

**COMPARATIVE NOTES**  
ON VARIOUS  
**TRAWLER CATCHES IN THE NORTH SEA,**  
INCLUDING SOME  
**STEAM TRAWLER RECORDS**  
For 1903 and 1905.

BY  
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I.—INTRODUCTION.

In these days, when so much importance is attached to fishery statistics and various systems of collecting and discussing them are employed, it may be well to examine what relation and differences these bear to one another and to try and find some means by which these may be combined and brought into comparative relations with one another. At present there exist in various publications, such as the Journal of the Marine Biological Association and others, a number of isolated records of catches of fish by trawlers in the North Sea, which if put in a suitable form by being reduced to the same unit of fishing, would be available as a means of comparison. These records are found extending backwards through a considerable period of years, and are most valuable when we consider that, imperfect as they are, they are the only means we have of comparing our present day statistics with those of former years and of estimating, even if only very approximately, the changes in distribution and in quantity that have occurred amongst our most important food fishes.

For this reason, if we can obtain factors which will readily convert a recorded catch, as, for instance, the amount of fish or of a given species taken per voyage, per month or per day's fishing to a standard of catch per hour, then we should have means of obtaining a quantitative measure of the changes in our fisheries which in years to come might be of inestimable value.

Some attempt has already been made to accomplish this object in the first Appendix to my Report on the Grimsby Trawler Records.\* In this the actual average amount of fishing that takes place per month, per voyage and per day's absence from port is calculated for the Grimsby steam trawlers and the Lowestoft sailing trawlers, and in the former case different regions of fishing are distinguished.

These factors have been applied in a few cases, such as those records given by Cunningham in his North Sea Investigations,† and comparisons drawn between the yield in the former years and that of more modern times.

It is obvious to those who have any acquaintance with such statistics as those to which I refer, that many of them are of slight value, owing perhaps to omissions, to different or unknown methods of measurements of the quantities of fish, or to the mixing of the species, but others will at least indicate this—that the catches of the present day are, for the most important species, much smaller than they were some twenty or more years ago, even by boats admittedly far less powerful than our modern steam trawlers and smacks.

The principle employed in such comparisons and investigations is that of calculating the average catch per unit of time and comparing it with another average catch on the same area at a different period, or on another area at the same time. The average may be taken over several hauls combined for a month or for a year.

\* Third Report (Southern Area) on Fishery Investigations in the North Sea. Cd. 5546.

† Journal Marine Biological Association. Vol. IV. 1895.

For most purposes it gives best results to combine the hauls in monthly averages, for in that period the stock has not had much time to change through migration or emigration. A yearly average is best estimated by taking the mean of the twelve monthly averages, for in this way we obtain an average which is not unduly weighted by excess of fishing in the months of greatest abundance which might be the case were the total quantity of fish taken in relation to the whole amount of fishing in the year. It often happens that the whole twelve months are not represented in the statistics, and in this case it is necessary to take the mean of as many months' averages as are present and compare it with the mean of the corresponding months' averages in another year to get some measure of the yearly change.

One of the greatest difficulties to be met in this investigation, and one that cannot always be overcome, is the inaccuracy introduced by the difference in the catching power of the boats, and this is not always capable of measurement. All we know is that the boats and trawls were in the course of years being constantly improved and becoming more and more effective, so that an increased or level catch per unit of time on a given ground may probably be indicative of improved facilities for capture rather than an increase or maintenance of the species on the ground.

Between sailing trawlers and steam trawlers there is a very great difference in catching power, and Dr. Garstang in his very valuable paper "The Impoverishment of the Sea" has given estimates of the relative powers of the two kinds of boats.

There is also a considerable difference shown among steam trawlers themselves. For instance, the monthly averages of the Dutch steam trawlers for a particular area will show almost identical seasonal fluctuations as those of the Grimsby steamers, but the averages will be found to be consistently lower in one case than in the other. Certain English steamers, perhaps of a somewhat older type than the Grimsby steamers in present use have this same characteristic and yield a much smaller quantity of fish when trawling in the same area and at the same time as these latter steamers.

