

International Fisheries Exhibition

LONDON, 1883

MACKEREL AND PILCHARD
FISHERIES

BY

THOMAS CORNISH

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CONFERENCE ON 13TH JULY, 1883.

Sir JOHN ST. AUBYN, Bart., M.P., in the Chair.

THE CHAIRMAN, in introducing Mr. Cornish, said he had come at the request of the Executive Committee to tell them something about a subject on which most people knew comparatively little. Whilst almost everybody in the room was more or less intimately acquainted with the mackerel, there were very few, except those who lived in Cornwall, on the west coast of Ireland, and on the coast of Brittany, who knew anything about the pilchard; but they might take it on his authority that the pilchard was a most excellent fish when eaten fresh, and when preserved, either after the manner of sardines in oil, or salted for exportation, it formed a most nutritious and excellent article of diet. The Cornish fishermen were employed to a very large extent both in the mackerel and pilchard fisheries, and went out a considerable distance from the shore in quest of these fish. They met with the mackerel at spring-time at a distance varying from close in-shore, to sixty, seventy, or one hundred miles out, and twenty-four hours after they were caught, people in London were in a position to judge of the result by seeing the mackerel on the slabs of fishmongers. A pilchard was a different sort

of fish altogether. It did not readily bear carriage, but had to be eaten as soon as possible after it was out of the water, and consequently the great trade in pilchards was when they were salted or preserved in oil. He could not give the statistics of the men, boats, and capital employed, but, to give some idea of the magnitude of the fisheries, he might mention that, in his own immediate neighbourhood, the water on which he could look down from his own windows contained within two and a half miles a fleet of something like four hundred boats, with all kinds of nets and gear and other appliances, representing a capital of something like £140,000. If a proportional amount of capital and men were employed in other parts of the country, it could readily be seen how important those fisheries were. They were not only important as a means of providing food, but formed an excellent nursery and school for a race of seamen than whom there were none, either in this kingdom or anywhere else in Europe, more industrious, steady, independent or courageous.

MACKEREL AND PILCHARD FISHERIES.

LADIES AND GENTLEMEN,—The honour has been done me of requesting me to read a Paper before you on the “Mackerel and the Pilchard,” and I presume that this has been done, because I come from West Cornwall, the principal English home of the fisheries for these two fish, and am well acquainted with them; but my ignorance makes it advisable that I should confine my remarks to the familiar facts which I know of these fish in my own county, rather than attempt to deal with the subject scientifically.

The mackerel is the head, or typical fish, but one of the smallest in size, of a large family, which has representatives in every sea in the world, except in the regions of extreme cold, and every member of which is excellent as food.

The first distinguishing mark of the family to an outside observer is a tail having a peculiar fork. You can see it in a moment in the fish market here. The next is the cleanness of the lines on which the fish is built. The long conical forepart of the body and snout, the smooth round body, and the clean run of the afterpart, all fit the fish for rapid propulsion through the water, whilst the powerful forked tail, working with much less opposition to the water than would a rounded tail, and precisely with the action with which the sailor sculls his boat by one oar over the stern, enables the fish to make the greatest possible use of the advantages of its shape. The last distinguishing exterior feature which I shall notice is the existence between the base of the tail fin, and the hindmost upper and under fins, and both above and below the body, of a series of little soft rudimentary fins, called finlets, and the use of which is obscure. This family includes the bonitos, the tunnies, the albacores, and other Mediterranean fish, all occasional visitants of our Western seas, and just excludes (if, indeed, it does exclude, for I, who have seen the fish, am not clear about it,) the Northern "opah," a noble great fellow, some four to five feet long, which would more than cover an ordinary card-table, and is a very Assyrian for "gleaming in purple and gold," being in fact almost the only northern fish which excels in splendour of colour the fish of the seas of the temperate zones and the tropics. I do not at this moment recollect whether there is a specimen of this fish in the building. If there is, you will find it in the court of Norway or possibly of Denmark.

But, of all the family, the mackerel is the most fitted for rapid propulsion and has the most powerful tail ; and this, you know, means the greatest power of propulsion, for the sole natural propulsive power of every fish lies in its tail. I once proved this beyond question, thus :—We stay in summer in a house so close to the sea that we are in our boat within a minute of our leaving our front door, and we have there a pill, or salt water pool, in the rocks, about thirty feet long by ten wide by three deep, which is left by the tide for about six hours in every tide, and into this pool we put the fish which we bring in alive from our trammels every morning, and watch them until we want them.

I have watched an octopus in that pool many times. But once I cut off the tail of a fish, a pollock I think, and I put it in this pool. At first the fish did not realise its loss, and we saw the stump of its tail working, but the other fins were, as usual, only balancing the fish. There was no progression. After a while the fish stopped working the stump of the tail, and lay simply balanced. About an hour afterwards I came back to it, and it was slowly progressing by using its pectoral fins (those next behind the gills) as oars. I had seen all I wanted to know, and had ascertained that the tail fin was the fin of propulsion, that the fish had sense enough to find out when it had lost it, and reason enough to adapt its pectoral fins to a use for which they were never intended. I then killed the fish, but my conscience did not, nor does it, accuse me of any cruelty towards it. It showed no symptoms of pain. Indeed, of all the very many thousands of fish that I have seen die, I never saw one show symptoms of pain. The nearest approach to it has occurred in the crimping of skate immediately on its being taken out of the water. The crimping is done by drawing a sharp knife in three cuts to the bone, on each side of and parallel

to the back-bone. The fish writhes under the knife, but from muscular action, I think, more than from pain, and before the last cut is given it is dead. And this, in my opinion, is a much more merciful way of dealing with the skate, than allowing it to lie suffocating in the bottom of your boat for the hour which it occupies in dying that way. I know many good people say that we should kill our fish as we catch them. If we could, we would, for they would be so much the better for the table, but in most kinds of sea fishing this is utterly impossible. Take a mackerel seine for instance. A tolerably successful haul ought to produce at least 2,000 fish. After the haul commences, everything depends on the speed with which it is completed. Every hand on board the boat is at it, and in a few minutes the 2,000 fish are spluttering about in the bottom of the boat. I once took upwards of 6 cwt. of fish, principally skate, on a long line of 500 hooks (i.e. 500 fathoms) stretched along the bottom of the sea in shallow water, in one haul. The whole hauling had to be done with the least possible stoppage, and at times the fish came so fast, that the boatmen attending on me had not time to unhook them, and had to cut away the snoodings. The fish had to lie in the bottom of the boat and die, we could not stop to kill them. And in the end I found that the line had cut my two forefingers almost to the bone. The fish were crueller to me that day than I was to the fish.

