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THE

HERRING FISHERIES.

BY

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[*PRIZE ESSAY.*]

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CONTENTS.

THE HERRING FISHERIES.

PART I.

THE herring fisheries form one of the greatest commercial sea enterprises at home or abroad as a ready source of wealth. Royalty has aided its development, for it is branded from olden time by the legislative care of kings and governments. In England this fishery was pursued at a very early period. Yarmouth was taxed to the amount of ten thousand herrings for his Majesty King Henry I. Edward III. encouraged and fostered this industry with money and wise legislation. In Scotland, also, it has had the patronage of royalty, especially from their Majesties James V. and VI. And to this present time Parliament has passed many Acts and inquiries affecting our herring fisheries.

The British herring fishery is inaugurated at the Hebrides in the month of May, and closes with the autumn and winter fishery at Yarmouth (with some exceptions in Scotland). Owing to this, we have a spring, summer, autumn, and winter fishery, and it is also between the winter and spring seasons that a close time for herring should exist.

Yarmouth is the central fishing station for this great industry on the east coast of England. Wick, Peterhead, and Fraserburgh, are the great fishing stations for the east coast of Scotland, but the best fishing grounds are found on the west coast.

Immature herring, which is really summer fry seeking the ocean waters, are found in the Atlantic in vast shoals, and many fishermen traffic with these comparatively worthless fish as early as the month of April. In the interests of the Lewis fishermen alone a close time is needed, and this is asked to be from the 15th of March to the 15th of May.

From Lewis in the Hebrides, Skye, Fort William, and other adjacent districts, the boats put out for the herring fishery. Sometimes after toiling all night the boats will come home clean, but more generally the season is favourable and propitious; for instance, the records for last year (1882) "Stornoway Herring Fishing" show great success attending the fishermen's efforts. In the beginning of May for that year "shots" of from thirty to forty "crans" were very common, while several were as high as fifty and sixty-three crans. Whereas at Barra, in the Hebrides, very poor "catches" were got, at least for the opening season of that year. Again, as we shall have occasion to notice, a bad opening may end in the same place with a perfect harvest of fish, and *vice versâ*, or the season may prove a very fluctuating one at almost any station or district. Sometimes a "total failure," and often a "good season," all through the different months.

The Orkney and Shetland Isles districts follow suit, passing round the north-east coast until it (the season) reaches the central and main fishing stations for Scotland, which is early in July.

"The Herring Fishery" now takes the precedence over the "White Fish Fishery," although both are well represented from the east coast fishing stations, and it ought to be noticed that the best bait for catching our white fish is the herring itself.

Many stations on the east coast are now actively engaged from July to September, and in the latter month the northern districts are practically closed for the season, and the engagements for the east coast fishermen also end in September. For all that, the fishery is still pursued from the various stations south-east of the Firth of Forth, known as the Berwickshire Coast Fishing Stations, and large additions of mixed quality are added to the season's catch.

About this time the herrings come inshore to spawn along the coasts of Northumberland, and of course the fishermen of this part have their rightful share in the fishery, and inaugurate the autumn and winter east coast of England herring fishery.

The Tyne trawlers of Newcastle and Hull boats follow out the fishery; and with reference to the last-named town or fishing district, it may be suitable to mention at this stage a novel invention of "curing herrings by machinery," introduced by Mr. George Leach of Hull, by which he estimates a barrel of herrings can be bloated at a cost of 6*d.*, as against 1*s.* 9*d.* the present cost. The plan may be described as a successive process of drying, smoking, and cooling, by carriage from the cleaning room to the grills or wire-work trays. By passing up through a series of chambers, and down again in a zig-zag direction, they are operated upon by the agency of heat, smoke, and cold, and on their coming down to the reception table at the end of the first journey, they are ready for packing.

The "Newcastle kipper" also deserves notice, as it is competing favourably against the celebrated "Yarmouth bloater" in the Metropolis, and was introduced at first by the late Mr. John Woodger, of Newcastle and Great Yarmouth.

Filey, off Flamborough Head, is the next and most important station, and exclusive of Great Yarmouth there are very large captures taken by the fishermen of Lowestoft, Folkestone, and Hastings, and boats come from the north of Scotland to share in the English fishery, although there is a winter fishery pursued in Scotland besides that of Yarmouth.

While in this vicinity we may notice the abundance of "whitebait" found during summer in the Thames, Humber, and other brackish waters near the sea coast, and that it really is the young of the herring or herring fry.

It ought also to be noticed that the smallest herrings are caught off this coast, known as "longshorers," and are really the finest caught on the east coast of England. The takes of herring by the Tyne and North Shields fishing boats for August, 1882, were so large that the "railway company had to put on extra special trains" for their transit to the Metropolis.

Coming round to the west coast, *viâ* Solway Firth and Ayrshire districts, we enter a "New Year," and they are still fishing for the best herrings that are found on any part of the British coasts. Loch Broom, Loch Horn, Loch Fyne, and many other places, have only to be mentioned, as the celebrated resorts for the best quality of herring. Indeed, during the month of October for last year (1882), extraordinary takes of herring, and such as have not been for many years, were found at Astle Bay, near the head of Ardlamont, Rothsay; from six hundred to seven hundred crans landed, and for the most part sent to England.

At Girvan, during January and February, the fishery is still pursued, and from many parts of the opposite coast, including Newhaven, fishermen come and share in the closing hauls for the season, and neither for quality or

quantity can any fishing grounds equal those in the west of Scotland; but practically there is no close of the British herring fishery, although the great season is from July to September.

Yarmouth, the headquarters for the English fishery, usually commences operations at the close of the east coast fishery for Scotland. In the beginning of October, a fleet of, or more than, five hundred vessels set out to the fishing grounds. A Yarmouth lugger is better adapted for the business, and less dangerous, than the open boats of Scotland, except where the "hauling in" of the nets are concerned. This is obviated in the case of Yarmouth boats by using smaller nets, as when searching for fish the men may shoot and re-shoot them quite easily. Nets range from one hundred to one hundred and forty for each boat, and the nets are forty-eight feet long, and thirty feet deep. A Yarmouth lugger may cost from £700 to £1000, and is equipped for cargo and partial curage, carrying barrels, salt, and other essentials. The boats average fifty feet long, and the crew about fifteen men. Both the fishery and the curing processes connected with it are very carefully conducted. Buoys, in the shape of small barrels, show the position of the nets, and these buoys are painted according to the ship's name and port to which they belong, and at night lights are used to prevent collisions with the boats.

Although there is a great and increasing demand for fresh herring, especially in the earlier part of the season, the greater portion of the season's catches is cured. The broken fish is sold in hundreds of tons for manure, and sometimes at as low a figure as 20*s.* a ton. The curing-houses usually consist of two interior divisions, one for receiving and cleaning the fish, and the other to smoke

them. The smoke-house, from bottom to top, has a series of woodwork called "tiers," on which the loaded spits hang, and the women are very dexterous in their manipulation, spitting a last in one day's time, or something like thirteen thousand herrings. Different effects follow both as to colour and curing, according to the length of time the fish are exposed to the action of heat. The names themselves indicate this, as they are called "Bloaters," "Straitsmen," "Reds," and "Blacks."

