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A REVIEW OF THE IRISH LOBSTER FISHERY

by

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INTRODUCTION: Records of the actual numbers of lobsters caught in Irish waters prior to 1887, are difficult to obtain. However, during the last thirteen years of the 19th century, the fishery had assumed such importance as to be included with the other major ones of the period i.e. salmon, herring, mackerel and cod. In 1891, the Inspector of Irish Fisheries, W.S. Green, commented that "the lobster fishery had reached such proportions as to deserve separate reporting". The help of the Coast Guard officers was sought for the task of compiling catch statistics, with the result that, from 1892 until the outbreak of the 1914-18 war, excellent records of the catch in the fishery are available. Since then the system of statistics collection has changed and now both catch and effort in the lobster fishery are assessed.

This paper deals mainly with the period 1900 to 1967. The catch of lobsters from 1887 to 1899 are however, given below, to illustrate that from the time when catch assessment was first undertaken on a regular basis the yield of lobsters was high.

Table I. Catch of lobsters from 1887 to 1899, for the whole coast of Ireland.

<u>Year</u>	<u>No. of lobsters caught</u>
1887	618,186
1888	304,433
1889	414,880
1890	237,890
1891	211,900
1892	222,000
1893	247,697
1894	231,081
1895	275,759
1896	920,400
1897	1,112,388
1898	1,072,080
1899	1,217,760

THE FISHERY: By the end of the 19th century, the lobster fishery had attained importance and the catch from it had reached the million mark. The fishery was at that time and for the first 30 years of the 20th century essentially a part-time one, pursued by farmer/fishermen using currachs and other small boats. However, these fishermen used lobster traps, designed and fished specifically for the capture of lobsters. The French crawfish trap was not introduced to Ireland until 1927 and had little

or no popularity until 1947, after which it became the commonest type of gear in use and remains so up to the present time.

During the early part of this century the activities of the Congested Districts Board encouraged the trapping of lobsters, particularly in the remoter parts of the coast. Thus it was that for many years the catches of lobsters recorded from "additional places", to quote the official reports of the time, always exceeded by far the catches from regular fishing ports, often by as much as half. The maintenance of the catch level depended, therefore, on a large coastal rural population fishing into small harbours and anchorages with currachs and hookers. However, by the mid-1930's power driven boats were being used and at the present time there is a large number of specially designed lobster boats in use with a consequent reduction in the number of smaller and un-engined boats.

From 1900 to 1947 nearly all the traps used for the capture of lobsters were made by the fishermen themselves from materials produced locally. The French crawfish creel was first used on a large scale in 1947 and thereafter was supplied in ever increasing numbers to Irish fishermen so that by the 1960s only a few areas of the coast still used lobster traps for lobster fishing. The latter areas were mainly located on the east and south east coasts, and in County Donegal where crawfish are scarce or absent. Accounts of the use of different gears have already been published by Gibson and Heffernan (1967) and Gibson (1967).

LIFE HISTORY: The lobster (Homarus gammarus) has a wide distribution particularly near the coasts. It is found from Northern Norway, well inside the Arctic circle, in the Skaggeiak almost to the Baltic Sea, around the coasts of Ireland, Great Britain, Belgium, Holland, France and the Atlantic coastlines of Spain and Portugal, in the Mediterranean Sea particularly around Italy and the Adriatic coast of Yugoslavia as far as Greece and along the North African coast from Morocco to Tunisia. In European and African waters it attains a maximum known length of about 30 inches (9 - 10 lbs, rarely heavier) but averages about 10 inches in length (1.3 lbs). It has been caught in depths ranging from 2 to 40 fathoms (12 to 240 feet).

