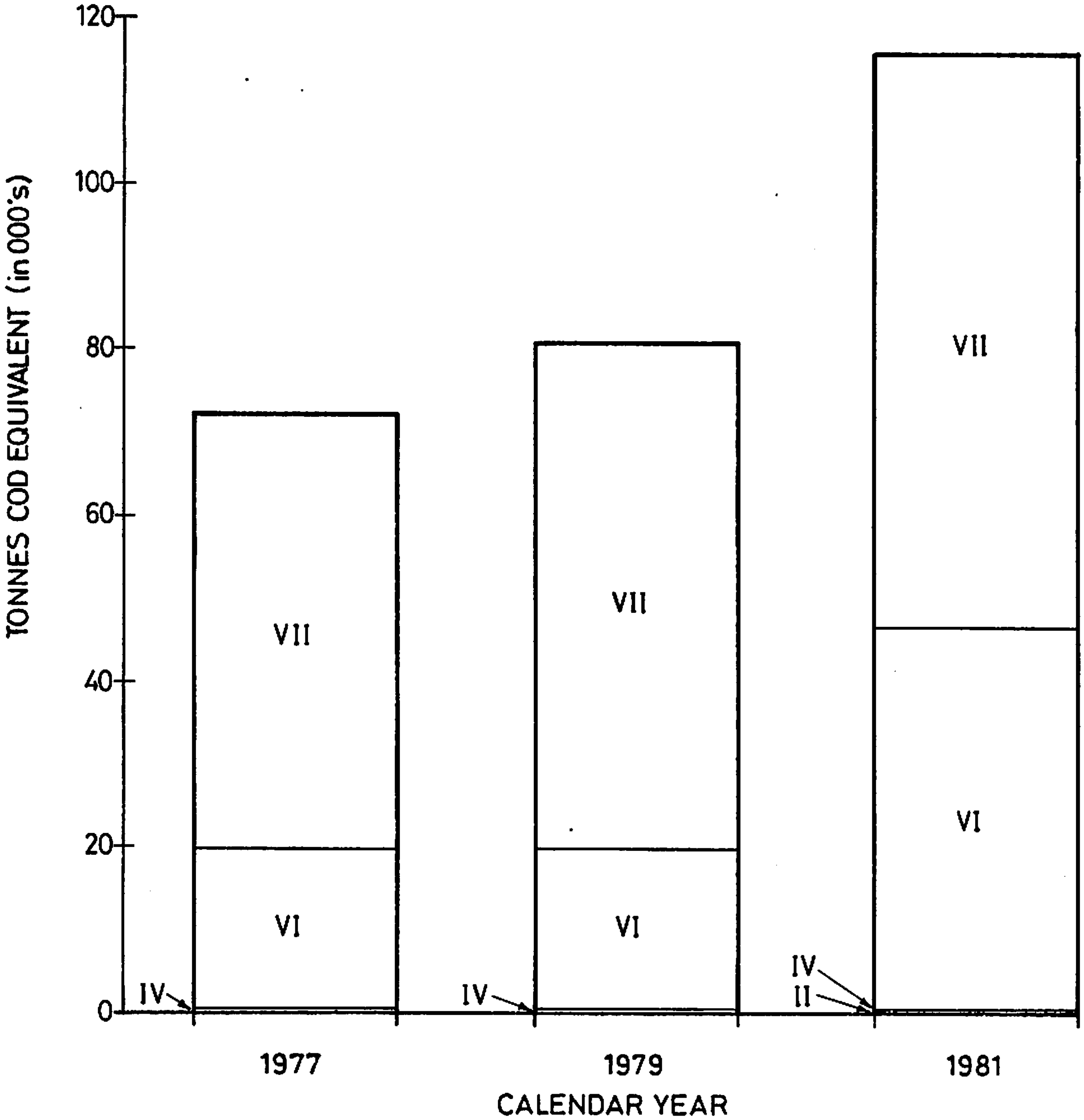
NETHERLANDS
TOTAL ANNUAL CATCH

Fig.30



FEDERAL REPUBLIC of GERMANY
TOTAL ANNUAL CATCH

Fig. 31



IRELAND
TOTAL ANNUAL CATCH

Fig.32

APPENDIX III

FLEET, ACTIVITY AND RESULTS

TABULATIONS

SPSS BATCH SYSTEM

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL UNDER30 UNDER5																				
VALIDN	11	0	11	9	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	6.46	M	3.14	48.78	1.82	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.56	M	2.33	81.20	.40	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND DEMERSAL UNDER30 5-10																				
VALIDN	15	0	15	12	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	6.41	M	3.16	32.67	1.67	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.00	M	1.53	22.20	.72	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND DEMERSAL UNDER30 10-20																				
VALIDN	12	0	12	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	6.36	M	3.03	18.91	1.83	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.24	M	1.37	13.71	.39	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND DEMERSAL UNDER30 OVER20																				
VALIDN	166	5	160	148	166	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0
MEAN	5.60	2.62	2.01	10.94	1.99	8.00	800.00	100.0	99.99	181.4	266.7	20.00	M	2.00	.25	.25	.45	.67	.05	M
STDEV	1.21	.83	1.23	10.92	1.05	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 30-40 UNDER5																				
VALIDN	12	1	11	12	12	11	11	11	11	11	11	11	3	11	11	11	11	11	11	3
MEAN	10.46	22.19	16.22	208.7	3.00	70.36	24491	330.9	2244	1307	6657	101.1	234.8	180.36	2.04	16.09	8.23	40.59	.53	2.90
STDEV	.92	M	6.81	106.8	1.13	55.45	21177	154.6	1897	918.5	4439	71.97	25.32	361.37	3.97	31.81	15.42	72.02	.86	2.82
SCOTLAND DEMERSAL 30-40 5-10																				
VALIDN	8	0	8	8	8	8	8	8	8	8	8	8	2	7	7	7	7	7	7	2
MEAN	10.46	M	14.27	143.9	3.25	94.75	30950	268.1	2858	1817	8838	207.3	597.7	91.57	.75	8.46	5.31	25.86	.61	1.52
STDEV	.80	M	4.85	48.42	1.49	62.00	23241	139.5	2155	1236	7144	167.1	102.2	60.51	.43	5.63	3.09	17.91	.42	.33
SCOTLAND DEMERSAL 30-40 10-20																				
VALIDN	17	1	16	17	17	14	13	13	13	13	13	13	4	13	13	13	13	13	13	4
MEAN	10.16	9.75	13.06	95.12	2.65	81.64	24946	321.1	2353	1532	8126	223.9	1362	114.15	1.68	10.66	6.55	37.37	1.01	8.76
STDEV	.88	M	4.75	39.06	.61	60.29	22258	291.9	2060	1224	7005	179.2	758.8	212.64	3.17	19.69	11.44	70.70	1.85	9.54
SCOTLAND DEMERSAL 30-40 OVER20																				
VALIDN	34	3	31	34	34	23	23	23	23	23	23	23	1	23	23	23	23	23	23	1
MEAN	10.09	18.45	10.80	78.56	2.53	72.09	17330	206.5	1650	1243	6251	217.1	1005	87.35	1.36	8.20	5.92	34.44	1.16	20.50
STDEV	.94	5.69	3.51	45.72	.96	54.52	15296	131.5	1449	1110	5666	197.6	M	153.11	2.60	14.17	9.62	71.09	2.11	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 40-50 UNDER5																				
VALIDN	6	0	6	6	6	6	5	5	5	5	5	5	2	6	6	6	6	6	6	2
MEAN	14.02	M	26.11	325.8	4.83	107.5	72020	813.9	5127	2751	14983	225.0	278.8	206.50	2.08	14.62	8.01	41.66	.62	.84
STDEV	.48	M	3.92	55.08	.98	65.53	40357	248.3	2837	1615	7488	119.3	241.6	107.28	.59	7.55	4.36	20.56	.33	.59
SCOTLAND DEMERSAL 40-50 5-10																				
VALIDN	18	0	18	18	18	18	18	18	18	18	18	18	4	18	18	18	18	18	18	4
MEAN	13.71	M	23.88	265.4	5.06	140.3	102094	710.0	7333	4234	19591	375.9	902.5	334.89	2.31	23.91	13.81	67.69	1.34	5.70
STDEV	.92	M	1.79	65.10	1.00	39.08	49697	285.7	3344	1991	7471	135.4	99.86	266.91	1.71	18.36	10.68	64.76	1.45	6.61
SCOTLAND DEMERSAL 40-50 10-20																				
VALIDN	19	0	19	19	19	18	19	18	19	19	19	19	8	19	18	19	19	19	19	8
MEAN	13.82	M	23.85	202.3	4.32	140.3	65332	462.5	4710	2766	15617	333.1	883.5	258.68	1.85	18.77	10.84	61.08	1.31	4.74
STDEV	.50	M	2.29	53.95	.95	32.67	28037	152.2	1966	1224	7008	146.3	303.3	296.82	2.17	22.09	12.19	73.20	1.45	5.76
SCOTLAND DEMERSAL 40-50 OVER20																				
VALIDN	47	19	28	46	47	42	44	42	44	44	44	44	10	43	41	43	43	43	43	10
MEAN	13.52	22.65	23.10	124.5	3.68	124.4	38932	305.0	2856	1667	10077	342.5	1610	171.12	1.40	12.46	7.56	45.70	1.63	13.06
STDEV	.65	1.80	1.91	50.74	.78	45.98	23743	130.6	1709	966.1	5192	213.1	697.5	253.17	2.14	18.18	11.83	71.55	2.89	20.29

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 50-60 UNDER5																				
VALIDN	21	2	19	21	21	20	20	20	20	20	20	20	7	20	20	20	20	20	20	7
MEAN	15.15	51.84	29.16	325.0	5.29	113.4	80700	762.6	5389	3026	16046	257.4	390.2	368.50	3.20	24.64	13.91	68.20	1.21	.99
STDEV	.46	2.84	8.13	71.15	.85	67.13	48592	211.6	3261	2068	11687	158.7	212.8	485.63	2.98	32.68	20.23	81.44	1.67	.44
SCOTLAND DEMERSAL 50-60 5-10																				
VALIDN	42	1	41	42	42	41	42	41	42	42	42	42	13	42	41	42	42	42	42	13
MEAN	15.40	46.29	29.10	287.0	5.29	138.3	100164	738.3	6486	3528	19104	355.2	703.9	281.43	2.06	18.22	9.79	53.52	1.01	1.82
STDEV	.91	M	8.36	54.34	.67	40.10	46375	260.9	2880	1586	9174	154.4	322.1	159.75	.98	10.07	5.03	31.20	.58	.85
SCOTLAND DEMERSAL 50-60 10-20																				
VALIDN	64	1	63	64	64	64	64	64	64	64	64	64	18	64	64	64	64	64	64	18
MEAN	15.52	49.99	31.19	231.1	4.92	137.5	77550	562.6	4998	2599	16103	347.9	906.9	201.87	1.47	13.02	6.80	41.84	.91	2.60
STDEV	1.00	M	8.08	62.49	.96	34.44	35836	200.7	2339	1378	7371	159.9	339.7	99.64	.61	6.48	3.82	20.67	.48	1.32
SCOTLAND DEMERSAL 50-60 OVER20																				
VALIDN	50	3	47	50	50	49	49	49	49	49	49	49	13	49	49	49	49	49	49	13
MEAN	15.55	41.99	29.54	189.4	4.76	129.1	50569	380.1	3246	1705	11316	295.7	952.5	141.57	1.06	9.09	4.79	31.12	.83	2.48
STDEV	.96	7.36	6.38	68.32	1.06	42.46	23299	123.1	1471	784.2	6149	156.7	399.3	73.94	.48	4.74	2.58	17.11	.51	1.23

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 60-70 UNDER5																				
VALIDN	29	0	29	29	29	29	29	29	29	29	29	29	10	29	29	29	29	29	29	10
MEAN	19.79	M	49.60	488.0	7.28	143.0	162766	1149	8214	3343	22501	333.6	347.0	654.48	4.46	32.75	13.41	85.10	1.27	1.74
STDEV	.90	M	4.89	58.80	.88	51.62	70386	275.0	3490	1506	9403	142.3	137.9	958.98	6.12	46.91	19.34	106.2	1.66	1.83
SCOTLAND DEMERSAL 60-70 5-10																				
VALIDN	49	0	49	49	49	48	48	48	48	48	48	48	9	48	48	48	48	48	48	9
MEAN	19.50	M	49.41	423.9	6.98	140.2	148131	1063	7553	3030	21157	365.2	747.7	457.10	3.27	23.19	9.33	64.35	1.09	3.20
STDEV	.95	M	2.79	83.24	.90	53.32	69166	326.5	3425	1404	9725	183.8	167.2	407.60	2.83	19.99	8.18	51.53	.84	3.76
SCOTLAND DEMERSAL 60-70 10-20																				
VALIDN	50	3	47	50	50	50	50	50	50	50	50	50	14	50	50	50	50	50	50	14
MEAN	19.29	73.51	47.69	328.8	6.44	139.3	112160	790.1	5800	2353	17596	376.8	699.6	378.44	2.66	19.43	7.88	58.05	1.34	2.17
STDEV	.87	12.99	5.11	91.36	1.09	39.60	40887	177.3	2056	895.5	6332	195.4	241.5	389.91	2.24	19.20	7.89	55.08	1.96	.83
SCOTLAND DEMERSAL 60-70 OVER20																				
VALIDN	79	6	73	79	79	78	78	78	78	78	78	78	35	77	77	77	77	77	77	35
MEAN	19.33	59.38	47.48	241.0	5.89	126.4	81637	625.5	4217	1701	13986	381.2	1573	394.78	2.91	20.33	8.19	63.62	1.83	8.59
STDEV	.81	8.64	4.03	105.9	1.17	40.21	39707	168.8	2034	825.3	6783	213.6	1054	592.95	3.77	30.51	12.24	89.93	2.63	9.83

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 70-80 UNDER5																				
VALIDN	34	2	31	34	34	31	31	31	31	31	31	31	9	31	31	31	31	31	31	9
MEAN	22.13	194.4	70.53	610.0	8.18	167.2	247413	1481	11032	3323	30001	399.0	491.5	571.81	3.46	25.56	7.72	69.63	.93	1.18
STDEV	1.17	0.0	19.11	118.4	.80	54.30	111464	378.5	4748	1400	12528	161.3	151.9	250.12	.85	10.70	3.11	28.45	.35	.38
SCOTLAND DEMERSAL 70-80 5-10																				
VALIDN	78	20	58	78	78	78	78	78	78	78	78	78	35	78	78	78	78	78	78	35
MEAN	22.47	121.1	69.07	566.7	7.83	177.4	223126	1242	9931	2920	28532	406.8	771.4	621.40	3.56	27.66	8.21	79.93	1.13	2.22
STDEV	1.06	15.30	12.44	113.5	.59	37.76	68824	286.1	3012	1119	8841	132.0	182.9	306.74	2.13	13.48	4.77	41.02	.54	.88
SCOTLAND DEMERSAL 70-80 10-20																				
VALIDN	40	10	30	40	40	39	39	39	39	39	39	39	17	39	39	39	39	39	39	17
MEAN	22.21	100.7	69.73	480.0	7.62	159.8	175677	1052	7875	2308	22700	371.1	902.7	498.56	3.10	22.28	6.59	64.78	1.03	2.63
STDEV	.96	18.41	6.41	117.0	.84	55.68	83912	307.5	3752	1212	10846	176.5	339.9	253.39	1.45	11.01	3.70	32.64	.47	1.16
SCOTLAND DEMERSAL 70-80 OVER20																				
VALIDN	16	4	12	16	16	15	15	15	15	15	15	15	9	15	15	15	15	15	15	9
MEAN	21.12	79.96	56.45	259.9	6.25	127.9	88067	644.3	4170	1467	13874	390.9	746.0	520.73	3.68	24.83	9.25	78.77	2.72	2.13
STDEV	.62	13.74	4.40	97.37	1.65	43.50	48049	212.5	2232	831.3	6242	254.5	444.4	794.62	5.03	38.22	15.91	111.8	5.25	1.25

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 80-110 UNDER5																				
VALIDN	2	2	0	2	2															
MEAN	27.30	316.3	M	1133	12.00															
STDEV	1.52	66.01	M	307.6	1.41															
SCOTLAND DEMERSAL 80-110 5-10																				
VALIDN	6	1	5	6	6	6	6	6	6	6	6	6	4	6	6	6	6	6	6	4
MEAN	27.51	205.6	93.15	672.3	8.33	109.2	172950	1553	6248	1723	21180	255.8	308.3	990.33	8.36	35.65	9.89	121.8	1.46	1.89
STDEV	1.44	M	8.48	57.18	.82	31.40	74663	387.4	2619	855.9	9857	103.5	59.28	592.54	4.06	21.10	6.42	76.27	.83	.49
SCOTLAND DEMERSAL 80-110 10-20																				
VALIDN	6	4	2	6	6	5	5	5	5	5	5	5	2	5	5	5	5	5	5	2
MEAN	27.87	180.3	104.0	729.2	9.17	176.4	197640	1130	7225	1482	23047	268.1	460.2	897.00	5.25	33.01	7.65	107.8	1.20	2.03
STDEV	1.76	34.13	4.57	128.9	1.47	23.64	26989	169.8	1106	499.4	5453	38.89	86.41	599.32	3.64	22.43	6.79	79.13	.80	1.25
SCOTLAND DEMERSAL 80-110 OVER20																				
VALIDN	16	15	1	16	16	14	14	14	14	14	14	14	1	14	14	14	14	14	14	1
MEAN	28.83	193.5	71.60	639.9	9.94	165.4	157986	913.2	5456	879.7	15793	259.9	992.0	543.57	3.43	19.19	3.71	59.49	.86	2.75
STDEV	1.92	32.75	M	125.2	2.14	67.25	81177	196.8	2681	411.1	6976	128.3	M	362.29	3.03	14.04	4.91	56.79	.50	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 110-140 UNDER5																				
VALIDN	1	1	0	1	1															
MEAN	32.84	385.8	M	1700	11.00															
STDEV	M	M	M	M	M															
SCOTLAND DEMERSAL 110-140 5-10																				
VALIDN	2	2	0	2	2															
MEAN	32.83	386.5	M	1725	11.50															
STDEV	.01	.96	M	35.36	.71															
SCOTLAND DEMERSAL 110-140 OVER20																				
VALIDN	4	4	0	4	4	3	3	3	3	3	3	3	0	3	3	3	3	3	3	0
MEAN	33.11	249.9	M	698.0	11.25	175.0	290400	1699	8708	1138	25929	414.3	M	868.00	4.93	25.95	3.37	77.66	1.24	M
STDEV	.79	21.80	M	48.06	.50	67.54	91544	156.0	2614	342.2	9125	146.2	M	374.50	.45	10.58	1.26	35.93	.55	M
SCOTLAND PELAGIC UNDER30 5-10																				
VALIDN	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	8.25	M	3.66	33.00	2.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 40-50 10-20																				
VALIDN	1	0	1	1	1															
MEAN	14.02	M	23.13	250.0	5.00															
STDEV	M	M	M	M	M															
SCOTLAND PELAGIC 50-60 UNDER5																				
VALIDN	1	0	1	1	1															
MEAN	16.66	M	33.99	365.0	6.00															
STDEV	M	M	M	M	M															
SCOTLAND PELAGIC 50-60 5-10																				
VALIDN	1	0	1	1	1															
MEAN	14.71	M	24.02	360.0	6.00															
STDEV	M	M	M	M	M															
SCOTLAND PELAGIC 50-60 10-20																				
VALIDN	3	0	3	3	3	3	3	3	3	3	3	3	0	3	3	3	3	3	3	0
MEAN	14.96	M	23.98	221.7	5.00	138.3	42733	311.0	2847	1776	8547	195.5	M	160.33	1.12	10.64	6.64	32.07	.74	M
STDEV	.40	M	.77	18.93	0.0	33.56	9307.2	26.89	554.4	341.2	1861	55.58	M	68.71	.28	4.38	2.73	13.74	.35	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 50-60 OVER20																				
VALIDN	2	0	2	2	2															
MEAN	15.41	M	28.11	260.0	4.50															
STDEV	.41	M	5.27	56.57	.71															
SCOTLAND PELAGIC 60-70 UNDER5																				
VALIDN	2	0	2	2	2															
MEAN	20.37	M	56.50	580.0	6.50															
STDEV	.23	M	12.64	113.1	.71															
SCOTLAND PELAGIC 60-70 5-10																				
VALIDN	6	0	6	6	6	6	6	6	6	6	6	6	1	6	6	6	6	6	6	1
MEAN	19.74	M	47.95	446.7	7.50	139.7	165500	1189	8391	3467	22152	373.5	570.6	1052.3	7.59	53.13	22.05	140.5	2.36	3.82
STDEV	1.01	M	1.61	39.33	.55	13.38	30869	213.7	1580	730.2	4363	80.75	M	291.84	2.14	14.32	6.46	40.14	.68	M
SCOTLAND PELAGIC 60-70 OVER20																				
VALIDN	2	0	2	2	2															
MEAN	19.77	M	48.44	410.0	7.00															
STDEV	.26	M	1.84	127.3	0.0															

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 70-80 UNDER5																				
VALIDN	6	0	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	5
MEAN	22.48	M	74.61	715.0	8.67	122.2	178867	1498	8004	2655	20940	253.3	286.3	1298.0	10.71	57.95	19.14	150.6	1.82	2.19
STDEV	1.23	M	20.85	83.61	1.63	24.51	25702	302.4	1417	1128	3402	45.52	71.76	405.57	3.31	18.10	8.78	45.60	.55	.99
SCOTLAND PELAGIC 70-80 5-10																				
VALIDN	14	3	11	14	14	14	14	14	14	14	14	14	8	14	14	14	14	14	14	8
MEAN	23.21	113.9	83.09	758.8	9.29	103.1	172543	1697	7411	1957	19007	232.8	380.7	1332.3	13.07	57.08	14.99	142.4	1.76	3.09
STDEV	.67	6.47	6.10	111.3	1.82	22.14	42420	345.0	1720	517.1	5126	71.74	91.02	546.94	4.87	22.75	6.30	48.99	.65	2.11
SCOTLAND PELAGIC 70-80 10-20																				
VALIDN	2	0	2	2	2															
MEAN	22.43	M	67.26	490.0	8.00															
STDEV	.59	M	.92	7.07	0.0															
SCOTLAND PELAGIC 70-80 OVER20																				
VALIDN	1	0	1	1	1															
MEAN	23.59	M	63.70	560.0	8.00															
STDEV	M	M	M	M	M															

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 80-110 UNDER5																				
VALIDN	2	0	2	2	2															
MEAN	27.74	M	112.5	925.0	12.00															
STDEV	.11	M	20.95	247.5	0.0															
SCOTLAND PELAGIC 80-110 5-10																				
VALIDN	12	5	7	12	12	11	11	11	11	11	11	11	2	11	11	11	11	11	11	2
MEAN	27.96	210.7	117.1	791.7	11.17	72.91	227091	3171	8119	1684	20601	296.8	208.5	2177.4	31.14	77.65	15.80	199.9	2.82	2.28
STDEV	1.33	30.32	21.02	106.2	1.34	24.23	87662	780.8	3223	892.7	7993	132.5	23.12	487.12	6.22	18.12	6.24	53.14	.78	.12
SCOTLAND PELAGIC 80-110 10-20																				
VALIDN	6	0	6	6	6	6	6	6	6	6	6	6	2	6	6	6	6	6	6	2
MEAN	27.60	M	100.6	791.7	11.50	61.33	206750	3454	7464	2057	17915	268.4	286.5	2134.8	35.69	77.12	21.51	184.0	2.71	3.55
STDEV	.94	M	10.77	171.5	.55	12.27	57090	1013	1930	520.4	4460	74.50	91.49	663.91	11.35	22.97	7.23	49.67	.56	.74
SCOTLAND PELAGIC 110-140 UNDER5																				
VALIDN	10	4	6	10	10	10	10	10	10	10	10	10	2	10	10	10	10	10	10	2
MEAN	34.32	307.9	221.4	1552	11.90	48.00	192450	3966	5625	833.3	16102	134.4	95.49	1859.2	41.09	54.30	7.90	155.3	1.28	1.03
STDEV	1.21	17.29	41.04	371.4	.99	31.04	136941	659.2	4002	698.6	11364	108.6	83.85	1052.4	10.44	30.81	5.35	86.93	.81	.95