At Yarmouth, billets of oak wood are used for smoking the fish, but in the west of Scotland brushwood and furze is made use of, but in all cases of smoked fish oak wood is best for practical purposes, though pine wood is said to give the best flavour; and a great deal depends on the fish itself, and dispatch in curing them, hence the reason why the boats carry salt and other necessaries with them. The Yarmouth "bloater" is a familiar speciality, only hanging till it swells or "bloats." It is often packed and ready for transmission the night following its capture.

The Yarmouth fishermen count their herrings by "swill-baskets;" thus twenty swills make one last, supposed to contain six hundred and sixty herrings in each swill. Again, four herrings make a "warp," thirty-three warps go to a "hundred;" in other words, one hundred and thirty-two fish.

Great Yarmouth, if not itself the earliest station of which we have any record, at least occupies the sand-bank which appeared about the same time as the Roman legions. This sand-bank, "Cerdick shore," derives its name from Cerdick the Saxon, who landed here in the year 495.

Not only were the Romans great lovers of fish, but especially so to a dish of herrings, and their encampment at the mouth of the Yare still remains in proximity to

Great Yarmouth. It is said that our ancient fishermen supplied this "garianonum" or encampment with herring.

In 670 a tax upon the herring fishery is mentioned, and this tax was commonly known as "herring silver." Another reference in details is dated also with the history of Evesham Monastery, founded in 709. We also find that an annual tribute of herrings, varying from thirty thousand to sixty thousand fish, was paid as rent to one Hugh de Montford, of Suffolk Manors. The "free fair" of Yarmouth, or herring market, was attended by many foreign fishermen,and this "free fair" lasted for forty days, ending November 11th.

We have already noticed the tax paid to King Henry I., and in 1209 we find King John granting a charter to Yarmouth, on condition that the burgesses provide his Majesty with fifty-seven ships for forty days at their own charge, as often as he should need them, for hostile occasions, and also that they pay an annual fee of £55 to farm rent for ever.

The Abbot of St. Albans was a large patroniser at the herring market, and some idea may be gathered from the fact that his agents employed "seven stout and handsome horses" in carting his herrings for storage. These latter he sold over again at a profit, after the free fair was over.

Passing by many interesting records, we find that the prefix "Great" was added to Yarmouth in the reign of Henry III.; and a noble provision in Magna Charta enacted that "all merchants may with security and safety go out of England, and come into England, and stay and pass through England, by land and water, to buy and to sell, without any evil tolls, paying the ancient and rightful dues, except in time of war."

The Statute of Herrings passed in 1357 enacted, "That all herrings should be bought and sold in the haven of Great Yarmouth during the fair, not at sea, or within a radius of seven miles from the port of Great Yarmouth, and that the last of fresh herring should not be more than 40*s.*, and that two lasts of fresh shotten herring should only be equal to the last of fresh full herring.

"That all sales should be contracted between sunrise and sunset, that six score should be the hundred of herrings, and the last to be ten thousand.

"Further, that the merchants of Yarmouth and Metropolis or elsewhere sell the thousand of herring to the public after the price rate of the last, and that the Yarmouth dealers should sell the last of red herring within forty days, at and not exceeding half a mark of gain above 40*s.* paid for fresh," &c.

These provisions show how important was the acknowledged position of Yarmouth in its relations to the herring fishery.

The herrings appear on the Irish coast in June, and just at the close of the mackerel fishery, and they are captured both by the Irish and Manx fishermen. Immense shoals now commence their journey down the west coast of England, literally darkening the sea with their numbers and density. They have been known to extend a distance of six miles off the Isle of Man. Great quantities are caught in Cardigan Bay, Swansea Bay, and St. Ives Bay. It may be noticed that the west coast of England fishery commences about the same time as the east coast of Scotland, and also that the Irish herring fisheries are almost a name; for instead of working a coast that may be said to superabound with this fish, they are content to derive supplies from the north of Scotland.

Sprats (*Clupea sprattus*) are caught in abundance off the Cornwall coast, and also in the south of England ; and the pilchard fishery of St. Ives is still one of the most important of any connected with the *Clupeidæ* family. The season is between August and September, and upwards of sixty years ago large quantities were caught in the Firth of Forth and other estuaries of Scotland. At present this fishery is confined to the coast of Cornwall. The mode of capture is to encircle the fish with a net called the "seine-net," requiring twenty men to each net. Including boats, netting, and gearage, the cost is nearly £1500. When cured for exportation they are carried and laid in "bulk," that is, laid in layers of salt and fish alternately, until the pile is finished. In about a month sufficient oil is extracted to allow of their being packed ; and this, the last process, requires a good deal of pressing before "heading" up the casks. On this account a pressing-machine is used for three times to each barrel or cask before heading it up. The Irish coast and west of England herring fishery can show records of national importance, and charters relative to it, as far back as the year 1202.

The French herring fishery has a history of its own, and is carried out not only on its own shores, but to a large extent in English waters. Prior to the Anglo-Franco war, more than three hundred French vessels pursued the fishery at Yarmouth Sands, and at this time they were considered the best fishers in the world.

Open ruptures were common among different nationalities through fishermen trespassing in each other's waters, and in 1468 a mutual treaty was made between European powers that fishermen should be allowed to fish without hindrance in any water.

The free fair of Yarmouth drew many French fishermen,

and others likewise, to vend their produce in England. Many of the traditions connected with Great Yarmouth are strangely linked with names that bespeak French or Norman extraction.

Peter Chivalier, a Yarmouth merchant, is credited with discovering how to cure herrings in salt, and his method was followed up by one Peter de Ferars. Louis VII. of France passed an edict that only mackerel and salted herrings might be purchased at Estampes; this was in the year 1155.

It was at Kiel Bay that the food of the herring was popularly demonstrated to be of a certain kind. Although M. Mobins is not the only naturalist who has asserted this, still we are indebted to the French coast fishery for those facts which relate to herring food. In the year 1383 immense shoals were caught off the French coasts, and sometimes the schools of herring are so large that the boats are unable to take all the herring which "strike."

During the season of 1880, which was a remarkable one in all quarters, one French fisherman drew thirty-five lasts, and it is asserted that another on one occasion caught more than fifty lasts, or 700,000 herrings.

And the takes of herring by French fishermen for 1880–81 are recorded to be above the usual average.

The sprat or sardine fishery of France is the most extensive of any that seek that species of the herring; and young herring-fry and pilchards form a large percentage of the true sardine; and it may be admitted that, in other points connected with fish culture and fish acclimatization, we should do well to follow up the footsteps of France.

The herrings appear on the north-western shores of Iceland from May to September; sometimes later, never sooner, or very rarely so, and always found in September

in the eastern fjords; they are never found on the south and south-west coasts.

The shoals, in their migration to the north and north-east coasts of Iceland, sweep into those fjords possessing deep water and feeding properties, and so we find them abundantly in such fjords as Eskjfjord or Seydisfjord.

The fishery is carried on in these fjords, and principally by Norwegian fishermen, who stay for the season, curing the fish at the various stations or wooden sheds erected for the purpose.

The Norwegian boats are larger than the Icelandic boats, but yet smaller than those of the east coast of Scotland.

The fishing is by means of the seine-net, and in large takes the ends of the net are anchored ashore, when the operations may now be compared to the pilchard fishery of Cornwall, the fish being taken out as they can cure them. The nets vary in size to suit the varying depths, with a mesh of half an inch.