In investigating the records of a very limited number of such trawlers working from Lowestoft it soon became evident from the results that the relative catching power is not the same for all species, but that if a factor to connect the catches from both is desired, it must be determined separately for each species. Furthermore, by comparing the average catches of Dutch steam trawlers and of these certain steamers referred to above, it was at once seen that the Dutch boats caught more plaice and fewer soles than the English boats.

Before going into the details of the results and conclusions that can be gathered from these few special statistics, and applying them to this investigation of relative catching power of boats, it may be well to illustrate my previous remarks by an example of the method I am seeking to explain.

Dr. Garstang, in his "Impoverishment of the Sea," referred to above, gives in Table V certain quinquennial averages, showing the catch of plaice and haddock and other fish over a long period by Grimsby smacks. I have no means of ascertaining the amount of actual fishing by these smacks in the year, but the Lowestoft smacks fishing show that the total amount is about 3,000 hours in the year. The averages given in the table reduce on this basis to ten hours' fishing as follows:—

—				Plaice.	Haddock.
				Cwts.	Cwts.
Grimsby smacks ...	...	1875-9		1.42	2.31
" "	...	1880-4		1.06	1.70
" "	...	1885-9		0.75	1.45
" "	...	1890-2		0.64	1.66
Grimsby steamers ...	...	1904-7		4.14	3.52
" "	per smack unit			0.52	0.44

The last averages given are estimated by taking a modern steam trawler to have eight times the efficiency of a smack.\* There is no doubt that there is some difference in the place of fishing of the two sets of boats considered, for the former seemed to have fished more on the haddock ground than the latter, and this fact somewhat vitiates the comparison, for it is probable that were the distribution more similar the plaice catches would show a much greater decrease.

\* Garstang's estimate, "The Impoverishment of the Sea." Journ. Mar. Biol. Asscn. VI. 1900, p. 48.

It seems to me also that, except for use in very general statistics, some correction is needed for the application of Dr. Garstang's estimate of the relative catching power of modern steam trawlers and smacks. It is reckoned to be about eight times as much, but as this is calculated from catches from all parts of the North Sea, and there is a good deal of difference in the distribution of the steam and sailing trawlers, it can only be correct if the density of the fish in different parts of the sea is uniform. That this is not actually the case the more recent statistics of the Board of Agriculture and Fisheries show. For the statistical areas show a progressive and steady increase in their yield in the northern and deeper waters. Part of the greater efficiency of the steamers must then be accounted for by the fact that they tend to fish more in the central and northern parts of the North Sea, while the sailing boats fish in a less well-populated region.

## II.—LOWESTOFT STEAM TRAWLER RECORDS, 1903 AND 1905.

In May, 1903, at the time when the Marine Biological Association first commenced obtaining records from the skippers of commercial sailing trawlers at Lowestoft, three or four masters of steam trawlers working from Lowestoft also undertook to fill in the record-books. Two of these failed to continue the records after one or two months, and a month or two later (in August) two more men took up this work, one continuing till October and the other up to December, and then ceasing. In 1905 (March) he recommenced his records and continued them intermittently till September, supplemented by the records of one other skipper in June. The books are of precisely the same form as those issued to the men recording at Lowestoft and Grimsby.

These few records, being so very discontinuous and irregular, and covering but a very small portion of the North Sea, were of practically no value by themselves, but since for some portion of the fishing ground they yielded very reliable averages in some months and thus afforded an interesting supplement to and comparison with other trawling statistics, it was thought well to publish them. As these boats were steam trawlers and fished in somewhat more distant grounds than the ordinary Lowestoft smacks, it was impossible to combine the two series in the same report. Neither could they be included in the Grimsby statistics, for there were no records from that port in 1903, and these vessels were of a different class and of less power than the Grimsby boats. They will be discussed here, not so much from the point of view of the seasonal and geographical distribution of the various species, which has already been done in connection with the ordinary records from Lowestoft and Grimsby, but rather from the comparative point of view, with respect to the yearly changes between 1903 and 1905, and the comparative catches of these steamers and the Grimsby and Lowestoft boats.