Whether viewed for its colour or its form, the mackerel is one of the most beautiful of English fish. I need not describe it to you. Doubtless its form is familiar to you all. And if it is not you have only to go into the fish-market here and see it in as much perfection as it can retain after a long journey. Beautiful as the mackerel on a London fishmonger's stall is, much more beautiful is it as it

comes out of the water alive. There is, in the best mackerel, an iridescent, rosy tint under the gills and forepart of the body, which I have seen in fish here, but which is much more conspicuous when they are taken. And it is this colour by which our fishermen judge their fish. They say, "*Red* mackerel is *good* mackerel ; *white* mackerel is mackerel ; *green* mackerel is poison."

And in this last remark they are quite correct. Whenever a green hue supersedes the rosy, the flesh of the fish when eaten will, with very many people, produce most unpleasant symptoms of blood poisoning ; and as these green mackerel are taken amongst the others at all times of the year, they give the fish a bad name, and cause people to abuse the whole family, when the truth is that they ought to have made a better selection.

An average mackerel weighs $1\frac{1}{2}$ lbs., which gives about 1,500 fish to the ton. Large fish go to 2 lbs. or even $2\frac{1}{2}$ lbs. but they are rare, and as they do not sell for more than the others, are reserved by the fishermen for presents to their friends, which starts another of our West Cornwall notions that "you should never eat a mackerel unless it is given to you." This saying is quite understood in West Cornwall now, but in process of time it will very probably get to be understood there, as meaning that it is unlucky to *buy* mackerel, and if that belief once gets about, well, we are a superstitious people, and you ladies and gentlemen in London will have a large addition to your supply of that fish from Cornwall.

These large mackerel are usually females, with roes ready to be shed, and are known as *Queen* mackerel and *King* mackerel, but I do not recollect ever seeing a large male mackerel of this sort.

Sometimes one is startled by an announcement in the

papers that a mackerel of six or even eight pounds weight has been caught, but in every instance in which I have been able to make inquiries the fish has turned out to belong to an allied species—the short finned tunny—which sometimes herds with the mackerel.

There is one fact about the personal history of this fish, which I will mention although I know I do it at the risk of having my veracity suspected ; but I narrate only what I have seen over and over again, have repeatedly shown to my friends, and am prepared to show in the cases of two fish out of three, to any one of you who will call on me at Penzance and go out and catch mackerel with me. The mackerel, like the turbot, requires, and has, enormous muscular power at the tail to give the tail-fin its full advantages. In the turbot the fishermen recognise this fact and say that the turbot has a “second heart,” and, as soon as they can, after they have caught one, they, at least in our parts, “bleed it,” that is, make an incision on the line of the lateral line on the white near the tail, which cuts into this “second heart,” and from which the fish bleeds freely. They have an impression that it whitens the white. Now, for my mackerel. The strongest and most muscular fish are those which wander about by themselves, and take surface bait, and it is on these only that my experiment has been tried. Take one of these immediately it comes into your boat, and, at once, without injuring it more than is necessary, prepare it for the gridiron just as your cook would, and lay it on the deck of the boat. In a short time a muscular action will develop itself in the tail, and the disembowelled fish will turn a clear summersault, sometimes two, and occasionally three, and will then become quiet after a convulsion in which every fin vibrates. Like many other discoveries this one was made by accident ; but I

call your attention to the fact that very much the same sort of thing happens in the case of a common snake killed, and dead beyond all question, but in which a muscular action goes on for hours, and gives rise to the common idea that a snake never dies until sunset. And I think our medical men can tell us that a very strong muscular action occasionally takes place in the human body after death from some particular convulsive diseases.

Taking the season through, a mackerel is worth two pence at the boat's side, and, with that fact before you, I leave you to judge how much the railway carrier and the fish-monger between them get out of the consumer.

Of course the price varies from day to day. Within the last month I have known mackerel selling at the boat's side for two and six pence per one hundred and twenty, or just one farthing per fish; and a boat with a catch of eight hundred threw them all overboard rather than come into harbour and pay her quay dues. On the other hand I have seen them selling at the boat's side at one shilling per fish.

The mackerel fishery of Cornwall is a very old one. The fish itself was known in our seas very long ago, for it has a name in the old Cornish language ("brithel"), but it was but a small affair until railways opened up our markets in 1859. I find that in 1808 we were sending mackerel from Penzance to Portsmouth in sailing cutters, but the record does not say in what condition they arrived there. It was probably fortunate for their owners that there were no Sanitary Inspectors about the markets in those days.

At this time, the fleet employed on the fishery in Cornwall consists of about 400 sails of luggers of about 15 to 18 tons burden, excellent sea-boats (of which many models are to be seen on the Cornwall stall in the British Fisheries Gallery), costing, when the nets are on board, six hundred pounds

each. They are capable of going closer to the wind than any ordinary yacht. The spread of canvas they make is, as you can see for yourselves, enormous, and they will live in exceedingly heavy weather ; but they give in sometimes. Three years ago the boat *Jane* succumbed to a fearful cross sea, and sank within two hundred yards (one hundred fathoms) of Penzance pierhead, and drowned her crew of six men and a boy, not only within sight of their own homes, but within sight of their wives and children, who knew what boat she was. But even in that case, the men who knew said she was lost because she had not sufficient canvas on her to force her through the sea.

If one of these boats is overpowered by the sea, she takes down her spars and makes them and her nets and such of her sails as she can afford to risk into a kind of raft, under the slight shelter of which she rides out the gale ; but you will find on the "Cornwall Stall" a suggestion for a very great improvement in this method. The exhibitor is a Cornishman, and he calls it a "floating anchor." It consists of a beam of timber to which is attached a large square piece of canvas, to which is attached another beam of timber from which there trails away a perforated zinc can which finds its place, when at work, in the cavity of a cone made of canvas, fastened to a wooden hoop. When the boat is storm-pressed she lowers her masts, heads up to wind, and hoists the whole machine out ahead of her and makes fast to the first beam ; and then, being deeper in the water than the machine, she drifts astern and down the wind towing the anchor, the outer beam of the anchor stretches the canvas sheet, and is assisted in doing this by the cone which it is dragging mouth foremost. The cone meanwhile is receiving from the zinc can, oil which exudes from it, and which the cone itself sends

out in a fan shape. Thus, an advancing wave first meets the oil, of the effect of which we have heard so much lately. It then meets, and perhaps breaks against the forward beam, and then has to pass under or fall on the sheet and in any case will reach the boat in a very enfeebled condition. I find practical men are speaking very well of this invention.