The best kinds of white fish are found here in conjunction with the herring, besides many of the numerous enemies that pursue the shoals, such as sharks, "herring whalers," catfish, wolf-fish, sea-gulls, &c., &c., and by the end of the season, or at least in September, herring nearly one pound in weight are taken, and such usually measure fourteen inches in length. It ought to be noticed that medium herring, or even the small ones, are preferable in quality.

As stated, the Icelanders do not follow out the herring fishery, and although Norway takes a leading share in this fishery, the east coast is represented in these waters through the firm of Messrs. Slimon, Leith.

Shetland is realising the growing importance of the herring fishery, for although they pursued the cod fishery with skiffs in comparison to the open boats, or even the

double-decked mainland Scotch boats, they have not only increased the number and size of the latter, but solely with the view to prosecute the herring fishery; as an instance, the following statistics will show this. In 1880, the number of boats was increased to 217. The success attending the fishermen for that year led to an increase of boats, which rose to 276 as against 217 for the year 1881; also 125 large decked boats as against 72; and in the year 1879 Shetland only possessed six large herring boats: this favourable account for this district is still on the increase. The terrible north-west gale which broke over the Shetland district on July 20, 1881, cost them the loss of ten boats and fifty-eight lives; but as many will remember, the season was a bad one all through; many valuable lives were lost, for on the east coast alone not less than one hundred and thirty-four fishermen perished within sight of home and friends. A fisherman's wife, writing about Shetland, says, "Instead of a fund for widows and orphans, could something not be done to save us being made such?"

The "haafs," or deep-sea boats of Shetland, are really what we termed them, "skiffs," barely able to carry 60 cwt. of fish; they resemble the Norwegian yawl, but having a greater spring from stem to stern.

Round the many points and promontories, and between the islands, numerous and dangerous tideways run at a fearful velocity. "Cutting the string" means crossing these tideways, and this is only attempted at slack tides; when it has to be performed at full tides, the danger will to some extent be understood; the livers of the fish are crushed to prevent the waves breaking called "lioom;" when this so-called "cutting the string" is not attempted, then they scud before the wind under bare poles.

It would prove an advantage to all connected were the

jacket-net more universally adopted at the herring fishing, as it saves time by telling whether herring are about, and at what depth, and a thermometer is also attached to show the temperature of the water.

Fishermen would be better prepared for any emergency if they would only provide themselves with a portable life-jacket, which could be inflated before taking the harbour in a storm.

Although the Norwegian schooners run to Iceland for herrings, their own fisheries, exclusive of Sweden and Denmark, are of considerable importance and value. The jagts or yawls fish in the numerous fjords, which in some cases extend inland for a hundred miles, with frowning mountains overhanging their sides, or sweeping cataracts disgorging themselves into the basin below, and sea-gulls helping themselves to the finny wealth from these waters. The depth close inshore of some fjords is one hundred fathoms, and even deeper in some cases.

The creeks of the west coast are subject to sudden squalls, which, through the intervening mountainous back-ground, sweep down unperceived. The herring shoals sweep into and from these fjords proceeding towards Stavangar and the Naze. From Bodo and along the chain of islands known as Loffoden Islands the fishery is prosecuted, and as a feeding ground these fjords resemble our own west coast of Scotland.

Along the Swedish coast there are also rocky islands of varying length and breadth, with a fisherman's house upon one or other of them, and a creek or fissure serving the purpose of a harbour. The fishery is pursued at various seasons of the year from the Cattegat grounds into the northern Atlantic ; but there are very important stations and fishing districts along the south coast, and the sprat

and anchovy fisheries form an independent nucleus of wealth.

Their mode of curing is peculiar and unique. Besides curing sprats (*à la* sardine), we may get herrings skinned and boned, or skinned, boned, and marinated, that is, cooked and potted either in vinegar or glacialine, or we can get the "brack-water herring" done up in the same manner.

Perhaps we should state here that these coasts exemplify a curious feature in marine life, viz. herrings living in fresh water, being unable, through physical features of the coast, to reach the Arctic Ocean.

There are also large companies in Norway and Sweden which cure and export herrings on a very large scale, such as the Stavanger Preserving Company, Nordlands Preserving Company, Bodo, Norway, &c.

Before the eighteenth century Swedish records show that their home and foreign trade surpassed the Scottish fishery. Vast quantities were boiled down for oil, and this over and above an immense quantity consumed at home besides exportation. The same is truer still in regard to Holland, for even before the sixteenth century their herring fishery was the best developed and most extensive one known, until it was prohibited in 1625 from fishing off our coasts unless provided with a royal licence. About this time a British Fishing Association was suggested by Coke as a mutual aid in withstanding the encroachments from Dutch and French fishermen. Notwithstanding both the Dutch and French fleets continued prosecuting the fishery in sight of Yarmouth, and the Dutch fleet were guarded by war-ships. The war between France and Holland was the first perceptible step that led to a decrease in her fisheries; this was in 1702, and through which she lost four hundred of large sized Dutch busses.

The invention of curing herrings is attributed to one Beukelsz, who died in 1397, and it is recorded that the Emperor Charles V. paid a royal compliment by visiting his tomb.

It seems as if the *Clupeidæ* family had found out the truth, for some time back, in that term which is so well known, viz. "Amsterdam is built on herring bones." At least the herring fishery of Holland is not what it used to be, principally owing to the scarcity of fish, yet it was Holland who inaugurated and developed this fishery into a system of commerce, though there is good reason for giving equal or even pre-historic precedence to Scotland, who allowed it to decline.

The Dutch are famed for the scrupulous care in every incident connected with the fishery and curing operations. They have two kinds of fish and two kinds of salt; this latter commodity is brought from Spain, the barrels must be of a certain kind, the mode of eviscerating must be up to the standard, and from beginning to end every detail must be complied with ere one officer would dare to stamp them as Dutch cured herrings.

We might notice here that the word "herring" was derived from the German "Heer," an army, in relation to the moving shoals in their progress or migration.

At Nova Scotia, Newfoundland, Carolina and Virginia, and other parts of the coast of America, an extensive herring fishery is followed out, and the same physical aspects and feeding properties through the rivers and other agencies mark out these grounds as a resort for all kinds of fish.

The season for herring begins in April, when the first "run" arrives, named "Granville fish," from the course they take past that township. The May herring are spent

fish, and, of course, inferior in quality. The season lasts to October, when, between the early takes of large herring, the celebrated Nova Scotia sprats form the closing hauls. Herrings of superior quality are found in the numerous bays of Nova Scotia and Newfoundland during summer and autumn, but, as we find on our own coasts, and, indeed, more or less everywhere, the herring shoals will disappear for a season, or seasons, invariably returning again to their old haunts. The sprats or herrings are cured by smoking, and one speciality in this class of cured fish is to remove the bones before drying them.

The herring species are extremely large in the North Atlantic waters. The *Clupea elongata* measures 15 inches in length and over 5 inches at its broadest part, and these, perhaps, are the extreme limits. They are very abundant during the season, and the smelts (*Osmerus viridescens*) are so abundant during the winter that they are invariably used for manuring purposes, notwithstanding their delicious flavour and edible qualities. Splendid specimens of the genus *Alosa tyrannus* are found here, and, if possible, they are even more extensively used to enrich the earth. The best specimens of our white fish are found here, and, considering the quality of their food so largely represented by the herring species, we need not search further for reasons. It is recorded that in the year 1796 a vast quantity of herring was frozen into a solid mass in one of the weirs of Nova Scotia.