Some of these boats were registered in London, others in Yarmouth, and they worked sometimes from Lowestoft, sometimes from Yarmouth. Their horse power averaged 29. In contrast to these figures we find that the boats recording voyages from Grimsby had a horse power which was generally about 45, but which, with the inclusion of several more powerful boats, averaged about 47 or 1.62 times that of the former boats.

The total number of hauls dealt with in 1903 was 397, corresponding to 1,893 hours' fishing, and in 1905 there were 271 hauls and 1,281 hours' fishing. The average duration of the hauls is thus seen to be 4.75 hours, or somewhat longer than is the case amongst the Grimsby trawlers.

### *Grounds Trawled and Division into areas.*

These small steam boats seem to be more adapted for the catching of prime fish, such as soles and turbot, than for other species. They are found at most times fishing where these species are comparatively abundant and where fish such as haddock and cod are very scarce. They fish mostly in the eastern part of the sea, from the Brown Ridges eastwards along the coast of Holland to Schiermonnikoog, and their main region of fishing is very well represented by area B<sub>3</sub> of the Board of Agriculture and Fisheries Chart.

For the purposes of monthly averages it was necessary to sub-divide this region, and a combination of the areas classified in my two charts used for the Grimsby and Lowestoft vessels respectively has been utilised. Capital letters have been employed to denote the Grimsby areas, and small letters those used in Lowestoft report. The areas and grounds visited by these men are as follows:—