Each of our boats carries a crew of seven men and a boy (the latter usually a relative of one of the crew), and is owned by a practical fisherman—very frequently by the master or his father—and is worked on the share system, under which each man brings a certain number of nets on board, and the proceeds of each season are shared in a peculiar and complicated way between the boats, the crew, and the nets. We have no large boat-owners and no boat-owning companies. This state of affairs produces results which, like many other things in Cornwall, are peculiar to the county. When the Commissioners came down last year on the inquiry as to—

Cruelty to fisherboys.

The prevention of desertion, and

The method of paying wages.

we satisfied them that under our system there was, in our fisheries :—

No cruelty to fisherboys.

No desertion—self-interest preventing it.

No disputes as to wages.

This last thing puzzled the Commissioners most of all. After the meeting two fishermen and myself were standing in the lobby when the Chairman came to us and said :—

“I am satisfied you have no disputes about wages, but I cannot make out how it is done.” And I turned to one of

the fishermen and said, "Tell the gentleman how it is done," and he said, "We leave all that to the women."

It will be seen from the numbers which I have given, that our mackerel fishery gives employment to about 3,000 men and boys, who, between the month of February when the season begins and June when it ends, usually catch about 4,000 tons of fish, which will give six millions of individuals. As soon as our mackerel season is over the pilchard season begins, and when it ends, our fleet sails for the Irish fishery, the Plymouth fishery, or the East coast of England fisheries; for they can go anywhere. One once reached Australia safely, but now, in these days when 14 foot punts cross the Atlantic, that is no great feat.

Still, in 1854, when the *Mystery*, of 36 foot keel and about 15 tons burden made her voyage, no boat of her size had ever attempted to deal with the Atlantic Ocean since the Caravel, which was the smallest of the little fleet of Columbus, had done so 350 years before, and she was in company with large vessels, and therefore the voyage of the *Mystery* remains noteworthy. This solitary boat sailed from Mount's Bay on the 18th November, 1854, and reached Melbourne on the 14th March, 1855, after a voyage of 117 days. She had a crew of seven men and carried her nets. I have recovered the log which was kept on board of her,* and, judging from it, a more dreary voyage than hers was never made. Beyond sighting a few ships and a few albatrosses, and being fêted at Table Bay, nothing seems to have occurred of more importance than "the broaching of the second barrel of pork," until they were nearing Australia, and then, for a short time, things got exciting, and they met with weather which made them ride

* Kindly lent to me by Mrs. Boase, the widow of the seaman who kept it.

to a raft in the way which I have described, and which they describe.

Thus, on 18th February, 1855, the Log says :—

Sunday, February 18th, 1855.

Lat. by acct. $40^{\circ} 5' S.$; Long. $81^{\circ} 25' E.$

A.M. Strong gales with heavy sea running.

4 A.M. Gale still increasing, handed the foresail and set a reef second mizzen forward.

6 „ Terrific gale with a tremendous heavy sea running, and carried away the second mizzen yard. Brought the ship head to wind and hove a raft out.

6.30 A.M. Split the third mizzen, unbent it, and bent the new one.

8 „ Gale still increasing, with more sea and heavy rain.

NOON. Ditto, weather.

3 P.M. Less wind and sea, made sail, set reef second mizzen forward.

MIDNIGHT. Strong squally weather.

Friday, February 23rd, 1855.

2 P.M. Gale fast increasing.

4 „ A complete hurricane, with mountains of sea and very heavy rain. Brought the ship head to wind. Ship riding very easy to a raft prepared for the purpose.

7 „ Rather less wind. Veering to the westward, hauled the raft on board, made sail, set reef second mizzen forward.

Saturday, February 24th, 1855.

A.M. Strong winds with a heavy sea on.

4 „ Moderating, set storm foresail and jib; squared.

8 P.M. Light airs and cloudy, all possible sail set.

10 „ Heavy rain. Wind inclined northerly.

NOON. Jibed ship. Lat. by acct. 40° S.; Long. by acct. 101° E.

P.M. Wind veering all round the compass, with heavy showers of snow and sleet.

3 P.M. Set the jib.

4 „ More wind, took in the large sails and set storm foresail and third mizzen.

5 „ Heavy gusts of wind and rain, ship running under bare poles.

6 „ Set reef second mizzen forward.

7 „ Very heavy squalls. Hauled down second mizzen.

8 „ Set second mizzen.

10 „ Down sail.

11 „ Set it again.

MIDNIGHT. Very strong squally weather.

Monday, March 5th, 1855.

AM. Strong gale, with mountains of sea. Ship running under reef second mizzen forward. Shipping a great quantity of water on deck.

4 P.M. Gale increasing with a great deal more sea.

6 P.M. Complete hurricane. Brought the ship head to wind, riding very easy, raft prepared for the purpose.

MIDNIGHT. Very heavy weather, with a high sea running.

Tuesday, 6th March, 1855.

A.M. A terrific gale of wind, it being the heaviest that we have experienced since leaving England. Our gallant little boat rides the mountains of sea remarkably well, not shipping any water whatever, having dry decks fore and aft. I am confident that she is

making better weather at present than a great many ships would if here.

4 A.M. Heavy gust of wind.

8 „ More moderate.

9 „ Hauled the raft on board, made sail, set reef second mizzen forward.

NOON. Very strong weather. Lat. by observation, 40° S.
Long. by chronometer, 131° E.

Saturday, 10th March, 1855.

A.M. Very heavy gale with a high sea running, ship riding very easy to a raft.

8 A.M. Ditto Weather ; repairing the second mizzen.

NOON. Rather less wind and sea. Lat. by observation, $38^{\circ} 39'$ S. ; Long. by chronometer, $140^{\circ} 45'$ E.