As we have stated, the smallest herrings are those caught off the Norfolk coast, known as "long-shorers," and the largest specimens are found along and off the coasts of Nova Scotia, Newfoundland, Labrador, and vicinity of North America. The herring is widely distributed, abounding in the White Sea, Baltic, Zuider Zee, and in the Black

and Caspian Seas. The Persians call their herring royal fish. It is a familiar favourite on all parts of the British coast, through Europe, and all parts of the northern hemisphere.

Large quantities of special cured herring are exported direct to our Australian colonies, and it is an expressed wish from the Antipodes that some effort for introducing the *Clupea harengus* be made.

Abundant as the herring is, there is good reason to believe that it may be made a common commodity wherever the conditions necessary to its habits exist; these conditions do exist particularly around the British coast, and very specially in the western islands of Scotland.

The herring is most abundant on the British coasts, in comparison to any other coast throughout the world, and perhaps this is the cause above all others why Great Britain possesses the best herring fisheries in the world.

PART II.

IN the district of Girvan there is a small village named Ballantrae, and the fishing-bed is on the "Ballantrae banks." Upon these banks the herring come regularly, and have done so for centuries, during the month of February, as a rule. This year (1883) has been the culminating point in the records of that district. Clouds of gannets darkened the immediate vicinity, or forced attention as they swooped to the surface of the water, and, rising with their captured fish, made way for others to repeat the process, in their journeys to and from "Ailsa Craig."

For the week commencing February 28th and beginning

of March, or, at least, not more than five days altogether, the total catch was "32,000 baskets," and to despatch the fresh herring, 500 railway trucks were linked on to a series of special trains. This is only for one week, and brings us already into the spring fishery, although we have yet to refer to the winter fishery. More than fifty carts were employed in taking the fish to the railway stations.

Some idea of the inconveniences resulting to our fishermen through a felt want of proper harbour accommodation may be gathered from this district.

Owing to the unsuitability for fishermen landing in this harbour they land on the beach, and when a heavy surf is rolling, this is, of course, impossible. To the credit of a few gentlemen interested in the fishermen's welfare, a machine or engine was constructed by which the boats are now drawn on to the landing-stage in safety. Notwithstanding these humane agencies, loss of life and property is frequent, and at the close of this week which we have just recorded, two Ardrishaig boats, while deeply loaded and returning from the Ballantrae banks to Girvan, ran on to the "Whelk rocks," a very dangerous reef that ought to be marked by a cage-beacon; we are sorry to add that three of the crews lost their lives, and only at some risk the rest were saved.

A cruising steamer with an officer from the Fishery Board does good service here by keeping a free course on the grounds where smacks anchor and cause obstruction.

The west coast herring make splendid kippers, and the produce of this class of cured fish comes from the Stornoway district; their fishery ends in November.

Messrs. James Methven and Company, Leith, used to take the responsibility of forwarding the kippers and cured fish to foreign ports, but, finding this too heavy for

them, these gentlemen were forced to charter powerful steamers for this purpose, besides an arrangement that the Baltic line of steamers shall call at Stornoway and other fishing ports on the west coast during the season, and convey the fish to Stettin, Dantzig, Konigsberg, Riga, and St. Petersburg. Besides these large steamers, smaller craft convey shipments to Glasgow, *vid* Hamburg, and other places, and Norwegian schooners even come for this purpose. In June for the year 1882 one steamer alone shipped upwards of 21,000 barrels of cured herring for Stettin. The smaller steamers referred to bring a large percentage of the herring to Stornoway in "bulk," to be gutted and otherwise prepared for the continental markets. The last shipment, in November, from Stornoway for Baltic ports was upwards of 1500 barrels of cured herring.

As a proof how fluctuating and uncertain the fishery may be at almost any station, we may select the present district.

At Stornoway, in May (1882), we stated that some boats realized from fifty to sixty-three "crans." In the beginning of June very poor catches were recorded, though some boats were more fortunate. Again, herrings were reported to have left the Ayrshire coast for a time, as they were met in with at the sound of Killbrannan; but one month later (September) a Troon boat came into Ayr Harbour loaded to the gunwale with a take of herring. It was estimated that she had forty maise (or 20,000 herring) of medium size and quality.

Wick, once the celebrated centre for Scotland, is a peculiar example on this point. In 1794, and even within the memory of some still alive, herrings were so plentiful that the land had to be manured with them. The selling price at Bo'ness, Firth of Forth, was *6d.* per barrel.

Even a strong wind was sufficient to strew the beach with fish.

Some authorities assert that the diminution of the herring fishery is caused by the winter fishery for sprats and young herring, and that the same reason may be applied to our white fish; and the splendid fishery in the Firth of Forth, extending at one time to Kincardineshire, is cited as an instance how we can disperse the white fish by exhausting the herring shoals.

As good authorities assert that it is impossible to affect the herring, or cause any apparent diminution in the average takes for the season, as any differences may readily be accounted for by the season itself, such as stormy weather, not to mention the casualties that too frequently happen through loss of nets, boat, and even life itself. But since we have to close this order with the winter fishery, it may serve some purpose to examine the facts, and leave opinions alone in the meanwhile. The principal centres for the winter fishery on the east coast are Wick, Anstruther, and Firth of Forth. The Firth of Forth closes in January, and the other districts named begin the winter fishery in this month.

The statistical tables are the main guides in determining our question, and as these are appended in full for some years past, we may state as a broad conclusion that where a decrease is shown at one district, an increase is shown at another. For this year (1883) about eight yawls, which represented the winter fishery in Firth of Forth, reported very poor fishing indeed; but then the bulk of the Newhaven fleet were at Girvan on the west coast, or Anstruther on the east coast, and for both stations large takes and good prices are recorded. At Wick (1883) the catch was very small, and for the whole season up to March it records 1990 crans against 4693 crans of corresponding date of

last year (1882). Now, although the comparison is very disparaging between this and last year, yet, since the inauguration of the winter fishery, the number for this year is, almost to a cran, "the number for any previous year."

This is very important in proving no diminution in the fishery itself, but, if possible, an increase, or the numbers of last year mean nothing, and, as we have tried to show, a decrease at one station may mean an increase at another.

We will now subjoin the tables for the district of Anstruther up to the year 1882. For this year (1883) a very promising commencement was made, and English buyers were early on the ground, and these were even more numerous than any previous year, representing London, Filey, Wolverhampton, Birmingham, Lowestoft, North Shields, Scarborough, Bridlington Quay, &c., and three of the principal English railway companies had representatives at Anstruther.

For the week ending January 27th the returns read

Monday	40 crans,	price 52*s.* to 80*s.* per cran.
Tuesday	200 „	„ 50*s.* „ 53*s.* „
Wednesday	150 „	„ 56*s.* „
Thursday (Stormy).		
Friday	102 „	„ 57*s.* „ 60*s.* „
Saturday (Stormy) . .	2½ „	„ 60*s.*

A mixed fleet of 185 boats was by the 17th of February reduced to 130, and these landed 1050 crans, realizing a sum of £3000. One boat had nearly fifty crans, and received for its cargo £130.

The 24th of February was the practical close of this fishery, owing to general stormy weather, but the details were very satisfactory for that week, and may be stated in sequence.