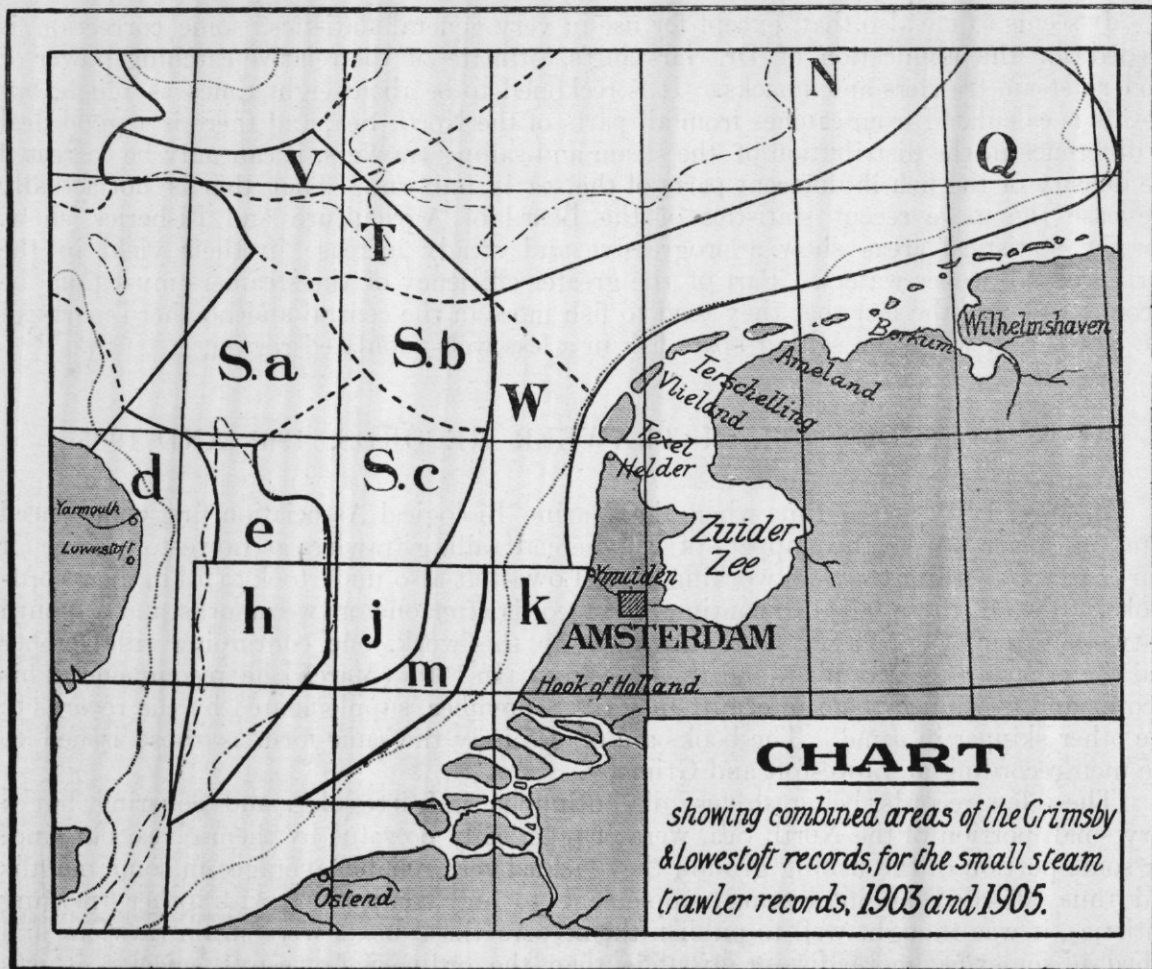


FIG. 1.—CHART showing combined areas of the Grimsby and Lowestoft records, for the small steam trawler records, 1903 and 1905.

Q. Terschelling, Ameland and Schiermonnikoog grounds.

W. As in chart of Grimsby Records, but continued southwards to the latitude of Ymuiden. It includes the Vlieland, Texel and Haaks ground and the Broad Fourteens.

N. As in the chart of Grimsby Records, but the fishing mostly took place in the south-western parts of this area in Terschelling Mud and Clay Deep.

S. This has been sub-divided into three areas. Sa the Leman Ground and Leman Bank Region; Sb the Black Bank, Botney Ground and Tea Kettle Hole region; Sc the Brown Bank, Brown Ridges and Winterton Ground. This latter area corresponds to areas C and F in the Lowestoft chart.

j. This is identical with area J in the Lowestoft Records and contains the Eastern Deep Water and part of the Brown Ridges.

m. These men fished in the northern half of the Lowestoft area M, mainly on the Brielle Ground.

k. This includes the part of the Brielle Ground between area m and the Dutch coast, limited on the north by a continuation of the line bordering on h, j and m.

In most of these areas there was but a small amount of fishing, and area Q takes the greatest share, that is about one-half in 1903 and nearly one-third in 1905 of the total amount of fishing in the year. Area Sb has the next largest share.

The method of treating these records has been precisely similar to that used in the case of the Grimsby and Lowestoft Records, and as it has already been fully described it will suffice here to say that all catches in each area are expressed as monthly averages per ten hours' fishing. Soles, turbot, brill and large cod are given in numbers, and the other species, measured in baskets by the fishermen, are converted into weight (cwts.). The scale used has been the same as that adopted in the report on the Lowestoft skippers, *i.e.*, a "trunk" of fish, whether plaice, codling, haddock or whiting, as packed upon deck is equivalent to two-thirds of a cwt., and a basket to one-half a cwt. For individual fish the scales of weight already adopted in these two reports are used here.

The resultant average catches for each area and month are set out in Table I., for each of the seven species yet dealt with, *i.e.*, plaice, soles, turbot, brill, cod, haddock and whiting, with the trade categories of large, medium and small, or large and small, distinguished.



The following Table is the result of this calculation :—

Area.	Number of Months.	Year.	Plaice. Cwts.	Soles.	Turbot.	Brill.	Cod. Cwts.	Haddock. Cwts.	Whiting. Cwts.
Q ...	4 {	1903	8.78	147.9	13.01	3.28	0.07	0.51	1.92
		1905	7.82	89.2	9.45	2.42	0.01	0.005	0.53
N ...	2 {	1903	3.35	91.2	19.75	1.07	0.11	4.58	2.85
		1905	1.47	21.3	15.18	2.16	0.10	1.40	0.99
Sb ...	2 {	1903	4.18	51.6	11.98	2.42	0.26	0.38	1.09
		1905	2.51	35.4	8.25	1.41	0.06	0.00	0.74
Sc ...	1 {	1903	3.54	41.6	12.52	5.31	0.04	0.00	1.27
		1905	3.56	29.1	7.58	2.12	0.00	0.00	0.15
T ...	1 {	1903	4.44	21.0	11.43	0.96	1.30	2.22	0.63
		1905	1.28	6.5	11.63	1.86	0.09	1.40	1.16

