

TWO OF THE ESSAYS,

RECEIVED

ON THE BEST MEANS TO KILL FISH,

(PARTICULARLY OF THE LARGER SPECIES),

WITH THE LEAST CRUELTY;

FOR THE BEST ESSAY

ON WHICH SUBJECT

A PRIZE OF £10

WAS OFFERED BY

THE RIGHT HONORABLE THE BARONESS BURDETT COUTTS.

PRIZE NOT AWARDED

TO ANY OF THE ESSAYS,

NONE BEING SUFFICIENTLY PRACTICAL.

THE ACCOMPANYING TWO ESSAYS,

OUT OF THOSE RECEIVED ON THE SUBJECT OF KILLING FISH WITH THE LEAST CRUELTY,

HAVE BEEN PUBLISHED BY THE DIRECTIONS, AND AT THE EXPENSE OF

THE RIGHT HON. THE BARONESS BURDETT COUTTS,

WITH THE VIEW OF ATTRACTING PUBLIC ATTENTION TO THE SUBJECT

HEREAFTER; AS THE JUDGES APPOINTED TO ADJUDICATE

ON THESE ESSAYS, DID NOT CONSIDER ANY

OF THEM

SUFFICIENTLY PRACTICAL TO MERIT THE PRIZE.



COPIES TO BE HAD FREE, ON APPLICATION TO THOMAS F.
BRADY, 11, PERCY-PLACE, DUBLIN.

1874.

Houses of the Oireachtas

ESSAYS, &c.
ON THE BEST MEANS OF KILLING FISH,
WITH THE LEAST CRUELTY.

To discover a practical mode of killing fish, particularly of the larger species, with the least cruelty, is what is sought in the following remarks.

It is very easy to say blow them up with torpedoes, or employ 7 or 8-pounder guns against them: this would, there is no doubt, effectually terminate their existence, but it would at the same time deprive those who seek to kill them of their value.

As the Basking Shark is the largest of the true fishes captured off the coasts of Ireland—and that it is to be regretted, even to a very small extent—it would be better to confine attention to it, as the principle involved can be applied to the killing of whales, sharks, &c.

The bank where the sun fish is principally pursued in Ireland, is situated about 30 miles off the coasts of Galway and Mayo, or just within sight of the highland of Achill Island, in from 70 to 90 fathoms of water. The fish resort to this bank in the beginning of summer—the best season for capturing them being the latter end of May or beginning or middle of June. In fine weather they come to the surface in the morning or evening; when they are pursued and struck with harpoons, for the sake of the oil which is extracted from their liver—as many as 120 to 150 gallons being obtained from one of them.

The fish visit the west and north-west coasts of Ireland at certain periods in considerable numbers, and are easily got at of a fine day; but the weather is generally so unfavorable and boisterous at the time they visit our shores, that they are difficult to be taken.

In the Report of Mr. THOMAS F. BRADY, Inspector of Irish Fisheries, on the proceedings taken to relieve the distress on the Islands of Innishboffin and Shark, there is a most interesting account of the fishing for sun-fish, which formerly took place near these islands ; and by which it will be seen that the capture at the present has almost ceased.

It is not, however, because the fish have left our shores, and their old haunts, for this is not the case ; but the want of proper boats, and suitable gear, which for some years past has prevented the fishermen pursuing this profitable fishery.

Now that the islanders of Boffin and Shark have been in a measure supplied with coils and harpoons for taking them, it is to be hoped this season's fishing will be successful, and many fish taken.

As the natural history of the basking shark has been so fully discussed in Mr. BRADY's Report, it will be unnecessary to do more than attach a copy of what is there stated. *See Appendix.*

It will be well, however, to state the present mode of fishing.

The boat approaches the fish, and the man in the bow launches a harpoon, to which is attached a coil of about 200 fathoms in length ; the fish is struck near the dorsal fin, rather high up, and immediately goes to the bottom, darting away, and bringing with him from 70 to 200 fathoms of line.

When the fishermen consider the fish is nearly tired out, they commence taking in line, which is coiled up in case of another rush taking place—a matter of frequent occurrence.

The fish is then played generally from 8 to 10 and 12 hours before being brought alongside the boat, when a second harpoon is fastened in same manner in its body, and it is lashed alongside with a rope—whilst the liver, which contains the oil, is extracted.

This operation is performed by cutting a hole in the fish, and the liver being cut out by one of the fishermen, who gets into its body and hitches a rope to the liver, which is brought ashore.

It is necessary to make a deep cut at each side of the fish's tail,

so that when it lashes the water, the bone snaps across where the cuts are made.

This is, no doubt, a cruel way of taking these fish, which must suffer great agony.

It is the primitive mode. To supersede it by a more speedy and less cruel process, is what is desired, and I think this can be obtained in any of the following ways.

1stly—By the employment of an explosive harpoon, such as is used in the Iceland Whale and Shark Fisheries, as will be seen from the following extract from the Report of Vice-Consul Crowe, dated at the end of the year 1866, on “The Fisheries, &c., of Iceland:”

“As previously stated, however, whale fishing had for upwards of a century been almost entirely abandoned, until about five years ago, when an enterprising American visited the Island, and commenced whale fishing on the east coast, where he has now established himself at Seydisfjord, in company with his four brothers.