Lobsters do not thrive in temperatures of less than 5°C and are likely to die when temperatures exceed 22°C. They appear to be most active and therefore most commonly caught at a temperature of about 15°C, which is reached in Irish waters during late July and usually continues to early October. Each mature female lobster carries from 5,000 to 40,000 fertilised eggs depending upon her size and age, the oldest females carrying the most. However, older females are the least numerous, so that the stock probably depends much more on the medium sized female for progeny than on the large ones. The eggs are carried by the female on the under side of the abdomen where they develop over a period varying

from 8 to 10 months before hatching as larvae which bear little resemblance to the adult. These larvae rise to the surface of the sea where they spend the next few weeks being carried about by the wind and currents, feeding, growing and changing until they reach a stage at which they look more like lobsters. They then drop to the sea floor where they remain. The time spent in the "pelagic phase" is thus of vital importance to the stocks. Firstly this is the young lobster's most vulnerable period because it is exposed to predation by many sorts of animal life. Secondly, at the mercy of the currents, larvae are transported great distances from their places of birth and so it is that some of the stocking takes place by larval drift from one area to another. It may be that this is an important means by which areas are stocked naturally. In the pelagic stage the larvae are about $\frac{3}{5}$ th of an inch in length. Gibson (1967) has reported that lobsters develop rapidly and enter the commercial catch after five years but they are not of legal size (83 mm carapace length or about 9.2 inches overall length) until the sixth year of life. It is, therefore, important for the well being of lobster stocks, that fishermen make certain to return to the sea, all undersized lobsters which come into their traps. They grow by means of moulting, a process which is termed ecdysis and involves the complete shedding of the shell and the emergence of a soft shelled but larger lobster. Just before moulting takes place, the old shell softens and the window like membrane between the head and the tail splits open. The soft lobster draws out its head region through this split and the old shell falls away. Next by a series of short struggles the soft tail is hauled out of the old hard casing. Finally and with considerable effort the soft new claws and legs are dragged free. At this stage the soft lobster is shiny, clean and dark blue and also helpless so the process of moulting in nature is carried out in a place of sanctuary. There the unprotected soft lobster stands the best chance of avoiding enemies, the smallest of which can make undefended attacks upon it. The time taken to complete a moult is from 30 to 40 minutes and the newly emerged soft lobster quickly absorbs a considerable amount of water, swelling to its new size in about 6 hours. One of the first undertakings by the soft lobster is the preservation of its old shell. This may be used for protection but it is also eaten by the lobster which may be a way by which the hardening of the new shell is accelerated.

Moulting is very frequent in early life and gradually decreases in frequency with age. Thus in the first year of life moulting occurs on average six times. By the time the lobster is 9 to 10 inches in length it may take place once or twice a year. Thereafter lobsters may only moult every second year or at longer intervals as they grow older. It has been said that female lobsters only moult every second year. Evidence from Irish lobster tagging from 1965 to 1967 suggests that a very considerable proportion of them have similar moulting habits to males, i.e. even when

they are mature they may moult every year or even twice in the one year.

Female lobsters are fertilised in the soft shelled state. At this time the male deposits sperm in the sperm sacs of the female, located between the bases of the last two legs. The sperms remain alive in the sacs until they are required. The females extrude their ripe eggs from openings at the bases of the second pair of walking legs. As the eggs emerge, they pass the sperm sac from which sperms are released and the eggs are thus fertilised. The eggs are passed back down the abdomen where due to their sticky surface they cling to the "hairs" of the swimmerets and to each other in clusters. Eggs are extruded by females at various times of the year but particularly from August to early October. Hatching occurs from April to October with peaks in May and August. The newly hatched surface swimming larvae probably suffer a 99% mortality but it is believed that when the survivors reach the seclusion of the sea-bed that mortality amongst them as they grow to maturity is low. Many attempts by fishing and skin-diving have failed to locate adolescent lobsters (2 - 4 inches long) in Irish waters. This suggests a highly developed ability at concealment.