6 P.M. Hauled the raft on board ; made sail, set storm sails.

10 „ Moderating fast.

11 „ Made the Australian land between Cape Northumberland and Cape Bridgwater. Tacked ship. Wind off the shore.

MIDNIGHT. Very fine weather.

The log does not state her rate of sailing, but I learn from Mr. J. C. James, who is related to one of the crew, that during one period of twenty-four consecutive hours she made eight knots, which is the equivalent of something like nine and a half miles per hour.

Our men, when on the home mackerel fishery, sell their fish to buyers—who are sent down by the large London and other houses for the purpose—in a very primitive but very effective fashion. The auctioneer takes his station on the beach in the early morning with the buyers around him.

A boat appears in the offing, and signals her number and the number of fish she has. The auctioneer announces both, and, if the bidding is slack, chucks a stone into the air. The buyers have to bid before that stone falls. If a bid comes, another stone is chucked up, and so on. And as the boats do not all arrive at the same time, this method conduces to much speculation.

Sometimes the fleet puts into Scilly, and sends the catch to the mainland by steamer. Then the market is steadier, because the total of the catch is known by telegraph; but scenes of wild excitement take place. The early boats unload and pack their fish and stow the baskets on board the steamer, but the late boats crowd round the steamer, which is a mail boat and bound to time, and simply unload their fish on to her decks. These fish are packed on the way over by men working against time. I came over in the steamer once when she had more than 60,000 fish on board, and I watched the packing of more than 15,000 of them, which had been thrown loose upon her deck, after which I considered I could say that I knew mackerel when I saw it. It was on a hot summer's day, and as the steamer rolled to the Land's End seas, the packers were constantly ankle-deep in blood and slush.

One result of this investigation was the certain conclusion that the "scribbled mackerel" and "dotted mackerel" of Couch (British Fishes) were only accidental varieties of the common mackerel.

Strictly speaking the mackerel is not a migratory fish. It is in our seas all the year round, but in the season which I have mentioned—February to June—it, for some unknown purpose, crowds from the deep sea inshore. By day, during this season, it swims in schools or shoals, and by night it makes a formation in loose order, probably for the purpose

of feeding ; but it never pursues, as true migrants do, any settled route. The fishermen have to search for their fish day by day. In the day-time the fish are taken by the scool or shoal in shallow water by the seine net, a net shot ahead of and around them. In the night-time they are taken by the drift-net, a net shot over the boat's side, and fastened at one end to the drifting boat, which goes with the wind or tide or both as may happen. The fleet represents a capital of about £240,000, the property of *bonâ fide* fishermen, and certainly deserves the protection which it requires. The drifters are much put upon by trawlers. These latter drive in hours which belong to the former. Trawling is a day fishery ; driving is a night fishery, and every now and then the slow moving, helpless, illegally fishing trawler comes across the nets of the equally helpless but legally fishing driver and carries them away. This happens in the night time ; the driver never has a punt with her and cannot ascertain the trawler's number. In fact she does not know that the mischief is done until she hauls her nets, and she has no remedy. I have known £400 of damage done to the drivers in this way in a single week. The thing could be easily prevented ; a gunboat or even a Government cutter cruising on the fishing-ground during the two months in Spring in which the mischief happens, would stop the whole thing. Some years since we had reasons for expecting to see that gunboat come round the Lizard every day for three seasons in succession, but she never came, and we gave up expecting her.

There is another matter in connection with our Mount's Bay fleet, and I believe it affects also some of the other fleets, which I think may interest you. Just before the *Jane*, of which I spoke just now, was lost, a Mutual Fishing Boat Insurance Club was started for the Mount's

Bay fleet. But we had then lost no boats lately, and our men were indifferent about it, and the thing fell flat. Only seven boats were entered in it. It happened that the *Fane*, and two other boats, partially wrecked in the same storm, were in it, and the club was ruined. The public generously gave us over £2,000 to provide for the widows and orphans of the crew of the *Fane*, and to repair damages generally. Out of this fund we provided liberally for the widows and orphans, and we then paid to the club enough to enable it to meet the demands on it, and we then distributed the remainder of the fund amongst the other owners whose boats had sustained damage, with the distinct assurance that if they did not put their boats in the club no one would ever again stir a finger to help them in case of accident. The Cornish fisherman is not behindhand in taking a hint, and I believe every boat in the bay is now in the club, even before she is launched. I certainly do not wish to see any club make its prosperity by such a fearful experience as that which set up ours, but I shall be most happy to send the rules of the club to any one interested in the matter. The general outline is just this : nets are not insurable (for want of that gunboat.) The surveyor of the club examines each boat entered and reports on her value, and she is then insured in two-thirds of her survey value. Losses are made good by the levy of a rate on all owners of boats in the club at the time of the loss, and no loss is made good which is occasioned by any neglect to observe the Board of Trade Rules.

I wish to call your attention to a great advantage which this Exhibition will certainly confer on Cornwall. Mackerel shoal in deep water as well as in shallow. Our desideratum for a long time past has been a seine which can capture the deep water shoals. A gentleman named Cox, a Cornishman,

has invented a seine of which a model is in the middle of our Cornwall stall (it is the one which has the weight attached to it), which he says can be worked at deep sea shoals of fish ; and curiously enough, a model of a second seine on the same principle, but differing a little in detail, is exhibited on the same stall by Mr. Moses Dunn, of Fowey, and a third by Mr. Barron of Mevagissey. Practical men saw these models, both before they came here and since, and pronounced them very pretty little toys, which might succeed in a fish pond, but utterly unfit for use at sea. Now a full seine costs a large sum of money, and no hard-headed capitalist is likely to lay it out on a speculation which the practical men tell him must fail. Well, the nets come here, and to them came an American gentleman and he said, "You have the precise principle on which we are working deep-sea seines in America, and they succeed admirably."