Monday . . .	81 boats	400 crans,	highest price	52*s.*
Tuesday . . .	194 „	1,288 „	„	37*s.* 6*d.*
Wednesday . .	100 „	400 „	„	38*s.*
Thursday . . .	160 „	500 „	„	33*s.*
Friday . . .	91 „	120 „	„	45*s.*
Saturday . . .	24 „	6 „	„	92*s.*
Total catch for the week .		2,714		

Total catch for the season, 8866 crans, or about 1650 crans above the quantity landed at the corresponding date of last year.

Now this is very satisfactory, and reads all the more favourably when stormy weather is taken into account.

CLOSE of the HERRING FISHING at ANSTRUTHER, May 1882, and COMPARATIVE TABLES for the SAME DISTRICT.

	Crans.		Crans.
1873 . .	9,800	1878 . .	10,500
1874 . .	20,000	1879 . .	2,160
1875 . .	8,700	1880 . .	8,630
1876 . .	5,640	1881 . .	16,950
1877 . .	2,500	1882 . .	13,380

There were nearly 1500 boats at this district in 1882, and, in consequence of competition among English buyers, the prices averaged 41*s.* per cran. The inshore grounds are proving more remunerative than on former occasions, and the quality superior.

Taking the winter fishery as a whole, in the upper parts of the Firth of Forth and northern districts they are very good, except for this year (1883) at Wick, which is the worst season they have yet dealt with.

The take of sprats from Firth of Forth in 1881 amounted to 13,110 crans, valued at £2786; in 1880 the take was 14,500 crans, and only realised £2175.

The chief centre for the sprat or Garvie fishery is in the Beauly Firth, and extremely heavy catches were taken in

November, 1882, as some boats had 25 crans, averaging £80 to each boat, and, as near as possible, for the whole season, £4500.

Such figures may prove very tantalising to those persons who hold that the sprat is really a herring, and, either way granted, it forms a very important item in our winter herring fishery.

TOTAL CATCH of HERRING OVER the ENTIRE EAST COAST of SCOTLAND for TWENTY-SIX YEARS; LEWIS and BARRA EARLY FISHING INCLUDED.

	Crans.		Crans.
1857 . .	329,251	1870 . .	596,421
1858 . .	393,035	1871 . .	562,865
1859 . .	302,943	1872 . .	562,737
1860 . .	463,100	1873 . .	714,717*
1861 . .	485,645	1874 . .	720,964*
1862 . .	520,280	1875 . .	655,606
1863 . .	439,210	1876 . .	406,440
1864 . .	432,064	1877 . .	561,439
1865 . .	395,157	1878 . .	618,597
1866 . .	413,065	1879 . .	516,406
1867 . .	474,098	1880 . .	930,307*
1868 . .	366,068	1881 . .	675,107
1869 . .	403,633	1882 . .	730,723*

TABLE SHOWING QUANTITES BRANDED in WICK DURING the LAST TWENTY-SIX YEARS up to 30th September in each year.

Years.	Quantity Branded.	Years.	Quantity Branded.
1857	48,612	1870	38,700
1858	54,348	1871	45,700
1859	50,256	1872	42,000
1860	60,559	1873	55,000
1861	67,949	1874	51,500
1862	77,564	1875	54,000
1863	80,000	1876	36,500
1864	67,000	1877	31,600
1865	57,000	1878	60,000
1866	56,700	1879	53,450
1867	66,450	1880	77,108
1868	21,200	1881	43,046
1869	63,000	1882	48,280

Wick Custom House Exports for past Ten Years.

Quantity of Herring entered at Wick Custom House for Exportation for the past Five Years, from 1st August to 21st October in 1878, to 7th November in 1879, to 14th October in 1880, to 15th October in 1881, and to 31st October in 1882.

Continental Ports.	This series dates from 1st August to 21st October in each Year.					From 1st August to 21st October in 1878, &c., ending 1882.				
	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.
	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.
Konigsberg	9,508	4,277	2,883	882	3,223	2,315	1,950	8,450	3,144	4,667
Dantzic	19,318	22,160	12,907	7,656	6,910	20,024	12,822	40,134	23,545	22,923
Stettin	20,492	26,130	28,630	27,466	24,063	34,122	42,427	26,606	19,232	27,854
Elsinore	3,384	1,125	..	..	..	..	..	..	..	..
Harburg	9,597	2,561	1,096	8,720	3,480	1,091	3,059	2,857	1,991	..
Rotterdam	5,493	..	..	..	..	..	..	..	..	..
Memel	900	..	..	..	347	600	954	331	..	..
Hamburg	2,915	3,997	11,314	13,898	11,230	12,229	18,982	13,425	22,704	9,606
Copenhagen	..	..	..	..	..	..	..	..	..	..
Altona	..	1,240	..	692	..	..	1,754	..	941	..
St. Petersburg	1,380	..	..	1,542	..	2,039	..	..	..	1,503
Bremen	..	..	..	..	..	410	..	..	..	..
Bremerhaven	1,150	808	..	818	600	..	..	..	..	..
Geestemunde	714	802	..	..	..	..	..	..	..	..
Libau	..	..	1,000	..	..	..	..	1,316	..	..
Emden	..	..	..	..	..	..	..	..	..	..
Odessa	..	..	..	..	..	..	..	..	..	..
Ghent	..	..	498	..	..	..	..	..	..	..
Pernaw	..	..	..	..	..	..	..	638	..	..

The above dates also apply to Irish Ports, English and Scotch Ports, for which see tables annexed.

N.B.—The above tables include the exports from Lybster and Helmsdale.

ENGLISH, SCOTCH, and IRISH PORTS ENTERED at WICK CUSTOM HOUSE.

	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.
IRISH PORTS.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.
Limerick	..	1,430	500	850	600	1,132	..	..	100	..
Cork	162	2,176	2,325	3,140	1,520	1,590	1,425	3,085	2,110	5,870
Waterford	..	..	..	..	..	..	..	..	..	..
Dublin	..	80	1,390	2,009	..	..	240	400	850	326
Larne	..	..	..	..	..	..	..	400	..	..
Drogheda	..	..	..	..	..	..	..	450	..	..
Dundalk	450	761	1,619	..	..	..	..	..	..	..
Belfast	630	1,650	2,809	2,500	950	1,380	600	1,150	1,510	1,124
Londonderry	844	650	840	1,950	580	740	100	..	..	..
Sligo	..	880	1,210	267	..	550	..	390	552	350
Galway	..	200	439	..	..	..	..	700	450	1,378
Newry	..	340	863	..	..	..	..	650	..	..
ENGLISH AND SCOTCH PORTS.										
Annan	..	..	..	..	..	..	..	..	..	..
Inverness	..	..	..	..	..	180	..	..	..	70
Stornoway	..	..	..	..	..	..	..	..	..	60
Leith	208	224	83	260	..	296	360	..	..	..
Lossiemouth	..	..	..	..	..	..	..	..	..	..
Orkney	..	..	..	..	..	..	90	..	..	..
Stromness	..	..	..	..	..	..	..	..	..	60
Kirkwell	..	..	..	..	..	..	..	315	..	..
Burntisland	..	..	..	..	..	..	..	..	..	..
Perth	..	570	355	290	..	..	..	..	..	..
Portmahomack	50	90	..	..	..	..	..	..	..	..
Tain	..	..	..	..	75	180	..	..	..	..

TOTAL CATCH at EACH STATION from NORTHUMBERLAND to SHETLAND DURING the PAST TEN YEARS.