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 110-140 5-10																				
VALIDN	3	1	2	3	3	3	3	3	3	3	3	3	1	3	3	3	3	3	3	1
MEAN	35.12	359.1	242.2	1217	12.33	51.67	215800	4283	6114	800.5	17520	188.3	257.5	2786.3	55.52	78.56	10.52	227.3	2.33	2.73
STDEV	1.71	M	121.2	425.2	.58	19.86	70105	500.6	1790	172.9	5887	76.17	M	1115.4	13.18	27.59	3.58	96.51	.61	M
SCOTLAND PELAGIC 110-140 10-20																				
VALIDN	4	0	4	4	4	4	4	4	4	4	4	4	1	4	4	4	4	4	4	1
MEAN	37.28	M	264.3	1525	13.00	50.50	196025	3839	5245	726.2	14731	127.3	132.9	2129.5	41.92	57.03	7.87	160.7	1.39	1.25
STDEV	.42	M	36.77	225.5	1.41	17.71	80819	355.1	2112	215.6	4447	46.51	M	806.80	3.86	21.20	2.02	46.40	.45	M
SCOTLAND SHELL UNDER30 UNDER5																				
VALIDN	86	0	86	78	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	6.27	M	2.49	48.91	1.66	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.19	M	1.44	48.65	.50	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND SHELL UNDER30 5-10																				
VALIDN	85	2	83	79	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	6.55	15.05	3.45	33.09	1.61	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.14	16.61	1.96	23.92	.51	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL UNDER30 10-20																				
VALIDN	123	2	121	116	123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	6.36	6.29	3.00	24.96	1.67	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.24	.52	1.82	24.27	.52	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND SHELL UNDER30 OVER20																				
VALIDN	407	20	382	361	407	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	6.05	3.15	2.52	16.24	1.59	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.27	1.60	1.54	15.83	.58	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND SHELL 30-40 UNDER5																				
VALIDN	37	2	35	37	37	14	14	14	14	14	14	14	1	13	13	13	13	13	13	1
MEAN	9.88	17.61	10.20	124.3	2.27	65.43	12671	226.9	1219	1106	4818	86.21	18.18	22.69	.48	2.15	1.82	8.21	.15	.05
STDEV	.88	9.97	4.70	48.08	.56	60.08	15283	192.2	1389	1113	5179	79.91	M	29.37	.49	2.58	1.60	7.67	.12	M
SCOTLAND SHELL 30-40 5-10																				
VALIDN	77	2	75	77	77	21	21	21	21	21	21	21	3	21	21	21	21	21	21	3
MEAN	9.99	10.76	10.50	102.7	2.22	67.57	12481	180.3	1257	1212	5240	116.4	43.09	16.86	.32	1.70	1.64	7.05	.16	.16
STDEV	.74	2.46	2.91	31.72	.53	63.88	14117	105.7	1426	1414	5875	138.1	25.07	17.86	.25	1.81	1.74	6.94	.17	.18

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL 30-40 10-20																				
VALIDN	73	2	71	73	73	27	27	27	27	27	27	27	1	26	26	26	26	26	26	1
MEAN	9.91	20.77	11.11	81.41	2.42	95.59	22919	251.3	2183	1484	7384	208.4	82.35	35.73	.47	3.39	2.25	11.08	.30	.12
STDEV	.77	2.16	3.37	32.29	.62	79.78	25271	212.5	2395	1500	7473	214.0	M	47.40	.68	4.47	2.60	12.38	.31	M
SCOTLAND SHELL 30-40 OVER20																				
VALIDN	124	18	106	123	124	40	41	40	41	41	41	41	3	37	36	37	37	37	37	3
MEAN	10.04	14.95	9.87	68.51	2.49	91.75	18120	184.4	1672	1184	6339	183.6	978.3	52.49	.69	4.87	3.49	20.69	.48	1.97
STDEV	.95	4.21	4.07	35.10	.78	73.76	16609	77.96	1530	1011	5664	169.7	940.2	104.48	1.67	9.72	7.07	52.01	.82	1.68
SCOTLAND SHELL 40-50 5-10																				
VALIDN	6	0	6	6	6	6	6	6	6	6	6	6	1	5	5	5	5	5	5	1
MEAN	12.64	M	21.62	159.2	3.67	108.3	42050	328.5	3206	1757	10521	239.6	970.0	124.80	.93	9.38	5.17	31.22	.68	1.77
STDEV	.76	M	3.61	30.40	.52	88.48	36946	187.8	2770	1519	9225	199.0	M	145.51	.95	10.65	5.89	36.36	.71	M
SCOTLAND SHELL 40-50 10-20																				
VALIDN	35	3	32	35	35	29	29	29	29	29	29	29	7	29	29	29	29	29	29	7
MEAN	13.37	24.99	22.86	161.3	3.60	154.3	45197	290.6	3348	1956	12396	290.4	934.0	82.55	.54	6.14	3.57	22.35	.53	1.71
STDEV	.84	.62	2.09	48.28	.65	45.52	17077	68.65	1199	721.8	4865	124.7	561.5	35.44	.21	2.64	1.55	9.46	.23	.94

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL 40-50 OVER20																				
VALIDN	68	13	55	68	68	48	47	47	47	47	47	47	8	46	46	46	46	46	46	8
MEAN	13.58	22.79	21.56	122.2	3.51	118.3	29157	247.8	2123	1283	8405	246.4	1439	64.67	.92	4.75	2.85	19.41	.61	8.01
STDEV	.77	2.29	3.79	45.66	.95	62.67	16827	89.08	1217	743.1	4876	150.4	519.7	100.85	1.86	7.66	4.52	33.62	1.40	15.82
SCOTLAND SHELL 50-60 UNDER5																				
VALIDN	2	1	1	2	2															
MEAN	16.18	49.98	33.99	382.5	6.00															
STDEV	.68	M	M	24.75	0.0															
SCOTLAND SHELL 50-60 5-10																				
VALIDN	8	0	8	8	8	8	8	8	8	8	8	8	1	8	8	8	8	8	8	1
MEAN	15.65	M	31.02	266.2	4.87	147.2	61475	403.5	3977	2201	13387	229.0	204.8	167.12	1.10	10.78	5.99	36.84	.65	.45
STDEV	.94	M	9.29	47.79	.83	44.23	26495	88.12	1780	1174	6932	96.57	M	105.57	.48	7.12	4.76	28.45	.47	M
SCOTLAND SHELL 50-60 10-20																				
VALIDN	66	3	63	66	66	62	62	62	62	62	62	62	12	62	62	62	62	62	62	12
MEAN	15.77	48.04	31.03	209.0	4.38	136.2	52503	378.5	3329	1719	12386	261.0	787.0	137.69	1.08	8.71	4.49	31.24	.67	2.35
STDEV	.91	3.23	7.18	46.36	.78	53.44	24308	92.95	1512	849.1	5980	124.3	290.4	123.87	1.17	8.02	4.64	23.81	.64	2.81

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL 50-60 OVER20																				
VALIDN	68	9	59	68	68	62	62	62	62	62	62	62	11	62	62	62	62	62	62	11
MEAN	15.41	39.17	27.39	165.9	4.18	120.0	33371	285.5	2168	1188	8196	221.6	1425	65.13	.65	4.23	2.30	15.86	.42	2.55
STDEV	.81	6.50	4.95	60.29	.98	58.13	19448	110.8	1278	713.5	4537	136.3	1084	43.93	.68	2.91	1.59	9.92	.26	2.28
SCOTLAND SHELL 60-70 UNDER5																				
VALIDN	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	19.05	M	49.45	550.0	8.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND SHELL 60-70 5-10																				
VALIDN	4	0	4	4	4	3	3	3	3	3	3	3	1	3	3	3	3	3	3	1
MEAN	18.31	M	43.84	360.0	5.75	165.0	105100	672.6	5665	2433	18767	351.5	591.5	256.67	1.66	13.81	5.93	45.64	.85	1.49
STDEV	1.04	M	1.62	119.2	.96	38.63	16004	251.6	706.8	455.0	2762	170.3	M	37.63	.68	1.15	1.02	3.05	.41	M
SCOTLAND SHELL 60-70 10-20																				
VALIDN	12	0	12	12	12	12	12	12	12	12	12	12	2	12	12	12	12	12	12	2
MEAN	18.69	M	44.60	317.9	4.75	144.8	68583	473.6	3670	1583	14496	242.9	741.6	300.50	2.20	15.91	6.67	67.67	.95	1.98
STDEV	.95	M	5.03	103.2	.97	54.13	30160	90.70	1583	760.9	6058	131.5	749.0	208.90	1.62	10.77	4.32	58.20	.55	2.03

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL 60-70 OVER20																				
VALIDN	43	2	41	43	43	42	42	42	42	42	42	42	18	41	41	41	41	41	41	18
MEAN	19.03	59.66	45.81	208.1	5.05	131.4	52643	401.1	2759	1121	10907	271.3	1459	147.78	1.06	7.63	3.09	31.16	.69	2.91
STDEV	.95	2.49	4.25	74.88	1.43	45.99	21010	95.80	1060	412.3	4882	119.6	1079	224.74	1.16	11.20	4.48	47.50	.73	1.93
SCOTLAND SHELL 70-80 10-20																				
VALIDN	3	0	3	3	3	2	2	2	2	2	2	2	0	2	2	2	2	2	2	0
MEAN	21.60	M	53.31	331.7	4.33	177.5	85450	480.9	4001	1584	21363	271.6	M	350.00	1.96	16.37	6.59	87.50	1.11	M
STDEV	.47	M	7.04	29.30	.58	10.61	8273.1	17.87	342.6	407.9	2068	32.36	M	100.41	.45	4.52	2.89	25.10	.34	M
SCOTLAND SHELL 70-80 OVER20																				
VALIDN	4	1	3	4	4	4	4	4	4	4	4	4	1	4	4	4	4	4	4	1
MEAN	21.09	71.98	50.19	174.0	6.00	109.7	45500	408.5	2154	866.4	8024	279.6	1700	144.25	1.44	6.82	2.40	27.11	.91	2.60
STDEV	.23	M	4.78	44.00	1.15	25.37	16159	60.50	750.1	442.4	4023	131.4	M	129.66	1.52	6.11	1.65	27.45	.89	M
SCOTLAND SHELL 80-110 OVER20																				
VALIDN	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	23.22	M	78.33	600.0	6.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 40-50 UNDER5																				
VALIDN	4	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	13.44	29.00	24.00	231.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.40	M	0.0	42.52	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 40-50 5-10																				
VALIDN	17	4	13	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	13.30	28.75	21.54	210.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.67	8.18	2.73	79.75	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 40-50 10-20																				
VALIDN	53	20	33	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	13.02	24.50	18.97	148.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.84	2.61	4.38	48.12	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 40-50 OVER20																				
VALIDN	286	181	105	273	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	13.15	21.21	17.81	107.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.87	4.36	4.88	45.19	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 50-60 UNDER5																				
VALIDN	14	5	9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	15.96	50.20	30.22	344.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.91	4.15	6.28	81.80	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 50-60 5-10																				
VALIDN	34	10	24	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	15.69	45.00	28.83	261.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.88	5.27	7.61	76.37	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 50-60 10-20																				
VALIDN	68	25	43	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	15.71	41.84	28.12	208.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.78	5.76	4.96	43.66	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 50-60 OVER20																				
VALIDN	220	129	91	188	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	15.87	35.67	24.92	152.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.83	7.93	6.27	62.08	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 60-70 UNDER5																				
VALIDN	3	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	19.11	114.0	47.50	515.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.33	M	.71	35.22	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 60-70 5-10																				
VALIDN	22	12	10	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	18.61	59.58	46.70	278.1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.97	20.49	4.64	120.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 60-70 10-20																				
VALIDN	22	8	14	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	18.60	60.00	43.64	302.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.94	15.59	5.36	105.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 60-70 OVER20																				
VALIDN	80	43	37	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	18.74	50.74	41.59	219.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.96	7.56	7.77	90.68	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 70-80 UNDER5																				
VALIDN	9	8	1	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	23.20	161.0	69.00	632.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.59	33.29	M	162.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 70-80 5-10																				
VALIDN	10	8	2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	22.73	145.1	61.00	634.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.99	27.42	26.87	136.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 70-80 10-20																				
VALIDN	21	8	13	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	22.81	1336	62.38	540.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.83	3500	13.70	167.2	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 70-80 OVER20																				
VALIDN	29	14	15	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	21.88	74.36	51.60	327.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.94	10.38	8.51	144.1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 80-110 UNDER5																				
VALIDN	3	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	28.00	305.3	M	1117	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.93	13.28	M	144.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 80-110 5-10																				
VALIDN	15	14	1	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	29.98	279.7	143.0	1103	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.38	60.63	M	174.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 80-110 10-20																				
VALIDN	23	16	7	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	27.00	177.2	86.71	681.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.19	33.79	11.07	183.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 80-110 OVER20																				
VALIDN	24	18	6	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	28.05	175.9	91.50	537.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.55	41.72	35.78	130.1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 110-140 5-10																				
VALIDN	19	16	3	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	34.22	350.7	239.7	1529	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.83	55.29	13.05	220.2	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 110-140 10-20																				
VALIDN	20	16	4	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	33.62	271.6	175.2	1009	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.08	24.41	25.29	232.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 110-140 OVER20																				
VALIDN	23	23	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	36.51	333.6	M	837.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.94	36.75	M	174.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 140-185 5-10																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	41.32	566.0	M	1900	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.22	46.67	M	0.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 140-185 10-20																				
VALIDN	3	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	42.40	513.0	M	1482	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	4.16	74.34	M	384.1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 140-185 OVER20																				
VALIDN	3	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	41.06	335.0	M	1155	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.11	24.25	M	211.1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL OVER185 5-10																				
VALIDN	12	12	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	63.38	1448	M	3223	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	6.40	155.5	M	419.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL OVER185 10-20																				
VALIDN	10	10	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	62.11	1142	M	2343	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.17	131.2	M	376.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL OVER185 OVER20																				
VALIDN	3	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	56.42	850.0	M	1920	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	4.08	166.6	M	207.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC 40-50 10-20																				
VALIDN	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	13.30	M	13.00	86.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC 40-50 OVER20																				
VALIDN	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	11.58	M	5.00	65.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC 50-60 OVER20																				
VALIDN	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	15.70	M	23.00	88.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND PELAGIC 110-140 10-20																				
VALIDN	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	32.00	260.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC 140-185 10-20																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	41.06	429.0	M	1230	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.18	14.14	M	324.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC 140-185 OVER20																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	40.62	562.0	M	900.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC OVER185 UNDER5																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	58.85	1192	M	3490	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND SHELL 40-50 5-10																				
VALIDN	4	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	14.14	49.00	23.67	175.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.35	M	2.31	49.50	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 40-50 10-20																				
VALIDN	9	1	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	13.22	21.00	20.62	140.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.92	M	3.16	29.66	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 40-50 OVER20																				
VALIDN	45	25	20	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	12.56	20.24	12.65	82.07	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.91	4.52	3.41	45.63	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 50-60 UNDER5																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	17.10	73.00	M	300.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND SHELL 50-60 5-10																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	15.85	44.00	M	230.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 50-60 OVER20																				
VALIDN	11	9	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	15.59	36.33	22.50	143.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.62	11.81	2.12	62.85	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 60-70 OVER20																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	18.62	61.00	M	250.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.01	25.46	M	70.71	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 70-80 OVER20																				
VALIDN	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	23.62	M	26.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND UNKNOWN 30-40 OVER20																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	10.50	19.55	M	176.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.93	16.31	M	1.41	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND UNKNOWN 60-70 OVER20																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	19.03	101.0	M	500.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND DEMERSAL 50-60 OVER20																				
VALIDN	6	2	4	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	16.19	22.50	35.84	202.8	5.33	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.63	.71	2.60	117.5	.82	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND DEMERSAL 60-70 OVER20																				
VALIDN	5	4	1	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	18.94	66.80	49.00	400.0	5.60	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.31	18.85	M	62.15	.55	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND PELAGIC 80-110 UNDER5																				
VALIDN	1	0	1	1	0															
MEAN	30.05	M	197.0	915.0	M															
STDEV	M	M	M	M	M															
N.IRELAND PELAGIC 80-110 5-10																				
VALIDN	2	2	0	2	0															
MEAN	29.34	314.6	M	1000	M															
STDEV	0.0	0.0	M	0.0	M															
N.IRELAND PELAGIC 110-140 UNDER5																				
VALIDN	1	1	0	1	0															
MEAN	37.57	532.2	M	1740	M															
STDEV	M	M	M	M	M															
N.IRELAND PELAGIC 140-185 5-10																				
VALIDN	1	1	0	1	0															
MEAN	48.20	995.9	M	2500	M															
STDEV	M	M	M	M	M															

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL UNKNOWN OVER20																				
VALIDN	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	M	50.00	M	400.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 40-50 UNDER5																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	13.14	36.75	M	231.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.75	18.58	M	83.44	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 40-50 5-10																				
VALIDN	3	2	1	3	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0
MEAN	12.71	31.26	14.73	182.3	M	59.00	22900	388.1	1845	871.4	M	117.4	M	54.00	.92	4.35	2.05	M	.28	M
STDEV	1.25	7.05	M	64.93	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 40-50 10-20																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	13.96	31.73	M	180.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.19	5.80	M	84.85	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL 40-50 OVER20																				
VALIDN	14	12	2	14	1	4	3	3	3	3	0	3	0	2	2	2	2	0	2	0
MEAN	13.90	25.29	21.82	114.2	5.00	2.25	3000.0	1453	219.8	122.6	M	31.71	M	42.00	20.85	3.08	1.71	M	.44	M
STDEV	.44	1.92	2.68	17.46	M	1.89	4340.5	2206	319.2	176.0	M	45.61	M	57.98	29.20	4.26	2.35	M	.61	M
N.IRELAND SHELL 50-60 UNDER5																				
VALIDN	8	7	1	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	16.69	57.02	36.75	369.1	6.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.51	10.39	M	60.24	0.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 50-60 5-10																				
VALIDN	3	2	1	3	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0
MEAN	16.08	51.27	33.18	328.3	M	148.0	63300	427.7	4095	1908	M	211.0	M	176.00	1.19	11.39	5.30	M	.59	M
STDEV	.88	16.55	M	62.52	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 50-60 10-20																				
VALIDN	7	5	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	16.19	45.81	27.93	231.4	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.92	3.99	.10	41.80	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL 50-60 OVER20																				
VALIDN	29	26	3	25	1	3	3	3	3	3	0	2	0	3	3	3	3	0	2	0
MEAN	16.01	38.46	22.51	165.0	5.00	15.67	3633.3	254.3	230.1	138.1	M	21.50	M	9.33	.64	.59	.36	M	.06	M
STDEV	.73	5.67	3.14	58.13	M	7.23	737.11	91.59	50.48	50.52	M	12.02	M	3.06	.24	.20	.17	M	.04	M
N.IRELAND SHELL 60-70 UNDER5																				
VALIDN	6	3	3	6	2	2	2	2	2	2	1	2	0	2	2	2	2	1	2	0
MEAN	18.54	83.91	39.05	431.3	6.00	7.50	4000.0	603.8	212.4	45.23	1100	9.36	M	10.50	1.23	.55	.12	3.17	.02	M
STDEV	.65	5.51	9.64	64.25	0.0	7.78	3677.0	136.0	190.0	39.44	M	8.47	M	12.02	.33	.63	.13	M	.03	M
N.IRELAND SHELL 60-70 5-10																				
VALIDN	5	5	0	5	0	5	5	5	5	5	0	5	0	5	5	5	5	0	5	0
MEAN	18.65	78.34	M	426.0	M	14.80	11020	768.0	605.0	148.9	M	26.00	M	30.60	3.51	1.67	.42	M	.07	M
STDEV	.86	8.32	M	19.17	M	12.46	10271	274.2	574.0	148.5	M	24.12	M	26.98	3.95	1.52	.42	M	.06	M
N.IRELAND SHELL 60-70 10-20																				
VALIDN	10	9	1	10	0	6	6	6	6	6	0	6	0	5	5	5	5	0	5	0
MEAN	18.46	64.90	31.15	359.5	M	13.33	6500.0	442.7	351.5	112.8	M	18.67	M	18.00	1.41	.97	.31	M	.05	M
STDEV	.92	13.14	M	68.57	M	11.27	5392.6	243.2	290.6	85.19	M	13.23	M	10.61	.90	.58	.19	M	.03	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL 60-70 OVER20																				
VALIDN	39	34	5	39	1	6	6	6	6	6	0	6	0	6	6	6	6	0	6	0
MEAN	19.10	56.33	48.66	255.2	6.00	25.83	9166.7	378.2	493.7	172.2	M	64.08	M	28.83	1.15	1.56	.54	M	.20	M
STDEV	.89	9.60	3.58	110.7	M	29.76	10643	48.29	566.1	195.7	M	93.58	M	32.29	.22	1.73	.60	M	.27	M
N.IRELAND SHELL 70-80 UNDER5																				
VALIDN	3	1	1	3	2	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0
MEAN	22.82	124.0	96.00	826.7	8.50	14.00	20100	1436	914.5	162.1	M	40.20	M	25.00	1.79	1.14	.20	M	.05	M
STDEV	.74	M	M	282.9	2.12	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 70-80 5-10																				
VALIDN	6	6	0	6	0	3	3	3	3	3	0	3	0	3	3	3	3	0	3	0
MEAN	21.77	127.5	M	534.8	M	10.00	13200	1414	604.0	110.7	M	24.12	M	15.33	1.49	.71	.13	M	.03	M
STDEV	1.38	41.72	M	83.05	M	8.72	9591.1	363.3	479.5	116.5	M	20.72	M	13.80	.21	.68	.16	M	.03	M
N.IRELAND SHELL 70-80 10-20																				
VALIDN	7	6	1	6	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0
MEAN	21.51	94.77	60.49	437.5	M	6.00	6400.0	1067	292.8	71.46	M	12.80	M	9.00	1.50	.41	.10	M	.02	M
STDEV	.54	11.42	M	99.64	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	LBP	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL 70-80 OVER20																				
VALIDN	5	3	2	5	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0
MEAN	21.78	81.00	59.35	386.0	M	2.00	2200.0	1100	101.1	35.22	M	9.57	M	2.00	1.00	.09	.03	M	.01	M
STDEV	1.10	18.34	4.41	131.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 80-110 OVER20																				
VALIDN	1	1	0	1	0															
MEAN	24.52	115.4	M	265.0	M															
STDEV	M	M	M	M	M															

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL UNDER 9 UNDER5																				
VALIDN	12	0	12	10	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	23.36	M	3.42	56.90	1.83	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	5.71	M	2.43	80.75	.39	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND DEMERSAL UNDER 9 5-10																				
VALIDN	16	0	16	13	16	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
MEAN	23.04	M	3.42	35.69	1.62	1.00	100.00	100.0	11.27	13.61	100.0	1.39	M	M	M	M	M	M	M	M
STDEV	3.95	M	1.81	23.89	.72	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND DEMERSAL UNDER 9 10-20																				
VALIDN	15	0	15	14	15	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0
MEAN	23.92	M	3.93	28.00	1.93	1.00	1200.0	1200	139.8	161.3	400.0	28.57	M	4.00	4.00	.47	.54	1.33	.10	M
STDEV	5.05	M	2.42	22.68	.46	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND DEMERSAL UNDER 9 OVER20																				
VALIDN	173	5	167	155	173	2	2	2	2	2	2	2	0	2	2	2	2	2	2	0
MEAN	20.15	2.62	2.23	12.16	2.01	9.50	800.00	86.36	96.59	137.8	333.3	18.00	M	2.00	.22	.24	.34	.83	.04	M
STDEV	4.66	.83	1.61	12.35	1.04	2.12	0.0	19.28	4.80	61.72	94.28	2.83	M	0.0	.05	.01	.15	.24	.01	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 9-12 UNDER5																				
VALIDN	11	1	10	11	11	11	11	11	11	11	11	11	3	11	11	11	11	11	11	3
MEAN	36.86	22.19	17.18	215.9	3.09	70.36	24491	330.9	2244	1307	6657	101.1	234.8	180.36	2.04	16.09	8.23	40.59	.53	2.90
STDEV	2.79	M	6.34	108.9	1.14	55.45	21177	154.6	1897	918.5	4439	71.97	25.32	361.37	3.97	31.81	15.42	72.02	.86	2.82
SCOTLAND DEMERSAL 9-12 5-10																				
VALIDN	9	0	9	9	9	9	9	9	9	9	9	9	2	9	9	9	9	9	9	2
MEAN	38.03	M	16.32	153.6	3.44	117.8	37211	291.5	3360	2098	11082	248.2	597.7	96.56	.75	8.72	5.39	28.56	.64	1.52
STDEV	2.31	M	4.28	36.27	1.13	50.13	18735	114.1	1717	935.3	6144	137.5	102.2	53.37	.37	4.90	2.68	16.42	.37	.33
SCOTLAND DEMERSAL 9-12 10-20																				
VALIDN	14	1	13	14	14	13	12	12	12	12	12	12	4	12	12	12	12	12	12	4
MEAN	36.46	9.75	14.33	102.4	2.71	87.85	26925	247.9	2537	1647	8770	240.2	1362	123.33	1.48	11.51	7.05	40.37	1.09	8.76
STDEV	1.94	M	4.24	38.92	.61	57.91	22021	129.8	2036	1204	6903	176.8	758.8	219.39	3.23	20.32	11.80	72.97	1.92	9.54
SCOTLAND DEMERSAL 9-12 OVER20																				
VALIDN	27	3	24	27	27	22	22	22	22	22	22	22	1	22	22	22	22	22	22	1
MEAN	36.28	18.45	11.86	89.07	2.59	74.86	18082	212.6	1720	1296	6517	226.2	1005	91.23	1.42	8.56	6.18	35.96	1.21	20.50
STDEV	2.50	5.69	3.21	45.34	1.05	54.11	15216	131.2	1442	1107	5651	197.2	M	155.55	2.65	14.39	9.76	72.38	2.15	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 12-15 UNDER5																				
VALIDN	16	0	16	16	16	16	15	15	15	15	15	15	5	16	16	16	16	16	16	5
MEAN	50.04	M	25.50	337.5	5.12	114.5	81847	767.3	5625	3268	16823	253.3	310.9	359.87	3.19	24.57	14.81	68.29	1.15	.88
STDEV	1.64	M	2.77	73.42	.96	58.56	44048	231.6	2994	1863	11494	141.1	174.9	475.30	3.02	32.10	21.30	79.82	1.65	.35
SCOTLAND DEMERSAL 12-15 5-10																				
VALIDN	38	0	38	38	38	38	38	38	38	38	38	38	10	38	38	38	38	38	38	10
MEAN	49.70	M	24.49	277.8	5.32	139.0	99679	725.3	6918	4077	18668	361.2	700.4	293.34	2.11	20.37	11.98	56.72	1.12	3.20
STDEV	1.98	M	.99	51.96	.57	41.72	40268	235.3	2798	1653	7129	133.4	188.0	193.08	1.22	13.50	7.81	46.84	1.04	4.39
SCOTLAND DEMERSAL 12-15 10-20																				
VALIDN	51	0	51	51	51	50	51	50	51	51	51	51	15	51	50	51	51	51	51	15
MEAN	49.55	M	24.29	214.9	4.55	140.6	70673	498.2	4909	2919	15811	335.4	910.0	219.47	1.56	15.37	9.07	49.15	1.06	3.84
STDEV	1.76	M	1.63	59.13	.90	30.47	36609	203.6	2494	1490	7563	143.6	271.4	199.77	1.40	14.71	8.21	47.84	.96	4.28
SCOTLAND DEMERSAL 12-15 OVER20																				
VALIDN	67	20	47	66	67	62	64	62	64	64	64	64	13	63	61	63	63	63	63	13
MEAN	47.82	23.20	23.74	141.5	3.88	125.9	41573	323.5	2977	1737	10686	325.1	1497	159.54	1.28	11.43	6.87	41.75	1.37	10.64
STDEV	2.48	3.00	1.88	63.29	.96	44.94	23748	134.1	1670	955.4	5870	200.3	647.4	213.35	1.78	15.32	9.94	60.18	2.43	18.16

