

Experiments on the Relative Abundance of Anchovies off the South Coast of England.

By

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By a resolution of the Council of the Association, passed on the 25th March, 1891, it was determined to proceed as speedily as possible with the inquiry into the relative abundance of anchovies on the south coast of England.

Mr. Cunningham* had already drawn attention to the presence of anchovies, had described their specific characters and habits and recorded the various "takes" which had come more especially under his notice. It was shown that at Dover the sprat fishers captured very considerable numbers; that at Torquay, one fifth of the fish, taken in the sprat nets, consisted of anchovies, and that off Plymouth and the fishing ports of Cornwall the fish were already fairly well known.

Men fishing for pilchards, herrings, and mackerel, occasionally found anchovies entangled in their nets, and since no net was used of a mesh small enough to catch them in the proper manner, it was very naturally supposed that, given a net of the correct mesh, anchovies might be taken in such numbers that a regular fishery could be established.

On this account, therefore, the Council determined to make the experiment, and Mr. Cunningham and myself took the work on hand at once.

In order that we might have a thorough knowledge of the various methods employed in the capture of this fish in other countries, I wrote to Prof. Marion, of Marseilles, Señor Vale, of the Spanish Fishery Department, Madrid, and to Dr. Eisig, of Naples.

Mr. Cunningham had previously written to Dr. P. P. C. Hoek, of Helder, Zuyder Zee.

* *Anchovies in the English Channel*, Journal of the Marine Biological Association, vol. i (N.S.), pt. iii, p. 328.

In each case I received a most courteous reply giving all the information desired.

On the south of France the anchovy is fished in the same way as the sardine, by means of the drift-net. Each boat carries 200 fathoms of net made up of four pieces. Each piece or *band* is from 8 to 10 or 12 metres wide. The mesh varies slightly in each band, the largest being sixteen to the *pan* (a pan being equal to 25 metres) the smallest—in which the anchovies are taken—eighteen to the pan. The net is shot at a great distance from the shore and the boat made fast to it as in this country. A net of this description costs 1200 francs (£50).

On the south coast of Spain anchovies are fished for in two ways, one a drift-net method similar to what has already been described, the other by using a seine-net worked in shallow water, the shoals of fish being surrounded and dragged on shore.

Signor Raffaele, writing from Naples, also describes a drift and a seine-net in use round the coasts of Italy and Sicily. The drift-net is 600 metres in length and 20 to 30 metres in height (say 656×26 yards). It is shot in a line parallel to the shore, and can be arranged at different depths, towards the surface at night and in the early morning, but at a greater depth during the heat of the day. It is composed of three pieces, and has a mesh varying from 1 to 2 cm.

The drift-net may therefore be considered the most important system in France, Spain, and Italy, the seine-net being used as a convenient method when a sandy shore exists.

Raffaele adds that pilchards are taken along with anchovies by the shore seine-nets of Italy.

In the Zuyder Zee, where the water is very shallow, three methods are used. A long net only about four feet deep, having the ends kept extended by means of poles, is moored in favourable localities. In order that it may maintain its proper position it is corked and leaded in the ordinary manner. Near Bergen op Zoom immense screens are constructed of willows and poplars. These appear to act similarly to leaders in a salmon bag-net, as openings at certain places allow of the anchovies being netted. Also a curious kind of trawl is used. The net is similar in shape to an otter-trawl or Thames stow-net. It is dragged along by two boats sailing a parallel course before the wind.

Considering the conditions existing in the south-west coast of England we decided upon the drift net as being the most likely to render good results, and, having received estimates for the making of an anchovy net, I ordered from Mr. Matthias Dunn, of Mevagissey, five nets, each to be 120 yards long and 30 score deep

= 60 fathoms \times 5 fathoms, with sixty-four rows to the yard—bringing the mesh a trifle over half an inch.

Our whole net, then, was about 50 yards shorter than that described for the south of France by Prof. Marion, but was 30 feet deep, while the French net is only about 11 feet. When corked and leaded, complete, and ready for use the net cost £62 10s.

The order was given on the 12th May, 1891, and the net received on the 26th of August.