Stations.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.
	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.	Barrels.
Wick to Keiss	76,601	67,450	73,186	66,030	48,243	84,248	63,094	113,186	55,542	69,926
Lybster and Clyth	18,400	12,749	11,079	11,624	7,778	6,910	9,240	12,371	15,231	1,626
Forse and Forse Station	2,250	1,673	1,574	1,820	769	282	620	592	219	28
Lathernonwheel	1,965	1,045	1,468	1,785	894	512	790	637	1,237	78
Dunbeath	4,462	2,346	2,100	3,720	1,980	1,502	2,800	1,056	1,802	504
Helmsdale	5,400	5,943	3,380	8,450	13,875	7,600	10,855	10,285	13,783	3,920
Cromarty	2,754	2,400	1,551	1,166	680	..	..	..	..	..
Portmahomack	..	..	..	..	..	858	1,391	1,790	1,515	1,376
Burghead and Hopeman	2,170	2,288	2,740	3,292	2,656	1,122	3,009	5,200	3,090	2,328
Lossiemouth	3,060	1,900	2,880	1,456	2,277	819	4,896	7,600	3,800	2,544
Buckie District	3,179	6,370	8,140	2,775	1,760	2,864	3,832	12,413	7,173	7,630
Portsoy Station	4,032	5,240	5,832	1,550	3,767	4,935	4,670	6,950	5,600	4,650
Whitehills	2,484	2,860	1,824	900	550	1,102	1,610	1,667	840	1,174
Macduff	11,360	15,860	11,360	2,208	3,840	4,756	7,384	8,530	5,538	9,762
Banff	..	1,520	3,026	1,014	810	250	1,360	1,913	1,606	3,030
Gardenstown	12,200	8,850	8,400	2,680	5,874	4,058	7,007	6,915	7,685	4,387
Fraserburgh and District	157,415	181,060	196,838	87,776	150,280	175,820	105,037	218,504	132,613	139,500
Peterhead District	168,000	164,294	128,556	72,045	85,440	122,456	83,200	177,300	124,800	124,185
Aberdeen	60,690	64,900	61,104	57,149	77,000	69,231	36,400	78,810	78,657	80,253
Montrose District	37,945	38,135	30,017	25,327	38,925	26,758	30,048	54,091	45,352	28,820
Anstruther and District	4,305	1,930	300	110	3,005	3,975	6,490	7,840	3,660	3,145
Eyemouth „ „	31,228	24,900	29,200	15,600	11,250	25,407	52,149	48,715	59,486	59,825
Dunbar*	1,170	4,968	1,155	620	800	1,500	5,460	4,600	4,110	2,722
North Sunderland	12,250	23,904	15,000	15,000	10,850	..	..	..	..	..
Orkney	19,950	20,389	12,196	4,843	9,776	14,722	8,364	16,142	14,418	16,160
Shetland	..	..	..	..	..	6,240	6,700	38,700	46,250	102,000
Lewis and Barra	73,450	57,100	39,900	12,700	74,240	50,670	60,000	94,500	41,100	45,240

N.B.—Stonehaven has been disjoined from the Montrose district and become a separate station. The results for the year 1882 are therefore given separately.

* Leith added to Dunbar in 1878.

The herring is a very voracious feeder, and, according to M. Mobins, the principal food of those found in the Baltic and German Ocean consists of some kinds of minute crustaceans of the order of *Copepoda*.

In February, 1872, a number of herrings were caught in Kiel Bay at about 240,000 herrings daily for three weeks, and in almost every one that M. Mobins opened, the stomach was found loaded with *Copepoda* belonging almost entirely to one species (*Temora longicornis*). By careful counting the number present in one case was found to be 60,895, and another herring contained 19,170. The upper surface of the water swarmed with these animalculæ, and could easily have been taken with fine nets in literal thousands. A very low estimate was assumed from these facts, namely, that allowing each of the 240,000 herrings to have devoured daily 10,000 *Copepoda*, this would give for one day a consumption of 2400 millions, and in three weeks 43,000 millions.

The roe of an ordinary sized herring is allowed to contain about 33,000 eggs, and the time taken for hatching the eggs depends both upon the season and the temperature of the water. Hatching operations seldom take longer than one month, and the young fry are invariably produced from the eggs in three weeks' time.

As with all our marine fish, temperature has a very important function in the growth and development of each species, and observation is showing a close relation between large or small catches and varying temperatures. Thus a low temperature is conducive to large catches, and a high temperature to small ones, and if the thermometer registers the sea temperature to be at or about 55·5°, average catches may be expected, other things being equal.

One of the most serious allegations against trawlers is,

that they both disturb and destroy immense quantities of herring spawn, and a very recent instance was cited by the Cockenzie fishermen and laid for redress before the Lord Advocate at Edinburgh, urging him to draw attention to this and other grievances they have to suffer. This is a public question, and may be dealt with at some length. The allegation was that a trawler brought up an immense quantity of herring spawn, and that it was sold for "manure." This is an old story, for the same complaints were made against the English trawlers, and at a commission of inquiry appointed by Government, it was alleged by a South Shields fisherman that he had drawn up himself three and a half tons of fish-spawn, and further, that he has seen a ton and a half of herring spawn offered for manuring purposes.

It is important to remember that up to the present date there is no diminution, but, as we think, rather an increase in the herring fishery; for all that it behoves us, for the future interest of our sea wealth, to make the strictest inquiries from competent sources and legislate accordingly. More than fifty tons of herring have been taken at one haul, and, considering the constant drain at all times of the year by the varied enemies of the herring, there is reason enough to feel anxious about the future welfare of our herring fishery.

The report of the Fishery Commissioners issued in 1879, estimates that 120,000,000,000 of herrings are annually destroyed by men, birds and fishes around the British coast, but that 1,200,000,000,000 eggs are deposited in the sea as a balance against this draught.

It is a fact that fifty years ago large quantities of fine herring could be found as far up the Firth of Forth as Alloa, and the curing troughs still remain along the coast

as a sad evidence; but it could not have been the trawlers who prevented herring ascending the Forth, seeing that they are a recent innovation on the east coast fishery for Scotland, and it is interesting to find that the Newhaven fishermen have launched a trawler for themselves, as of all, perhaps, they had most reason to complain. That the trawl will bring up herring spawn there can be no doubt, but, as a rule, it cannot do so, for herring prefer spawning among rocks or upon coarse ground, where the trawl cannot go without injuring itself.

Again, trawlers assert that our flat fishes are the most voracious feeders upon herring spawn, and that, as they capture a large proportion of these fish, they are really conferring a benefit upon our fishermen by its use.

A counter allegation was, that the use of circle trawls instead of ordinary beam-trawls in the sprat fishery enabled the fishers to capture young herring, and that the destruction of these young fry was fatal to the white fish fisheries and conducive to a diminution of the herring themselves.

A very important point comes out in connection with the Firth of Forth, and one which we have already alluded to, namely, that herring became scarce in this district before the introduction of trawlers. If it can be shown that there is no decrease on other parts of our coast where trawling operations are carried out, then the question is so far satisfactorily settled, and we think the statistics are on this side. But there are some very important reasons why specified limits as to the kind of trawl to be used, and the place or grounds to be fished over should be rigidly maintained. The law at present seems to be a dead letter in many points, and this is chiefly owing to a felt want for marine police. It is a frequent occurrence for trawlers to run right through the nets, and it is at any time dangerous

for them to be in the vicinity of open boats using either nets or lines.