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 15-18 UNDER5																				
VALIDN	14	2	12	14	14	13	13	13	13	13	13	13	4	13	13	13	13	13	13	4
MEAN	54.90	51.84	36.70	329.3	5.57	120.9	95562	829.0	5910	2782	16738	282.3	433.7	319.08	2.56	20.01	9.06	55.03	.97	1.06
STDEV	3.55	2.84	10.28	66.01	.94	72.74	66470	227.3	3880	2010	10672	172.0	254.0	333.40	1.78	21.58	9.30	54.34	1.08	.57
SCOTLAND DEMERSAL 15-18 5-10																				
VALIDN	24	1	23	24	24	23	24	23	24	24	24	24	8	24	23	24	24	24	24	8
MEAN	56.26	46.29	36.72	304.2	5.46	141.6	114554	802.0	6951	3215	21049	387.7	793.0	329.25	2.29	20.13	9.30	60.57	1.13	1.99
STDEV	3.30	M	10.52	60.07	.93	36.01	56456	282.9	3346	1678	10521	194.7	389.9	195.30	1.19	12.28	6.01	37.55	.73	1.04
SCOTLAND DEMERSAL 15-18 10-20																				
VALIDN	40	1	39	40	40	40	40	40	40	40	40	40	11	40	40	40	40	40	40	11
MEAN	57.22	49.99	38.97	257.7	5.35	136.9	86735	635.1	5189	2268	16566	358.1	885.6	230.15	1.68	13.72	5.99	43.60	.95	2.47
STDEV	3.03	M	6.00	75.52	1.03	36.39	30449	168.9	1776	875.6	6231	166.3	396.7	108.73	.69	6.20	2.90	20.24	.52	1.40
SCOTLAND DEMERSAL 15-18 OVER20																				
VALIDN	37	2	35	37	37	36	36	36	36	36	36	36	11	36	36	36	36	36	36	11
MEAN	56.57	46.22	34.65	194.6	4.97	130.0	58192	429.9	3501	1642	11998	322.9	948.3	158.67	1.18	9.56	4.50	32.41	.89	2.56
STDEV	3.01	.93	6.86	63.41	.90	40.38	27713	140.9	1582	668.0	5985	147.9	440.4	75.76	.45	4.42	2.03	15.24	.42	1.38

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 18-21 UNDER5																				
VALIDN	37	0	37	37	37	36	36	36	36	36	36	36	14	36	36	36	36	36	36	14
MEAN	68.97	M	50.73	499.2	7.38	144.8	165969	1160	8182	3365	22769	332.6	396.4	616.31	4.20	30.38	12.52	80.40	1.18	1.62
STDEV	2.11	M	7.51	50.25	.83	53.87	72041	257.3	3486	1491	9858	140.2	146.7	865.51	5.51	42.42	17.46	96.26	1.51	1.54
SCOTLAND DEMERSAL 18-21 5-10																				
VALIDN	57	0	57	57	57	56	56	56	56	56	56	56	15	56	56	56	56	56	56	15
MEAN	67.71	M	49.70	432.7	7.11	144.9	158064	1093	7898	3209	22199	376.1	779.4	497.62	3.48	24.80	10.11	69.31	1.15	2.80
STDEV	2.73	M	3.15	76.56	.86	51.15	67839	308.2	3300	1372	9553	167.4	136.2	402.79	2.90	19.68	8.16	52.11	.81	2.90
SCOTLAND DEMERSAL 18-21 10-20																				
VALIDN	48	5	43	48	48	48	48	48	48	48	48	48	16	48	48	48	48	48	48	16
MEAN	67.23	75.80	50.61	339.9	6.56	137.6	118442	827.8	5981	2300	18119	379.8	679.2	389.40	2.74	19.60	7.63	58.71	1.33	2.10
STDEV	2.52	9.71	7.45	93.36	1.13	46.61	60501	239.8	2951	1075	8699	214.0	253.0	405.28	2.27	19.93	8.12	57.29	2.00	.84
SCOTLAND DEMERSAL 18-21 OVER20																				
VALIDN	81	7	74	81	81	80	80	80	80	80	80	80	38	79	79	79	79	79	79	38
MEAN	66.94	60.91	48.98	247.0	6.02	126.5	82735	632.4	4205	1670	13756	380.3	1486	445.89	3.25	22.61	9.01	70.02	2.12	8.02
STDEV	2.45	8.86	4.56	106.5	1.16	39.89	39908	168.3	2014	817.4	6548	220.6	1050	670.18	4.25	33.91	13.71	99.99	3.41	9.63

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 21-24 UNDER5																				
VALIDN	23	2	20	23	23	21	21	21	21	21	21	21	5	21	21	21	21	21	21	5
MEAN	77.13	194.4	80.50	660.4	8.52	172.8	281867	1642	12279	3234	32799	422.5	468.8	629.62	3.70	27.42	7.10	73.24	.94	1.08
STDEV	2.81	0.0	14.46	109.8	.59	54.24	110407	327.5	4780	1386	12453	169.1	197.1	260.65	.88	11.22	2.77	29.24	.36	.45
SCOTLAND DEMERSAL 21-24 5-10																				
VALIDN	66	20	46	66	66	66	66	66	66	66	66	66	28	66	66	66	66	66	66	28
MEAN	77.27	121.1	73.96	590.7	7.91	178.9	228524	1259	10033	2748	28927	398.1	766.1	622.94	3.49	27.30	7.45	79.13	1.08	2.25
STDEV	2.51	15.30	8.61	103.3	.57	40.01	71962	297.7	3180	1087	9209	135.0	199.1	310.02	1.99	13.37	4.00	40.56	.52	.96
SCOTLAND DEMERSAL 21-24 10-20																				
VALIDN	34	8	26	34	34	33	33	33	33	33	33	33	15	33	33	33	33	33	33	15
MEAN	76.13	106.0	69.88	490.9	7.74	163.9	178939	1056	7924	2317	22841	371.2	951.6	518.52	3.17	22.92	6.78	66.61	1.05	2.76
STDEV	2.66	16.48	6.86	123.2	.79	51.37	75479	281.4	3255	1073	9550	155.9	315.0	245.79	1.54	10.50	3.61	31.50	.44	1.15
SCOTLAND DEMERSAL 21-24 OVER20																				
VALIDN	7	3	4	7	7	6	6	6	6	6	6	6	5	6	6	6	6	6	6	5
MEAN	73.32	83.26	56.45	264.6	6.29	120.7	84200	627.9	3880	1287	13450	383.3	775.3	252.67	1.87	11.61	3.71	40.48	1.10	2.28
STDEV	2.26	14.76	4.65	108.4	1.98	60.22	65261	302.7	2963	1043	9244	322.0	544.4	183.82	.86	8.22	2.56	26.07	.76	1.68

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 24-28 UNDER5																				
VALIDN	1	1	0	1	1															
MEAN	92.50	269.6	M	915.0	11.00															
STDEV	M	M	M	M	M															
SCOTLAND DEMERSAL 24-28 5-10																				
VALIDN	2	0	2	2	2															
MEAN	90.80	M	84.95	637.0	8.00															
STDEV	2.69	M	3.15	0.0	0.0															
SCOTLAND DEMERSAL 24-28 10-20																				
VALIDN	4	2	2	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	4	2
MEAN	94.34	152.0	104.0	770.0	8.75	167.0	197950	1183	7404	1618	23353	260.8	460.2	1010.0	6.05	37.58	9.03	122.4	1.33	2.03
STDEV	1.10	17.62	4.57	144.7	1.50	12.49	31154	140.2	1190	456.8	6246	40.69	86.41	627.53	3.67	23.06	6.98	83.24	.86	1.25
SCOTLAND DEMERSAL 24-28 OVER20																				
VALIDN	5	4	1	5	5	4	4	4	4	4	4	4	1	4	4	4	4	4	4	1
MEAN	92.55	144.4	71.60	568.0	8.40	161.5	135900	835.1	5232	1132	17341	272.8	992.0	637.50	4.93	25.11	7.08	93.86	1.08	2.75
STDEV	3.97	14.84	M	142.0	1.82	44.12	49047	155.5	1777	286.5	5075	123.4	M	557.83	5.79	22.82	8.85	100.2	.70	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 28-33 UNDER5																				
VALIDN	2	2	0	2	2															
MEAN	108.0	374.4	M	1525	12.00															
STDEV	11.14	16.15	M	247.5	1.41															
SCOTLAND DEMERSAL 28-33 5-10																				
VALIDN	6	3	3	6	6	6	6	6	6	6	6	6	3	6	6	6	6	6	6	3
MEAN	105.4	326.2	98.61	1035	9.50	154.8	290667	1769	9476	1623	29769	279.9	316.3	1216.3	8.13	40.77	8.45	133.1	1.37	1.95
STDEV	8.15	104.4	5.21	537.1	1.76	50.27	162312	517.2	4610	766.5	12735	73.77	69.90	450.98	3.44	15.48	6.25	59.43	.73	.58
SCOTLAND DEMERSAL 28-33 10-20																				
VALIDN	2	2	0	2	2															
MEAN	106.3	208.5	M	647.5	10.00															
STDEV	.35	1.70	M	17.68	1.41															
SCOTLAND DEMERSAL 28-33 OVER20																				
VALIDN	14	14	0	14	14	12	12	12	12	12	12	12	0	12	12	12	12	12	12	0
MEAN	107.9	217.5	M	677.1	10.79	163.6	181617	1082	5923	826.4	16400	273.7	M	535.17	3.14	17.49	2.44	48.12	.80	M
STDEV	4.24	15.71	M	97.85	1.76	72.59	94556	375.5	3032	419.2	8142	141.2	M	277.17	1.03	9.02	1.25	23.90	.40	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND DEMERSAL 33-40 OVER20																				
VALIDN	1	1	0	1	1															
MEAN	121.0	280.7	M	712.0	11.00															
STDEV	M	M	M	M	M															
SCOTLAND PELAGIC UNDER 9 5-10																				
VALIDN	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	28.85	M	3.66	33.00	2.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND PELAGIC 12-15 5-10																				
VALIDN	1	0	1	1	1															
MEAN	50.70	M	24.02	360.0	6.00															
STDEV	M	M	M	M	M															
SCOTLAND PELAGIC 12-15 10-20																				
VALIDN	2	0	2	2	2															
MEAN	49.20	M	23.17	242.5	5.00															
STDEV	1.13	M	.06	10.61	0.0															

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 15-18 UNDER5																				
VALIDN	1	0	1	1	1															
MEAN	57.20	M	33.99	365.0	6.00															
STDEV	M	M	M	M	M															
SCOTLAND PELAGIC 15-18 10-20																				
VALIDN	2	0	2	2	2															
MEAN	52.30	M	24.36	215.0	5.00															
STDEV	.14	M	.57	21.21	0.0															
SCOTLAND PELAGIC 15-18 OVER20																				
VALIDN	2	0	2	2	2															
MEAN	53.02	M	28.11	260.0	4.50															
STDEV	1.38	M	5.27	56.57	.71															
SCOTLAND PELAGIC 18-21 UNDER5																				
VALIDN	3	0	3	3	3	3	3	3	3	3	3	3	0	3	3	3	3	3	3	0
MEAN	69.59	M	53.53	616.7	7.00	102.0	144000	1274	7011	2993	19530	216.7	M	1079.3	12.94	52.62	21.97	149.7	1.67	M
STDEV	.67	M	10.32	102.1	1.00	73.26	109517	352.0	5320	2361	14631	157.8	M	632.38	5.07	30.61	14.50	83.31	.85	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 18-21 5-10																				
VALIDN	6	0	6	6	6	6	6	6	6	6	6	6	1	6	6	6	6	6	6	1
MEAN	67.30	M	47.95	446.7	7.50	139.7	165500	1189	8391	3467	22152	373.5	570.6	1052.3	7.59	53.13	22.05	140.5	2.36	3.82
STDEV	3.30	M	1.61	39.33	.55	13.38	30869	213.7	1580	730.2	4363	80.75	M	291.84	2.14	14.32	6.46	40.14	.68	M
SCOTLAND PELAGIC 18-21 OVER20																				
VALIDN	2	0	2	2	2															
MEAN	67.40	M	48.44	410.0	7.00															
STDEV	.85	M	1.84	127.3	0.0															
SCOTLAND PELAGIC 21-24 UNDER5																				
VALIDN	5	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
MEAN	77.44	M	80.02	720.0	8.80	121.6	174880	1479	7672	2350	20157	246.4	286.3	1305.4	10.84	57.29	17.67	149.2	1.82	2.19
STDEV	2.89	M	18.01	92.47	1.79	27.36	26581	334.3	1298	946.2	3143	47.19	71.76	452.98	3.69	20.15	8.95	50.84	.61	.99
SCOTLAND PELAGIC 21-24 5-10																				
VALIDN	14	3	11	14	14	14	14	14	14	14	14	14	8	14	14	14	14	14	14	8
MEAN	78.57	113.9	83.09	758.8	9.29	103.1	172543	1697	7411	1957	19007	232.8	380.7	1332.3	13.07	57.08	14.99	142.4	1.76	3.09
STDEV	2.17	6.47	6.10	111.3	1.82	22.14	42420	345.0	1720	517.1	5126	71.74	91.02	546.94	4.87	22.75	6.30	48.99	.65	2.11

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 21-24 10-20																				
VALIDN	2	0	2	2	2															
MEAN	76.05	M	67.26	490.0	8.00															
STDEV	1.91	M	.92	7.07	0.0															
SCOTLAND PELAGIC 21-24 OVER20																				
VALIDN	1	0	1	1	1															
MEAN	79.80	M	63.70	560.0	8.00															
STDEV	M	M	M	M	M															
SCOTLAND PELAGIC 24-28 UNDER5																				
VALIDN	2	0	2	2	2															
MEAN	97.87	M	112.5	925.0	12.00															
STDEV	.39	M	20.95	247.5	0.0															
SCOTLAND PELAGIC 24-28 5-10																				
VALIDN	5	1	4	5	5	4	4	4	4	4	4	4	1	4	4	4	4	4	4	1
MEAN	94.22	181.1	124.7	760.0	11.80	83.25	260450	3158	9659	2180	22526	357.6	192.1	2257.7	29.14	83.95	18.85	194.1	3.08	2.19
STDEV	3.08	M	26.14	54.77	.45	37.76	130403	675.8	4616	1108	12350	192.5	M	682.37	6.55	24.04	6.82	67.33	1.04	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 24-28 10-20																				
VALIDN	2	0	2	2	2															
MEAN	93.50	M	88.76	850.0	11.50															
STDEV	3.11	M	10.42	0.0	.71															
SCOTLAND PELAGIC 28-33 UNDER5																				
VALIDN	1	1	0	1	1															
MEAN	111.9	282.1	M	1460	13.00															
STDEV	M	M	M	M	M															
SCOTLAND PELAGIC 28-33 5-10																				
VALIDN	7	4	3	7	7	7	7	7	7	7	7	7	1	7	7	7	7	7	7	1
MEAN	101.8	218.1	107.0	814.3	10.71	67.00	208029	3179	7239	1401	19501	262.1	224.8	2131.4	32.28	74.06	14.05	203.2	2.67	2.36
STDEV	2.52	29.34	5.94	131.4	1.60	12.40	56029	887.4	2043	676.1	5132	82.88	M	394.83	6.24	14.73	5.64	49.03	.64	M
SCOTLAND PELAGIC 28-33 10-20																				
VALIDN	4	0	4	4	4	4	4	4	4	4	4	4	1	4	4	4	4	4	4	1
MEAN	99.32	M	106.5	762.5	11.50	62.25	228325	3805	8111	2154	19758	306.4	351.2	2251.0	37.70	79.95	21.27	193.9	2.95	4.07
STDEV	.29	M	4.09	213.6	.58	15.48	59515	1102	2127	615.5	4423	58.70	M	749.81	13.42	26.69	7.62	56.02	.38	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND PELAGIC 33-40 UNDER5																				
VALIDN	9	3	6	9	9	9	9	9	9	9	9	9	2	9	9	9	9	9	9	2
MEAN	122.1	316.5	221.4	1563	11.78	48.33	195278	3995	5666	860.1	16463	136.6	95.49	1871.6	41.33	54.21	8.09	157.6	1.29	1.03
STDEV	2.99	2.38	41.04	392.5	.97	32.91	144938	692.6	4243	735.5	11992	114.9	83.85	1115.5	11.04	32.68	5.64	91.87	.86	.95
SCOTLAND PELAGIC 33-40 5-10																				
VALIDN	3	1	2	3	3	3	3	3	3	3	3	3	1	3	3	3	3	3	3	1
MEAN	123.9	359.1	242.2	1217	12.33	51.67	215800	4283	6114	800.5	17520	188.3	257.5	2786.3	55.52	78.56	10.52	227.3	2.33	2.73
STDEV	6.04	M	121.2	425.2	.58	19.86	70105	500.6	1790	172.9	5887	76.17	M	1115.4	13.18	27.59	3.58	96.51	.61	M
SCOTLAND PELAGIC 33-40 10-20																				
VALIDN	4	0	4	4	4	4	4	4	4	4	4	4	1	4	4	4	4	4	4	1
MEAN	131.5	M	264.3	1525	13.00	50.50	196025	3839	5245	726.2	14731	127.3	132.9	2129.5	41.92	57.03	7.87	160.7	1.39	1.25
STDEV	1.48	M	36.77	225.5	1.41	17.71	80819	355.1	2112	215.6	4447	46.51	M	806.80	3.86	21.20	2.02	46.40	.45	M
SCOTLAND SHELL UNDER 9 UNDER5																				
VALIDN	93	1	92	85	93	3	3	3	3	3	3	3	0	3	3	3	3	3	3	0
MEAN	22.65	10.56	2.72	52.84	1.69	78.67	7966.7	101.3	911.6	1656	3983	75.28	M	10.33	.13	1.18	2.15	5.17	.10	M
STDEV	4.54	M	1.68	49.03	.49	60.99	6880.6	19.77	774.0	1517	3440	48.84	M	9.29	.04	1.05	2.05	4.65	.07	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL UNDER 9 5-10																				
VALIDN	97	3	94	91	97	4	4	4	4	4	4	4	0	4	4	4	4	4	4	0
MEAN	23.92	13.04	3.90	40.57	1.66	49.00	7875.0	176.7	912.8	927.5	4025	72.86	M	9.75	.38	1.13	1.16	5.13	.09	M
STDEV	4.46	12.25	2.29	31.28	.52	77.72	14220	158.0	1652	1651	7053	131.7	M	16.17	.42	1.88	1.87	7.94	.15	M
SCOTLAND SHELL UNDER 9 10-20																				
VALIDN	138	2	136	131	138	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0
MEAN	23.22	6.29	3.61	28.34	1.71	83.00	11700	141.0	1310	1416	5850	162.5	M	13.00	.16	1.46	1.57	6.50	.18	M
STDEV	4.83	.52	2.51	25.31	.50	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND SHELL UNDER 9 OVER20																				
VALIDN	435	21	409	389	435	3	3	3	3	3	3	3	0	2	2	2	2	2	2	0
MEAN	21.85	3.21	2.78	18.27	1.62	18.67	1033.3	61.59	119.2	144.6	638.9	45.07	M	2.00	.08	.23	.29	1.50	.09	M
STDEV	4.82	1.58	1.80	17.99	.60	14.50	971.25	44.29	113.7	132.3	511.1	46.65	M	0.0	.03	.01	.02	.71	0.0	M
SCOTLAND SHELL 9-12 UNDER5																				
VALIDN	30	1	29	30	30	11	11	11	11	11	11	11	1	10	10	10	10	10	10	1
MEAN	35.37	24.66	11.07	130.8	2.33	61.82	13955	261.2	1302	955.7	5046	89.19	18.18	26.40	.58	2.44	1.72	9.12	.16	.05
STDEV	2.51	M	4.66	49.67	.61	62.30	16903	204.7	1533	1018	5678	88.19	M	32.63	.51	2.87	1.56	8.35	.13	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL 9-12 5-10																				
VALIDN	67	1	66	67	67	19	19	19	19	19	19	19	3	18	18	18	18	18	18	3
MEAN	35.74	12.50	11.24	105.9	2.28	64.53	12168	180.5	1200	1146	4955	113.5	43.09	17.56	.32	1.73	1.66	7.10	.16	.16
STDEV	2.05	M	2.89	31.67	.55	62.66	14121	94.29	1394	1379	5708	139.0	25.07	18.21	.21	1.81	1.74	6.88	.17	.18
SCOTLAND SHELL 9-12 10-20																				
VALIDN	59	2	57	59	59	27	27	27	27	27	27	27	1	26	26	26	26	26	26	1
MEAN	35.63	20.77	11.91	88.29	2.53	97.89	23607	253.8	2229	1494	7728	215.7	82.35	36.58	.47	3.45	2.26	11.50	.31	.12
STDEV	2.01	2.16	3.42	31.51	.65	80.29	25207	211.6	2389	1500	7613	215.8	M	47.18	.68	4.46	2.60	12.41	.31	M
SCOTLAND SHELL 9-12 OVER20																				
VALIDN	101	18	83	100	101	39	40	39	40	40	40	40	3	37	36	37	37	37	37	3
MEAN	36.51	15.88	11.19	77.09	2.61	100.1	20355	198.0	1862	1292	7070	204.6	978.3	55.24	.71	5.09	3.61	21.56	.51	1.97
STDEV	2.58	3.54	4.15	34.77	.77	72.54	16557	71.92	1513	985.7	5635	173.4	940.2	103.77	1.66	9.66	7.03	51.81	.82	1.68
SCOTLAND SHELL 12-15 5-10																				
VALIDN	7	0	7	7	7	7	7	7	7	7	7	7	1	7	7	7	7	7	7	1
MEAN	47.61	M	23.95	209.3	4.29	160.6	68786	436.8	4963	2869	16246	335.1	970.0	182.86	1.14	13.02	7.61	43.89	.87	1.77
STDEV	3.25	M	.50	48.51	.49	34.78	21611	136.9	1412	886.6	5662	98.75	M	142.94	.85	9.87	5.92	36.65	.65	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL 12-15 10-20																				
VALIDN	53	3	50	53	53	47	47	47	47	47	47	47	11	47	47	47	47	47	47	11
MEAN	47.90	24.99	23.72	173.8	3.91	145.1	46460	326.8	3320	1949	11994	273.9	950.7	101.96	.82	7.24	4.26	24.81	.59	2.57
STDEV	3.01	.62	2.02	49.08	.79	49.71	17926	90.79	1248	759.1	5091	122.1	472.8	113.51	1.29	7.66	4.66	19.46	.63	2.90
SCOTLAND SHELL 12-15 OVER20																				
VALIDN	90	13	77	90	90	71	70	70	70	70	70	70	11	69	69	69	69	69	69	11
MEAN	48.42	23.32	23.01	133.1	3.69	120.3	29694	250.9	2096	1257	8154	228.6	1523	62.46	.82	4.46	2.65	17.69	.53	6.79
STDEV	2.34	2.66	2.78	49.82	.98	59.96	18003	97.11	1264	744.7	4633	142.4	963.3	85.98	1.61	6.48	3.81	27.89	1.16	13.54
SCOTLAND SHELL 15-18 UNDER5																				
VALIDN	2	1	1	2	2															
MEAN	55.60	49.98	33.99	382.5	6.00															
STDEV	2.26	M	M	24.75	0.0															
SCOTLAND SHELL 15-18 5-10																				
VALIDN	8	0	8	8	8	7	7	7	7	7	7	7	1	7	7	7	7	7	7	1
MEAN	57.61	M	38.66	321.2	5.12	153.3	65571	406.7	3900	1787	13671	208.4	204.8	164.43	1.07	9.75	4.44	33.93	.53	.45
STDEV	3.32	M	8.74	97.75	.83	48.34	32189	100.5	1812	816.2	7043	84.43	M	69.74	.36	3.86	1.87	15.96	.19	M

