

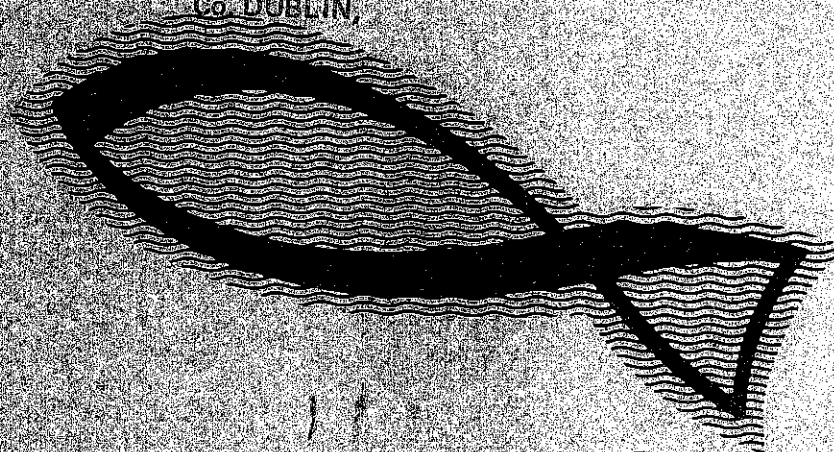


**Fishery Leaflet
Number 15
1970**

**an roinn
talmhaíochta
agus iascaigh**

The edible mussel (MYTILUS EDULIS)

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FISHERIES RESEARCH CENTRE,
ABBOTSTOWN,
CASTLENOCK,
Co. DUBLIN.



by

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1 The mussel is one of the commonest bivalve molluscs around the Irish coast but quantity and quality vary greatly from place to place. Ideal conditions for the natural or farmed production of mussels are as follows:-

- (i) Sheltered bays or inlets;
- (ii) Firm shingly substrata;
- (iii) Good food supplies in the water;
- (iv) Absence of parasites and predators.

Mussels on exposed shores subject to excessive water movement, are usually slow growing and of poor quality. In other areas, although there is shelter from the action of wave and weather, the bottom may consist of soft mud or sand, neither of which is suitable for the settlement, survival and growth of mussels. Similarly areas may have the necessary shelter and firm substrata for the attachment of mussels, but, because the water does not produce an adequate supply of food material, the mussels do not flourish. Even in areas where there is shelter, firm substrata and plenty of feeding there may be many predators (e.g. crabs, starfish etc.) or parasites (e.g. redworm (Mytilicola intestinalis) and pea-crabs) which often render mussels unsuitable for marketing. Because of these limitations, it is not surprising that many areas of our coast produce mussels which are of poor quality.

At present the five centres at which good quality mussels are produced are

- (a) Carlingford Lough
- (b) Dundalk Bay
- (c) River Boyne estuary
- (d) Wexford Harbour
- (e) Castlemaine Harbour (Cromane), Co Kerry.

The locations of the stocks of mussels referred to in this paper are shown in Fig. 1 attached.

2 The quantity and value of mussels landed in Ireland each year since 1959 are as follows:-

<u>Year</u>	<u>Weight</u> cwt	<u>Value</u> £
1959	29,180	7,083
1960	40,050	16,548
1961	14,919	7,187
1962	6,308	3,086
1963	17,655	9,291
1964	17,751	7,913
1965	18,597	7,627
1966	15,134	7,617
1967	23,272	12,571
1968	47,867	25,183

It will be seen that there has been considerable fluctuations in the quantities and values of mussels landed during the ten years in question. The improvement noted in 1967 and 1968 reflects to a large extent the development work carried out in recent years.