Trawling cannot be abolished without an international convention, nor is it generally desired that it should be even without this; but that some effective measures which will meet all cases is requisite, and urgently demanded, the baneful system of coopering alone will show. A cooper is a floating public-house, under the colour of a fishing smack. The worst is that these bumboats sell or barter poisoned drink in return for fish; and cruel evidence has been proved against this villainous traffic, where in many cases not only do they take all the money first, but have as often succeeded in securing fish, nets, gearage, and even the boats too, in return for a maddening drink that has made some victims leap overboard through its effects. Evidence of a worse nature than this was brought against foreign fishermen, chiefly Belgian and Dutch trawlers, to the effect that not only were the nets purposely run through, but the warp was cut in a deliberate manner by an instrument called the "devil." This instrument resembles the end of a huge scythe, and when fixed at the stern of the ship it can be used with terrible effects to the helpless fishermen.

International protection is both needed and asked for as a guarantee against these nefarious proceedings, for the regulations at present existing only apply to territorial waters, and the application of the law is the fault at issue. Even where ordinary grievances prevail fishermen can raise an action for damages, but as a rule they have neither opportunity nor means to do so. Some useful remedies have been often suggested, such as empowering our coast-guardsmen at their respective stations to act on the complaint of a fishing crew, or to have at least four swift cruisers in the German Ocean, representing England, France,

Belgium, and Holland. Also, with a proposal to adopt fish culture in some of our favourite estuaries and firths, that trawling be entirely abolished from such districts, &c.

It is now five hundred years since a petition was presented to the English Parliament against the use of a machine which not only retained all kinds of fish, both small and great, in the meshes of its net, but also by its iron supports destroyed fish, spawn, &c., "to the great damage of the whole commons of the kingdom." Trawling, then, has not yet reduced the fish supply, and it only now remains to guard against this.

Much of the so-called herring spawn has been proved to be gelatinous bodies of marine zoophytes and ascidians, or the spawn of cuttle-fishes, but, as we stated, herring eggs have been brought up by the trawl.

The old legal mesh for the herring net was 1 inch square from knot to knot, but since 1868 fishermen have been allowed to use any size of mesh they please. It is desirable that the old law of 1809 be re-enacted, because a small mesh will catch small, and therefore young, herrings; at the same time it can only choke large herrings without catching them. There are very many points which require overhauling in the interests of the fishermen alone. And there are some which require redress in the interests of the public. For instance, boat owners and others "sailing by the share" must proceed in the first instance to a custom-house, and sign their respective contracts before the officials. The charges for taking depositions as to damage or loss at sea should be from some other source than the sufferers themselves.

Great damage is done to nettage by lost anchors ripping them open, and these hidden snares are unintentionally encouraged by the Board of Trade, for heavy penalties

bind the salvors to deliver "swiped anchors" to the Receiver of Wreck. Now, as very few owners return to look for lost anchors, and the amount given by the Board of Trade for salvage is extremely small, it follows that very few take the trouble to clear the grounds, notwithstanding the general loss continually accruing.

Again, if statistics are to be taken at all, they should be dealt with generally all round the coast, either in the order of the fisheries themselves, or commencing in the north and ending in the south, or where practicable. Statistics for the east coast of England are always awanting, and when given very unreliable as a total estimate to the growing importance of the English coast fishery.

The spring herring fishery at Lowestoft is a recent addition to this industry, but usually the largest deliveries of the season are landed at Yarmouth. It is asserted that in 1853 upwards of 10,000 lasts of herrings were cured at Great Yarmouth. And it is within the estimate to allow the yearly average to be 15,000 lasts delivered at Great Yarmouth alone for the past thirty years. One authority assumes the grand total for the past thirteen years to be at least not less than 2,772,000,000 herrings, or 210,000 lasts.

Before noticing the leading fishery and particular features connected with it, a novel and very pleasant pastime is offered to anglers through the open facilities in catching herrings. A few enterprising individuals have even supplied the markets by angling operations over the side of a boat, and others have taken them from the shore itself. The reason why this mode of fishing is not more general than it deserves to be, is the erroneous ideas existing about the fishing apparatus and habits of the herring. Herrings are a surface-swimming fish, and the great point to successful angling is the smallness and brightness of the hooks

used, as the herring possesses a very small mouth. In the north of Scotland some anglers fix the hooks from the end of ordinary stocking wires, and these wires are about twelve inches distant from each other on the line. No bait is required, but the hook must be small and bright.

PART III.

THE LEADING HERRING FISHERY OF THE WORLD.

As the herring fisheries of Scotland are the leading fisheries in the world, we may infer from this fact alone that there must be gigantic modes of carrying on the business in the mighty waters.

The curers are the real promoters of this industry; in some cases they even provide the boats and gearage; but arrangements are made long before the season begins, notwithstanding the fact that the fishery is to a large extent uncontrollable by regulations. Thus, though boat-owners may bind themselves to deliver a certain number of crans at a given time in the season, it is after all a probability that these very men may have the "cleanest" boats for that season.

The "bounty system" is a mode of advancing money, and as often a question of retaining it, and cannot be compared to the "share" principle, where the fishermen have a better compensation for their arduous work. Boat-owners try to strike as good terms as possible, and by stating an agreement entered into last January (1883) for the ensuing season, we may illustrate this.

Herring Fishing Engagements at Broughty Ferry, January, 1883.

Twenty-one boats, with the crews already made up, are arranged to fish as follows:—Montrose district, ten boats; Aberdeen district, nine boats: the other two to fish between or on the coast bounded by the Tay and Montrose. Terms, £45 of bounty, £1 per cran of fresh fish for a complement of 200 crans, and 15*s.* per cran for salted herrings. Arles, money or perquisites in addition to each boat's crew, £2. In the case of the Montrose boats the herrings will only be considered fresh when landed at 1 A.M. In the case of the Aberdeen boats the herring will only be considered fresh when landed at "midnight." After these hours the prices allowed will be the same as is allowed for salted fish, &c.*

The highest prices are paid for the early takes in every district; and as it would be noticed, the men are bound down to a given time, even should their boats be so loaded that they cannot get in.

Enormous quantities of early fresh fish are trucked immediately to English markets, or partially cured and shipped to German ports, till at length the curing yards become a scene of life and activity that can only be compared to the herrings themselves in their onward progress beneath the waves.

The largest quantity exported from any Scotch port as a cargo was that of last season (1882) by the ss. *Silesia*, from Peterhead, with 3075 barrels of cured herrings, and at present Peterhead and Fraserburgh are the leading centres of the east coast for Scotland, just as Great Yarmouth and Lowestoft are in England.

For Fraserburgh the season's cure of 1882 is very close

* It may be stated that the bounty is better this year by about £10 than on any previous occasion.

on the numbers of 1881, but both the vessels employed and the exportations show an increase, thus—1881, vessels employed, 158 ; 1882, vessels employed, 173. Or to tabulate it in fuller form, thus :—

Fraserburgh.		Fraserburgh.	
Season 1882.		Season 1881.	
Vessels employed for conveying cured herring to continental ports—		Vessels employed in 1881—	
Total number	173	Total number	158
Barrels exported . . .	160,678	Barrels exported . . .	145,494
	Barrels.		Barrels.
July	28,914½	July	29,845½
August	63,574½	August	39,297
September	47,321	September	40,053
October	20,131	October	22,800
November	..	November	12,496
December	..	December	620½
January	736½	January	...
February	..	February	382
Totals . .	160,677½	Totals . .	145,494

The second section of tables gives a comparative view of the Monthly Shipments under their respective dates to various continental ports.