This table shows that for almost all species, brill alone perhaps excepted, the average catches in 1903 were consistently greater than the average catches of the corresponding months in 1905. This result, that the quantities of fish were significantly greater in 1903 than in 1905, although not based on very many months of comparison, is confirmed by and also confirms the same result obtained from the Lowestoft Trawler Statistics. The region examined in the two cases is not exactly the same, but they are sufficiently contiguous to lead us to expect that the same yearly changes would prevail over the whole region investigated by the two sets of statistics, and this is evidently the case. The Lowestoft records show a substantial decrease in the catches of plaice and soles between these two years, and some unpublished statistics for turbot and brill maintain exactly the same condition. 1903 (the summer at least of this year) thus seems to have been what may be called a "bumper" year for all the most important fishes in this region when compared with the corresponding periods of 1904 and 1905. It is impossible to say what is the cause of this fact, but some conditions must have been present to make a marked difference in the abundance of fishes in that year. It is not possible that the whole of the great difference shown between the two years is due to the effects of over-fishing alone, and we must look for some additional cause in unusual conditions of temperature and salinity.

The charts of the Bulletin Trimestriel, issued by the International Council, do not show any extraordinary abnormalities in the nature of the temperature during 1903 in this particular part of the North Sea, except perhaps in August, when the surface temperatures were somewhat lower than usual. The case is different with regard to the salinity, which was significantly higher than the mean of the period over which the charts of mean salinity\* were taken.

It is possible that, just as the low salinity of 1906 in the eastern part of the North Sea† was accompanied by a lessened quantity of certain species, so also is the high salinity of 1903 accompanied by a great abundance of these species.

(b.)—*Distribution and Seasonal Variations.*

Without placing too much reliance on the monthly changes of these figures, it will be seen that certain facts are suggested by them, which are in complete agreement with those derived from the Grimsby and Lowestoft trawler statistics. The chief of these are noted as follows :—

*Plaice.*—There is a progressive diminution in the catches from the inshore to the offshore grounds from area Q to areas N, T or Sb., or further south from K through m to j, the Lowestoft areas. Small fish form a very large proportion of the total catch, this proportion diminishing as the distance from the shore increases. In area Q (Terschelling, &c.) the percentage of the total catch formed by the small fish is 74.0 in 1903 and 70.0 in 1905. In N (Clay Deep, &c.) it is 48.9 and 57.0 respectively, in the two years; in Sb it is 34.9 and 40.6, and in Sc 27.7 and 51.8 respectively.

*Soles.*—Area Q yields much the largest catches of soles, reaching an average of 332 in one month. The fishing in this area is limited to a small section of it and is often just inside the 20 fathom line so that the ordinary seasonal fluctuations are somewhat intermediate in character to N and Q. In the adjacent area N the numbers are significantly

\* Bulletin Trimestriel, 1906–1907. Partie Supplémentaire.

† Cf. Report on Grimsby Trawler Records, p. 26.

smaller, but then there is no fishing during the time of greatest abundance of soles in this area, *i.e.* in the winter. Both areas Sb and Sc show the autumn maximum, and the presence of larger numbers in the former area (Black Bank, &c.) than in the latter, Sc (Brown Bank, Brown Ridges, &c.) as were determined by the analysis of the Grimsby Records.\*

The averages in the three last areas j, k and m are interesting in confirming the comparative scarcity of soles found in the S.E. part of the North Sea on the grounds off the east coast of Holland by the Lowestoft Records.

*Turbot.*—These are distributed in accordance with the distribution already found that is to say the largest catches are made in Area N, and the next largest in the adjacent Area Q (Terschelling, Ameland, &c.). The catches were fairly large in 1903 in Area N, being 19.51 for the three months examined, and in Area Q 14.59 for the six months examined. We notice also the slight superiority of Area Sb over Sc, both of them however showing very good quantities. The averages in Area T are all very high, but they are not based on sufficient hours' fishing to be very reliable. The quantities on the Brielle grounds and Eastern Deep Water in March, 1905 (j, k, m) are very small, indeed almost negligible, being less than one per ten hours' fishing.