Lobsters are not gregarious and might be described as being peculiarly anti-social. Normally they live in lairs or crevices in the rocks from which they will only emerge when they are short of food. That they can obtain food in or near their lairs is evidenced by the presence of skeletal remains of various animals nearby, especially at the entrance. Lobsters crave cover, any suitable rock crevice, boulder formation or sheltered ledge is utilised by them. They are not generally active whilst light penetrates the water layers, preferring to feed during the twilight hours before and after dawn or dusk and possibly at night time also. Thus the traditional method for the capture of lobsters was related closely to their habits in that traps were set individually as close to rocks as possible and were only fished in the late evening and very early morning.

The tagging work carried out from 1957 to 1965 (Gibson 1967) showed absolutely no evidence of large scale movements by lobsters. Distances from point of release to point of recapture have rarely exceeded one to two miles. Thus the lobster population is relatively static with no movement of adults from one fishing area to another. It is for this reason that local populations of lobsters are very susceptible to over-fishing. So it can happen that lobster stocks in a particular area may become so depleted as to give the impression of being fished out. However, these areas usually have an adequate stock of young maturing lobsters which will replenish the overfished area given time and thus in the overall sense the stocks can remain strong.

HISTORICAL NOTES: Up to 1913, detailed records of the catch of lobsters and the number of men and boats engaged in their capture, were recorded by the former coast guard service. From 1914 to 1921 these records became

scanty but estimates of the numbers of lobster boats have been made. From 1922 to 1967, each Annual Report of the Sea and Inland Fisheries records abstracts of the number of boats, by length and tonnage and the men engaged in all classes of sea fishing. These data are based on records contained in certain forms, one of which was related to shell fisheries specifically. The latter records the actual number of boats engaged in lobster fishing at each port. Although these are not available for all years, it has been possible to estimate with considerable accuracy the number of lobster fishing boats from 1900 to 1967, with the exception of the periods 1918 to 1921 and 1940 to 1945 when very little information was available about the fishing fleet. These figures have been set out in Table 2 and the striking feature of this is that the number of lobster boats has reduced from a maximum of 1225 in 1912/13 to a minimum of 565 in 1966/67.

Table 2. Numbers of boats fishing for lobsters in 2-year averages from 1900 to 1967.

<u>Period</u>	<u>No. of boats</u>	<u>Period</u>	<u>No. of boats</u>
1900/01	1,100	1934/35	760
02/03	1,050	36/37	740
04/05	950	38/39	750
06/07	1,020	40/41	-
08/09	1,050	42/43	-
10/11	1,175	44/45	-
12/13	1,225	46/47	700
14/15	1,000	48/49	750
16/17	825	50/51	740
18/19	-	52/53	750
20/21	-	54/55	630
22/23	1,075	56/57	580
24/25	1,190	58/59	575
26/27	1,200	60/61	575
28/29	1,040	62/63	575
30/31	920	64/65	560
32/33	825	66/67	565

Figure I shows the catch of Irish lobsters (excluding the catch from Counties Derry, Antrim and Down) from 1900 to 1967, in two year averages and the fishing effort in terms of boat numbers. These data are an interesting reflection of the state of fishing throughout the period.

- (1) The average catch from 1900 to 1919 was 996,000 lobsters per annum.
- (2) From 1920 to 1939, the catch fell to 734,000 per annum on average.
- (3) From 1940 to 1967, the average annual catch has been 365,000 lobsters per annum.

(4) Reductions or increases in the numbers of boats from 1900 to 1937 were reflected by corresponding decreases or increases in the catch of lobsters. However, from 1946 to 1967, while effort in terms of boats continued to decrease, catches increased (though not to their former peaks), especially from 1952 to 1959. From 1947 onwards greater use was made of French crawfish creels and there was a masking effect caused by the catches of crawfish and the development of a mixed lobster/crawfish fishing.

The general picture which emerges is one in which the catch of lobsters in the 1960s has fallen by 40% compared with that in the 1900s, and the number of boats reduced in the same period by approximately 50%. These catch figures pose the problem whether the stocks today are so reduced that if the same effort were exerted as in the 1900s, the catches would still be at the present level or whether they would be as high as in the early part of the century? Fig. 2 shows the catches from 1949 to 1961 when data was available of the time spent fishing for lobsters each year. The catch is plotted against the fishing time (in months) irrespective of the year. It is clear that there is a linear relationship between fishing time and the size of the catch, i.e. the longer the fishing season the greater the catch. Unfortunately these data have not been available since 1961, but it is a characteristic of a strong stock that as effort increases so does catch.