The autumn and summer seasons, as everyone knows, were extremely unsettled, and the long-continued gales often rendered fishing quite impossible for several weeks at a time. We, therefore, had a most unfortunate start in this our attempt to ascertain if it was possible to institute an entirely new fishery for England. For instance, on receiving reports that anchovies were seen off Mevagissey, in Cornwall, I sent a boat at once, but a gale springing up just before the destination was reached, the anchovies disappeared, and a week was spent lying wind-bound in harbour. During very many weeks the boat could not leave Plymouth on account of heavy weather, and often when the attempt was made it was found impossible to shoot the nets.

The first trial was made on the 4th of September, 1891, and the nets were finally taken on shore on 14th January, 1892. During that period the nets were shot twenty-two times. The results yielded considerable numbers of sprats, pilchards both large and small, a few mackerel and herring, but anchovies only in limited numbers.

That several shoals of anchovies were present I feel satisfied, on account of the numerous reports received, accompanied in many cases by specimens.

To aid us in determining the best localities, I put an advertisement up on the fish quay, asking that information might be given to the fishermen of the Association when anchovies had been seen or caught. In my record of the anchovy experiments I come upon many entries relating to reports of this kind, and after deducting a proper percentage for the somewhat large grain of salt with which almost every fisherman deems it necessary to flavour his remarks, I am inclined to come to the conclusion that, although our own fishing proved unsuccessful from a commercial point of view, there were nevertheless large shoals of anchovies off the coast of Devon. To take an extract from my diary :

“ November 9th. Roach reports this morning that a boat fishing mackerel on Saturday night (7th) about twenty miles south of Salcombe, caught 20,000 mackerel, 1000 *Acanthias*, and was amongst anchovies in such numbers that a net to mesh them could not have

been taken on board. The skipper's remark was that 'you could have loaded a ship with them.'

"Received twenty anchovies from another boat, fishing a little further west." And again:

"November 21st. Mayflower out fishing four miles west of Eddystone. Took twenty anchovies large, . . . using our nets. Boats fishing pilchards closer inshore took anchovies in considerable numbers. . . . A boat fishing herring close to where our nets were shot took 100 anchovies."

An interesting point is the enormous size of the anchovies on our coasts. The following figures will suffice to give an idea of the large fish met with. It is the record of the catch in which our largest anchovy was taken, and I am not aware that any anchovy of such a size has ever been previously recorded.

The largest was $8\frac{1}{8}$ inches long and measured $3\frac{1}{4}$ inches in girth, the other measurements are in inches.

$7\frac{1}{8}$	...	$7\frac{1}{2}$	...	$6\frac{3}{8}$	...	$7\frac{1}{4}$
$7\frac{1}{2}$	...	7	...	$7\frac{3}{8}$	...	$7\frac{3}{8}$
$7\frac{1}{2}$	...	7	...	$7\frac{1}{2}$...	
$7\frac{3}{8}$	...	$7\frac{3}{8}$	...	$7\frac{1}{8}$...	
$6\frac{3}{8}$	...	$7\frac{3}{8}$	...	$7\frac{3}{8}$...	

The smallest anchovy captured was about the size of those usually found in bottles and tins of the retail dealer; it measured a trifle over 5 inches ($5\frac{1}{10}$). The average size is $7\frac{1}{4}$, yet in the previous year so many were brought to the Laboratory measuring only 5 or $5\frac{1}{4}$ inches, that the average then must have been considerably less.

An interesting feature in the use of the small meshed nets was the capture of small pilchards or sardines. Mr. Cunningham has prepared a statement upon them which will be found in his paper in this number, under the title *Rate of Growth of some Sea Fishes* (Section *The Pilchard*, p. 244).

In reading this account of our endeavours it must be borne in mind that in a expanse of open sea like the English Channel, one boat with one net runs a comparatively poor chance of meeting with great success. Men fishing for herring or mackerel have the assistance, it may be, of three or four hundred crews in enabling them to find out where the fish are, and where they are not. We, on the other hand, were looking for fish which no one else was looking for, and had to grope in the dark. It appears, however, that November is the month during which most anchovies will be found off the coast of Devon and Cornwall, and as the autumn season arrives we shall hope to try again with greater success.