There is another point which I must not overlook. There is an idea of great antiquity, and very generally entertained, that mackerel must always be fresh to be good. It is perfectly true that mackerel is in its perfection when cooked as soon as captured, but if that cannot be done it is like most other fish, none the worse for a little keeping. And it is for this reason, and because ice takes the flavour out of the fish, that I consider dry packing (ie., packing fish-upon-fish without ice) preferable to packing in ice; it injures the flavour less. But there is another view to be taken. This fish is eminently amenable to the action of antiseptics. The smallness and fineness of its scale causes an antiseptic bath to act upon its skin and gilled surfaces with marked effect. I once received two of the large mackerel of which I have spoken, which had been caught off the Scilly Isles on a Monday night in the month of June (I believe, at all

events in the height of summer); I received them in their natural state on Tuesday evening, and put them into a bath formed by the solution of some antiseptic in powder, which the late Mr. Frank Buckland had procured for me. The bath totally destroyed the beauty of colours of the fish, and turned them into a dirty brown, but I ate one of those fish on the Saturday after in perfectly good condition and flavour, and I could have eaten the other in the same state, so far as the flesh went, on the Saturday after that again, but the flies had got at the gills, and the idea was distasteful. I wrote for some more of the disinfectant, and the reply that I got was that the company was in liquidation, and that I could have the patent for £1,000; so I thought no more of the matter and have forgotten the name of the disinfectant. I only mention the matter to show of what service antiseptics may be.

The drift fishery of which I have been speaking is the principal mackerel fishery now, and supplies us with practically the whole of this fish. The few thousand mackerel taken at present each year in seines are wholly absorbed in strictly local markets. The mackerel takes bait, but, generally speaking, shyly. Every five or six years they turn up in large shoals, which are intensely localised, in the autumn and for about two hours a day, in the evening, for a week or ten days, take surface bait greedily. I, myself, once cruising backwards and forwards over a little patch of ground (where a shoal of this sort had located itself), for about two hours between five and eight on each evening, for four days in August month, took, on a whiffing or light hand-line and on a hook baited with a strip cut from an old white kid glove, over three hundred fish. I have known the mackerel to be in shoals in December, but this is rare. When they do occur in

that month they are small but in excellent condition as food.

Before I pass away from the mackerel, on which I have detained you a great deal too long, I wish to tell you of another discovery of mine, which no doubt equally affects all fish ; but as my observation of it was made on mackerel, I confine my narrative to that fish. Its habit of shoaling in the daytime taught me the curious fact that the shoal leaves behind it a distinct scent in the water, and that there are other inhabitants of the sea who quite understand what that scent means, and utilize it.

A shoal of fish in the water looks, at a distance, like the shadow of a cloud moving steadily on. As the shade nears you, you can see the fish "playing," jumping out of the water just as small trout do, only in a large shoal you will see thousands of fish out of the water at the same time. Each sort of fish gives a colour to the water which is peculiar to it, so that an experienced fisherman knows at sight whether the shadow of the cloud, which he knows to be a shoal of fish, covers mackerel, or pilchard, or herring, or sprat. I was once standing on the beach with an old fisherman when we saw a straggling shoal of fish about half-a-mile long, swimming very slowly, which we could not make out. Their colour was new to him. So we took a boat and went out to them, and found they were a shoal of huge jelly fish, great transparent things shaped like an open umbrella and about its size, having around the edge of the umbrella a beautiful purple fringe which causes you to recollect it if you incautiously touch it. On the occasion to which I refer I was standing on a headland in a place called Prussia Cove, in Mount's Bay, when I saw a shoal, which I knew at once to be of mackerel, come out of a sandy bay there and go due west.

Shortly after I saw a shoal of porpoises (a cetacean which loves the mackerel in an epicurean sense) come lumbering up from the south into the sand. When they came across the trail of the mackerel these latter were a good mile off on their way. The porpoises had no sooner got into their back water than they wheeled into their course and set off in full chase. In about three minutes they were in the midst of the mackerel, playing havoc, whilst the unfortunate mackerel were driving forward in one solid line of terror, making the water foam before them as they fled.

Of the Pilchard I have a different tale to tell. It is a little fish of the "herring" family, generally about ten inches long, and rarely so much as half a pound in weight. It is very local in its habits, rarely occurring in numbers of any importance east of the Start Point, in Devonshire, on the South coast, and Trevoze Head, in Cornwall, on the north. It is taken yearly as far east as the estuary of the Exe, and has been taken, and occasionally in large numbers, off Seaton, in Devonshire, at the mouth of the river Axe. Some years since a small shoal was taken off Folkestone.*

It occurs in very large numbers off the south-west coast of Ireland, but there is no native fishery for it there, and as its season on that coast coincides with its season on ours, our people are too busy at home to look after it. It occurs, of course, off the French coasts as the sardine. And the Spaniards have a mode of curing it which altogether beats our English method, as may be seen by a comparison of our

* There is also some record of the capture of a shoal at Harwich, and a fish supposed to be the pilchard occurs in Scotland under the name of the garvie herring, but practically its home in England is in Cornwall and mainly in West Cornwall.

cured pilchards in this exhibition with those in the Spanish division.*

Unlike the mackerel, the pilchard is not sought for in its fresh state out of Cornwall and West Devon. Our fishermen have tried many markets with it, but without success. And this is the more remarkable seeing that the fish is cheap, nutritious, and of exceedingly good flavour. When tourists first found out West Cornwall, they very soon found out pilchards, and more, they turned a little bit of "chaff" against us west countrymen into a reality, at their own expense. It used to be said of us that we ate "cream with our pilchards," which of course we never did. But when the tourist came down, he took it for granted that he could eat clotted cream with everything, and he insisted on having "cream with his pilchard," and he is said to have got it, and to have found it so good a mixture that now no large hotel gives broiled pilchard for breakfast without it.†

But we have other ways of cooking them besides broiling. We fry them and eat them with a sauce made of finely chopped onions, salt, cold water, and nothing else; it is a very nasty sauce. And we eat them without any knives or forks, with our fingers. I do not say that *all* of us do this, but I have seen it done, and less than one hundred years ago the practice was universal amongst the bulk of our people.

I hope to cure this want of a fresh pilchard market soon

* There are two open barrels of the fish exhibited one at each end of the westernmost case in the Spanish Court. One is labelled "pressed sardines," and the other "salted sardines," but they are both of them pilchards, more cleanly cured than is our wont.