Table 3. Average gross earnings by boat from selected ports on each coast, from 1952 to 1967.

<u>Year</u>	<u>East</u> £	<u>South</u> £	<u>West</u> £	<u>North</u> £
1952	104	177	45	57
1953	117	93	58	74
1954	78	126	58	105
1955	320	634	281	315
1956	116	1,111	161	446
1957	260	475	146	412
1958	250	672	316	931
1959	300	1,187	524	1,120
1960	212	770	243	307
1961	230	825	464	395
1962	264	957	506	330
1963	170	802	512	340
1964	170	1,220	670	543
1965	135	1,225	705	455
1966	316	1,132	840	332
1967	316	1,060	893	733

The average earnings in four ports, each regarded as one of the best for the particular coast, are given in Table 3. The fishermen of the east coast port in question fish only for lobster and use lobster traps in small numbers from outboard powered punts. The fishermen in the south coast port use 80% lobster gear and 20% French crawfish gear, from various sized power

driven boats. The fishermen from the west coast port use French crawfish gear and catch equal numbers of lobsters and crawfish using a variety of boat sizes. The fishermen in the north coast port use mainly lobster gear with a very small amount of crawfish gear, and a considerable variety of boat sizes. The striking feature of this Table is that it reveals that where lobster fishing is pursued with lobster gear the value of the catch per boat is better than in the case where crawfish gear mainly is used for catching both lobsters and crawfish.

DISCUSSION: The most obvious feature of the lobster fishery in the last 67 years has been the decline of the catch. It is the purpose of this paper to explore the possible causes which have led to the catch reducing to about one-third of what it was in the early part of this century.

One possibility which must be examined is that of over fishing. Gibson (1967) calculated that lobsters enter the commercial fishery at the end of their fifth and during their sixth year of life. At this age they are very close to but have not quite reached the size of the present legal size limit, i.e. 83 mm carapace length or about 9.2 inches overall length. This size limit was introduced in 1963. From 1952 to 1962 the size limit had been 9 inches total length and from 1900 to 1951 it had been 8 inches total length. It is well known that the smaller the size limit given to a marine animal the greater the deleterious effect which this will have on stock numbers. A size limit of 8 inches would have been more severe on the stocks than the present size limit. It takes lobsters approximately 6 years for the majority of them to enter the commercial fishery and if, therefore, the heavy fishing recorded in the late 19th and early 20th centuries had had a deleterious effect, this should have been evident within a period of 6 years. From Table I and Fig. I it can be seen that the mean catch for the 20 year period from 1896 to 1915 was approximately 1,000,000. This period of heavy fishing would have adversely affected subsequent generations of lobsters if it constituted one of overfishing and the effects ought to have been clearly seen in any year during the ensuing 20 years up to 1935. Instead we find that the catches again approached the 1,000,000 mark from 1924 to 1929 and only slumped much later, from 1940 onwards, when the European market was closed in the second world war and the British market was reduced.

CONCLUSIONS: There are no adequate grounds upon which overfishing can be proved or refuted in absolute terms. However, the evidence would suggest that the yield of lobster can be increased at least to 600,000 per annum (Fig. 1) at which level, if the size limit is rigidly observed, the stocks could maintain recruitment. Nothing can be done to prevent a reduction in catches if undersized lobsters continue to be landed and sold.

It would appear that in order for the catches to return to these relatively high figures, it will be necessary for Irish lobster fishermen

to do two things. Firstly, they must fish lobsters with specialised lobster gear. The advantages of doing so have been described by Gibson and Heffernan (1967) and Gibson (1967). Secondly they must be prepared to search for other fishing grounds. Perhaps in doing this they will re-discover some of the older grounds which must have been used at the turn and in the early part of this century.