*Brill.*—Much smaller numbers of this species than of turbot were taken. The greatest average catch is 4.81 in Area Q in August, 1903, but the averages however are generally between two and four per 10 hours' fishing. In Area N they are very scarce except in September.

*Cod and Haddock.*—The quantities of these two species caught in these areas are very small and in the case of haddock very often nil. These southern shallow grounds are not visited by these species to any extent except in the autumn and winter, and at this season we have no records from these steamers.

We find confirmed the absence of haddock from nearly all these areas, except N & T, and in the former of these the amounts are extraordinarily large, especially in the spring. Cod occur in this region more frequently, but in very small quantities. Their presence in most areas is indicated by the occasional capture of a single large or medium fish, but in these months they do not occur at all in large quantities, and their absence in the summer is particularly marked.

The high average catch of haddock in area Q in June, 1903, is not representative. In the most southern areas investigated off the Dutch Coast, we find large cod present in March, 1905, but haddock entirely absent from the catches.

*Whiting* is a fish whose abundance it is very difficult to represent with any degree of accuracy. The average catches of this species by these steam trawlers come out very many times greater than those of the Grimsby trawlers, and this may be due to some error in estimating the weight, or as is also likely to be the case, to the fact that the amount of whiting kept from the haul is very dependent on the whims of the individual fishermen, and is therefore very variable.

It is impossible to gain any further light on the nature of the seasonal fluctuations, for they appear here to be as irregular as they were shown to be in the case of the Grimsby trawlers. For instance, in both areas Q and Sb the September average is much higher than that of May in 1903, but is considerably below it in 1905, and other indications of seasonal changes are not at all plain or consistent.

### III.—COMPARATIVE CATCHING POWER OF VARIOUS TYPES OF FISHING BOATS.

We come now to the consideration of the comparative catching powers of these vessels and the boats fishing from other ports, such as the Grimsby steamers, Lowestoft smacks and Dutch steamers.

We assume that boats of the same catching power would make approximately the same average catch of fish for any month in a given area, and therefore that the difference in catching power of two classes of boats can be measured by the relation of the average amount of fish caught in a given area at a given time by each class.

On this assumption I have taken the average catch of these steamers of each species in certain months and areas and compared with them the average catch of the Grimsby and Lowestoft boats for which reliable statistics for the same months and areas were available, expressing the ratio of the one to the other as measure of the catching power of the more powerful boats to the smaller ones, and averaging the results for each species. In some cases it will be found that these ratios are somewhat variable, but this is easily understood when we consider that the figures are not based on sufficient hauls to be always a reliable sample of the whole area and month considered.

\* Loc. cit. p. 37.

The figures are given not as anything approaching a final estimate, but rather as an illustration of the method and as pointing out the nature of the relations existing. The most important fact that becomes evident is the great difference in the relative catching power for different species.

(a.)—*Comparison between small Steam Trawlers and Lowestoft Smacks.*

The averages for the Lowestoft smacks are drawn from the report on the Lowestoft trawling statistics, and from some unpublished figures for turbot and brill derived from the same records. All these figures, being the average per six-hour haul, are converted in averages per ten hours' fishing.

Area.	Month.	Plaice.			Soles.			Turbot.			Brill.		
		Steam Trawlers.	Sailing Trawlers.	Ratio.	Steam Trawlers.	Sailing Trawlers.	Ratio.	Steam Trawlers.	Sailing Trawlers.	Ratio.	Steam Trawlers.	Sailing Trawlers.	Ratio.
Sa. (B)	May, 1903	4.95	1.63	3.04	14.9	22.8	0.65	7.71	0.73	10.56	2.00	1.48	1.35
Se. ...	Oct., 1903	2.75	0.78	3.53	70.9	34.2	2.07	10.22	1.82	5.62	6.09	0.92	6.62
j. ...	Mar., 1905	6.04	2.23	2.71	21.2	9.5	2.23	0.52	0.00	} 3.32 {	1.74	0.73	2.38
m. ...	Mar., 1905	9.89	2.85	3.47	9.0	9.7	0.93	0.71	0.37		1.06	0.98	1.08
	Average...	5.91	1.87	3.16	29.0	19.1	[1.52]	4.79	0.73	[6.56]	2.72	1.03	2.64

These figures show firstly, what is to be expected, that these steam trawlers catch more fish than the sailing boats in a given unit of time. The factors determined for the comparative powers are about 3.2 for plaice, but for soles it is only 1.5, so that it is seen that the sailing boats are capable of catching more soles in proportion to their power than they do plaice.