† I can speak to the excellency of clotted cream as a sauce with broiled pilchard from personal experience.

in this building. I hope to induce some of our fisher people to send a supply to the fish-market here so soon as the season opens, which it will in a few weeks, and I think that with the great advantages offered here, we may succeed where others, under less favourable circumstances, have failed. Spain is running us so close in the business of supplying salted pilchards for the markets of the Roman Catholic countries, that we could easily find thirty to forty millions of fish for the supply of a fresh fish market without feeling the loss of them. This apparently enormous number would be a mere flea-bite out of our catch for a season. It would be a day's, or at most two day's successful fishing for the seines of St. Ives alone. And this brings me to the support of Professor Huxley in his remark, that in the waters frequented by the pilchard the sea, taken acre for acre, is of greater pecuniary value than the land. A seine when "shot" around a shoal of pilchards may enclose an acre of superficial water, certainly not more than two. It is on record that the seines in St. Ives Bay did on one occasion, in one day, capture 10,000 hogsheads, or over 30 millions of pilchards, worth, over the boat's side, £2 per hogshead. I do not know the number of seines employed, but they could not possibly have exceeded 20; but, supposing they were 20, then 20 acres, or at the highest figure 40 acres of sea yielded £20,000 as its produce for one day, and each season consists of many days, and the fisherman pays no rent.*

* The greatest recorded catch by one seine at one shot was made at St. Ives in 1868. There 5,600 hogsheads, or over 16 millions of pilchards, were saved out of one seine. This catch was worth between £11,000 and £12,000. Remarks of precisely the same character, but differing in detail, apply to our trawling grounds, but as pilchards are never taken by the trawler, I only allude to this fact.

Since I wrote the above about opening up a cheap market for small dainty fish like the pilchard, the question, as one intended to benefit the poorer classes, has been placed before me in what is to me an entirely new light. And it is this: Supposing you can supply pilchards in the height of their season at one penny each over the fish-stall (and the remark applies to all other fish which could be sold cheap), what is the poor man to do with it? In summer he must go to the expense of a fire to cook it. At any time he must provide fat in which to fry it, most of which will be wasted, and after all, the chances are that his wife does not know how to cook it, and will spoil the dish in the doing of it. And for this, my practical informant says, there is but one remedy. If you want to introduce cheap fish for the use of the artisan you must in some way or other start shops or whatever places you like where he can get it cooked. Most of these difficulties apply also to the dressing of fish by boiling, but my informant adds to these another, that the prejudice against boiled fish is at present so deep-seated as to be practically ineradicable.

You will find in this building, pilchards cured by all the methods in use, salted in barrels for the foreign market, dressed in oil, as sardines, or in salt sauce, as anchovies, or marinated, which is, I believe, an invention of our own; and in every form you will find them good.

The method in which the pilchards are cured for the Italian market expresses from them when "in bulk" (i.e., under the pressure in large masses necessary for salting them) large quantities of blood, which run from the curing-house down the streets in gutters to the sea. We are a toast-drinking people, and this peculiarity in the curing process gave rise to a toast which used to be given as equivalent to prosperity to the pilchard fishery. It was:—

"Long life to the Pope, and may our streets run with blood."

The fish itself resembles a small silvery herring having large scales. The people who catch it are much the same as those who fish for mackerel, but the fishery has a separate capital invested in it, the boats and nets used being peculiar to it.

It is captured in much the same way as the mackerel is. In the night in drift nets; in the day time in seines. Originally pilchard seining and mackerel seining were conducted in much the same way, but the decline of mackerel seining has now-a-days caused them to differ.

The lookout of a mackerel seine is mostly kept on board the boat itself, and the seine net is hauled bodily on board with the fish in it, but in pilchard seining the lookout is kept from some hill where the huer—or man stationed to watch for the shoals of fish—can be seen from the boat, standing clear out against the sky. He thus gets a much wider outlook than can be had from the boat. He holds in each hand a bush, and when he sights a shoal of fish he informs the boat of its whereabouts by preconcerted signals made with these bushes. The seine boat moves in the direction indicated, and if it reaches the shoal in time it shoots its net. You must consider of this net when shot, as a round room in the water without a floor or ceiling, and if the shot is successful it contains the pilchards. At the next low water time a net, called a tuck net, and which I will liken to a perforated pocket handkerchief, is let down from large boats stationed at one side of the room of water, the tuck-net being inside the seine, and it is drawn up by means of ropes hauled in on board large boats stationed for the purpose at the other side so as to scoop up the fish in the seine. As the ropes come home the boats close in

upon the net, and then a very exciting, and on moonlight nights a very beautiful scene sets in. Millions of silvery little fish are sputtering and clattering on the surface of the water in the tuck-net. Half a dozen men are in the midst of them up to their knees in fish, handing them into the boats in baskets, and working for dear life. Everybody is giving orders at the top of his voice about everything, and nobody is obeying anybody, and so the work goes on until the coming tide stops them, and causes them to run the risk of the escape of the fish before the next low water. Most of the fish thus caught are salted for export, but many find their way through the locality of their capture in the cowels or baskets exhibited on our Cornwall stall, and which are worn in the picturesque way shown in the lithograph also exhibited there. A strong woman can carry 1 cwt. of fish in the way shown, and for miles.

But the waving of a huer's bushes has a very curious effect on any fishing village which happens to get sight, or news of it. To the stranger it would appear that the whole population of the place had suddenly gone lunatic. Every available man, woman and child turns out and rushes violently down the steep cliff to the sea shouting "heva! heva!" Whence the word is derived, we do not know; but it is the signal that shoaling fish are in sight, and that the population must turn out to be ready to receive them, for all this fish-work requires to be done with the utmost dispatch.

A very curious thing, and entirely inexplicable, about these shoaling pilchards, is that at uncertain periods they shift their course for years together. For instance, fifty years ago, St. Ives on our North coast had almost a monopoly of the shoaling pilchard; now she divides with

Newquay. Thirty-five years ago the principal South coast seining fishery was in Mount's Bay, now it is at Mevagissey, and it is no question of new seine fisheries having been established. It is due solely and entirely to a change of habitat on the part of the fish. We have many things yet to learn about the pilchard.

One thing I have learned since I began to write this paper, is that during the mackerel season (February to June) and before our pilchard season commences, numerous shoals of very large pilchards are met with by our mackerel drivers in the deep sea, eight leagues and over, south and west of the Scilly Islands. These large pilchards are mostly females full of roe, ready to be shed, and unlike most fish in that condition are so dry and tasteless as to be utterly useless as food. A test of their size is that they are taken in the meshes of the mackerel nets.