C-TY-SZ-AG		FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL 15-18 10-20																					
	VALIDN	50	3	47	50	50	46	46	46	46	46	46	46	9	46	46	46	46	46	46	9
	MEAN	56.00	48.04	34.24	219.5	4.36	138.9	55679	385.4	3404	1628	13053	264.7	755.0	152.74	1.10	9.27	4.37	36.17	.69	1.70
	STDEV	2.59	3.23	7.13	47.85	.75	52.83	26143	93.12	1583	835.9	6193	128.6	288.5	112.64	.73	6.64	3.24	30.51	.45	.98
SCOTLAND SHELL 15-18 OVER20																					
	VALIDN	49	8	41	49	49	45	45	45	45	45	45	45	9	45	45	45	45	45	45	9
	MEAN	55.55	40.55	31.81	175.2	4.33	121.3	37429	312.1	2301	1156	9035	242.5	1342	73.67	.66	4.55	2.29	17.82	.46	2.22
	STDEV	3.31	5.35	7.13	66.81	1.03	58.08	18695	101.7	1158	636.0	4862	137.3	728.3	41.82	.47	2.67	1.48	10.74	.24	1.18
SCOTLAND SHELL 18-21 UNDER5																					
	VALIDN	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MEAN	65.05	M	49.45	550.0	8.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
SCOTLAND SHELL 18-21 5-10																					
	VALIDN	1	0	1	1	1															
	MEAN	67.70	M	42.04	230.0	7.00															
	STDEV	M	M	M	M	M															

C-TY-SZ-AG		FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
SCOTLAND SHELL 18-21 10-20	VALIDN	9	0	9	9	9	9	9	9	9	9	9	9	1	9	9	9	9	9	9	1
	MEAN	64.87	M	45.34	331.1	5.00	144.8	68244	475.3	3593	1571	13562	234.2	212.0	298.22	2.20	15.48	6.50	61.09	.92	.54
	STDEV	2.95	M	5.51	111.5	.87	61.94	32455	94.63	1684	849.6	6480	132.9	M	218.19	1.67	10.97	4.31	52.40	.58	M
SCOTLAND SHELL 18-21 OVER20	VALIDN	36	2	34	36	36	35	35	35	35	35	35	35	17	34	34	34	34	34	34	17
	MEAN	66.02	59.66	46.97	213.7	5.25	127.3	52740	411.0	2717	1087	10396	261.5	1449	158.76	1.14	8.09	3.25	32.46	.71	2.93
	STDEV	2.74	2.49	3.71	74.01	1.42	48.11	23031	100.7	1165	446.6	5119	124.0	1111	245.82	1.26	12.27	4.92	52.10	.80	1.99
SCOTLAND SHELL 21-24 10-20	VALIDN	3	0	3	3	3	2	2	2	2	2	2	2	0	2	2	2	2	2	2	0
	MEAN	73.37	M	53.31	331.7	4.33	177.5	85450	480.9	4001	1584	21363	271.6	M	350.00	1.96	16.37	6.59	87.50	1.11	M
	STDEV	1.52	M	7.04	29.30	.58	10.61	8273.1	17.87	342.6	407.9	2068	32.36	M	100.41	.45	4.52	2.89	25.10	.34	M
SCOTLAND SHELL 21-24 OVER20	VALIDN	4	1	3	4	4	3	3	3	3	3	3	3	1	3	3	3	3	3	3	1
	MEAN	74.52	71.98	59.70	264.0	5.75	112.7	49733	436.4	2345	935.6	9137	327.2	1700	173.33	1.73	8.18	2.82	33.43	1.14	2.60
	STDEV	4.92	M	16.82	224.0	.96	30.24	16857	28.62	790.6	514.6	4104	110.9	M	141.93	1.72	6.70	1.74	29.85	.93	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 9-12 10-20																				
VALIDN	8	3	5	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	40.91	24.00	13.80	128.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.47	1.00	2.28	27.97	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 9-12 OVER20																				
VALIDN	43	27	16	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	40.68	17.52	11.50	84.07	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.55	3.60	2.58	33.80	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 12-15 UNDER5																				
VALIDN	6	1	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	47.80	29.00	25.60	269.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.34	M	4.16	69.05	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 12-15 5-10																				
VALIDN	29	5	24	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	47.98	30.40	22.67	210.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.97	7.99	2.48	66.90	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG		FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 12-15 10-20	VALIDN	64	23	41	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MEAN	47.28	27.57	21.49	166.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	STDEV	3.10	6.19	4.28	51.65	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 12-15 OVER20	VALIDN	281	169	112	270	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MEAN	46.91	22.11	19.53	117.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	STDEV	2.59	4.30	4.26	49.28	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 15-18 UNDER5	VALIDN	13	5	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MEAN	56.02	50.20	33.00	365.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	STDEV	2.93	4.15	8.54	95.60	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 15-18 5-10	VALIDN	30	16	14	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MEAN	57.05	47.50	33.93	274.2	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	STDEV	2.88	3.95	8.88	75.26	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 15-18 10-20																				
VALIDN	58	24	34	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	56.11	46.25	30.71	216.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.63	8.52	6.10	49.86	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 15-18 OVER20																				
VALIDN	207	130	77	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	56.02	38.42	26.98	157.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.78	7.65	7.16	66.87	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 18-21 UNDER5																				
VALIDN	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	67.30	114.0	47.00	525.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	3.54	M	M	43.13	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 18-21 5-10																				
VALIDN	15	6	9	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	65.59	79.83	46.67	327.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	3.10	28.62	4.92	145.4	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 18-21 10-20																				
VALIDN	14	3	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	65.93	66.67	46.73	343.4	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.60	20.11	6.77	109.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 18-21 OVER20																				
VALIDN	61	28	33	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	66.05	53.29	44.61	237.2	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.95	8.98	6.78	85.75	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 21-24 UNDER5																				
VALIDN	9	8	1	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	78.53	161.0	69.00	632.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.91	33.29	M	162.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 21-24 5-10																				
VALIDN	9	7	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	77.73	150.0	61.00	644.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.43	25.60	26.87	144.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 21-24 10-20																				
VALIDN	22	9	13	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	78.05	1199	64.46	532.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.47	3300	15.56	161.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 21-24 OVER20																				
VALIDN	25	14	11	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	75.80	75.79	55.00	358.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	3.37	11.36	11.37	154.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 24-28 UNDER5																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	95.00	290.0	M	950.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 24-28 5-10																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	94.41	193.5	M	750.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	3.13	6.36	M	70.71	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 24-28 10-20																				
VALIDN	15	9	6	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	93.00	163.8	86.33	652.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	4.04	16.37	12.08	150.2	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 24-28 OVER20																				
VALIDN	8	4	4	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	91.16	124.7	81.25	490.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	4.63	27.54	28.30	124.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 28-33 UNDER5																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	100.7	313.0	M	1200	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.04	0.0	M	0.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 28-33 5-10																				
VALIDN	19	18	1	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	109.3	293.6	143.0	1230	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	3.13	48.51	M	180.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 28-33 10-20																				
VALIDN	13	12	1	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	110.5	238.8	157.0	856.2	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	5.58	35.15	M	207.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 28-33 OVER20																				
VALIDN	17	16	1	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	107.4	215.1	149.0	612.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	4.21	41.69	M	148.4	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 33-40 5-10																				
VALIDN	14	11	3	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	125.4	399.0	239.7	1633	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	5.99	48.60	13.05	176.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL 33-40 10-20																				
VALIDN	14	11	3	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	121.9	297.6	181.3	1137	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	6.16	81.24	27.15	294.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND DEMERSAL 33-40 OVER20																				
VALIDN	20	20	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	130.8	340.3	M	842.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	4.49	32.47	M	185.4	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL OVER40 5-10																				
VALIDN	13	13	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	218.0	1383	M	3121	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	29.47	278.6	M	543.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL OVER40 10-20																				
VALIDN	12	12	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	208.3	1035	M	2164	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	26.05	277.1	M	540.9	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND DEMERSAL OVER40 OVER20																				
VALIDN	6	6	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	171.9	592.5	M	1537	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	31.03	301.5	M	459.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND PELAGIC 9-12 OVER20																				
VALIDN	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	40.20	M	5.00	65.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC 12-15 10-20																				
VALIDN	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	46.00	M	13.00	86.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC 15-18 OVER20																				
VALIDN	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	54.00	M	23.00	88.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC 28-33 10-20																				
VALIDN	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	112.9	260.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND PELAGIC OVER40 UNDER5																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	207.6	1192	M	3490	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC OVER40 10-20																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	144.8	429.0	M	1230	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.64	14.14	M	324.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND PELAGIC OVER40 OVER20																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	143.3	562.0	M	900.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 9-12 10-20																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	41.00	21.00	M	150.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND SHELL 9-12 OVER20																				
VALIDN	17	7	10	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	40.62	15.43	11.40	70.82	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	.56	2.70	1.51	36.98	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 12-15 5-10																				
VALIDN	4	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	48.80	49.00	23.67	175.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.16	M	2.31	49.50	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 12-15 10-20																				
VALIDN	8	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	46.31	M	20.62	139.5	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.69	M	3.16	31.49	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 12-15 OVER20																				
VALIDN	30	20	10	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	45.62	23.35	13.90	92.03	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.86	5.18	4.33	51.51	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND SHELL 15-18 UNDER5																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	58.63	73.00	M	300.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 15-18 5-10																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	54.50	44.00	M	230.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 15-18 OVER20																				
VALIDN	10	8	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	54.96	42.12	22.50	146.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	2.71	19.45	2.12	64.62	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
ENGLAND SHELL 18-21 OVER20																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	66.00	43.00	M	300.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
ENGLAND SHELL 21-24 OVER20																				
VALIDN	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	79.90	M	26.00	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND UNKNOWN 9-12 OVER20																				
VALIDN	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	36.52	19.55	M	126.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	3.15	16.31	M	1.41	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND UNKNOWN 18-21 OVER20																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	65.00	101.0	M	500.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND DEMERSAL 15-18 OVER20																				
VALIDN	8	4	4	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	57.07	38.80	35.84	244.0	5.50	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	3.19	22.96	2.60	126.4	.76	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND DEMERSAL 18-21 OVER20																				
VALIDN	3	2	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	66.89	78.50	49.00	421.7	5.33	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	4.28	.71	M	70.06	.58	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND PELAGIC 28-33 UNDER5																				
VALIDN	1	0	1	1	0															
MEAN	106.0	M	197.0	915.0	M															
STDEV	M	M	M	M	M															
N.IRELAND PELAGIC 28-33 5-10																				
VALIDN	2	2	0	2	0															
MEAN	103.5	314.6	M	1000	M															
STDEV	0.0	0.0	M	0.0	M															
N.IRELAND PELAGIC 33-40 UNDER5																				
VALIDN	1	1	0	1	0															
MEAN	132.5	532.2	M	1740	M															
STDEV	M	M	M	M	M															

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND PELAGIC OVER40 5-10																				
VALIDN	1	1	0	1	0															
MEAN	170.0	995.9	M	2500	M															
STDEV	M	M	M	M	M															
N.IRELAND SHELL UNKNOWN OVER20																				
VALIDN	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	M	50.00	M	400.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 9-12 UNDER5																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	41.30	23.62	M	172.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 9-12 5-10																				
VALIDN	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	40.40	M	14.73	112.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL 12-15 UNDER5																				
VALIDN	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	49.60	49.89	M	290.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 12-15 5-10																				
VALIDN	2	2	0	2	0															
MEAN	45.82	31.26	M	217.5	M															
STDEV	4.00	7.05	M	31.82	M															
N.IRELAND SHELL 12-15 10-20																				
VALIDN	3	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEAN	48.97	31.73	27.86	186.7	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
STDEV	1.40	5.80	M	61.10	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 12-15 OVER20																				
VALIDN	17	14	3	16	1	4	3	3	3	3	0	3	0	2	2	2	2	0	2	0
MEAN	48.63	26.24	20.85	117.1	5.00	2.25	3000.0	1453	219.8	122.6	M	31.71	M	42.00	20.85	3.08	1.71	M	.44	M
STDEV	1.90	3.19	2.53	19.88	M	1.89	4340.5	2206	319.2	176.0	M	45.61	M	57.98	29.20	4.26	2.35	M	.61	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL 15-18 UNDER5																				
VALIDN	11	9	2	11	4	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0
MEAN	58.42	62.29	32.38	373.7	6.00	2.00	1400.0	700.0	78.06	17.34	M	3.37	M	2.00	1.00	.11	.02	M	.00	M
STDEV	2.39	13.79	6.19	55.74	0.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 15-18 5-10																				
VALIDN	5	4	1	5	0	3	3	3	3	3	0	3	0	3	3	3	3	0	3	0
MEAN	57.68	60.37	33.18	370.0	M	65.33	31400	522.5	1940	786.7	M	94.24	M	89.33	1.49	5.51	2.22	M	.27	M
STDEV	3.90	14.27	M	72.20	M	72.29	29363	195.2	1947	982.3	M	103.7	M	81.59	.70	5.40	2.72	M	.29	M
N.IRELAND SHELL 15-18 10-20																				
VALIDN	11	9	2	11	0	2	2	2	2	2	0	2	0	1	1	1	1	0	1	0
MEAN	58.52	50.97	29.57	278.2	M	7.50	2550.0	228.6	144.3	81.26	M	12.64	M	15.00	1.07	.85	.48	M	.07	M
STDEV	2.86	7.40	2.23	75.51	M	9.19	3464.8	181.8	196.2	112.1	M	17.48	M	M	M	M	M	M	M	M
N.IRELAND SHELL 15-18 OVER20																				
VALIDN	31	29	2	28	1	4	4	4	4	4	0	3	0	4	4	4	4	0	3	0
MEAN	56.32	40.34	24.30	166.1	5.00	18.75	4850.0	266.6	293.1	150.1	M	39.19	M	14.00	.73	.84	.42	M	.12	M
STDEV	2.85	5.84	.57	57.63	M	8.54	2506.7	78.74	132.6	47.71	M	31.79	M	9.66	.27	.52	.19	M	.11	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL 18-21 UNDER5																				
VALIDN	3	1	2	3	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0
MEAN	65.33	90.27	44.57	476.7	6.00	13.00	6600.0	507.7	346.8	73.11	1100	15.35	M	19.00	1.46	1.00	.21	3.17	.04	M
STDEV	.29	M	1.64	40.41	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 18-21 5-10																				
VALIDN	6	6	0	6	0	4	4	4	4	4	0	4	0	4	4	4	4	0	4	0
MEAN	68.09	94.45	M	450.0	M	11.50	11975	971.2	609.6	134.0	M	26.42	M	23.00	3.96	1.17	.26	M	.05	M
STDEV	3.34	13.10	M	42.31	M	8.85	10674	236.7	533.7	115.6	M	22.45	M	7.26	4.38	.35	.07	M	.01	M
N.IRELAND SHELL 18-21 10-20																				
VALIDN	7	7	0	7	0	4	4	4	4	4	0	4	0	4	4	4	4	0	4	0
MEAN	66.82	76.58	M	390.0	M	16.25	8475.0	549.7	455.1	128.5	M	21.68	M	18.75	1.49	1.00	.27	M	.05	M
STDEV	3.66	18.16	M	38.73	M	12.23	5372.4	204.3	291.5	83.16	M	12.40	M	12.09	1.02	.67	.19	M	.03	M
N.IRELAND SHELL 18-21 OVER20																				
VALIDN	36	31	5	36	1	5	5	5	5	5	0	5	0	5	5	5	5	0	5	0
MEAN	66.13	58.79	48.66	273.6	6.00	25.40	9300.0	393.1	496.1	169.4	M	61.98	M	29.00	1.18	1.55	.53	M	.19	M
STDEV	2.72	9.63	3.58	109.1	M	33.25	11894	35.30	632.9	218.7	M	104.5	M	36.10	.23	1.93	.66	M	.30	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL 21-24 UNDER5																				
VALIDN	3	1	1	3	2	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0
MEAN	77.30	124.0	96.00	826.7	8.50	14.00	20100	1436	914.5	162.1	M	40.20	M	25.00	1.79	1.14	.20	M	.05	M
STDEV	2.40	M	M	282.9	2.12	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 21-24 5-10																				
VALIDN	3	3	0	3	0	2	2	2	2	2	0	2	0	2	2	2	2	0	2	0
MEAN	77.03	150.3	M	591.3	M	5.00	7950.0	1529	337.4	44.12	M	12.48	M	7.50	1.46	.32	.04	M	.01	M
STDEV	4.58	51.71	M	79.10	M	1.41	4313.4	430.2	182.7	23.94	M	6.77	M	3.54	.29	.15	.02	M	.01	M
N.IRELAND SHELL 21-24 10-20																				
VALIDN	5	4	1	4	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0
MEAN	74.00	96.74	60.49	462.5	M	6.00	6400.0	1067	292.8	71.46	M	12.80	M	9.00	1.50	.41	.10	M	.02	M
STDEV	.79	5.74	M	116.4	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N.IRELAND SHELL 21-24 OVER20																				
VALIDN	3	1	2	3	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	0
MEAN	75.98	102.2	59.35	410.0	M	2.00	2200.0	1100	101.1	35.22	M	9.57	M	2.00	1.00	.09	.03	M	.01	M
STDEV	3.06	M	4.41	177.6	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

C-TY-SZ-AG	FEET	GRT 1	GRTIV	POWER	CREW	DAYS	VALUE	V/DAY	V/LBP	V/GRT	V/MAN	V/BHP	V/CAP	WEIGHT	T/DAY	T/LBP	T/GRT	T/MAN	T/BHP	T/CAP
N.IRELAND SHELL 24-28 OVER20																				
VALIDN	1	1	0	1	0															
MEAN	86.50	115.4	M	265.0	M	32.														
STDEV	M	M	M	M	M															

APPENDIX IV

TONNAGE DISCRIMINATION ALGORITHM

TONNAGE DISCRIMINATION ALGORITHM

Results of Tonnage Regressions:-

Part I GRT < 80 ft: (N=84, r^2=0.921)

$$\mathrm{Log}_e(GRT_I)=2.4736.\mathrm{Log}_e(Lreg)+0.01348.\mathrm{Year}-7.0134$$

Part I GRT > 80 ft: (N=42, r^2=0.970)

$$\mathrm{Log}_e(GRT_I)=2.1533.\mathrm{Log}_e(Lreg)+0.02482.\mathrm{Year}-6.2229$$

Part IV GRT: (N=84, r^2=0.911)

$$\mathrm{Log}_e(GRT_{IV})=2.1044.\mathrm{Log}_e(Lreg)+0.00812.\mathrm{Year}-5.4530$$

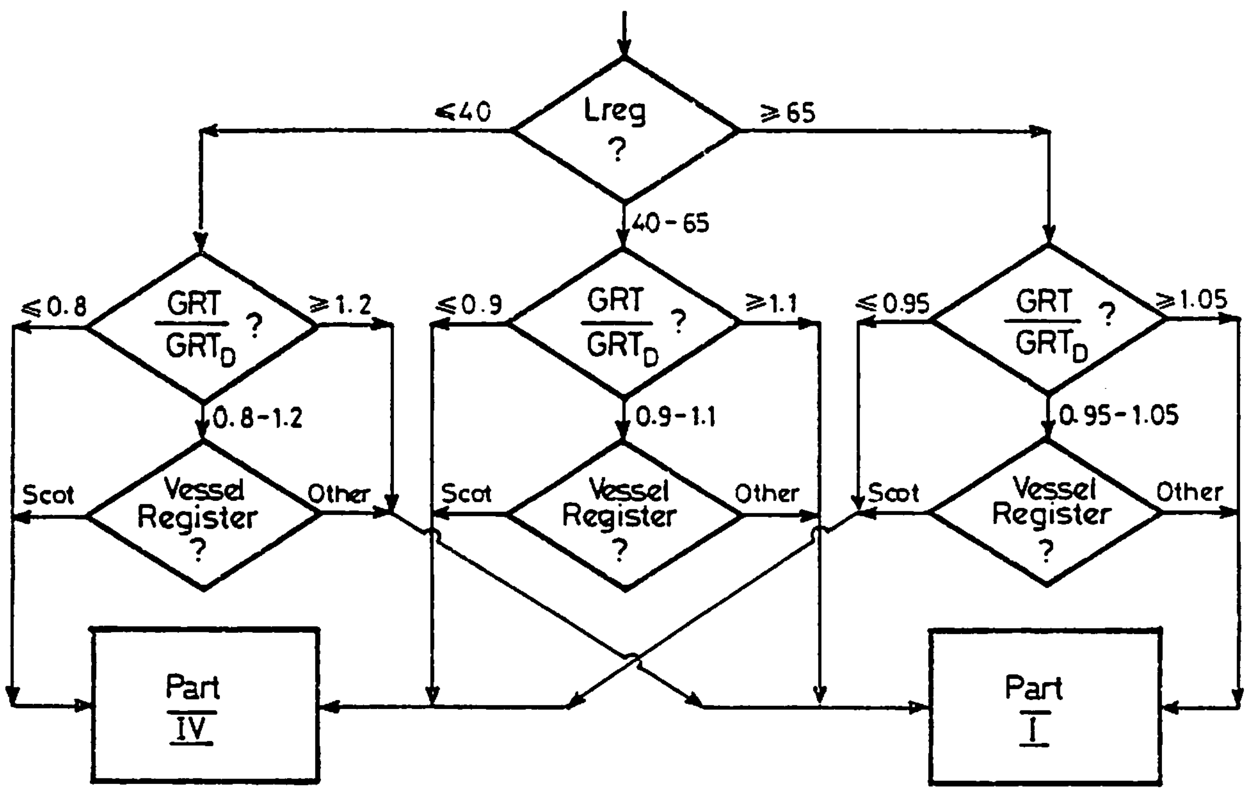
(Note, Lreg in feet, Year is measured from 1900 as base).

Definition

Discriminating Tonnage, $GRT_D = (GRT_I \times GRT_{IV})^{0.5}$

Also Scotland prefers Part IV registration, while the rest of the UK prefers Part I.

Discrimination Algorithm



APPENDIX V

RESULTS OF PRODUCTIVITY

REGRESSION ANALYSIS

TABLE 1

Frequency of Respondents to 1982 Cost + Earnings Surveys

By Region and Fishing Method

Method / Region	Demersal Trawl	Seine Net	Purse Seine	Pelagic Trawl	Pots & Creels	Shell Trawl
Forth	2	2	0	0	0	3
Grampian	121	88	10	14	1	42
Highland	2	0	0	0	7	1
Island	18	9	2	0	17	2
Clyde	1	0	0	0	0	2
North East	37	6	0	0	0	0
Humberside	30	34	0	10	0	0
East Anglia	10	0	0	0	0	1
South East	1	0	0	0	1	0
South West	25	0	0	0	6	1
Wales	1	0	0	0	0	0
North West	15	0	0	2	0	0

Note: Excluded from the above table are 7 line fishing vessels, 9 vessels using fishing methods not defined above, and 23 vessels where the fishing method is unknown.