(b.)—*Comparison between catches of small Steam Trawlers and Dutch Steam Trawlers.*

Valuable statistics are issued by the Dutch investigations,\* giving the monthly average catch for each species and month for certain grounds. I have chosen those which were available for comparison with the averages here published, and after reduction to cwts. per 10 hours' fishing, have expressed the one as a ratio of the other. The results are given in the following table. The grounds given in the Dutch Statistics have been chosen to coincide as far as possible with the areas here.

Area.	Month.	Plaice (cwts.).			Soles.			Turbot.			Brill.		
		Dutch Steamers.	Small Steamers.	Ratio.	Dutch Steamers.	Small Steamers.	Ratio.	Dutch Steamers.	Small Steamers.	Ratio.	Dutch Steamers.	Small Steamers.	Ratio.
	1903.												
Sc. ...	September	6.98	3.54	1.97	22.0	41.6	0.53						
	October ...	5.50	2.75	2.00	27.0	70.9	0.38						
W. ...	May ...	7.54	3.82	1.97	26.0	35.1	0.74						
Q. ...	May ...	9.90	7.35	1.35	66.0	48.7	1.36						
	June ...	7.60	15.95	0.48	56.0	71.4	0.78						
	August ...	10.90	10.32	1.06	112.0	192.7	0.58						
	September	8.20	4.37	1.88	32.0	332.0	0.10						
	November	4.72	3.85	1.23	51.0	110.2	0.46						
	1905.												
Sc. ...	April ...	10.40	2.73	3.81	26.0	22.7	1.15	3.0	0.9	3.33	4.0	2.7	1.48
W. ...	April ...	9.86	6.90	1.43	50.0	18.0	2.78	4.0	1.3	3.08	1.0	3.0	0.33
	March ...	2.48	5.82	0.43	40.0	17.0	2.35	1.0	0.9	1.11	3.0	1.8	1.67
Q. ...	May ...	10.94	5.22	2.10	140.0	110.7	1.26	6.0	9.3	0.65	7.0	2.9	2.41
	June ...	10.76	12.75	0.84	78.0	29.7	2.63	13.0	8.4	1.55	5.0	0.6	8.33
	August ...	4.00	2.75	1.45	72.0	97.7	0.74	19.0	12.0	1.58	4.0	2.8	1.43
	September	8.20	10.56	0.78	75.0	118.5	0.63	9.0	8.2	1.10	5.0	3.4	1.47
N. ...	September	4.22	2.39	1.77	7.0	36.4	0.19	6.0	16.1	0.37	+	3.5	0.50
	Average ratio ...	—	—	1.53	—	—	1.04	—	—	1.60	—	—	2.14

\* Vangstatistieken van Hollandsche Stoom trawlers. 1903-4, 1904-5.

With regard to the catches of haddock, cod and whiting, it may be remarked that the figures are not here given, although they exist, for the reason that the catches are so small, sometimes almost nil, that they are of no value in a comparison of this sort. It is only where sensible quantities of the species are caught that the approximation to the catching power can be obtained. The figures for turbot and brill are given and illustrate this point, for the numbers caught are so few that the ratios fluctuate enormously.

A fair number of averages are contained in this table and the resulting ratio for the plaice catching power must be somewhere near the actual fact. It shows that the Dutch steamers are about one and a half times as effective in plaice catching as the smaller steamers fishing from Lowestoft, while as regards sole catching power they appear to be, if anything, somewhat less. They also catch slightly more turbot and brill.