3 NATURAL MUSSEL STOCKS AT CASTLEMAINE HARBOUR

During 1967 and 1968 research on mussel stocks and mussel growth at Castlemaine Harbour was intensified and a number of experiments were carried out. In one of these experiments mussels of selected lengths were placed in four wire baskets and anchored from buoy lines in various parts of the harbour. Two of these baskets were placed in existing mussel beds (Banc Fluic and Banc Ban), another was placed in an area which held mussels in the past (Camoig Pt) and the fourth was placed in an area which was never known to held mussels (Near Bed). The mussels were protected by the baskets from predators and mortality

could therefore be expected to be low. Each basket was raised at regular intervals and examined for mortality and growth rate. The mortality rate was low as expected and the growth rate was good. The growth rates were as follows:-

<u>Location of Basket</u>	<u>Actual length of mussels when put out in May 1967</u>	<u>Average length of mussels at end of experimental 9 month period</u>
	mm	mm
Banc Fluic	50	58
Banc Ban	42.5	56
Camoig Point*	40	45.5 after four months
Near Bed	45	57.5

*Basket was lost before end of experiment.

These details are illustrated in Fig 2. It will be noted that by October 1967 the mussels in Banc Ban, Banc Fluic and Near Bed had virtually reached the same size even though when first placed in the baskets they varied in actual length from 42.5mm to 50mm. May to October is the main annual growing period and little growth is made from November to April during which time the mussel is using most of its energies to develop sexually for reproduction in the Spring and Summer. Growth in Banc Fluic has been observed in the past not to be as good as at Banc Ban and these experiments confirm this and also confirm that the latter bed and the experimental area called the Near Bed are suitable for transplantation and intensive mussel farming. Growth at Camoig point did not appear to be as good as in the other areas but the experiment could not be completed as the basket of mussels was lost after four months due to strong tidal action. The area of suitable mussel ground in Castlemaine Harbour is now thought to be in excess of three hundred acres which could be capable of sustaining an annual production of 3,500 tons of good quality mussels. The

source of supply for transplanting in the better growing areas of the harbour.

4 MUSSEL SURVEYS:

In 1967/68 a number of areas were surveyed for mussel abundance. These included Dungarvan Harbour, Waterford Harbour, Bannow Bay, Wexford Harbour, Dundalk Harbour, Cork Harbour, Youghal Harbour and Blacksod Bay, Co Mayo. This work included the use of grabs to estimate the quantity of mussels per unit area and dredging and bottom trawling to estimate the quantities caught on a time basis. The results of the surveys may be summarised as follows:-

- (1) Wexford Harbour: This area has large stocks of fine quality mussels which are being extensively fished for processing in Wexford. The quantity can be improved further by mussel farming.
- (2) Blacksod Bay: No commercial mussels found.
- (3) Bannow Bay: Some good quality mussels were found in this Bay but the stocks were small.
- (4) Youghal Harbour: One mussel bed was located at Monatray which could be exploited commercially.
- (5) Cork Harbour: Certain areas of Cork Harbour were found to be suitable for mussel cultivation but only small commercial stocks of mussels exist there at present.
- (6) Waterford Harbour: No commercial beds of mussels were found.
- (7) Dungarvan Harbour: This estuary has no commercial stocks of mussels.
- (8) Dundalk Harbour: Four mussel beds which had an estimated total stock of 1,000 tons, were exposed at low water. The mussels were of good quality yielding over 18 lbs of mussel meat per cwt. of live mussels but were too dense to permit of a successful spat fall. The transplanting of these mussels would improve the fishery to a considerable degree.

5 RAFT CULTURE:

The principle of raft culture of mussels is to attract mussel spat to settle naturally on ropes hanging from a floating timber frame work which has been anchored in a part of a bay or inlet where food supplies in the water are known to be good. The raft and hanging ropes are moored in position sometime before the mussel spawning season, so that the ropes can become acclimatized to sea-water. The ropes develop a growth of marine organisms which gives them a more natural surface and they later attract the free-swimming larval mussels to settle on them.

A timber raft measuring 21 feet by 15 feet was moored on the east side of Cromane Point, Co. Kerry, in April 1968. The depth there is about 8 feet at low water of ordinary spring tides. There was a dense settlement of young mussels on the ground in this area, which suggested that a raft might be successful in attracting larvae. Three different types of rope were attached to the raft, namely: 2" manila, 2 $\frac{1}{2}$ " esparto grass and 2" nylon. Each piece of rope was about 6 feet long, and there were 192 pieces in all suspended from the raft.