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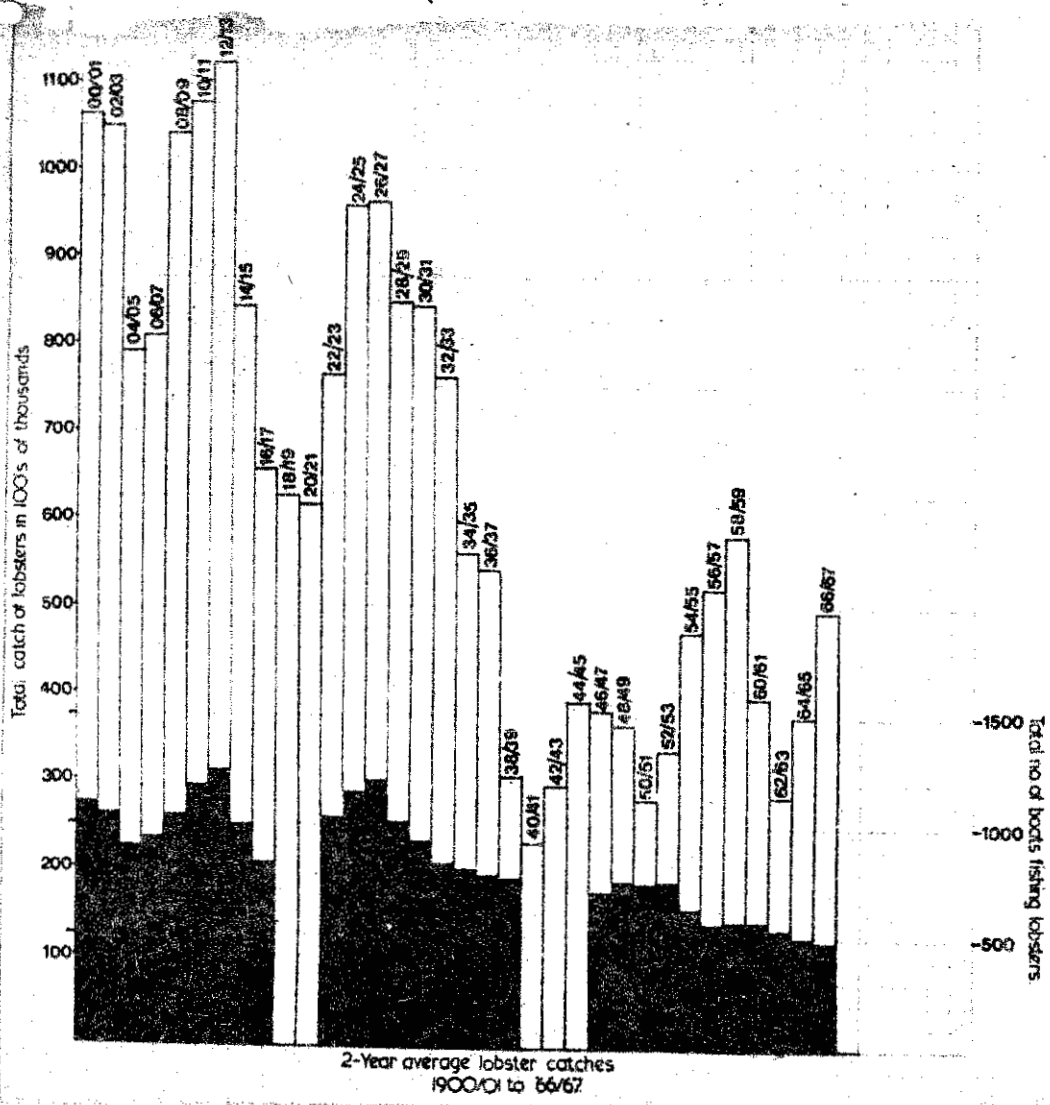


Fig.1. Total catch of lobsters from the Irish coast (excluding Northern Ireland) in two year averages from 1900/01 to 1966/67 and the number of boats engaged in the lobster fishery during the same period.