TABLE 2

Grampian Demersal Trawl

Number of Valid Cases for Regression (Sample Size) = 121

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	149038	89956	0.604
LogInc	11.71	0.699	0.060
Lreg	63.98	12.87	0.201
LogLen	4.137	0.211	0.051
BHP	382.6	188.1	0.492
LogPow	5.817	0.532	0.091
Age	13.24	8.212	0.620
Days	213.6	39.77	0.186

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.7175	0.7899	-.5177	0.4014
Lreg	-	1	0.8062	-.0867	0.1936
BHP	-	-	1	-.4260	0.2055
Age	-	-	-	1	-.1803
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.6854	0.7834	-.5375	0.5442
LogLen	-	1	0.7984	-.0721	0.2151
LogPow	-	-	1	-.4459	0.2731
Age	-	-	-	1	-.1803
Days	-	-	-	-	1

TABLE 3

Highland & Island Demersal Trawl

Number of Valid Cases for Regression (Sample Size) = 20

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	124194	61768	0.497
LogInc	11.61	0.506	0.044
Lreg	56.88	9.866	0.173
LogLen	4.027	0.173	0.043
BHP	264.3	128.4	0.486
LogPow	5.454	0.533	0.098
Age	16.55	14.07	0.850
Days	180.4	30.53	0.169

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.7012	0.6760	-.2709	0.4833
Lreg	-	1	0.4122	0.1544	0.2577
BHP	-	-	1	-.6785	0.0185
Age	-	-	-	1	0.1377
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.6551	0.6546	-.3445	0.4634
LogLen	-	1	0.3285	0.1717	0.2692
LogPow	-	-	1	-.7486	0.0471
Age	-	-	-	1	0.1377
Days	-	-	-	-	1

TABLE 4

North East Demersal Trawl

Number of Valid Cases for Regression (Sample Size) = 35

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	81742	48674	0.595
LogInc	11.14	0.599	0.054
Lreg	52.43	6.654	0.127
LogLen	3.952	0.119	0.030
BHP	212.3	113.6	0.535
LogPow	5.248	0.462	0.088
Age	17.03	9.021	0.530
Days	150.9	35.32	0.234

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.4571	0.8816	-.7165	0.4379
Lreg	-	1	0.7089	-.1445	0.0711
BHP	-	-	1	-.6555	0.2486
Age	-	-	-	1	-.2940
Days					

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.3330	0.8272	-.7267	0.5267
LogLen	-	1	0.6213	-.1240	0.0995
LogPow	-	-	1	-.7206	0.3625
Age	-	-	-	1	-.2940
Days	-	-	-	-	1

TABLE 5

Humberside Demersal Trawl

Number of Valid Cases for Regression (Sample Size) = 30

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	326687	180018	0.551
LogInc	12.44	0.872	0.070
Lreg	100.6	33.89	0.337
LogLen	4.549	0.370	0.081
BHP	747.4	562.6	0.753
LogPow	6.327	0.800	0.126
Age	17.07	9.199	0.539
Days	177.6	66.64	0.375

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.9217	0.5932	0.1062	0.8714
Lreg	-	1	0.7315	0.1256	0.8483
BHP	-	-	1	-.3942	0.4824
Age	-	-	-	1	0.2733
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.8359	0.7112	-.0092	0.7802
LogLen	-	1	0.8691	0.1230	0.8465
LogPow	-	-	1	-.3195	0.6361
Age	-	-	-	1	0.2733
Days	-	-	-	-	1

TABLE 6

East Anglia Demersal Trawl

Number of Valid Cases for Regression (Sample Size) = 10

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	232408	117918	0.507
LogInc	12.06	1.021	0.085
Lreg	102.4	27.36	0.267
LogLen	4.583	0.348	0.076
BHP	899.5	429.2	0.477
LogPow	6.581	0.853	0.130
Age	16.00	7.557	0.472
Days	214.8	48.53	0.226

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.9181	0.9322	-.8258	0.9088
Lreg	-	1	0.9282	-.7023	0.7932
BHP	-	-	1	-.9008	0.8744
Age	-	-	-	1	-.8676
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.9849	0.9844	-.7692	0.8610
LogLen	-	1	0.9834	-.7024	0.7930
LogPow	-	-	1	-.8140	0.8492
Age	-	-	-	1	-.8676
Days	-	-	-	-	1

TABLE 7

South West Demersal Trawl

Number of Valid Cases for Regression (Sample Size) = 23

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	64689	43669	0.675
LogInc	10.85	0.698	0.064
Lreg	54.81	11.67	0.213
LogLen	3.984	0.200	0.050
BHP	256.5	167.3	0.652
LogPow	5.383	0.577	0.107
Age	20.74	10.35	0.499
Days	132.0	33.55	0.254

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.8587	0.7595	-.3074	0.3673
Lreg	-	1	0.8781	-.0847	0.1674
BHP	-	-	1	-.2943	0.2579
Age	-	-	-	1	-.4960
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.8129	0.7525	-.3418	0.4122
LogLen	-	1	0.8886	-.0719	0.1497
LogPow	-	-	1	-.2765	0.1839
Age	-	-	-	1	-.4960
Days	-	-	-	-	1

TABLE 8

North West Demersal Trawl

Number of Valid Cases for Regression (Sample Size) = 13

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	137743	200965	1.459
LogInc	10.99	1.216	0.111
Lreg	76.74	38.71	0.504
LogLen	4.245	0.431	0.102
BHP	579.7	763.2	1.317
LogPow	5.622	1.197	0.213
Age	23.62	8.761	0.371
Days	146.4	44.51	0.304

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.9632	0.9804	-.8606	0.6183
Lreg	-	1	0.9904	-.8688	0.4465
BHP	-	-	1	-.8911	0.4904
Age	-	-	-	1	-.3781
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.9167	0.8925	-.8605	0.6806
LogLen	-	1	0.9763	-.8501	0.3860
LogPow	-	-	1	-.8660	0.3433
Age	-	-	-	1	-.3781
Days	-	-	-	-	1

TABLE 9

Grampian Seine Net

Number of Valid Cases for Regression (Sample Size) = 88

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	223875	89020	0.398
LogInc	12.17	0.683	0.056
Lreg	70.58	8.054	0.114
LogLen	4.249	0.125	0.029
BHP	430.0	171.3	0.398
LogPow	5.955	0.522	0.088
Age	11.41	7.806	0.684
Days	213.1	40.13	0.188

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.6182	0.7291	-.6058	0.6336
Lreg	-	1	0.7018	-.2556	0.2852
BHP	-	-	1	-.6295	0.3298
Age	-	-	-	1	-.1685
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.7070	0.7644	-.5209	0.7126
LogLen	-	1	0.7691	-.2958	0.2996
LogPow	-	-	1	-.6935	0.3796
Age	-	-	-	1	-.1685
Days	-	-	-	-	1

TABLE 10

Humberside Seine Net

Number of Valid Cases for Regression (Sample Size) = 31

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	84197	29629	0.352
LogInc	11.28	0.362	0.032
Lreg	57.28	3.338	0.058
LogLen	4.046	0.058	0.014
BHP	149.7	42.55	0.284
LogPow	4.970	0.285	0.057
Age	29.32	13.28	0.453
Days	164.2	33.56	0.204

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.5580	0.3226	-.3915	0.7001
Lreg	-	1	0.4391	-.4321	0.3363
BHP	-	-	1	-.4716	0.2617
Age	-	-	-	1	-.1937
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.5539	0.2983	-.3457	0.6976
LogLen	-	1	0.4607	-.4352	0.3389
LogPow	-	-	1	-.4598	0.2522
Age	-	-	-	1	-.1937
Days	-	-	-	-	1

TABLE 11

Grampian + Island Purse Seine

Number of Valid Cases for Regression (Sample Size) = 11

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	466879	165635	0.355
LogInc	12.98	0.426	0.033
Lreg	111.1	12.26	0.110
LogLen	4.705	0.110	0.023
BHP	1030.5	439.6	0.427
LogPow	6.864	0.392	0.057
Age	8.818	5.250	0.595
Days	110.7	25.81	0.233

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.3279	0.5145	-.6067	0.4079
Lreg	-	1	0.6955	-.1337	0.1628
BHP	-	-	1	-.4738	0.4596
Age	-	-	-	1	-.3871
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.2670	0.5757	-.6190	0.4705
LogLen	-	1	0.6901	-.1485	0.1483
LogPow	-	-	1	-.4645	0.4577
Age	-	-	-	1	-.3871
Days	-	-	-	-	1

TABLE 12

Grampian Pelagic Trawl

Number of Valid Cases for Regression (Sample Size) = 14

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	257430	71423	0.277
LogInc	12.42	0.309	0.025
Lreg	77.61	11.55	0.149
LogLen	4.342	0.149	0.034
BHP	607.5	148.9	0.245
LogPow	6.377	0.277	0.043
Age	8.357	4.830	0.578
Days	209.1	20.83	0.100

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.7644	0.6834	-.2195	0.4509
Lreg	-	1	0.5109	-.0143	0.2461
BHP	-	-	1	-.4687	0.3937
Age	-	-	-	1	0.0476
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.7200	0.7604	-.2276	0.5085
LogLen	-	1	0.6212	-.0058	0.2834
LogPow	-	-	1	-.4077	0.4587
Age	-	-	-	1	0.0476
Days	-	-	-	-	1

TABLE 13

Humberside + North West Pelagic Trawl

Number of Valid Cases for Regression (Sample Size) = 12

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	781174	377749	0.484
LogInc	13.40	0.698	0.052
Lreg	196.4	43.69	0.222
LogLen	5.250	0.274	0.052
BHP	2687.5	765.1	0.285
LogPow	7.845	0.360	0.046
Age	9.417	2.392	0.254
Days	176.3	61.81	0.351

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.2479	0.5778	-.3234	0.8264
Lreg	-	1	0.8087	0.1760	-.2519
BHP	-	-	1	-.3183	0.1898
Age	-	-	-	1	-.4370
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.1181	0.4168	-.3458	0.8335
LogLen	-	1	0.8847	0.1567	-.2333
LogPow	-	-	1	-.2302	0.1123
Age	-	-	-	1	-.4370
Days	-	-	-	-	1

TABLE 14

Highland + Island Pots & Creels

Number of Valid Cases for Regression (Sample Size) = 23

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	17017	13954	0.820
LogInc	9.462	0.786	0.083
Lreg	36.82	5.674	0.154
LogLen	3.596	0.142	0.039
BHP	89.65	28.99	0.323
LogPow	4.442	0.346	0.078
Age	16.87	15.51	0.919
Days	154.0	54.62	0.355

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.1902	0.2453	0.3842	0.2611
Lreg	-	1	0.0847	0.6417	0.1042
BHP	-	-	1	-.1508	0.0268
Age	-	-	-	1	0.1879
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.2450	0.3708	0.2919	0.4114
LogLen	-	1	0.1497	0.6626	0.1096
LogPow	-	-	1	-.0895	0.0160
Age	-	-	-	1	0.1879
Days	-	-	-	-	1

TABLE 15

Grampian Shell Trawl

Number of Valid Cases for Regression (Sample Size) = 41

Summary Statistics

Variable	Mean	St.Dev	Coef of Var
Sales	75799	21646	0.286
LogInc	11.19	0.299	0.027
Lreg	59.94	7.454	0.124
LogLen	4.086	0.126	0.031
BHP	194.4	66.47	0.342
LogPow	5.217	0.325	0.062
Age	23.59	8.916	0.378
Days	213.3	24.85	0.117

Correlation Coefficients

Linear:

	Sales	Lreg	BHP	Age	Days
Sales	1	0.1687	0.4359	-.4417	0.3544
Lreg	-	1	0.0457	0.4904	0.1915
BHP	-	-	1	-.5716	-.0687
Age	-	-	-	1	0.0125
Days	-	-	-	-	1

Non-Linear:

	LogInc	LogLen	LogPow	Age	Days
LogInc	1	0.1919	0.4490	-.4368	0.4317
LogLen	-	1	0.0797	0.4951	0.1901
LogPow	-	-	1	-.5766	-.0721
Age	-	-	-	1	0.0125
Days	-	-	-	-	1

TABLE 16
Results of Regression
Sales with Lreg, Age and Days

Independant variable;-	Constant	Lreg	Age	Days
Grampian Demersal Trawl (121)				
Regression Coefficients:-	-174482	4487	-4598	455.6
Multiple R^2 Change due to variable:-		0.5148	0.2036	0.0380
Highland + Island Demersal Trawl (20)				
Regression Coefficients;-	-218694	4206	-1868	746.0
Multiple R^2 Change due to variable:-		0.4916	0.1473	0.1256
North East Demersal Trawl (35)				
Regression Coefficients:-	-48820	2591	-3213	327.5
Multiple R^2 Change due to variable:-		0.2090	0.4321	0.0515
Humberside Demersal Trawl (30)				
Regression Coefficients:-	-156444	3314	-1389	977.0
Multiple R^2 Change due to variable:-		0.8495	0.0001	0.0330
East Anglia Demersal Trawl (10)				
Regression Coefficients:-	-171198	2273	-1889	936.6
Multiple R^2 Change due to variable:-		0.8430	0.0647	0.0268
South West Demersal Trawl (23)				
Regression Coefficients:-	-114536	3067	-693.2	193.3
Multiple R^2 Change due to variable:-		0.7373	0.0555	0.0163
North West Demersal Trawl (13)				
Regression Coefficients:-	-265697	3972	-2441	1067
Multiple R^2 Change due to variable:-		0.9277	0.0023	0.0447
Grampian Seine Net (88)				
Regression Coefficients:	-229039	4182	-4936	1004
Multiple R^2 Change due to variable:-		0.3821	0.2146	0.1863
Humberside Seine Net (31)				
Regression Coeficients:-	-141603	2673	-337.0	502.8
Multiple R^2 Change due to variable:-		0.3114	0.028	0.2868
Grampian + Island Purse Seine (11)				
Regression Coefficients:-	137600	3130	-16046	1112
Multiple R^2 Change due to variable:-		0.1075	0.3225	0.0251
Grampian Pelagic Trawl (14)				
Regression Coefficients:-	-255173	4264	-3306	1001
Multiple R^2 Change due to variable:-		0.5843	0.0435	0.0798
Humberside + North West Pelagic Trawl (12)				
Regression Coefficients:-	-1080918	4206	1111	5818
Multiple R^2 Change due to Variable:-		0.0615	0.1390	0.7045
Highland + Island Pots + Creels (23)				
Regression Coefficients:-	11399	-222.3	365.0	49.62
Multiple R^2 Change due to variable:-		0.0362	0.1168	0.0364
Grampian Shell Trawl (41)				
Regression Coefficients:-	-14603	1276	-1601	242.7
Multiple R^2 Change due to variable:-		0.0285	0.3620	0.0741

TABLE 17
Results of Regression
LogInc with LogLen and Age

Independant variable:-	Constant	LogLen	Age
Grampian Demersal Trawl (121)			
Regression Coefficients:-	3.3804	2.1471	-0.0417
Multiple R^2 Change due to variable:-		0.4698	0.2395
Highland + Island Demersal Trawl (20)			
Regression Coefficients:-	3.2463	2.1474	-0.0169
Multiple R^2 Change due to variable:-		0.4292	0.2152
North East Demersal Trawl (35)			
Regression Coefficients:-	7.0057	1.2458	-0.0462
Multiple R^2 Change due to variable:-		0.1109	0.4771
Humberside Demersal Trawl (30)			
Regression Coefficients:-	3.5043	2.0048	-0.0108
Multiple R^2 Change due to variable:-		0.6988	0.0127
East Anglia Demersal Trawl (10)			
Regression Coefficients:-	0.5926	2.5755	-0.0206
Multiple R^2 Change due to variable:-		0.9699	0.0118
South West Demersal Trawl (23)			
Regression Coefficients:-	0.2189	2.7681	-0.0192
Multiple R^2 Change due to variable:-		0.6609	0.0807
North West Demersal Trawl (13)			
Regression Coefficients:-	3.9615	1.8832	-0.0407
Multiple R^2 Change due to variable:-		0.8403	0.0238
Grampian Seine Net (88)			
Regression Coefficients:-	-1.5552	3.3112	-0.0299
Multiple R^2 Change due to variable:-		0.4998	0.1065
Humberside Seine Net (31)			
Regression Coeficients:-	-1.1294	3.0922	-0.0035
Multiple R^2 Change due to variable:-		0.3068	0.0135
Grampian + Island Purse Seine (11)			
Regression Coefficients:-	10.1443	0.6937	-0.0481
Multiple R^2 Change due to variable:-		0.0713	0.3432
Grampian Pelagic Trawl (14)			
Regression Coefficients:-	6.0469	1.4949	-0.0143
Multiple R^2 Change due to variable:-		0.5184	0.0499
Humberside + North West Pelagic Trawl (12)			
Regression Coefficients:-	12.0650	0.4507	-0.1091
Multiple R^2 Change due to Variable:-		0.0140	0.1361
Highland + Island Pots + Creels (23)			
Regression Coefficients:-	7.4269	0.5111	0.0117
Multiple R^2 Change due to variable:-		0.0660	0.0299
Grampian Shell Trawl (41)			
Regression Coefficients:-	6.5000	1.2836	-0.0236
Multiple R^2 Change due to variable:-		0.0368	0.3747

TABLE 18
Results of Regression
Sales with BHP, Age and Days

Independant variable:-	Constant	BHP	Age	Days
Grampian Demersal Trawl (121)				
Regression Coefficients:-	-56680	316.6	-2059	523.5
Multiple R^2 Change due to variable:-		0.6239	0.0375	0.0508
Highland + Island Demersal Trawl (20)				
Regression Coefficients:-	-156157	395.2	993.1	883.9
Multiple R^2 Change due to variable:-		0.4570	0.0653	0.1828
North East Demersal Trawl (35)				
Regression Coefficients:-	-6939	300.8	-1056	283.6
Multiple R^2 Change due to variable:-		0.7772	0.0337	0.0385
Humberside Demersal Trawl (30)				
Regression Coefficients:-	-88132	66.88	-465.2	2099
Multiple R^2 Change due to variable:-		0.3519	0.1369	0.3098
East Anglia Demersal Trawl (10)				
Regression Coefficients:-	-282908	207.6	4421	1201
Multiple R^2 Change due to variable:-		0.8690	0.0010	0.0492
South West Demersal Trawl (23)				
Regression Coefficients:-	-12872	185.4	-39.56	233.4
Multiple R^2 Change due to variable:-		0.5769	0.0077	0.0238
North West Demersal Trawl (13)				
Regression Coefficients:-	-125713	237.8	279.9	812.8
Multiple R^2 Change due to variable:-		0.9613	0.0008	0.0241
Grampian Seine Net (88)				
Regression Coefficients:-	-46000	211.9	-3110	1005
Multiple R^2 Change due to variable:-		0.5315	0.0357	0.1825
Humberside Seine Net (31)				
Regression Coeficients:-	3643	25.57	-557.4	566.8
Multiple R^2 Change due to variable:-		0.1041	0.0737	0.3815
Grampian + Island Purse Seine (11)				
Regression Coefficients:-	405759	93.87	-13918	786.8
Multiple R^2 Change due to variable:-		0.2647	0.1698	0.0113
Grampian Pelagic Trawl (14)				
Regression Coefficients:-	-78024	306.8	1050	670.9
Multiple R^2 Change due to variable:-		0.4671	0.0130	0.0297
Humberside + North West Pelagic Trawl (12)				
Regression Coefficients:-	-1016782	238.1	29533	4990
Multiple R^2 Change due to Variable:-		0.3339	0.0217	0.5375
Highland + Island Pots + Creels (23)				
Regression Coefficients:-	-8974	144.5	356.2	45.64
Multiple R^2 Change due to variable:-		0.0602	0.1815	0.0307
Grampian Shell Trawl (41)				
Regression Coefficients:-	1449	100.0	-657.5	330.1
Multiple R^2 Change due to variable:-		0.1901	0.0550	0.1427

TABLE 19
Results of Regression
LogInc with LogPow and Age

Independant variable:-	Constant	LogPow	Age
Grampian Demersal Trawl (121)			
Regression Coefficients:-	6.7931	0.8910	-0.0200
Multiple R^2 Change due to variable:-		0.6137	0.044
Highland + Island Demersal Trawl (20)			
Regression Coefficients:-	6.1192	0.9622	0.0149
Multiple R^2 Change due to variable:-		0.4950	0.075
North East Demersal Trawl (35)			
Regression Coefficients:-	7.1550	0.8184	-0.0180
Multiple R^2 Change due to variable:-		0.6842	0.0355
Humberside Demersal Trawl (30)			
Regression Coefficients:-	6.6047	0.8601	0.0230
Multiple R^2 Change due to variable:-		0.5058	0.0529
East Anglia Demersal Trawl (10)			
Regression Coefficients:-	3.4905	1.2717	0.0128
Multiple R^2 Change due to variable:-		0.9689	0.0030
South West Demersal Trawl (23)			
Regression Coefficients:-	6.4076	0.8626	-0.0098
Multiple R^2 Change due to variable:-		0.5663	0.0194
North West Demersal Trawl (13)			
Regression Coefficients:-	8.7788	0.5985	-0.0487
Multiple R^2 Change due to variable:-		0.7965	0.0308
Grampian Seine Net (88)			
Regression Coefficients:-	6.0994	1.0172	0.0016
Multiple R^2 Change due to variable:-		0.5843	0.0002
Humberside Seine Net (31)			
Regression Coeficients:-	10.3772	0.2241	-0.0072
Multiple R^2 Change due to variable:-		0.0890	0.0552
Grampian + Island Purse Seine (11)			
Regression Coefficients:-	10.5623	0.3993	-0.0364
Multiple R^2 Change due to variable:-		0.3314	0.1576
Grampian Pelagic Trawl (14)			
Regression Coefficients:-	6.6705	0.8930	0.0063
Multiple R^2 Change due to variable:-		0.5782	0.0082
Humberside + North West Pelagic Trawl (12)			
Regression Coefficients:-	8.7158	0.6901	-0.0770
Multiple R^2 Change due to Variable:-		0.1737	0.0659
Highland + Island Pots + Creels (23)			
Regression Coefficients:-	5.1401	0.9098	0.0166
Multiple R^2 Change due to variable:-		0.1375	0.1065
Grampian Shell Trawl (41)			
Regression Coefficients:-	9.9886	0.2714	-0.00893
Multiple R^2 Change due to variable:-		0.2016	0.0474

TABLE 20
Results of Regression
LogPow with LogLen and Age

Independant variable:-	Constant	LogLen	Age
Grampian Demersal Trawl (121)			
Regression Coefficients:-	-1.8661	1.9379	-0.0253
Multiple R^2 Change due to variable:-		0.6375	0.1516
Highland + Island Demersal Trawl (20)			
Regression Coefficients:-	0.1442	1.4477	-0.0314
Multiple R^2 Change due to variable:-		0.1079	0.6678
North East Demersal Trawl (35)			
Regression Coefficients:-	-2.5009	2.1047	-0.0335
Multiple R^2 Change due to variable:-		0.3860	0.4206
Humberside Demersal Trawl (30)			
Regression Coefficients:-	-2.1061	1.9952	-0.0376
Multiple R^2 Change due to variable:-		0.7553	0.1846
East Anglia Demersal Trawl (10)			
Regression Coefficients:-	-2.1022	1.9907	-0.0274
Multiple R^2 Change due to variable:-		0.9670	0.0300
South West Demersal Trawl (23)			
Regression Coefficients:-	-4.4070	2.5195	-0.0119
Multiple R^2 Change due to variable:-		0.7896	0.0454
North West Demersal Trawl (13)			
Regression Coefficients:-	-3.8487	2.3438	-0.0203
Multiple R^2 Change due to variable:-		0.9415	0.0061
Grampian Seine Net (88)			
Regression Coefficients:-	-4.6159	2.5792	-0.03414
Multiple R^2 Change due to variable:-		0.5916	0.2380
Humberside Seine Net (31)			
Regression Coeficients:-	-1.2040	1.5756	-0.0069
Multiple R^2 Change due to variable:-		0.2123	0.0830
Grampian + Island Purse Seine (11)			
Regression Coefficients:-	-3.5376	2.2627	-0.0277
Multiple R^2 Change due to variable:-		0.4763	0.1340
Grampian Pelagic Trawl (14)			
Regression Coefficients:-	1.5592	1.1543	-0.0232
Multiple R^2 Change due to variable:-		0.3859	0.1633
Humberside + North West Pelagic Trawl (12)			
Regression Coefficients:-	1.8577	1.2427	-0.0570
Multiple R^2 Change due to Variable:-		0.7828	0.1395
Highland + Island Pots + Creels (23)			
Regression Coefficients:-	1.2953	0.9103	-0.0075
Multiple R^2 Change due to variable:-		0.0224	0.0635
Grampian Shell Trawl (41)			
Regression Coefficients:-	0.8135	1.2500	-0.0298
Multiple R^2 Change due to variable:-		0.00635	0.5027

TABLE 21
Results of Regression
Days with Lreg and Age

Independant variable:-	Constant	Lreg	Age
Grampian Demersal Trawl (121)			
Regression Coefficients:-	188.70	0.5541	-0.7979
Multiple R^2 Change due to variable:-		0.0375	0.0269
Highland + Island Demersal Trawl (20)			
Regression Coefficients;-	134.16	0.7496	0.2177
Multiple R^2 Change due to variable:-		0.0664	0.0098
North East Demersal Trawl (35)			
Regression Coefficients:-	162.11	0.1554	-1.1345
Multiple R^2 Change due to variable:-		0.0051	0.0822
Humberside Demersal Trawl (30)			
Regression Coefficients:-	-6.964	1.6264	1.2278
Multiple R^2 Change due to variable:-		0.7195	0.0283
East Anglia Demersal Trawl (10)			
Regression Coefficients:-	211.86	0.6438	-3.934
Multiple R^2 Change due to variable:-		0.6292	0.1903
South West Demersal Trawl (23)			
Regression Coefficients:-	144.74	0.3629	-1.573
Multiple R^2 Change due to variable:-		0.0280	0.2338
North West Demersal Trawl (13)			
Regression Coefficients:-	99.13	0.5535	0.2039
Multiple R^2 Change due to variable:-		0.1994	0.0004
Grampian Seine Net (88)			
Regression Coefficients:-	128.03	1.2909	-0.5255
Multiple R^2 Change due to variable:-		0.0813	0.0098
Humberside Seine Net (31)			
Regression Coeficients:-	-10.30	3.1232	-0.1503
Multiple R^2 Change due to variable:-		0.1131	0.1160
Grampian + Island Purse Seine (11)			
Regression Coefficients:-	100.42	0.2379	-1.829
Multiple R^2 Change due to variable:-		0.0265	0.1359
Grampian Pelagic Trawl (14)			
Regression Coefficients:-	172.70	0.4453	0.2206
Multiple R^2 Change due to variable:-		0.0606	0.0026
Humberside + North West Pelagic Trawl (12)			
Regression Coefficients:-	325.12	-0.2554	-10.474
Multiple R^2 Change due to Variable:-		0.0634	0.1592
Highland + Island Pots + Creels (23)			
Regression Coefficients:-	151.67	-0.2674	0.7245
Multiple R^2 Change due to variable:-		0.0109	0.0249
Grampian Shell Trawl (41)			
Regression Coefficients:-	171.60	0.8135	-0.2988
Multiple R^2 Change due to variable:-		0.0367	0.0087