Like the mackerel the pilchard is not a true migrant, but comes in from the deep sea, shoaling by day and scattering by night, and remains on for its season. Unlike the mackerel it never takes a bait,* and is but very rarely seen in our seas except in its season ; but again, like the mackerel, it is too thorough a nomad to stand the confinement of an aquarium. And those of you who wish to see either of them alive must seek for them in their native haunts.

* Whilst this paper was in the press information reached me that a pilchard had been captured, hooked in the mouth, on a white-feather whiffing-fly ; but as two other pilchards were at the same time captured, hooked in the side, it is probable that they were all accidentally hooked out of a shoal through which the whiffing-line was passing. The fish may have been playing with the fly rather than attempting to feed on it.

DISCUSSION.

Professor BROWN GOODE said he had heard some complaint that there were too many scientific men on the platform in these conferences, and too few practical men, but every one would agree that Mr. Cornish had shown that he had a thorough practical acquaintance with the subject, whilst he had used a thoroughly scientific method in his deductions. He had listened with great pleasure to the Paper, having been for some years paying special attention to the mackerel fishery in the United States. That fishery was one of the most important in the American waters. The produce in the year 1880 was about 132,000,000 pounds. It employed about 470 of their finest sea-going schooners, of from 60 to 100 tons burden each, and with an aggregate capacity of about 23,000 tons, with crews of 14 to 20 men, and nets worth 450,000 dollars or more. Within the last few years, since the introduction of the purse net to which Mr. Cornish had referred, it was not uncommon for one of those vessels to catch fish to the value of £5000 or even £7500 a year. The history of the mackerel fishery was very interesting. As long ago as the year 1600, within forty years of the settlement in New England, there were records of the colonists seining the mackerel off Cape Cod by moonlight ; and it was somewhat remarkable, that on this fishery was founded the system of public schools in the United States, for within ten or twenty years of that time the first public school was founded on a tax upon the fishery. At that time, when perhaps not one hundred barrels a year were taken, they found the inhabitants petitioning to prevent the destruction

of the mackerel by this method of fishing, and that appeal had been repeated at various times in the history of the fisheries, even down to the present time. In the American Court of the Exhibition could be seen a diagram showing the progress of the mackerel fishery, and the very great fluctuations which took place not only with reference to the quantity of fish caught, but the number of vessels employed. It would be noticed that in 1882 the catch was very much greater than in any previous year, so that the fears as to the destruction of the fish did not seem to be well founded. Two methods of fishing were afterwards introduced ; first, the gill net or drag net, like that used in Cornwall, and which is still used to a limited extent at the present time. Another method introduced about the same time, and kept up for a considerable period, was what they called trailing, or dragging a bait after a vessel under sail. That was carried on until the beginning of this century, and it was not uncommon to see a vessel with four or five poles sticking out from it, to which the bait was attached. That was given up, however, fifty years ago. At the beginning of this century another form of apparatus came into use, which was exceedingly effective for a time, and it was during the prevalence of this method that the great fisheries in the United States and the Canadian waters sprung up which had led to so many treaties from 1865 to 1870. There were from 500 to 700, or even in some years 1000 American vessels in the Gulf of St. Lawrence fishing for mackerel, and this was called the mackerel hook fishery. It was conducted in this way : the fishermen took on board a hundred or more barrels of a very oily, fat fish called the menhaden, something like the pilchard. They ground it up fine and threw it out

in great quantities. The mackerel would follow this for a long distance, and come up round the vessel like a flock of chickens coming to be fed. Then the fishermen had short lines with hooks on the ends, with which they caught the mackerel and threw them over on to the deck, and with a crew of 10 to 14 men the catch would sometimes amount to 20,000 in a day. That mode of fishing was carried on for a long time, but the purse seine gradually came into use and displaced it. It was first used in 1814, but did not come into general use until 1860, and there were now probably 500 of them at work. The mackerel fishery had now been transferred from the Gulf of St. Lawrence to off the shore waters along the coast, and at the present time they followed them down to Cape Hatteras. The mackerel on the other side of the Atlantic had definite migrations, coming north in the spring of the year, when the fishermen followed them until August, when they were in the Gulf of Maine, then they followed them back in the fall. The mackerel increased in size as they got on better feeding-ground. They disappeared for a month or so in June, when they went to the bottom and spawned. He could assure Mr. Cornish that there was not the slightest practical difficulty in working the purse seine. They were from 70 to 150 feet in depth, and 1,000 to 1,300 in length, and were worked by a special boat something like a whale boat, and it was quite easy for a vessel to catch as many fish as could be cured in three or four days. At first they used to give the surplus away or let them go, but now they had invented a kind of storage net, which they hung out over the side of the vessel, and kept the fish alive in it, taking out at intervals as many as they could cure before they spoiled.

Mr. KENNETH CORNISH asked if Mr. Cornish was in favour of legislation for the preservation of mackerel? Referring to what had been said in regard to the pursuit of herrings and mackerel by porpoises, he might say that he witnessed a very remarkable sight at Teignmouth in the year 1860. In walking along the sea wall they saw a great commotion in the sea, a mile out, and watching it, they soon found a shoal of salmon running in, pursued by a shoal of large grampuses, who drove the unfortunate salmon right against the wall. They seized the salmon in their jaws, threw them up, and caught them like a terrier would a rat, and when the salmon turned and went out to sea again, they pursued them. He should like to know if Mr. Cornish thought it possible to catch these cetacea, seals and other animals that preyed on salmon, herrings, and mackerel, by the use of spinning bait on a large scale? It seemed to him we were thinning down the fish, but not thinning down their natural enemies. It would not be at all difficult to make baits which would exactly represent a salmon, mackerel, or herring, with hooks concealed internally; and they might even be impregnated with the natural flavour of the fish.

Mr. CORNISH, in reply, said, as far as his experience went, he did not think legislation was required with respect to a close time for mackerel or pilchards; they took a close time for themselves and got away where they could not be caught. Further legislation was very desirable for the purpose of regulating the fishing of our own boats in British waters; and even if what legislation there was were better enforced, it would be of great importance. With regard to catching porpoises, he should not like to tackle one weighing more than 2 cwt. in a small boat.

Mr. SHAW, M.P., in moving a vote of thanks to Mr.