The ropes were first examined in June 1968 and although some organisms had settled on them - particularly on those made of esparto grass - no mussels were observed. By September 1968 there was a very small settlement of mussels. In November 1968 settlement on the esparto grass ropes were observed to be very heavy, the highest density being 300 young mussels per inch of rope. Mussels were less dense on the nylon and manila ropes. The length distribution of the mussels was calculated in December 1968 and is shown in Fig. 3, from which it will be seen that their average size was 20 mm with a variation from under 5 mm to 45 mm (25 mm approximately equal to one inch). This growth rate, if maintained, could produce mussels of commercial size in about 18 months as compared with the normal period of about three years on the ground.

Information supplementary to that gained from the experimental raft at Cromane, came from marker buoys which were set down in November, 1967, to delimit the fishing areas of the Harbour. These buoys were held in position by 2 cwt. cement blocks to which $\frac{3}{8}$ " chains were attached. By November, 1968, the chains had become heavily settled with mussel, 60% of which were just under marketable size of 62 mm ($2\frac{1}{2}$ ") in length and yielding 40 lbs of mussel meat per cwt. of whole mussel after boiling. This is very good quality and a high production rate. These experiments indicate that there are good prospects for successful raft cultivation of mussels at Cromane.

6 YIELD OF MEAT:

The meat yield (as percentages of the whole mussels) was determined for mussels taken from a number of localities and the yield in lb. per cwt. was also calculated. The results were as follows:-

<u>Location</u>	<u>Date</u>	<u>Percentage</u>	<u>Lb. per cwt.</u>
Mornington	24.9.68	25%	28.0
Carlingford Lough	2.10.68	28%	31.5
Cromane	15.10.68	25%	28.0
Mornington	16.10.68	18.7%	21.0
Cromane	18.10.68	24%	27.0
Wexford	31.10.68	28%	31.5
Carlingford Lough	20.11.68	25%	28.0
Mornington	20.11.68	20%	22.5
Wexford	12.12.68	22.7%	25.5
Cromane	13.12.68	19.4%	21.8

7 BIO-CHEMICAL ANALYSIS OF MUSSEL MEAT

A chemical analysis of mussels from Cromane revealed that they contained high concentrations of valuable human food material including protein and many important salts, as illustrated in the following table:-

<u>Material</u>	<u>Percentage</u>
Crude protein	13.6%
Sodium	4.34%
Potassium	0.21%
Phosphorous	0.16%
Sulphur	0.15%
Calcium	0.05%
Magnesium	0.008%
Iron	0.006%

8 MUSSEL PURIFICATION:

It is necessary to ensure the purity of mussels before selling or exporting them for human consumption. There are a number of acres scheduled by law from which mussels may not be marketed fresh without first going through a purification process. These areas are set out in the Food Hygiene Regulations, 1950, (Shellfish Controlled Areas) Order, 1951 and the Food Hygiene Regulations, 1950 (Shellfish Controlled Areas) (Amendment) Order, 1952 which are obtainable from the Government Publications Sale Office, GPO Arcade, Dublin 1. Any person who proposes to sell or export mussels live for human consumption should first consult with the local County Medical Officer of Health as to whether mussels from the area in question require to be purified. Mussels which are marketed in cooked or processed form are normally suitable for human consumption and do not require any other form of purification.

CONCLUSION:

- I Not all areas of the coast are suitable for mussel production.
- II The production of mussels is on the increase.
- III Certain areas not at present productive can be converted into satisfactory mussel producing centres by the use of farming or other specialised techniques.
- IV Raft Culture of mussels was found in 1968 to be experimentally possible and experiments along these lines are being continued.
- V The mussel is a highly nutritious shellfish which commands a good export market either in the shell or in processed form.