TABLE 22

Combined Sample of All Sectors

Number of Valid Cases for Regression (Sample Size) = 532

Summary Statistics

Variable	Mean	St.Dev.	Coef of Var	No. in Sub-Sample
LogInc	11.58	0.996	0.086	532
LogLen	4.150	0.339	0.082	532
LogPow	5.647	0.815	0.144	532
LogGRT	3.871	0.915	0.236	532
Age	16.60	10.95	0.660	532
D1	0.227	0.420	-	121
D2	0.038	0.190	-	20
D3	0.066	0.248	-	35
D4	0.056	0.231	-	30
D5	0.019	0.136	-	10
D6	0.043	0.204	-	23
D7	0.026	0.160	-	13
D8	0.165	0.372	-	88
D9	0.058	0.235	-	31
D10	0.021	0.142	-	11
D11	0.026	0.160	-	14
D12	0.023	0.149	-	12
D13	0.043	0.204	-	23
D14	0.077	0.267	-	41

Correlation Coefficients

	LogLen	LogPow	LogGRT	Age	Highest D1-D14	Lowest D1-D14
LogInc	.7972	.8347	.7759	-.4253	.2782	-.4529
LogLen	1	.8689	.9717	-.2014	.4933	-.3475
LogPow		1	.8558	-.5253	.4103	-.3146
LogGRT			1	-.2102	.5174	-.3363
Age				1	.2894	-.1666

TABLE 23

Results of Regression

LogInc with LogLen, Age and Sector

Variable	Regression Coefficient	R^2 Change
LogLen	2.1971	0.6355
Age	-.0235	0.0730
D1	-.0233	
D2	0.1993	
D3	-.0965	
D4	-.1090	
D5	-.5832	
D6	-.4058	
D7	-.6838	0.0869
D8	0.1510	
D9	0.1225	
D10	-.1024	
D11	0.1197	
D12	-.8640	
D13	-.9978	
D14	-.1842	
Constant	2.9552	

Analysis of Variance

Source of Variation	Degs of Freedom	Sum of Squares	Mean Square
Regression	16	419.0	26.19
Residual	515	107.8	0.209
Total	531	526.8	-

'F' ratio = 125.1

TABLE 24

Results of Regression

LogInc with LogPow, Age and Sector

Variable	Regression Coefficient	R^2 Change
LogPow	0.9212	0.6968
Age	-.0011	0.0002
D1	-.0453	
D2	0.1947	
D3	-.0854	
D4	0.2173	
D5	-.3929	
D6	-.5210	
D7	-.5255	0.0896
D8	0.2893	
D9	0.3208	
D10	0.2566	
D11	0.1401	
D12	-.2246	
D13	-1.024	
D14	-.0009	
Constant	6.4119	

Analysis of Variance

Source of Variation	Degs of Freedom	Sum of Squares	Mean Square
Regression	16	414.4	25.90
Residual	515	112.4	0.218
Total	531	526.8	-

'F' ratio = 118.6

TABLE 25

Results of Regression

LogInc with LogGRT, Age and Sector

Variable	Regression Coefficient	R^2 Change
LogGRT	0.7729	0.6020
Age	-.0212	0.0719
D1	0.0837	
D2	0.2844	
D3	-.0770	
D4	-.0398	
D5	-.4968	
D6	-.2991	
D7	-.6696	
D8	0.3264	0.1041
D9	0.1132	
D10	0.2667	
D11	0.3615	
D12	-.7429	
D13	-1.004	
D14	-.0636	
Constant	8.9500	

Analysis of Variance

Source of Variation	Degs of Freedom	Sum of Squares	Mean Square
Regression	16	409.9	25.62
Residual	515	117.0	0.227
Total	531	526.8	-

'F' ratio = 112.8

APPENDIX VI

RESULTS OF REMUNERATION

REGRESSION ANALYSIS

TABLE 1

Combined Sample of All Sectors

With Lreg less than 80 ft.

Number of Valid Cases for Regression (Sample Size) = 403

Summary Statistics

Variable	Mean	St.Dev.	Coef of Var	No. in Sub-Sample
LabRet	7592	3775	0.497	403
CapRet	7.314	19.78	2.704	403
TurnOv	1.109	0.713	0.643	403
Lreg	59.72	12.56	0.210	403
Age	16.67	10.82	0.649	403
D1	0.263	0.441	-	106
D2	0.042	0.201	-	17
D3	0.070	0.255	-	28
D4	0.017	0.131	-	7
D5	0.005	0.070	-	2
D6	0.040	0.196	-	16
D7	0.027	0.163	-	11
D8	0.208	0.407	-	84
D9	0.042	0.201	-	17
D10	0	0	-	-
D11	0.027	0.163	-	11
D12	0	0	-	-
D13	0.047	0.212	-	19
D14	0.102	0.303	-	41

Correlation Coefficients

	CapRet	TurnOv	Lreg	Age	Highest D1-D14	Lowest D1-D14
LabRet	.2915	.0242	.5996	-.4153	.4387	-.2977
CapRet	1	.5164	-.0017	-.0302	.1105	-.1653
TurnOv		1	.0029	.4925	.1968	-.1408
Lreg			1	-.2025	.4193	-.4259
Age				1	.2257	-.2713

TABLE 2

Results of Regression

LabRet with Lreg, Age and Sector

for Lreg less than 80 ft.

Variable	Regression Coefficient	R^2 Change
Lreg	129.6	0.3595
Age	-94.53	0.0901
D1	-844.5	0.0899
D2	433.8	
D3	-1703	
D4	2332	
D5	-2612	
D6	-2042	
D7	-3063	
D8	784.5	
D9	1180	
D10	-	
D11	-531.3	
D12	-	
D13	-2576	
D14	-1852	
Constant	1998	

Analysis of Variance

Source of Variation	Degs of Freedom	Sum of Squares	Mean Square
Regression	14	3090252312	220732308
Residual	388	2638384135	6799959
Total	402	5728636447	-

'F' ratio = 32.46

TABLE 3

Combined Sample of All Sectors

Number of Valid Cases for Regression (Sample Size) = 461

Summary Statistics

Variable	Mean	St.Dev.	Coef of Var	No. in Sub-Sample
LabRet	8107	4048	0.499	461
CapRet	6.609	20.05	3.033	461
TurnOv	1.149	0.841	0.732	461
Lreg	69.11	30.78	0.445	461
Age	16.16	10.49	0.649	461
D1	0.236	0.425	-	109
D2	0.037	0.189	-	17
D3	0.061	0.239	-	28
D4	0.052	0.222	-	24
D5	0.022	0.146	-	10
D6	0.035	0.183	-	16
D7	0.030	0.172	-	14
D8	0.184	0.388	-	85
D9	0.037	0.189	-	17
D10	0.024	0.153	-	11
D11	0.028	0.166	-	13
D12	0.026	0.159	-	12
D13	0.041	0.199	-	19
D14	0.089	0.285	-	41

Correlation Coefficients

	CapRet	TurnOv	Lreg	Age	Highest D1-D14	Lowest D1-D14
LabRet	.2630	.0697	.3953	-.4120	.3157	-.2851
CapRet	1	.4342	-.0997	-.0098	.1085	-.1975
TurnOv		1	.0765	.4723	.3527	-.1442
Lreg			1	-.1879	.6766	-.2254
Age				1	.2265	-.2280

TABLE 4

Results of Regression

CapRet with Lreg. Age and Sector

All Boats

Variable	Regression Coefficient	R^2 Change
Lreg	-.0568	0.0099
Age	.0541	0.0009
D1	-6.233	
D2	7.844	
D3	-.2676	
D4	1.612	
D5	-21.84	
D6	-7.622	
D7	-24.84	
D8	2.335	0.1067
D9	-10.38	
D10	7.908	
D11	-.0138	
D12	-1.888	
D13	3.580	
D14	-2.320	
Constant	12.14	

Analysis of Variance

Source of Variation	Degs of Freedom	Sum of Squares	Mean Square
Regression	16	21719	1357
Residual	444	163178	367.5
Total	460	184897	-

'F' ratio = 3.694

TABLE 5

Results of Regression

TurnOv with Lreg, Age and Sector

All Boats

Variable	Regression Coefficient	R^2 Change
Lreg	0.0095	0.0059
Age	0.0405	0.2455
D1	-.3569	
D2	-.1238	
D3	-.1584	
D4	0.6124	
D5	-.3460	
D6	-.5792	
D7	-.8511	
D8	-.1911	0.1821
D9	-.7284	
D10	-.9491	
D11	-.5573	
D12	-1.809	
D13	-.2388	
D14	-.1192	
Constant	0.1260	

Analysis of Variance

Source of Variation	Degs of Freedom	Sum of Squares	Mean Square
Regression	16	141.1	8.816
Residual	444	184.4	0.415
Total	460	325.4	-

'F' ratio = 21.23

APPENDIX VII

MATHEMATICAL DEVELOPMENT OF CAPSIM

CAPSIM

TOTAL FLEET CAPACITY SIMULATION MODEL

Objective

Given an existing fleet structure, and a proposed restructured fleet, both determined by numbers of vessels in specified size and age groups, to estimate the percentage change in the total capacity of the fleet.

Mathematical Development

1 Let the fleet be divided into 'n' age groups and 'm' size groups.

Let the number of vessels in the existing fleet within the cell formed by the union of the 'i'th age group and the 'j'th size group be $(P)_{ij}$.

Similarly let the number of vessels in the restructured fleet within the corresponding cell be $(Q)_{ij}$.

Then, if $(\bar{y})_{ij}$ is the mean performance of the vessels within the ij cell, and the total fleet capacity be denoted Y,

$$Y_P = \sum_{j=1}^{m} \sum_{i=1}^{n} (P)_{ij} \cdot (\bar{y}_P)_{ij}$$

and

$$Y_Q = \sum_{j=1}^{m} \sum_{i=1}^{n} (Q)_{ij} \cdot (\bar{y}_Q)_{ij}$$

where the subscript P refers to the existing fleet, and Q refers to the restructured fleet.

2 Further let the performance of an individual vessel within the fleet be denoted 'y', and let y be estimated by an equation of the form:

$$y = K.(a.x^{b}+c).(e^{-d.t}).(E)$$

where
'K' is a constant chosen to scale y values to suitable arbitary units.
'x' is the size of the vessel (e.g. registered length, LBP, GRT, BHP, etc.).
't' is the age of the vessel (e.g. in years from a suitable base year).
'a,b,c and d' are constants.
'e' is the base of natural logarithms ($\simeq$ 2.718...).
'E' is a random variable with unit mean and with variance (S^2_E) representing the error of estimate of y inherent for each vessel.

3 Let the input to the model consist of the fleet structures $(P)_{ij}$ and $(Q)_{ij}$ together with the constants of the estimating equation a, b, c and d, with the variance S^2_E of the error term.

Also, the model user should determine the number of age and size groups, m and n, together with the upper and lower limits of each group, $(t^h)_i$, $(t^l)_i$ and $(x^h)_j$, $(x^l)_j$ respectively.

4 Assume that within each cell both age and size are uniformly distributed and are independant of each other.

5 In general, if $f(x)$ represents the probability density function (p.d.f.) of a random variate x, and a transformation of x is defined by $u = u(x)$ the p.d.f. of u, $g(u)$, is given by:

$$g(u) = f(x)/u'(x)$$

Now the mean of u is defined by:

$$\bar{u} = \int u.g(u).du$$

but

$$u = u(x),\ g(u) = \frac{f(x)}{u'(x)},\ \text{and } du = u'(x).dx$$

so

$$\bar{u} = \int u(x).f(x).dx$$

similarly the variance of u is given by

$$S^2_u = \int u^2(x).f(x).dx - \bar{u}^2$$

6 Consider the case of the size term in the performance estimating equation above, and define

$$u = a.x^b+c$$

Now x is uniformly distributed between $(x^l)_j$ and $(x^h)_j$.

Let $(x^h)_j - (x^l)_j = (w_x)_j$, the group width, so that

$$f(x) = 1/(w_x)_j$$

so

$$(\bar{u})_j = \int_{(x^l)_j}^{(x^h)_j} \frac{1}{(w_x)_j} . (a.x^b+c).dx$$

$$(\bar{u})_j = \frac{1}{(w_x)_j} \cdot \frac{a}{b+1} \left\{ (x^h)_j^{\,b+1} - (x^l)_j^{\,b+1} \right\} + c$$

similarly,

$$(s^2{}_u)_j = \int_{(x^l)_j}^{(x^h)_j} \frac{1}{(w_x)_j} \cdot (a.x^b+c)^2.dx - (\bar{u})^2_j$$

$$(s^2{}_u)_j = \frac{a^2}{(w_x)^2_j} \cdot \left\{ \frac{(w_x)_j \left[(x^h)_j^{\,2b+1} - (x^l)_j^{\,2b+1} \right]}{2b+1} - \frac{\left[(x^h)_j^{\,b+1} - (x^l)_j^{\,b+1} \right]^2}{b^2+2b+1} \right\}$$

7 Next consider the age term of the performance estimating equation, and define

$$v = e^{-d.t}$$

Then

$$(\bar{v})_i = \int_{(t^1)_i}^{(t^h)_i} \frac{1}{(w_t)_i} . e^{-d.t}.dt$$

$$(\bar{v})_i = \frac{1}{d.(w_t)_i} \left\{ e^{-d.(t^1)_i} - e^{-d.(t^h)_i} \right\}$$

Similarly

$$(S^2{}_v)_i = \int_{(t^1)_i}^{(t^h)_i} \frac{1}{(w_t)_i} . (e^{-d.t})^2.dt - (\bar{v})_i{}^2$$

$$(S^2{}_v)_i = \frac{1}{2d.(w_t)_i} . \left\{ e^{-2d.(t^1)_i} - e^{-2d.(t^h)_i} \right\} - (\bar{v})^2{}_i$$

8 Now the mean of the product of two independant random variates is the product of their means, so

$$(\bar{y}_p)_{ij} = K.(\bar{u})_j.(\bar{v})_i$$

9 Also the variance of the product of two independant random variates is given by the product of their variance plus the sum of each mean squared times the other variance.

i.e. $(S^2_{u.v})_{ij} =$

$$(S^2_u)_j.(S^2_v)_i + (S^2_u)_j.(\bar{v})^2_i + (S^2_v)_i.(\bar{u})^2_j$$

and the variance of performance of individual vessels within each cell is given by

$$(S_y^2)_{ij} = K^2.(S^2_{u.v})_{ij}.\left[(S^2_E)+1\right] + (S^2_E).(y_p)^2_{ij}$$

10 Two further assumptions become necessary, firstly that vessels leaving a cell are removed strictly in performance order, and that vessels entering a cell have the same expectation of performance as existing members of that cell.

A variety of arguments pro and con these assumptions can be made but they are based on the following reasoning.

The first comes from the idea that the vessels which accept de-commissioning inducements or otherwise leave the fleet will be, in general, the worst performers in their sector. However, obviously some who leave will not be as bad as some who stay, but the model ignores this and imposes a strict cut-off point, leading to some unquantifiable over-estimate of $(\bar{y}_Q)_{ij}$, and hence Y_Q.

With regard to successful skippers who wish to re-invest in new boats not increasing the average performance of the fleet consider the following argument. Consider a skipper of above average ability who operates his vessel at say r times the mean of its cell $(\bar{y}_p)_{ij}$. When he invests in a new boat he will sell his boat to another skipper who one would, in general, expect to be of average ability. Thus the fleet would lose say $\Delta Y_1=(r-1).(\bar{y}_p)_{ij}$ capacity. However this skipper re-invests in a new, more powerful boat from a cell with expected performance $\bar{y}_e$ say. Now the model assumes that this man's boat performs, in general at $\bar{y}_e$, whereas, if the skipper maintains his personal ability it could be expected to perform at $r.\bar{y}_e$, representing a gain in fleet capacity of $\Delta Y_2=(r-1).\bar{y}_e$.

Now the model, by making the assumption that new vessels do not alter cell means, effectively assumes $\Delta Y_1=\Delta Y_2$. However if $\bar{y}_e$ is greater than $(\bar{y}_p)_{ij}$, as one would expect, ΔY_2, the gain in capacity, would be greater than ΔY_1, the reduction. Thus the models assumption represents some unquantifiable under-estimate of Y_Q.

It is to be hoped that these over and under estimates roughly cancel out leading to an accurate estimate of Y_Q.

11 A further assumption is made, in that the distribution function taken to represent the variation in performance is a log-logistic distribution with c.d.f. given by

$$F(y) = 1 - \frac{\hat{y}^k}{\hat{y}^k + y^k}$$

where $\hat{y}$ is median value of y, and k is a shape parameter. (See Appendix VIII).

Now if the coefficient of variation $\eta = \sqrt{(s^2{}_y)_{ij}}/(\bar{y}_p)_{ij}$

an approximation for k_{ij} is given by

$$k_{ij} \simeq \frac{\pi}{\left[\frac{1}{\eta^2+1}\left(0.22485+0.0065\left[\frac{\eta^2}{\eta^2+1}\right]^{2.5}\right)+1\right] . \arccos\left(\frac{1}{\eta^2+1}\right)}$$

and for $\hat{y}_{ij}$ the following expression may be used.

$$\hat{y}_{ij} = \frac{k_{ij}}{\pi} . (y_p)_{ij} . \sin\left(\frac{\pi}{k_{ij}}\right)$$

12 Following the assumptions in paragraph 10 above if $(Q)_{ij} \geqslant (P)_{ij}$ then $(\bar{y}_Q)_{ij} = (\bar{y}_p)_{ij}$, otherwise the following procedure is adopted to estimate $(\bar{y}_Q)_{ij}$.

13 Let the cut-off value of performance, corresponding to the proportionate reduction in cell frequency, $1-(Q)_{ij}/(P)_{ij}$, be $(y_o)_{ij}$.

Then, using the log-logistic distribution described in Appendix VIII,

$$1 - \frac{(Q)_{ij}}{(P)_{ij}} = 1-\frac{\hat{y}_{ij}^{\;k_{ij}}}{\hat{y}_{ij}^{\;k_{ij}} + (y_o)_{ij}^{\;k_{ij}}}$$

or

$$(y_o)_{ij} = \hat{y}_{ij}.((P)_{ij}/(Q)_{ij}-1)^{1/k_{ij}}$$

14 Now

$$(\bar{y}_Q)_{ij} = \int_{(y_o)_{ij}}^{\infty} y.f(y).dy \Big/ \int_{(y_o)_{ij}}^{\infty} f(y).dy$$

$$= \left[(\bar{y}_p)_{ij} - \int_{0}^{(y_o)_{ij}} y.f(y).dy \right].(P)_{ij}/(Q)_{ij}$$

15 To estimate

$$\int_0^{(y_o)_{ij}} y.f(y).dy \text{ where } f(y) \text{ is}$$

defined by the log-logistic distribution:

$$f(y) = \frac{k.\hat{y}^k.y^{k-1}}{(\hat{y}^k+y^k)^2}$$

it is not possible by direct integration, but Simpsons first rule may be applied to give a numerical approximation.

Dividing the interval o-y_o into four parts we obtain

$$\int_o^{(y_o)_{ij}} y.f(y).dy \simeq$$

$$\frac{y_o k.\hat{y}^k}{12} \cdot \left[\frac{4.(y_o/4)^k}{(\hat{y}^k+(y_o/4)^k)^2} + \frac{2.(y_o/2)^k}{(\hat{y}^k+(y_o/2)^k)^2} + \right.$$

$$\left. \frac{4.(3.y_o/4)^k}{(\hat{y}^k+(3.y_o/4)^k)^2} + \frac{(y_o)^k}{(\hat{y}^k+y_o{}^k)^2} \right]$$

16 From either paragraph 12, or 13, 14 and 15, we now have values of $(\bar{Y}_Q)_{ij}$, allowing estimates to be made of both Y_P and Y_Q.

Then the increase in capacity is given by $Y_Q - Y_P$ or in percentage terms by

$$100 . \frac{Y_Q - Y_P}{Y_P} \text{ percent}$$

APPENDIX VIII

MATHEMATICAL DEVELOPMENT OF

LOG-LOGISTIC PROBABILITY DISTRIBUTION

DEVELOPMENT OF LOG-LOGISTIC DISTRIBUTION

A convenient method of assessing the change in performance of a fishing fleet, as inefficient vessels leave, and new vessels enter the industry, is required.

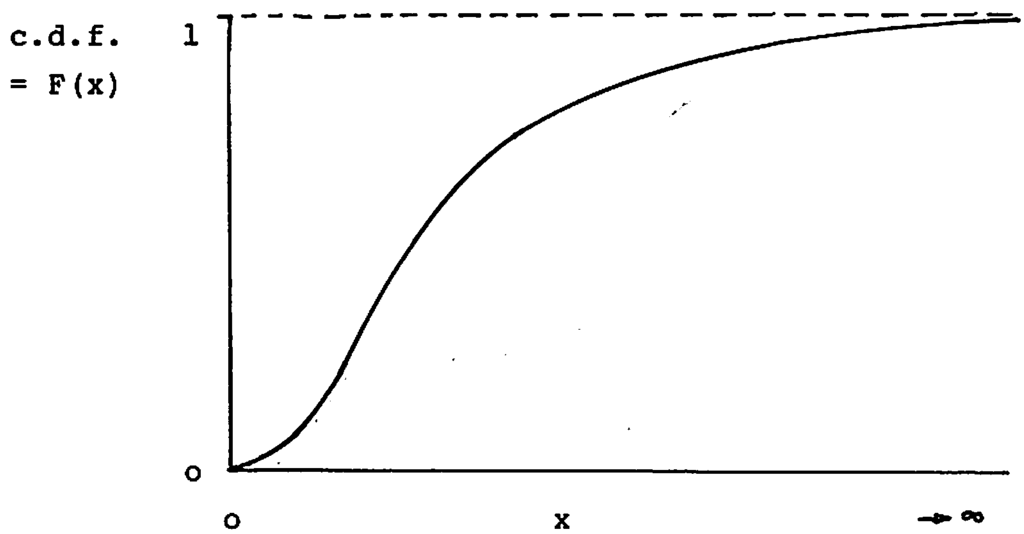
The effects of de-commissioning and re-building programs will be to modify both the average performance and the variance in performance of a fleet sector, as well as the total number of vessels. Thus, as replacement vessels are likely to be more effective catching units than either average or inefficient vessels, increases in fleet capacity may result.

Neither the Normal, nor LogNormal probability density functions have integrals (cumulative distribution functions) available in closed form, nor do their inverses exist, which makes the estimation of these effects very cumbersome if based on these distributions.

It should be noted that the other standard positively skewed distribution, i.e. the Gamma distribution (or its special case the Erlang distribution), does not meet these requirements (Hastings and Peacock 1975). However, the Logistic distribution has been successfully utilised as a replacement for the symmetrical Normal distribution, and has found application in fisheries modelling (A.L. Jensen, 1982).

NEW DISTRIBUTION

For variates restricted to positive values only (excluding zero), the c.d.f. must take the form shown below.



Functions of the form:-

$$F(x) = 1 - \frac{1}{1 + h(x)} \qquad x \geqslant 0$$

have this shape provided that the function h(x) is monotonically increasing and h(0) = 0.

The obvious choice for this function h(x) would be a power law curve, i.e.

$$h(x) = \left(\frac{x}{a}\right)^n \qquad a > 0,\ n > 0$$

and this is the function proposed, after alternatives had been rejected for various reasons.

The proposed c.d.f. is thus

$$F(x) = 1 - \frac{1}{1 + \left(\frac{x}{a}\right)^n}$$

or, after re-arrangement:

$$\text{c.d.f.:-}\quad F(x) = 1 - \frac{a^n}{a^n + x^n}$$

A prime requirement is for the new distribution to possess an inverse c.d.f. in closed form, which by simple re-arrangement of the above expression is found to be:

$$\text{Inverse c.d.f.:}\quad x = a\left[\frac{F(x)}{1 - F(x)}\right]^{1/n}$$

One property of this distribution becomes immediately apparent, viz that the median, defined by that value of the variate x at which F(x) = 0.5, is found to be the location parameter a.