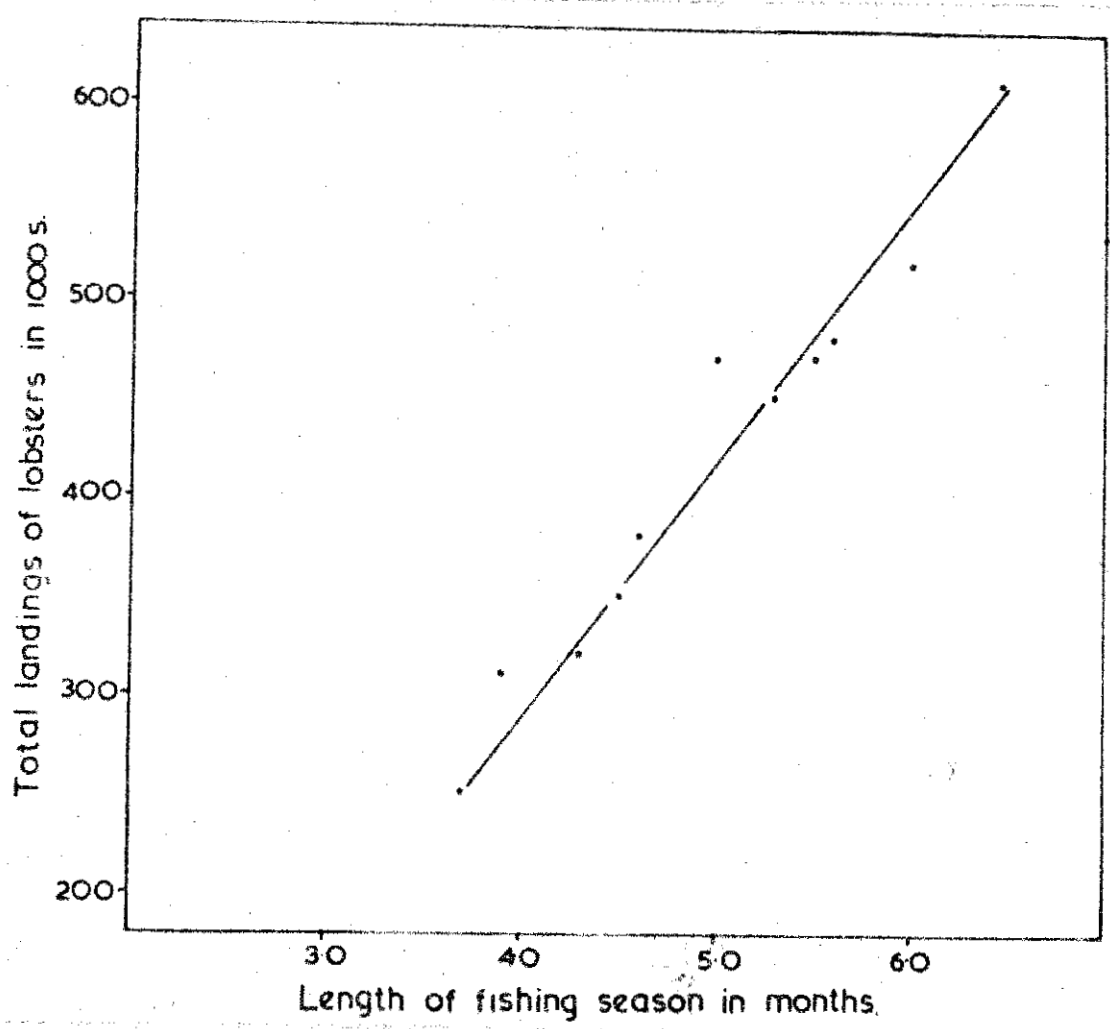


Fig. 2. Length of fishing season in relationship to total catch.