**SURVEY OF
IRISH MUSSEL FISHERIES
1967 - 1968**

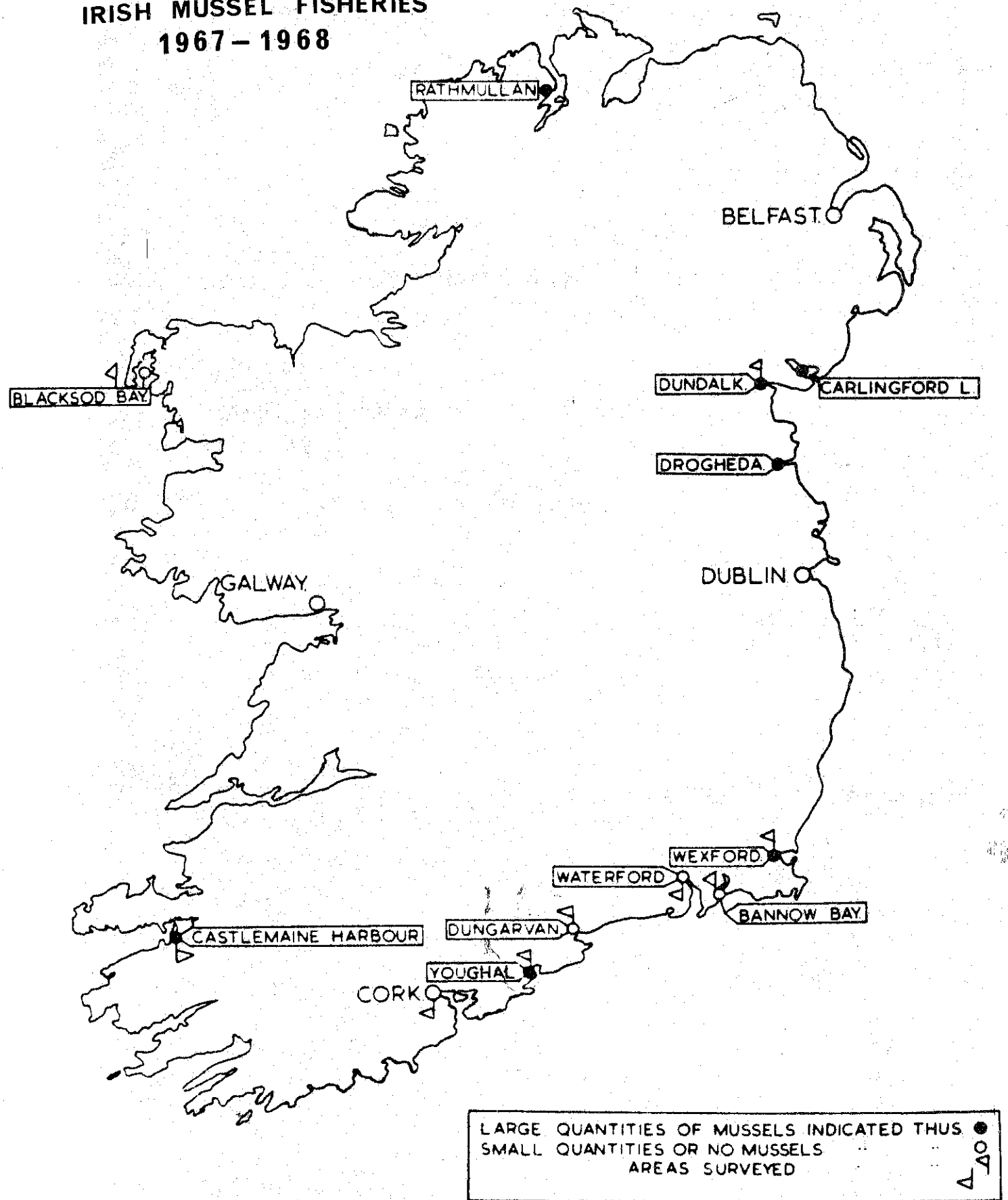
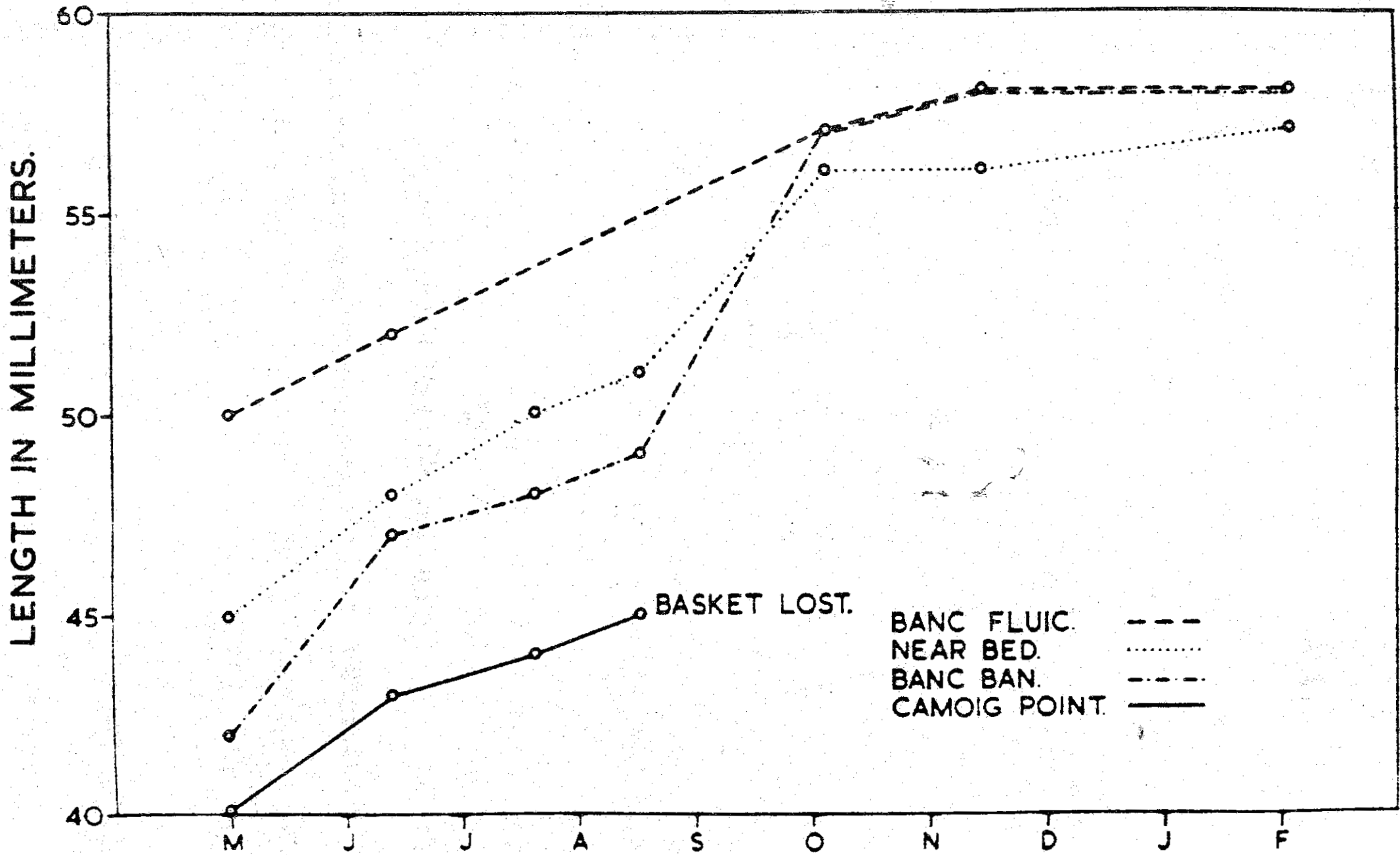