(c.)—*Comparison between the catches of small Steam Trawlers and the Grimsby Steamers.*

There are but a few reliable averages common to the Grimsby statistics and those here given, for corresponding areas and months. Those available are used here to determine the ratios of the catch of the larger to the smaller vessels for the four species, plaice, soles, turbot, and brill. They are as follows :—

Area.	Month.	Plaice.			Soles.			Turbot.			Brill.		
		Grimsby Steamers.	Small Steamers.	Ratio.	Grimsby Steamers.	Small Steamers.	Ratio.	Grimsby Steamers.	Small Steamers.	Ratio.	Grimsby Steamers.	Small Steamers.	Ratio.
Q. ...	1905. August ...	5.92	2.75	2.15	133.7	97.7	1.37	5.04	11.98	0.42	5.49	2.75	2.00
N. ...	May ...	1.21	0.54	2.24	8.8	6.1	1.44	24.93	14.29	1.74	2.71	0.82	3.02
	September	11.47	2.39	4.80	28.1	36.4	0.77	14.78	16.07	0.92	1.35	3.49	0.39
	Average ...	6.20	1.89	3.28	56.9	46.7	1.29	14.92	14.11	1.06	3.18	2.35	1.35

The number of averages concerned in these ratios is too scanty to give results of any value, but the figures show at least this, that as in the case of the comparison with the Dutch steamers, these small steamers have a relatively greater capacity for soles than for plaice.

(d.)—*Comparison between the Grimsby Steam Trawlers and the Dutch Steamers.*

TABLE 2 showing the relations between the catching power of Dutch and Grimsby steam trawlers by means of their average catch in various areas.

Area. Kind of Boats.	Turbot	Brill.	Soles.	Plaice.	Haddock.	Cod.	Whiting.
Q. 14 months.				Cwts.	Cwts.	Cwts.	Cwts.
Dutch ...	16.7	4.4	68.0	7.02	0.90	0.40	0.50
G.Y. ...	14.4	3.8	78.1	11.43	0.15	0.18	0.39
Ratio ...	0.86	0.86	1.15	1.63	0.17	0.45	0.78
O. 10 months.							
Dutch ...	3.2	0.20	0.6	0.36	14.16	1.26	1.12
G.Y. ...	3.3	0.32	0.7	0.88	7.18	1.63	0.57
Ratio ...	1.03	1.60	1.17	2.44	0.51	1.29	0.51
I. 12 months.							
Dutch ...	3.3	0.20	4.1	0.84	10.46	1.32	1.02
G.Y. ...	8.9	0.93	15.0	1.73	6.73	1.59	0.62
Ratio ...	2.70	4.65	3.66	2.06	0.64	1.20	0.61
N. 17 months.							
Dutch ...	13.0	2.40	41.2	1.80	4.20	0.61	0.94
G.Y. ...	16.0	2.09	55.7	2.89	2.21	0.74	0.76
Ratio ...	1.23	0.87	1.35	1.61	0.53	1.21	0.81
All combined— 53 months.							
Dutch ...	9.9	2.0	32.2	2.70	6.62	0.89	0.88
G.Y. ...	11.6	1.95	42.0	4.50	3.63	0.95	0.59
Ratio ...	1.17	0.98	1.30	1.67	0.55	1.07	0.67

Lastly we can compare the catching power of the Grimsby steam trawlers, those that fish so ubiquitously over the North Sea and supply such a large proportion of the catches given in the English statistics, with that of the Dutch boats. For the latter there is an admirable series of monthly averages on certain grounds for the very same species as are discussed in the report on the Grimsby Records. A very fair number of comparisons can be made when the figures which coincide in the two sets of statistics for the same grounds and months during the years 1904-6 are extracted. I have taken the mean value of all species for each area, giving the number of months of comparison on which the mean is based. These have been compared by dividing the catch of the Grimsby boats by that of the Dutch boats, the latter having been reduced from kilos per hour to cwts. per 10 hours. Table 2 gives the results. It is interesting to note that where the amount taken is very small, the ratio generally fluctuates irregularly on either side of unity. This is the case with brill and cod.

In comparing the Dutch and Grimsby boats and leaving out brill, whose irregularity has always been noted, one is surprised to find a bias in favour of the Grimsby boats in the catching of flat fish, and in favour of the Dutch boats in the catching of round fish. This is most marked in the case of plaice and haddock: the Grimsby boats take one and two-thirds the amount of plaice taken by the Dutch boats, and just over one-half the amount of haddock. The Dutch boats take 1.82 times the haddock taken by those of Grimsby.