Cornish, said he was much interested in the mackerel fishing of the south coast of Ireland ; but he had learnt a great deal he did not know before. Up to the present he always thought that if a mackerel could speak it would talk Irish, but he was now pretty well convinced that it would also speak in Cornish ; and perhaps if it could speak in either language it could give a different account of its sufferings to that which had been given in the Paper. One thing, however, might mitigate one's sympathies in this respect, for mackerel had not the slightest regard for other fish which suited its taste. In the neighbourhood of Cork there was a fleet of five hundred boats engaged in the mackerel fishery. He was sorry to say there were not as many native Irish engaged in it as he could desire, because round that part of the coast the inhabitants were a poor class of men, with very little enterprise, and very few of them were men of business or capital. In another district, too, mackerel fishing had been established, and seemed likely to succeed ; and he should be very much wanting in his duty if he did not refer to the great help given there by Lady Burdett Coutts, but for whose assistance the thing could not have existed. It was very satisfactory to know that the people of the coast—a simple primitive people—had availed themselves of the assistance offered them, and there were some of the best boats engaged in the fishery now going from the Harbour of Baltimore on the south coast of Ireland. The great object of catching fish was to bring it as quickly and cheaply as possible to the table, and he did not think there was a better fishing ground in the world than that round the south coast of Cork ; but hitherto facilities of transport had been rather deficient. Now, however, they were in a much better position in this respect, as there were rails now touching the

fishing grounds at Kinsale, Skibbereen, Baltimore, and Bantry, and in the Bay of Bantry a steamer had been put on, so that every evening the fish caught in any of those places could be shipped, and next day it would be delivered in the cities and towns of England. The great thing to be desired was to have as few people as possible between the consumer and the fishermen, otherwise the profit was scattered about by the number of hands through which the fish passed. If there were any gentlemen present engaged in the fish business, he would recommend them to send their agents over there, who would day by day collect the fish and send it forward. He knew, from practical experience, that fishermen got very little as the result of their industry; this did not apply so much to the mackerel fishery, because it was mostly conducted by men of skill and experience who could take care of themselves.

Mr. C. E. FRYER had great pleasure in seconding the vote of thanks. The Chairman had referred to the beautiful scene presented at night when the boats were leaving the harbour, but it appeared to him the enjoyment was much enhanced when you happened to be on board one of the vessels going to the fishing grounds. Having had the pleasure himself, he could recommend any one who visited Cornwall to endeavour to get a night's fishing on board one of those boats; for no more beautiful scene could be imagined than was presented on a fine evening on board a boat off the Land's End. The energy of the Cornish fishermen had been referred to, but, like many others engaged in the same vocation, they were remarkably conservative in their habits, and it was very difficult to induce them to adopt improved methods of fishing. He had had the great satisfaction of introducing into this country the system of preserving pilchards in oil, in the manner in which sardines

were preserved in France. There could be no question that the sardine was exactly the same fish as the pilchard, and those who had not tasted them he would recommend to buy in future not the French sardines but the Cornish. He had no interest personally in giving this advice, beyond the desire of seeing an industry which he had established prospering to the extent which it deserved. As an instance of the difficulty of inducing the fishermen to take a "new departure" in fishery matters, he related that on one occasion, when off Penzance, he endeavoured to get the fishermen to put aside the smaller fish, for the purpose of preserving them as sardines, as it was found that the smaller ones were preferred for the purpose, but he had the greatest difficulty in the world to induce the fishermen to adopt that simple precaution. Every fish had to be taken out of the net, and it would have been perfectly easy for the men to put the small ones on one side and the large ones on the other, but their conservative tendencies prevailed, and they would not take the trouble to do so. There was a saying that the Cornish people could make anything into a pie ; and it was said that if a certain gentleman, who should be nameless, were to go there, he would be put into a pie ; and just as they were determined to put everything into a pie, so were they loth to adopt new methods of preserving fish for the market. If proper means were adopted there was no reason why enormous quantities of pilchards, preserved in salt as well as in tins, should not be sent to London and other English markets, though of course there were difficulties of transport to be overcome. Mr. Cornish had referred to the remarkable occasional disappearance of the pilchard from the coast of Cornwall, and it occurred to him that possibly the china clay works in Cornwall might have some influence on the movements of those fish. Enormous quantities of milk-

white water were poured into the sea down many small streams in the county, and that might have some effect, though he did not suppose it was the chief cause of the disappearance, because the same sudden disappearance had been noticed in France. He recently came across a letter received in 1879 from a friend in France, who spoke of the sudden appearance there of the sardines in great abundance, though for more than twenty years there had been a great scarcity. The abundance which had generally prevailed since had shown large occasional fluctuations. He trusted that many other gentlemen in Cornwall would follow Mr. Cornish's example, and make a study of the movements of this and other fish with a view to the practical encouragement of those very important industries.

The resolution having been carried unanimously

Mr. CORNISH said he did not think the china clay had much to do with the disappearance of fish, because it had been noticed that they still remained in localities where that water and also mineral water ran into the sea. They would require to watch them still more closely for some time to find out the reason for those movements.

The MARQUIS OF EXETER then proposed a vote of thanks to the Chairman for presiding. Mr. Cornish had alluded to three kinds of mackerel, one of which, the green, was unwholesome; and he was glad to hear the explanation, because not long ago his crew, who were Irish, came one morning and said they were all very bad from eating mackerel that had been in the moonlight. He concluded that it was this green mackerel. He had oftentimes enjoyed the pleasure of fishing off the Cornish coast, and had always met with the greatest kindness from fishermen and others; and he could recommend any one who wanted a good fishing ground where they could catch all manner of

fish, to go, when the wind was not to the south or west, and lie off Penzance. They might catch there every kind of fish, from the mackerel down to the beautiful jelly-fish which Mr. Cornish had alluded to, which he had often watched on a calm day struggling to make head against the tide, but eventually drifting with it ; and perhaps the Chairman would recollect that they had it on the authority of a noble duke, that certain friends of his, who were as brilliant in talents as these jelly-fish were in colour, were also in the habit of drifting with the tide.

Mr. HORNBLOWER seconded the motion, which was carried unanimously.

The CHAIRMAN, in response, said it had given him much pleasure to be present at a discussion of so practical a character. There were many points on which he should have liked to touch had the time not been so far advanced, but he would only say, in correction of what Mr. Fryer had said, that the Cornish proverb was that the devil would not come into Cornwall because he was afraid of being put into a pie.