The probability density function (p.d.f.), $f(x)$ is defined to be the differential of $F(x)$ with respect to x, i.e.:

$$f(x) = \frac{d}{dx} F(x)$$

Applying the quotient rule for differentiation (Rektorys 1969)

p.d.f.:- $$f(x) = \frac{na^n x^{n-1}}{(a^n + x^n)^2}$$

MOMENTS

The 'j'th moment about the origin, λ'_j, is defined by:-

$$\lambda'_j = \int_0^\infty x^j . f(x) . dx$$

i.e.

$$\lambda'_j = \int_0^\infty x^j . \frac{na^n \, x^{n-1} \, .dx}{(a^n+x^n)^2}$$

In order to obtain the mean $\bar{x}$, and variance, σ^2, attempts were made to establish λ'_1 and λ'_2 respectively by direct integration, however this approach was unsuccessful.

However, if the substitution $y = \log_e x$ is made, the following is obtained:-

$$\lambda'_j = \int_{-\infty}^{\infty} e^{jy} \cdot \frac{na^n\, e^{ny}}{(a^n+e^{ny})^2} \cdot dy$$

Now the Logistic probability density function is given by Hastings and Peacock as, (after changing notation):-

$$p(y) = \frac{e^{(y-\alpha)/k}}{k(1 + e^{(y-\alpha)/k})^2}$$

With substitutions $\alpha = \log_e a$, $k = 1/n$ this can be shown to be identical to the second term of the integral above, so

$$\lambda'_j = \int_{-\infty}^{\infty} e^{jy} \cdot p(y) \cdot dy$$

Now this is the definition of a moment generating function (Kendal and Stuart 1963), which Hastings and Peacock give, for the logistic distribution, as

$$\int_{-\infty}^{\infty} e^{jy} \cdot p(y) \cdot dy = e^{\alpha j} \cdot \Gamma(1 - kj) \cdot \Gamma(1 + kj)$$

Recktorys gives the following general relationships for the gamma function:-

$$\Gamma(x + 1) = x\,\Gamma(x) \quad \text{and}$$

$$\Gamma(x).\,\Gamma(1 - x) = \frac{\pi}{\sin \pi x} \qquad 0 < x < 1$$

so

$$\Gamma(1 - x).\,\Gamma(1 + x) = \frac{\pi x}{\sin \pi x}$$

therefore:-

$$\lambda'_j = e^{\alpha j}.\ \frac{k\pi j}{\sin k\pi j}$$

or, replacing and k with a and n:-

$$\lambda'_j = a^j\ .\ \frac{j\pi}{n.\ \sin\,(j\pi/n)} \qquad 0 < j/n < 1$$

Thus this distribution possesses moments of order $j < n$. The first moment about the origin is the mean, $\bar{x}$ and is given by:-

Mean:- $$\bar{x} = a.\ \frac{\pi}{n.\ \sin(\pi/n)} \qquad n > 1$$

The second moment about the mean, λ_2, is the variance σ^2, and is found from:-

$$\lambda_2 = \lambda_2' - \lambda_1'^2$$

so

$$\text{Variance:-}\ \sigma^2 = \bar{x}^2 \left[\frac{n}{\pi} . \tan \frac{\pi}{n} - 1 \right] \qquad n > 2$$

This leads to the definition of the coefficient of variation η, $(=\sigma/\bar{x})$ as

Coefficient of Variation:-

$$\eta = \left[\frac{n}{\pi} . \tan \frac{\pi}{n} - 1 \right]^{\frac{1}{2}}$$

ESTIMATION

Method of Quantiles

From the definition of F(x) given,
and defining x_1 and x_2 as quantiles of order p_1, p_2 respectively, then

$$p_1 = 1 - \frac{a^n}{a^n + x_1^{\,n}}$$

$$p_2 = 1 - \frac{a^n}{a^n + x_2^{\,n}}$$

Re-arranging and eliminating 'a' gives:-

$$n = \log_e\left[\frac{p_1(1-p_2)}{p_2(1-p_1)}\right] \Big/ \log_e\left(\frac{x_1}{x_2}\right)$$

Back substitution then gives:-

$$a = x_1\left(\frac{1}{p_1} - 1\right)^{1/n} \text{ or } a = x_2\left(\frac{1}{p_2} - 1\right)^{1/n}$$

Method of Moments

Above, it was shown that the coefficient of variation, η, was solely a function of the shape parameter, n. This property can be used, given a sample estimate of the population η, to find n:-

$$\eta^2 + 1 = \frac{n}{\pi} \tan \frac{\pi}{n}$$

However, as this is of the form $\tan(y) = cy$, with $y = \pi/n$, $c = \eta^2 + 1$, there is no closed solution for y(or n) in terms of c(or η).

However, an approximation, valid in the range $2 < n < \infty$, $(1 < c < \infty)$, which estimates n to four significant figures accuracy, is given by:

$$y \simeq \left[\frac{1}{c}(0.22485+0.0065(1-\frac{1}{c})^{2.5}) + 1\right] . \operatorname{arcos}\left(\frac{1}{c}\right)$$

From this estimate of y, n can be found from $n=\pi/y$.

Once an estimate for n has been obtained from η, then a can be estimated from the mean $\bar{x}$, using the definition given:

$$a = \frac{n}{\pi} \cdot \bar{x} \cdot \sin \frac{\pi}{n}$$

Method of Moments Using Transformed Variate

It was shown above, when deriving an expression for λ'_j, that $\log_e(x)$ was Logistically distributed, with parameters α and k, related to a and n by $\alpha = \log_e a$, $k = 1/n$.

Now the mean of the logistic distribution is simply the location parameter α and the standard deviation is $\pi k/\sqrt{3}$ (Hastings and Peacock).

Thus estimates of a and n are simply obtained from:-

$$a = \exp\ (\text{mean}\ (\log_e x))$$

and

$$n = \frac{\pi}{\sqrt{3}} (\text{st.dev.}(\log_e x))^{-1}$$

This property has been used to name the new distribution the Log-Logistic.

Linear Regression

Unlike most probability distributions, it is possible to estimate the parameters a and n of the new distribution by fitting a 'best' curve to the cumulative distribution function.

This is most easily achieved by using a linear regression technique by transforming the c.d.f. into a linear form as follows:

$$F(x) = p = 1 - \frac{a^n}{a^n + x^n}$$

Rearranging gives:

$$\left(\frac{x}{a}\right)^n = \frac{p}{1 - p}$$

and taking logarithms:

$$n.\log_e x - n.\log_e a = \log_e\left(\frac{p}{1 - p}\right)$$

Now this is a linear equation of the form Y = AX + B where:

$Y = \log_e \left(\frac{p}{1-p}\right)$, $X = \log_e (x)$, $A = n$, and $B = -n.\log_e a$

so A and B can be found using linear regression, and hence n and a from:

$$n = A$$
$$a = e^{(-B/A)}$$

Applying this procedure to a sample, however, requires consideration of the values of p and x to be used. Two methods are possible, both following the definition of sample median given by Kendal and Stewart.

The first is to assign the probability values (p_j) against each sample x value (x_j) as $p_j = (j - 0.5)/N$ where N is the sample size, for j = 1 to N.

The second method is to assign variate values of $(x_j + x_{j+1})/2$ to each sample probability $p_j = j/N$, for j = 1 to N-1. This method has the disadvantage of giving less weight to the first and last members of the sample.

APPENDIX IX

EXAMPLE APPLICATION OF

CAPSIM

CAPSIM -Total Fleet Capacity Simulation Model-

GRIMSBY MIDDLE WATER TRAWLERS

Input Data

REGRESSION MODEL DATA -

Coefficient	'a'	=	.04
	'b'	=	2.1971
	'c'	=	0
	'd'	=	.0235
Parameter	'K'	=	.8486
	'E'	=	.221

EXISTING FLEET STRUCTURE - Number of Vessels in each Group -

Size Groups				
	From-	110.0	120.0	130.0
	To-	120.0	130.0	140.0
Age Groups				
From-	To-			
-5	0	0	0	0
0	5	0	0	0
5	10	1	0	0
10	20	0	0	0
20	30	0	0	11
Total No.-		1	0	11

RESTRUCTURED FLEET - Number of Vessels in each Group -

Size Groups				
	From-	110.0	120.0	130.0
	To-	120.0	130.0	140.0
Age Groups				
From-	To-			
-5	0	0	0	0
0	5	0	0	0
5	10	0	0	0
10	20	0	0	0
20	30	0	0	0
Total No.-		0	0	0

Results of Simulation

CAPACITY OF EXISTING FLEET = 10933 tonnes
CAPACITY OF RESTRUCTURED FLEET = 0 tonnes
RESULTANT CHANGE IN CAPACITY = -100.00 Percent

CAPSIM -Total Fleet Capacity Simulation Model-

GRIMSBY INSHORE VESSELS

Input Data

REGRESSION MODEL DATA -

Coefficient	'a' =	.04
	'b' =	2.1971
	'c' =	0
	'd' =	.0235
Parameter	'K' =	.4256
	'E' =	.221

EXISTING FLEET STRUCTURE - Number of Vessels in each Group -

Age Groups From-	To-	Size Groups From- 30.0 To- 40.0	40.0 50.0	50.0 60.0	60.0 70.0	70.0 80.0
-5	0	0	0	0	0	0
0	5	0	1	1	0	0
5	10	1	1	1	2	0
10	15	0	3	1	1	0
15	20	0	1	1	1	1
20	30	0	1	5	1	1
30	45	0	1	5	0	0
45	60	0	0	4	0	1
Total No.-		1	8	18	5	3

RESTRUCTURED FLEET - Number of Vessels in each Group -

Age Groups From-	To-	Size Groups From- 30.0 To- 40.0	40.0 50.0	50.0 60.0	60.0 70.0	70.0 80.0
-5	0	0	2	0	0	0
0	5	0	1	1	0	0
5	10	1	1	1	2	0
10	15	0	3	1	1	0
15	20	0	1	1	1	1
20	30	0	1	4	1	1
30	45	0	1	4	0	0
45	60	0	0	0	0	1
Total No.-		1	10	12	5	3

Results of Simulation

CAPACITY OF EXISTING FLEET = 2440 tonnes
CAPACITY OF RESTRUCTURED FLEET = 2406 tonnes
RESULTANT CHANGE IN CAPACITY = -1.39 Percent

CAPSIM -Total Fleet Capacity Simulation Model-

GRIMSBY SEINERS NO NEW VESSELS

Input Data

REGRESSION MODEL DATA -

Coefficient	'a'	=	.04
	'b'	=	2.1971
	'c'	=	0
	'd'	=	.0235
Parameter	'K'	=	.7478
	'E'	=	.221

EXISTING FLEET STRUCTURE - Number of Vessels in each Group -

Size Groups From-		40.0	50.0	60.0	70.0	80.0
To-		50.0	60.0	70.0	80.0	90.0
Age Groups From-	To-					
-5	0	0	0	0	0	0
0	5	0	0	0	0	0
5	10	0	8	3	0	1
10	15	1	14	3	0	0
15	20	0	7	2	0	0
20	30	2	26	14	0	0
30	40	2	13	3	0	0
40	55	0	16	0	0	0
55	70	0	4	0	0	0
Total No.-		5	88	25	0	1

RESTRUCTURED FLEET - Number of Vessels in each Group -

Size Groups From-		40.0	50.0	60.0	70.0	80.0
To-		50.0	60.0	70.0	80.0	90.0
Age Groups From-	To-					
-5	0	0	0	0	0	0
0	5	0	0	0	0	0
5	10	0	8	3	0	1
10	15	1	13	3	0	0
15	20	0	7	2	0	0
20	30	2	24	13	0	0
30	40	2	12	3	0	0
40	55	0	10	0	0	0
55	70	0	0	0	0	0
Total No.-		5	74	24	0	1

Results of Simulation

CAPACITY OF EXISTING FLEET = 14816 tonnes
CAPACITY OF RESTRUCTURED FLEET = 14142 tonnes
RESULTANT CHANGE IN CAPACITY = -4.55 Percent

CAPSIM -Total Fleet Capacity Simulation Model-

GRIMSBY SEINERS 20 NEW VESSELS

Input Data

REGRESSION MODEL DATA -

Coefficient	'a'	=	.04
	'b'	=	2.1971
	'c'	=	0
	'd'	=	.0235
Parameter	'K'	=	.7478
	'E'	=	.221

EXISTING FLEET STRUCTURE - Number of Vessels in each Group -

Size Groups		From-	40.0	50.0	60.0	70.0	80.0
		To-	50.0	60.0	70.0	80.0	90.0
Age Groups							
From-	To-						
-5	0		0	0	0	0	0
0	5		0	0	0	0	0
5	10		0	8	3	0	1
10	15		1	14	3	0	0
15	20		0	7	2	0	0
20	30		2	26	14	0	0
30	40		2	13	3	0	0
40	55		0	16	0	0	0
55	70		0	4	0	0	0
Total No.-			5	88	25	0	1

RESTRUCTURED FLEET - Number of Vessels in each Group -

Size Groups		From-	40.0	50.0	60.0	70.0	80.0
		To-	50.0	60.0	70.0	80.0	90.0
Age Groups							
From-	To-						
-5	0		0	0	10	10	0
0	5		0	0	0	0	0
5	10		0	8	3	0	1
10	15		1	13	3	0	0
15	20		0	7	2	0	0
20	30		2	24	13	0	0
30	40		2	12	3	0	0
40	55		0	10	0	0	0
55	70		0	0	0	0	0
Total No.-			5	74	34	10	1

Results of Simulation

CAPACITY OF EXISTING FLEET = 14816 tonnes
CAPACITY OF RESTRUCTURED FLEET = 21393 tonnes
RESULTANT CHANGE IN CAPACITY = 44.39 Percent

CAPSIM -Total Fleet Capacity Simulation Model-

GRIMSBY PAIR FISHERS NO NEW VESSELS

Input Data

REGRESSION MODEL DATA -

Coefficient	'a'	=	.04
	'b'	=	2.1971
	'c'	=	0
	'd'	=	.0235
Parameter	'K'	=	1.1634
	'E'	=	.221

EXISTING FLEET STRUCTURE - Number of Vessels in each Group -

Size Groups				
	From-	50.0	60.0	70.0
	To-	60.0	70.0	80.0
Age Groups				
From-	To-			
-5	0	0	0	0
0	5	1	0	2
5	10	2	4	0
10	15	4	6	1
15	20	2	0	0
20	30	0	1	0
30	40	0	0	1
Total No.-		9	11	4

RESTRUCTURED FLEET - Number of Vessels in each Group -

Size Groups				
	From-	50.0	60.0	70.0
	To-	60.0	70.0	80.0
Age Groups				
From-	To-			
-5	0	0	0	0
0	5	1	0	2
5	10	2	4	0
10	15	4	5	1
15	20	2	0	0
20	30	0	1	0
30	40	0	0	1
Total No.-		9	10	4

Results of Simulation

CAPACITY OF EXISTING FLEET	=	7810 tonnes
CAPACITY OF RESTRUCTURED FLEET	=	7645 tonnes
RESULTANT CHANGE IN CAPACITY	=	-2.11 Percent

CAPSIM -Total Fleet Capacity Simulation Model-

GRIMSBY PAIR FISHERS 20 NEW VESSELS

Input Data

REGRESSION MODEL DATA -

Coefficient	'a'	=	.04
	'b'	=	2.1971
	'c'	=	0
	'd'	=	.0235
Parameter	'K'	=	1.1634
	'E'	=	.221

EXISTING FLEET STRUCTURE - Number of Vessels in each Group -

Size Groups				
	From-	50.0	60.0	70.0
	To-	60.0	70.0	80.0
Age Groups				
From-	To-			
-5	0	0	0	0
0	5	1	0	2
5	10	2	4	0
10	15	4	6	1
15	20	2	0	0
20	30	0	1	0
30	40	0	0	1
Total No.-		9	11	4

RESTRUCTURED FLEET - Number of Vessels in each Group -

Size Groups				
	From-	50.0	60.0	70.0
	To-	60.0	70.0	80.0
Age Groups				
From-	To-			
-5	0	0	10	10
0	5	1	0	2
5	10	2	4	0
10	15	4	5	1
15	20	2	0	0
20	30	0	1	0
30	40	0	0	1
Total No.-		9	20	14

Results of Simulation

CAPACITY OF EXISTING FLEET = 7810 tonnes
CAPACITY OF RESTRUCTURED FLEET = 18925 tonnes
RESULTANT CHANGE IN CAPACITY = 142.33 Percent

CAPSIM -Total Fleet Capacity Simulation Model-

HULL SEINERS

Input Data

REGRESSION MODEL DATA -

Coefficient	'a'	=	.04
	'b'	=	2.1971
	'c'	=	0
	'd'	=	.0235
Parameter	'K'	=	.7478
	'E'	=	.221

EXISTING FLEET STRUCTURE - Number of Vessels in each Group -

Size Groups			
	From-	60.0	70.0
	To-	70.0	80.0
Age Groups			
From-	To-		
-5	0	0	0
Total No.-		0	0

RESTRUCTURED FLEET - Number of Vessels in each Group -

Size Groups			
	From-	60.0	70.0
	To-	70.0	80.0
Age Groups			
From-	To-		
-5	0	13	14
Total No.-		13	14

Results of Simulation

CAPACITY OF EXISTING FLEET = 0 tonnes
CAPACITY OF RESTRUCTURED FLEET = 9845 tonnes
RESULTANT CHANGE IN CAPACITY = 0.00 Percent

APPENDIX X

SUMMARY OF ICES DATA

ENGLAND AND WALES

1977 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
I	500-1000	-	82256.3	9089
		AREA TOTAL	82256.3	-
II	500-1000	-	58620.2	13401
	1000-2000	-	699.4	117
		AREA TOTAL	59319.6	-
IV	UNKNOWN	-	3791.2	-
	1-25	-	860.8	1774
	25-50	-	49575.8	25943
	50-100	-	124770.1	31509
	100-150	-	9198.9	3350
	250-500	-	57152.9	12518
		AREA TOTAL	245349.6	-
V	500-1000	-	4109.9	1183
	1000-2000	-	46.2	9
		AREA TOTAL	4156.1	-
VI	25-50	-	2.9	2
	250-500	-	11181.6	5016
	500-1000	-	3933.7	1013
		AREA TOTAL	15118.2	-
VII	UNKNOWN	-	11327.8	-
	1-25	-	1045.9	130
	25-50	-	50447.5	19827
	50-100	-	9647.5	2134
	100-150	-	3982.4	286
	150-250	-	312.6	94
	250-500	-	674.1	1890
		AREA TOTAL	77437.8	-
XIV	500-1000	-	1625.8	565
		AREA TOTAL	1625.8	-
		NATIONAL TOTAL	485263.4	-

ENGLAND AND WALES

1979 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
I	500-1000	-	1833.8	191
	1000-2000	-	13890.9	1729
		AREA TOTAL	15724.7	-
II	250-500	-	45.7	22
	500-1000	-	2129.9	408
	1000-2000	-	9484.4	1421
		AREA TOTAL	11660.0	-
IV	1-25	-	26857.6	46406
	25-50	-	45285.9	28907
	50-100	-	17007.0	9246
	100-150	-	6563.2	2840
	150-250	-	55453.7	8182
	250-500	-	94377.7	14312
	500-1000	-	2874.7	758
	1000-2000	-	300.4	126
		AREA TOTAL	248720.1	-
V	250-500	-	579.1	224
	1000-2000	-	142.9	48
		AREA TOTAL	722.0	-
VI	50-100	-	14.5	22
	100-150	-	555.6	396
	150-250	-	1534.1	797
	250-500	-	2090.0	662
	500-1000	-	2930.5	699
	1000-2000	-	5955.2	954
		AREA TOTAL	13079.9	-
VII	1-25	-	20858.3	62161
	25-50	-	12438.9	8896
	50-100	-	6934.1	3511
	100-150	-	1876.1	991
	150-250	-	3909.2	1479
	250-500	-	4580.5	310
	500-1000	-	7443.8	695
	1000-2000	-	17334.0	2213
		AREA TOTAL	75374.9	80256
		NATIONAL TOTAL	365281.7	-

ENGLAND AND WALES

1981 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
I	500-1000	-	222.2	39
	1000-2000	-	3179.3	259
		AREA TOTAL	3401.5	-
II	500-1000	-	434.7	59
	1000-2000	-	3985.7	497
		AREA TOTAL	4420.4	-
III	150-250	-	246.6	30
		AREA TOTAL	246.6	-
IV	1-25	-	27627.7	52636
	25-50	-	51035.0	30218
	50-100	-	20295.1	8566
	100-150	-	6615.7	2270
	150-250	-	32733.6	4511
	250-500	-	48579.6	6820
	500-1000	-	2549.5	609
	1000-2000	-	59.7	29
		AREA TOTAL	189495.8	-
VI	25-50	-	19.1	16
	50-100	-	19.5	15
	100-150	-	136.0	72
	150-250	-	494.3	174
	250-500	-	1243.4	338
	500-1000	-	5076.8	1014
	1000-2000	-	3393.4	447
		AREA TOTAL	10382.6	-
VII	1-25	-	24748.5	78647
	25-50	-	15555.7	10985
	50-100	-	7573.9	4673
	100-150	-	3179.6	1384
	150-250	-	5043.5	2159
	250-500	-	2377.7	518
	500-1000	-	788.0	77
	1000-2000	-	1451.6	221
		AREA TOTAL	60718.4	-
		NATIONAL TOTAL	268665.4	-

SCOTLAND

1977 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
I	UNKNOWN	-	79.6	10
	250-500	1500-2000	939.3	264
		AREA TOTAL	1019.0	-
II	250-500	1000-1500	611.1	122
	250-500	1500-2000	389.9	123
	500-1000	2000-3000	54.9	19
		AREA TOTAL	1055.9	-
IV	UNKNOWN	-	7778.1	28699
	UNKNOWN	200-500	4.4	3
	1-25	1-30	1407.7	10892
	1-25	30-100	407.8	1318
	1-25	100-200	41370.6	34701
	1-25	200-500	348.5	152
	25-50	100-200	2804.6	2262
	25-50	200-500	66758.2	30089
	25-50	750-1000	15.6	6
	50-100	100-200	207.6	134
	50-100	200-500	44780.1	16465
	50-100	500-750	8217.4	1376
	50-100	750-1000	197.9	48
	100-150	500-750	19514.7	5996
	100-150	750-1000	8.0	3
	150-250	100-200	3.2	3
	150-250	500-750	9858.7	3610
	150-250	1000-1500	177.3	19
	150-250	1500-2000	118.2	18
	250-500	200-500	29.4	9
	250-500	750-1000	14909.3	4550
		AREA TOTAL	218917.5	-
V	UNKNOWN	-	244.4	74
	25-50	100-200	11.7	6
	50-100	200-500	542.9	291
	50-100	500-750	11.6	4
	50-100	750-1000	13.0	5
	50-100	1000-1500	7.9	5
	100-150	200-500	942.7	523
	100-150	500-750	13.0	5
	100-150	750-1000	2.1	3
	150-250	200-500	484.6	199

SCOTLAND

1977 RESULTS CONTINUED

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
V cont'd	150-250	500-750	3902.7	1277
	150-250	750-1000	6.1	3
	250-500	1000-1500	9040.0	2705
	250-500	1500-2000	371.5	104
		AREA TOTAL	15594.4	-
VI	UNKNOWN	-	6919.4	21108
	UNKNOWN	100-200	121.1	80
	UNKNOWN	750-1000	65.2	16
	UNKNOWN	1000-1500	372.1	20
	1-25	1-30	1406.7	5212
	1-25	30-100	113.3	389
	1-25	100-200	22854.3	22869
	1-25	200-500	1539.3	1417
	25-50	100-200	9175.9	7704
	25-50	200-500	28966.1	15613
	25-50	500-750	505.9	34
	50-100	100-200	44.2	34
	50-100	200-500	3371.7	1822
	50-100	500-750	16650.4	2577
	100-150	200-500	344.9	223
	100-150	500-750	3152.2	994
	100-150	750-1000	5420.1	348
	150-250	200-500	44.9	24
	150-250	500-750	3274.1	1144
	150-250	750-1000	40.2	38
	150-250	1000-1500	1855.8	72
	250-500	100-200	1.9	1
	250-500	750-1000	3592.9	992
	250-500	1500-2000	215.8	48
	500-1000	200-500	284.1	201
		AREA TOTAL	110332.8	-
VII	UNKNOWN	-	2184.0	874
	1-25	1-30	1390.4	1130
	1-25	30-100	3.0	3
	1-25	100-200	844.9	456
	25-50	100-200	285.4	197
	25-50	200-500	243.6	93
	50-100	100-200	4.2	2
	50-100	200-500	107.5	59
	150-250	1000-1500	2.9	1
	500-1000	200-500	64.4	28
		AREA TOTAL	5130.4	-
		NATIONAL TOTAL	352049.9	