FIG. 1.



MONTHLY GROWTH OF MUSSELS AT CROMANE. CO. KERRY.
 FIG.2.

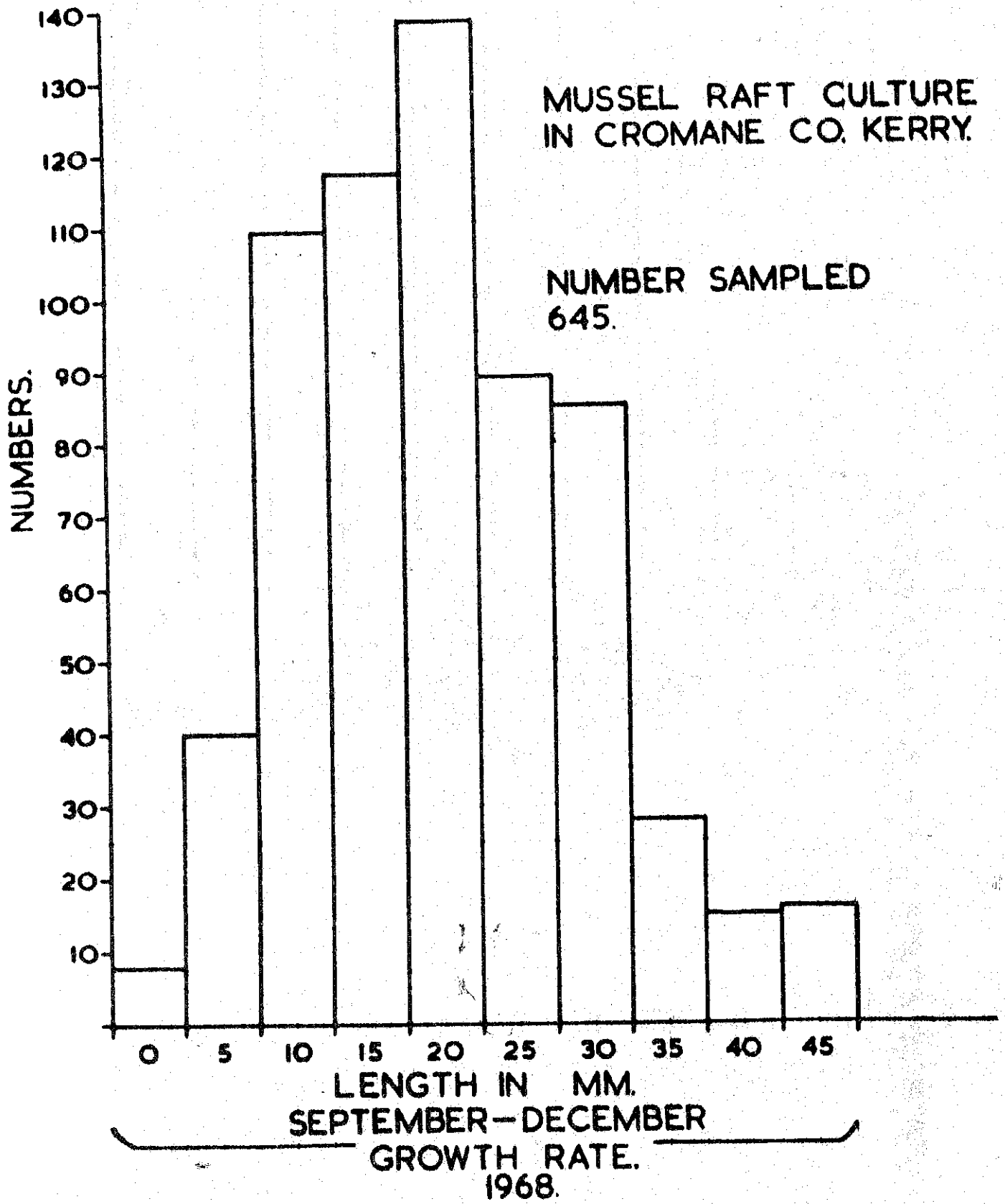


FIG. 3.