The curing process begins at once, and for this purpose all hands are ready to begin work. The herrings are counted out by the cran to the curer ; the cran is a measure holding forty-five gallons. The "gutters" or eviscerators immediately commence to open and clear away the intestines. These persons are usually women, who work in gangs of five or eight at a time. The fish are carried to the "rousing troughs," where, as the name implies, they are roused in salt, and so expert are the women at cleaning, salting, and packing, that they will produce a barrel to the cooper in ten minutes with ease.

When large takes of herrings come in it is necessary to

have many hands at work, for, unless the herrings be in pickle the same day of arrival, the officer will not brand them, or at least is supposed to see that this requirement is fulfilled.

This brand question has been a bone of contention and source of controversy for many years, and it is unfortunately branded itself by many fishermen and large curing-firms as a useless and misleading system, and the question has now come to be whether it should be retained or dispensed with. The old Scotch Fishery Board was established in 1808, but it seems probable that this vexed question may be successfully handled by the re-arrangements of the Fishery Board of 1882. As the case stands, the duties of the Board are the branding of the herrings according to quality, together with a collection of statistics as to the fishery itself.

Many of the firms who stand upon the merits of their own productions have a strong case in point of various classes of cured fish, which at the same time would not be unimpaired by a British brand, and, to say the least, would look all the better.

The Stettin Herring Report for last season, dated November, states that the supplies of Scotch herring brings the import up to "85,553 barrels crownfulls, against 87,238 barrels in 1881; 48,751 barrels unbranded fulls against 32,377; 46,112 barrels crown matties against 50,902; 42,213 barrels unbranded matties against 30,829; 7802 barrels crown and unbranded mixed against 5921, and 12,482 barrels crown and unbranded spents against 13,279; 3656 turnbellies in barrels against 2,919—246,559 barrels in all, against 223,465 barrels in 1881.

"This year's import is now considerably larger than the total of last year, and will be still increased by about

10,000 barrels floating for our port; but the stocks of Scotch herrings are not all large here, in fact, considerably smaller than last season, the consumption having been very satisfactory."

The herring is known as fry or sil, matties, fulls or full-herring, and spents or shotten herring.

The matties are the finest condition of the fish, when all the food goes to form the fattening properties of the fish. A full herring is a later stage with the milt or roe fully developed, which is not the case with matties; and, as the name implies, a spent or shotten herring is one that has spawned.

The herring is a very symmetrical fish, and its distinguishing features are the head and the belly. Although there are no eyelids, yet the eyes are large and extremely beautiful. It possesses all the characteristics applying to such fish as were enjoined as edible food in the Scriptures. It has seven fins, and the number seven is the perfect number in Scripture, and these fins are respectively—dorsal, 1; pectoral, 2; ventral, 2; anal, 1; and caudal, 1.

Strange markings may be seen beneath the delicate scales, which are compared by fishermen to a herring-net; indeed, some assert that the idea was conceived from this as to how a net should be constructed; fancy might rather attribute this to the first herrings which escaped from the nets, and the impressions they received would be indented in their whole being, and handed down to future generations. And when the mouth closes, so as to allow the cheeks to overlap the lower jaw, certain well-defined outlines are seen on each side, which fishermen say resemble a fishing-boat with the mast in the very position it should be when the men are engaged in fishing operations. The air-bladder is joined both to the vent and stomach. The

vertebral column has fifty-six bones. The ribs consist of twenty-one to each side. The head is furnished with twenty-eight bones, eight of which form supports to the gills. From end to end the entire skeleton numbers three hundred and seventy-one bones, and in this form it presents a marvellous view of constructive skill and adaptation to its home in the great deep, and reflecting the mind at once to that supreme source from which order has sprung.

The order of the fisheries just given will indicate the habitat of the herring, and it is never found in warm latitudes, though often found both in and without the Arctic circle. Small varieties are met with on the northern shores of Greenland, and it is scarcely necessary to state that the annual migration of herring shoals to and from polar regions is now known to be a fallacy. It is found in the North Atlantic Ocean between forty and seventy degrees of latitude, and abounds in the northern seas, and found in greatest numbers on the British coasts.

The herring is not so prolific in the produce of spawn as many of the other species are, unless we take into account that it may spawn oftener than other fishes; and this is a point that many able men are still investigating. It is estimated that if the full-roed herrings recorded as taken for the year 1881 had been allowed to spawn, and if that spawn had become fry, then "there would have been produced no less than 6,946,470,000 barrels of herring," had such been caught. This assumption is very modest, and, of course, is going on the old lines that the said full-roed fish would only spawn once, though they spawn at least twice in the year; and it seems certain that they spawn much oftener, as both "spent" and full herrings are caught in nearly any season and at any place. The fact really seems to be that, once they come to maturity, it is only a

question of regaining their strength after spawning as to when they shall spawn again; and it is not improbable that the fecundity of the herring is much greater than it is commonly supposed. When accurate knowledge is established on such important points as these, then our dominion over the fish of the sea will have attained its highest degree, "for knowledge is power." There is also good reason for believing that what is generally called a white sea by fishermen is really produced by the innumerable presence of herring spawn and herring fry, as such are actually found upon the surface of the waters in thousands, and many think, despite the fact that herring eggs are found at the bottom of the waters, that they are really produced and vivified at the surface. Indeed, some fishermen think that it is owing to the non-impregnation of milt and roe that eggs are found at the bottom at all, and that only those eggs float which have been so impregnated; if so, this places the herring on the same footing with our other white fish in regard to its breeding points.

The report of the Fishery Commissioners for 1878 states that 2,400,000,000 of herrings are annually caught in the North Sea by the British, French, Dutch, and Norwegian fishermen, and it is estimated that Scotland alone possesses no fewer than 14,500 herring-boats, with a total for men and boys of about, or more than 50,000, and statistics show that these numbers are increasing every year as yet.

Surface fishing is an improvement on the old method, and proves that the herring are nearer the surface of the water than was usually supposed. This method is conducted with great success, and consists in letting the back ropes be lowermost, so that the bottom of nettage may float towards the surface; but this plan is open to great risk from passing vessels.

Experienced fishermen are usually able to shoot their "nets" at the right time and place, and they can even sight and fix the spot for operations at a distance, as the schools of herring will often throw an oily phosphorescent gleam along the surface of the water. There are other indications as to the presence of herring, and often enough the nets are shot at a venture. Some Norwegian fishermen use water-glasses in their coast fisheries; this is a simple instrument that enables them to see a long way into the depths, and is probably only a practical aid at such places as the fjords or inshore fisheries. When the train of nets has been cast into the sea by being paid over the stern of the boat as "she" is rowed slowly from the starting-point, then a great perforated wall is left in an upright position on which the shoals will strike in their onward progress, and thus be taken prisoners.

The beautiful tinted silver rays produced as the herrings are emptied into the boats baffles all description, but the curing-yards are now the only thoughts for the fishermen with their silver treasures, for this may be the last haul for the season, and, as we have been there already, we may now take leave of the "Herring Fisheries," and, as we say good-bye, we wonderingly inquire, if all the herring-nets in the world were joined together, where would they reach?

"WHO CAN TELL?"

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