SCOTLAND

1979 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
II	500-1000	3000-5000	4.0	7
		AREA TOTAL	4.0	-
IV	UNKNOWN	-	7962.8	39685
	1-25	-	964.5	861
	1-25	30-100	314.7	560
	1-25	100-200	31849.9	29453
	1-25	200-500	7424.4	5966
	25-50	-	3930.2	1603
	25-50	100-200	3569.9	3341
	25-50	200-500	58398.9	32319
	50-100	-	2768.0	1016
	50-100	100-200	664.5	495
	50-100	200-500	42790.2	19303
	50-100	500-750	4012.1	1655
	50-100	750-1000	37.5	13
	100-150	-	548.3	321
	100-150	500-750	10414.2	4675
	100-150	750-1000	89.7	25
	150-250	-	463.1	349
	150-250	30-100	3.0	11
	150-250	200-500	2072.5	1248
	150-250	500-750	4634.7	2104
	150-250	750-1000	1943.2	680
	150-250	1000-1500	447.9	65
	250-500	-	12.8	18
	250-500	200-500	3.0	7
	250-500	750-1000	169.9	91
	250-500	1000-1500	10067.2	3190
	500-1000	1500-2000	328.1	91
		AREA TOTAL	195885.3	-
V	25-50	200-500	27.2	12
	50-100	200-500	430.7	290
	100-150	200-500	861.0	536
	150-250	500-750	1428.5	741
	250-500	750-1000	502.4	221
	250-500	1500-2000	90.0	14
		AREA TOTAL	3339.8	-

SCOTLAND

1979 RESULTS CONTINUED

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
VI	UNKNOWN	-	6776.2	-
	1-25	-	1558.0	5095
	1-25	30-100	12.1	78
	1-25	100-200	19005.9	20606
	1-25	200-500	682.0	1021
	25-50	100-200	81.3	88
	25-50	200-500	31626.3	23042
	50-100	200-500	4570.2	2393
	50-100	500-750	3990.1	794
	50-100	750-1000	4335.0	212
	100-150	-	316.1	118
	100-150	200-500	183.4	128
	100-150	500-750	2793.9	1165
	100-150	750-1000	6191.5	326
	100-150	1500-2000	2.4	1
	150-250	-	228.1	90
	150-250	500-750	3437.3	1522
	150-250	750-1000	831.8	237
	150-250	1000-1500	5491.7	193
	150-250	1500-2000	1292.4	209
	250-500	-	37.5	9
	250-500	500-750	37.0	22
	250-500	1000-1500	7939.5	1411
	250-500	1500-2000	1466.2	217
	500-1000	1500-2000	1014.3	40
	500-1000	2000-3000	1098.0	173
		AREA TOTAL	104998.2	-
VII	UNKNOWN	-	3851.9	1948
	1-25	-	102.0	45
	1-25	100-200	944.1	426
	25-50	-	2530.7	318
	25-50	200-500	995.3	523
	50-100	-	15617.0	777
	50-100	200-500	112.6	51
	100-150	-	6890.6	432
	100-150	500-750	28.1	10
	150-250	-	4878.1	556
	250-500	-	6649.3	337
	500-1000	1000-1500	31.5	6
		AREA TOTAL	42631.4	-
		NATIONAL TOTAL	346858.7	-

SCOTLAND

1981 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
II	25-50	OVER-5000	124.5	2
	150-250	-	76.5	6
	250-500	-	709.2	35
	250-500	1000-1500	107.4	2
	250-500	1500-2000	58.5	2
		AREA TOTAL	1076.1	-
IV	UNKNOWN	-	7063.6	35779
	1-25	-	683.2	561
	1-25	1-30	10.0	58
	1-25	30-1000	5056.1	5103
	1-25	100-200	16336.1	14850
	1-25	200-500	18512.3	11440
	1-25	3000-5000	6.2	2
	25-50	-	4765.3	1886
	25-50	30-100	18.6	11
	25-50	100-200	14047.3	8316
	25-50	200-500	50832.8	22927
	25-50	500-750	14991.8	5323
	50-100	-	5630.0	1648
	50-100	30-100	2.1	1
	50-100	100-200	1169.0	547
	50-100	200-500	25160.8	9004
	50-100	500-750	28726.6	9479
	50-100	750-1000	5435.1	1909
	100-150	-	1288.4	337
	100-150	200-500	2506.1	991
	100-150	500-750	9654.3	3304
	100-150	750-1000	1771.7	552
	100-150	1000-1500	424.8	80
	150-250	-	620.4	171
	150-250	200-500	443.0	229
	150-250	500-750	4667.9	1469
	150-250	750-1000	3122.3	780
	150-250	1000-1500	369.7	41
	150-250	1500-2000	251.2	41
	250-500	-	156.9	44
	250-500	500-750	1019.1	213
	250-500	750-1000	24.0	9
	250-500	1000-1500	1288.4	230
	250-500	1500-2000	3409.8	555
	250-500	2000-3000	12.3	6
		AREA TOTAL	229477.7	-

SCOTLAND

1981 RESULTS CONTINUED

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
V	50-100	200-500	97.7	79
	100-150	200-500	83.7	64
	100-150	500-750	11.0	6
	100-150	1000-1500	48.0	3
	150-250	500-750	196.7	84
	150-250	750-1000	42.0	3
	250-500	1000-1500	114.6	6
	250-500	1500-2000	210.5	34
		AREA TOTAL	804.3	-
VI	UNKNOWN	-	9993.9	34269
	1-25	1-30	16.0	62
	1-25	30-100	2013.0	2985
	1-25	100-200	14321.0	16022
	1-25	200-500	10614.5	7294
	1-25	3000-5000	12.2	4
	25-50	-	52.9	24
	25-50	30-100	3.3	19
	25-50	100-200	7037.6	5459
	25-50	200-500	33004.5	18046
	25-50	500-750	6578.8	1650
	50-100	100-200	547.7	371
	50-100	200-500	5147.8	1827
	50-100	500-750	7296.4	1207
	50-100	750-1000	7721.0	762
	100-150	200-500	468.6	241
	100-150	500-750	8867.3	1594
	100-150	750-1000	3417.8	272
	100-150	1000-1500	3811.0	260
	150-250	-	51.0	20
	150-250	200-500	65.6	18
	150-250	500-750	1440.0	580
	150-250	750-1000	4147.7	399
	150-250	1000-1500	3087.5	217
	150-250	1500-2000	1974.7	91
	250-500	-	252.0	7
	250-500	500-750	115.9	18
	250-500	750-1000	1175.4	72
	250-500	1000-1500	4724.4	609
	250-500	1500-2000	5223.1	355
	250-500	2000-3000	754.2	56
	500-1000	750-1000	517.1	40
	500-1000	1500-2000	429.3	48
	500-1000	2000-3000	422.9	37
	500-1000	3000-5000	851.3	83
		AREA TOTAL	146157.0	-

SCOTLAND

1981 RESULTS CONTINUED

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
VII	UNKNOWN	–	4646.5	2183
	1-25	–	42.6	43
	1-25	1-30	8.4	4
	1-25	30-100	214.7	194
	1-25	100-200	375.9	261
	1-25	200-500	526.4	185
	25-50	-	282.5	99
	25-50	100-200	81.4	25
	25-50	200-500	1246.9	575
	25-50	500-750	327.8	122
	50-100	-	4572.0	276
	50-100	200-500	214.9	84
	50-100	500-750	366.7	113
	50-100	750-1000	124.6	34
	100-150	-	3052.5	239
	100-150	500-750	90.7	13
	100-150	750-1000	181.1	40
	100-150	1000-1500	42.8	4
	150-250	-	4833.6	567
	150-250	500-750	14.6	7
	150-250	1500-2000	44.4	2
	250-500	-	3017.6	186
	250-500	1000-1500	80.3	8
	250-500	2000-3000	52.2	2
	500-1000	750-1000	9.8	2
		AREA TOTAL	24445.8	-

NATIONAL TOTAL 401965.9

NORTHERN IRELAND

1977 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
VI	1-25	1-30	53.0	198
		AREA TOTAL	53.0	-
VII	1-25	1-30	27.0	32
	25-50	100-200	89.0	73
	50-100	200-500	16963.4	10786
		AREA TOTAL	17079.4	-
		NATIONAL TOTAL	17132.4	-

NORTHERN IRELAND

1979 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
IV	25-50	-	15.6	13
		AREA TOTAL	15.6	-
VI	1-25	1-30	50.3	127
		AREA TOTAL	50.3	-
VII	1-25	-	45.9	29
	25-50	-	77.8	36
	50-100	-	231.1	68
	50-100	200-500	20061.5	14555
	50-100	500-750	157.6	20
	100-150	750-1000	32.2	9
	150-250	-	0.1	2
		AREA TOTAL	20606.2	-
		NATIONAL TOTAL	20672.2	-

NORTHERN IRELAND

1981 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
VI	1-25	1-30	48.5	149
	50-100	-	2.8	1
	250-500	1000-1500	12.8	2
		AREA TOTAL	64.1	-
VII	1-25	-	9.3	9
	1-25	30-100	238.8	225
	25-50	-	128.5	57
	50-100	-	63.5	37
	50-100	200-500	24464.3	15492
	150-250	500-750	110.8	12
		AREA TOTAL	25015.2	-
		NATIONAL TOTAL	25079.3	-

ISLE OF MAN

1979 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
VI	1-25	-	74.8	8
	50-100	-	18.3	6
	500-1000	-	48.9	3
		AREA TOTAL	142.0	-
VII	25-50	-	391.4	100
	50-100	-	3232.7	473
	100-150	-	756.3	123
	150-250	-	252.2	48
	250-500	-	377.2	15
	500-1000	-	958.1	41
		AREA TOTAL	5968.0	-
		NATIONAL TOTAL	6110.0	

ISLE OF MAN

1981 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
II	500-1000	-	111.3	7
		AREA TOTAL	111.3	-
IV	500-1000	-	309.3	8
		AREA TOTAL	309.3	-
VI	50-100	-	5.0	2
	500-1000	-	315.2	7
		AREA TOTAL	320.2	-
VII	1-25	-	93.0	40
	25-50	-	605.7	282
	50-100	-	2126.9	700
	100-150	-	672.5	156
	150-250	-	57.6	16
	250-500	-	66.4	30
	500-1000	-	838.1	42
		AREA TOTAL	4460.3	-
		NATIONAL TOTAL	5201.1	-

BELGIUM

1977 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
I	500-1000	1000-1500	44.8	19
		AREA TOTAL	44.8	
IV	25-50	100-200	3872.7	5986
	50-100	200-500	19187.3	13397
	100-150	200-500	3277.7	1914
	100-150	500-750	19127.8	6585
	150-250	500-750	33195.3	4010
		AREA TOTAL	78660.8	-
V	250-500	750-1000	5437.8	2341
		AREA TOTAL	5437.8	-
VII	50-100	200-500	2947.8	1828
	100-150	200-500	4267.6	2711
	100-150	500-750	3805.6	1692
	150-250	500-750	4976.7	2044
		AREA TOTAL	15997.6	-
VIII	150-250	500-750	446.2	227
		AREA TOTAL	446.2	-
		NATIONAL TOTAL	100587.3	-

BELGIUM

1979 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
III	50-100	200-500	68.1	32
	150-250	750-1000	4739.0	199
		AREA TOTAL	4807.1	-
IV	25-50	100-200	6076.2	5709
	25-50	200-500	65.7	73
	50-100	200-500	16478.9	10056
	100-150	200-500	4404.0	2090
	100-150	500-750	18871.2	6700
	150-250	500-750	32208.6	3753
		AREA TOTAL	78104.7	-
V	250-500	750-1000	5288.6	1613
		AREA TOTAL	5288.6	-
VI	150-250	500-750	6.8	1
		AREA TOTAL	6.8	-
VII	50-100	200-500	1724.9	1205
	100-150	200-500	672.5	439
	100-150	500-750	5755.5	2136
	150-250	500-750	5799.9	1594
	150-250	750-1000	3757.7	1277
		AREA TOTAL	17710.6	-
		NATIONAL TOTAL	105917.7	-

BELGIUM

1981 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
III	50-100	200-500	63.4	50
	150-250	750-1000	1687.1	128
		AREA TOTAL	1750.5	-
IV	25-50	100-200	3984.9	4924
	50-100	200-500	10807.2	5896
	100-150	200-500	11220.5	4734
	100-150	500-750	20830.3	7471
	150-250	500-750	21733.9	3150
	250-500	1000-1500	195.4	66
		AREA TOTAL	68772.2	-
V	250-500	750-1000	3631.7	1274
		AREA TOTAL	3631.7	-
VI	150-250	500-750	33.0	9
		AREA TOTAL	33.0	-
VII	50-100	200-500	833.6	564
	100-150	200-500	4994.9	2829
	100-150	500-750	8537.5	2267
	150-250	500-750	7354.0	2551
	150-250	750-1000	6048.5	2384
		AREA TOTAL	27768.5	-
VIII	250-500	1000-1500	49.7	18
		AREA TOTAL	49.7	-
		NATIONAL TOTAL	102005.7	-

NETHERLANDS

1977 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
III	50-100	500-750	1984.4	201
	100-150	200-500	1.3	6
	100-150	500-750	10566.4	828
	150-250	1000-1500	58958.6	3032
		AREA TOTAL	71510.7	-
IV	UNKNOWN	-	110663.7	-
	25-50	100-200	14504.0	18974
	25-50	200-500	3556.4	1780
	50-1000	200-500	60000.2	13182
	100-150	200-500	21.0	22
	100-150	500-750	78577.2	13301
	100-150	750-1000	58.6	31
	150-250	750-1000	4028.6	1125
	150-250	1000-1500	219663.8	24641
	250-500	1000-1500	7554.1	1976
	250-500	1500-2000	2635.1	850
	500-1000	2000-3000	490.4	110
		AREA TOTAL	501753.1	-
V	250-500	1000-1500	84.8	26
		AREA TOTAL	84.8	-
VI	150-250	750-1000	422.1	92
	250-500	1500-2000	6687.3	1100
	500-1000	2000-3000	925.1	83
		AREA TOTAL	8034.5	-
VII	100-150	750-1000	314.8	56
	150-250	750-1000	242.4	104
	150-250	1000-1500	4805.4	788
	250-500	1500-2000	13349.9	3031
	500-1000	2000-3000	3430.9	426
		AREA TOTAL	22143.4	-
VIII	150-250	1000-1500	46.4	11
	500-1000	2000-3000	95.8	18
		AREA TOTAL	142.2	-
		NATIONAL TOTAL	603668.7	-

NETHERLANDS

1979 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
II	50-100	500-750	92.4	7
	150-250	1000-1500	1403.9	60
		AREA TOTAL	1496.3	-
III	50-100	500-750	74.0	10
	100-150	500-750	1691.9	149
	150-250	1000-1500	8179.7	625
		AREA TOTAL	9945.7	-
IV	UNKNOWN	-	98605.1	-
	25-50	100-200	22696.7	18078
	25-50	200-500	3234.7	1653
	50-100	200-500	47565.3	12595
	100-150	500-750	74262.8	13472
	150-250	500-750	118.8	72
	150-250	750-1000	4327.7	1279
	150-250	1000-1500	199635.5	26935
	250-500	1000-1500	1523.2	432
		AREA TOTAL	451969.8	-
VI	250-500	1000-1500	113.9	37
	250-500	1500-2000	3949.0	948
	500-1000	2000-3000	1767.6	291
		AREA TOTAL	5830.5	-
VII	150-250	1000-1500	1591.8	274
	250-500	1000-1500	169.2	21
	250-500	1500-2000	14029.2	3262
	500-1000	2000-3000	5933.7	865
		AREA TOTAL	21724.0	-
		NATIONAL TOTAL	490966.3	-

NETHERLANDS

1981 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
III	1-25	30-100	67.4	12
	50-100	500-750	3.0	32
	150-250	1000-1500	315.8	72
	250-500	1000-1500	8244.4	176
		AREA TOTAL	8630.6	-
IV	UNKNOWN	-	110186.9	-
	25-50	100-200	14383.6	12663
	25-50	200-500	6438.9	4232
	50-100	200-500	34192.9	11933
	50-100	500-750	12234.9	2424
	100-150	200-500	154.6	64
	100-150	500-750	42790.1	9871
	100-150	750-1000	17425.8	2501
	150-250	750-1000	10453.7	2560
	150-250	1000-1500	269973.5	30767
	250-500	1500-2000	42.8	9
	500-1000	2000-3000	405.4	43
		AREA TOTAL	518682.9	-
VI	250-500	1500-2000	2574.1	402
	500-1000	2000-3000	8122.5	883
		AREA TOTAL	10696.6	-
VII	50-100	500-750	54.1	10
	100-150	500-750	19.2	5
	100-150	750-1000	378.0	34
	150-250	750-1000	545.6	49
	150-250	1000-1500	1527.1	619
	250-500	1500-2000	8441.9	1662
	500-1000	1500-2000	115.8	11
	500-1000	2000-3000	23532.4	3152
		AREA TOTAL	34614.1	-
VIII	250-500	1500-2000	93.1	30
		AREA TOTAL	93.1	-
		NATIONAL TOTAL	572717.5	-

FEDERAL REPUBLIC OF GERMANY

1977 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
I	1000-2000	2000-3000	168.9	14
	2000-4000	3000-5000	5351.8	349
		AREA TOTAL	5520.6	-
II	500-1000	2000-3000	8822.4	941
	1000-2000	2000-3000	3205.4	299
	1000-2000	3000-5000	201.6	17
	2000-4000	3000-5000	32027.6	2036
		AREA TOTAL	44257.0	-
III	UNKNOWN	-	28459.9	-
	25-50	200-500	711.7	233
	50-100	200-500	6115.9	2492
	100-150	200-500	6157.1	1841
	150-250	500-750	20.0	16
	2000-4000	3000-5000	4.6	1
		AREA TOTAL	41469.3	-
IV	UNKNOWN	-	5763.0	-
	25-50	100-200	12.9	22
	25-50	200-500	1583.0	958
	50-100	100-200	172.3	145
	50-100	200-500	42832.6	9629
	100-150	200-500	16846.3	4865
	100-150	500-750	6.4	2
	150-250	-	303.5	63
	150-250	500-750	757.9	150
	250-500	500-750	3949.8	1226
	500-1000	-	65.1	11
	500-1000	1500-2000	185.6	13
	500-1000	2000-3000	1984.1	207
	1000-2000	-	1725.0	174
	1000-2000	3000-5000	464.8	24
	2000-4000	3000-5000	13006.9	1124
		AREA TOTAL	89659.3	-
V	500-1000	1500-2000	12091.0	2207
	500-1000	2000-3000	32968.4	4384
	1000-2000	2000-3000	8936.2	1227
		AREA TOTAL	53995.7	-

FEDERAL REPUBLIC OF GERMANY

1977 RESULTS CONTINUED

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
VI	250-500	500-750	180.7	59
	500-1000	2000-3000	480.8	48
	1000-2000	2000-3000	23.5	7
	1000-2000	3000-5000	2.8	3
	2000-4000	3000-5000	1029.2	57
		AREA TOTAL	1716.9	-
VII	1000-2000	3000-5000	267.8	25
	2000-4000	3000-5000	3507.6	319
	2000-4000	OVER 5000	8.7	2
		AREA TOTAL	3784.1	-
XIV	500-1000	1500-2000	2468.6	460
	500-1000	2000-300	6967.7	916
	1000-2000	2000-3000	1376.9	162
	2000-4000	3000-5000	7894.2	403
		AREA TOTAL	18707.4	-
		NATIONAL TOTAL	259110.4	-

FEDERAL REPUBLIC OF GERMANY

1979 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
I	2000-4000	3000-5000	0.2	1
		AREA TOTAL	0.2	-
II	500-1000	1500-2000	1107.6	44
	500-1000	2000-3000	19037.2	1897
	1000-2000	3000-5000	154.7	29
	2000-4000	3000-5000	8923.8	842
		AREA TOTAL	29223.3	-
III	UNKNOWN	-	22046.5	-
	50-100	200-500	3852.6	708
	100-150	200-500	882.4	250
		AREA TOTAL	26781.5	-
IV	UNKNOWN	-	4602.8	-
	1-25	30-100	2.0	4
	1-25	100-200	21.5	44
	25-50	100-200	151.1	59
	25-50	200-500	810.5	574
	50-100	100-200	115.3	76
	50-100	200-500	38263.9	8603
	100-150	200-500	8024.2	2460
	100-150	500-750	155.2	58
	250-500	500-750	1629.0	571
	500-1000	-	4906.0	343
	500-1000	1500-2000	461.3	3
	500-1000	2000-3000	1483.5	60
	1000-2000	3000-5000	779.4	56
	2000-4000	3000-5000	8518.7	619
		AREA TOTAL	69509.4	-
V	500-1000	1500-2000	1473.2	436
	500-1000	2000-3000	7986.3	1059
	1000-2000	2000-3000	1120.0	95
	2000-4000	3000-5000	71.5	1
		AREA TOTAL	10651.0	-

FEDERAL REPUBLIC OF GERMANY

1979 RESULTS CONTINUED

FISHSING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
VI	500-1000	2000-3000	1000.4	84
	1000-2000	2000-3000	246.2	44
	1000-2000	3000-5000	66.4	4
	2000-4000	3000-5000	2230.5	131
		AREA TOTAL	3543.5	-
VII	1000-2000	3000-5000	1300.7	127
	2000-4000	3000-5000	6992.7	558
	2000-4000	OVER 5000	17.0	7
		AREA TOTAL	8310.4	_
XII	500-1000	1500-2000	114.3	4
	500-1000	2000-3000	7793.9	276
	1000-2000	2000-3000	1941.2	51
	2000-4000	OVER 5000	0.4	5
		AREA TOTAL	9849.8	-
XIV	500-1000	2000-3000	10481.0	2216
	1000-2000	2000-3000	5470.6	611
	2000-4000	3000-5000	16008.4	959
	2000-4000	OVER 5000	211.2	11
		AREA TOTAL	32171.1	-
		NATIONAL TOTAL	190040.2	-

FEDERAL REPUBLIC OF GERMANY

1981 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
I	2000-4000	3000-5000	379.4	23
		AREA TOTAL	379.4	-
II	500-1000	2000-3000	9906.2	999
	1000-2000	-	9.4	6
	2000-4000	3000-5000	5616.9	419
		AREA TOTAL	15532.5	-
III	UNKNOWN	-	20661.6	-
	25-50	200-500	163.0	35
	50-100	200-500	746.2	34
	50-100	500-750	1999.3	213
	100-150	500-750	1488.2	319
	150-250	500-750	147.0	25
		AREA TOTAL	25205.3	-
IV	UNKNOWN	-	7646.1	-
	25-50	200-500	1543.7	714
	50-100	100-200	95.0	42
	50-100	200-500	30436.5	6111
	100-150	200-500	18069.7	4834
	150-250	500-750	1415.8	340
	250-500	500-750	2009.3	508
	500-1000	2000-3000	2259.0	84
	1000-2000	3000-5000	321.4	21
	2000-4000	3000-5000	1676.7	67
	2000-4000	OVER 5000	0.3	1
		AREA TOTAL	65473.6	-
V	500-1000	1000-1500	4621.4	382
	1000-2000	3000-5000	1481.6	78
	2000-4000	3000-5000	3669.7	126
		AREA TOTAL	9772.7	_
VI	250-500	500-750	91.0	22
	500-1000	2000-3000	824.4	90
	1000-2000	3000-5000	2124.6	125
	2000-4000	3000-5000	21257.5	990
		AREA TOTAL	24297.5	-

FEDERAL REPUBLIC OF GERMANY

1981 RESULTS CONTINUED

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
VII	1000-2000	3000-5000	472.7	29
	2000-4000	3000-5000	995.3	42
	2000-4000	OVER 5000	167.3	2
		AREA TOTAL	1635.3	-
XII	500-1000	2000-3000	3262.5	181
	2000-4000	3000-5000	4699.4	45
		AREA TOTAL	7961.9	-
XIV	500-1000	2000-3000	12853.8	1646
	1000-2000	3000-5000	4276.0	275
	2000-4000	3000-5000	36923.8	1853
		AREA TOTAL	54053.6	-
		NATIONAL TOTAL	204311.9	-

IRELAND

1977 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
IV	250-500	1000-1500	436.4	-
		AREA TOTAL	436.4	-
VI	50-100	200-500	19291.8	-
		AREA TOTAL	19291.8	-
VII	25-50	100-200	11494.5	-
	50-100	200-500	40489.0	-
	1000-2000	2000-3000	231.3	-
		AREA TOTAL	52214.8	-
		NATIONAL TOTAL	71943.0	-

IRELAND

1979 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
IV	250-500	1000-1500	368.6	-
		AREA TOTAL	368.6	-
VI	50-100	200-500	19342.4	-
		AREA TOTAL	19342.4	-
VII	50-100	200-500	60843.2	-
		AREA TOTAL	60843.2	-
		NATIONAL TOTAL	80554.1	-

IRELAND

1981 RESULTS

FISHING AREA	TONNAGE GROUP	POWER GROUP	TONNES COD EQUIVALENT	TOTAL DAYS AT SEA
II	500-1000	-	81.2	-
		AREA TOTAL	81.2	-
IV	UNKNOWN	-	33.6	-
	500-1000	-	604.1	-
		AREA TOTAL	637.7	-
VI	UNKNOWN	-	45794.3	-
		AREA TOTAL	45794.3	-
VII	UNKNOWN	-	69364.2	-
		AREA TOTAL	69364.2	-
		NATIONAL TOTAL	115877.4	-