“He at first fished from a small sailing vessel; but last year procured from England a small screw steamer of about 40 tons burden, in which in fair weather he puts out to sea, in search of the fish, having a large whaling boat in tow.

“His method is so far peculiar, that it may merit attention. The whale is struck by means of a harpoon shot from a sort of rocket apparatus; the handle or stock is charged with some detonating compound, which explodes as the weapon enters the fish; the explosive force is sufficient to shiver the harpoon in pieces in the creature’s inside, and send the splinters to all parts of its body.

“This destructive missile is the American’s own invention, and has been patented by him, and it is stated to have the advantage of killing the whale almost *instantly*; and by causing the generation of gas in its inside, prevents the sinking of the carcase.”

2ndly—By using an express rifle, with explosive bullet, which, when it enters, will burst and fly into countless minute fragments, and paralyse the vitality of the fish. This, of course, would require to be done *as soon as the fish was struck* with the harpoon, and before leaving the surface.

The effects of this bullet are well known to sportsmen, who shoot elephants, tigers, bears, alligators, &c., a single ball well placed being sufficient to kill any of those I have mentioned.

It might be contended that the value of the fish would be lessened by using an explosive such as I have mentioned. To this

I reply, that the first means here proposed has been proved by experience not to injure the liver—the only valuable portion of the sun-fish—and the employment of an express rifle .450 bore, to throw a ball into the *head* of the fish, and in no way interfere with the liver, cannot, therefore, be rejected on that score. The cost of one of these rifles is also inconsiderable.

I have had opportunities of seeing nearly every description of harpoon that is used in fishing, including the Harpoon Gun, which will no doubt prove of great service to the Innishboffin and Shark Sun-fish Fishermen, to whom one was forwarded by Mr. BRADY for use this coming season.

From the fact of the food of the basking shark not being known, and it being uncertain whether these fish could be taken with bait—perhaps the experiment of trying to take them by means of a lump of meat or fish poisoned with arsenic, or some deadly poison, and fastened to a stout iron hook, attached to an iron chain, pendant from a buoy of sufficient size to float the fish—would prove useful.

I never heard of this plan having been tried—its efficacy would depend on the fish taking the bait, which is a matter of uncertainty to naturalists.

Should it be determined, however, that, like the shark, the sun-fish *will* take the bait, I cannot doubt but that this mode will be practicable.

It is well known that the resistance of water to a floatable body is augmented the further that body sinks; and consequently the greater the distance the buoy would be drawn from the surface, the greater strain there would be on the fish, and the greater the tendency to approach the surface.

The fish then being hooked, would, in fact, “play” itself until the poison killed it, when it could be brought to the surface of the water, and the liver extracted in the usual way.

In any new suggestions for killing such fish as the basking shark, much that is speculative and hypothetical must of necessity be advanced. It is really only by experiments that the knowledge of the best mode can be arrived at, and this can only be found out in time.

Any means by which this valuable fishery could be restored to its former flourishing condition should be hailed with delight, and a great boon would be conferred on the fishermen of the West of Ireland.

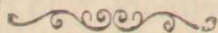
I hope the mode employed in the Iceland fisheries, which I have mentioned, will be tried in our own. The harpoon being patented, the names of the inventor and manufacturer can be easily found.

Were many sun-fish killed in this country, the fishermen would be greatly benefited, and enabled to raise themselves and families from the destitution which unhappily exists amongst them.

I trust this will be the result of the interest so kindly manifested by THE BARONESS BURDETT COUTTS, in wishing to make known the *most* efficacious mode of killing such fish, with the *least* amount of cruelty.

“KOSCIUSKO.”

March 26th, 1874.



NATURAL HISTORY OF THE SUN-FISH OR BASKING SHARK.

COUCH.

SELACHE.

Dr. JOHN EDWARD GRAY's character of this genus, which he names *Cetorhinus* is, Snout short and blunt; the spiracles small; gill openings very large, passing almost entirely across the throat, and upwards towards the neck. Teeth numerous, very small, conical, and without side notches. Scales with small curved points bent in all directions, so that the skin feels rough each way. But Dr. FLEMING says that the basking shark is smooth when the hand is passed from head to tail.

BASKING SHARK.

SUN-FISH.

SAIL-FISH.

HOE-MOTHER, in Orkney.

It was not known to Linnæus in the tenth edition of his System.

<i>Squalus Maximus</i> , .	.	.	TURTON's Linnæus.
" "	.	.	FLEMING; Br. Animals, p. 164.
" "	.	.	JENYNS; Manual, p. 503.
" "	.	.	YARRELL; Br. Fishes, vol. ii. p. 518, but not his figure.
<i>Selachè</i> , "	.	.	CUVIER.
<i>Squale Tresgrand</i> ,	.	.	LACEPEDE.
<i>Cetorhinus Maximus</i> ,	.	.	GRAY; Catalogue Br. Museum, p. 129.

It is rightly observed by Cuvier, and also by Mr. Yarrell, that the difficulty of taking a correct likeness of this and other large fishes, as well as other marine animals, as they lie irregularly on the beach when dead, perhaps imbedded in sand or mud, or from the manner in which they float, will account for the incorrect representations of them which exist; to which must be added the thronging of a crowd of spectators, who press on the object, or stand in the way of the draftsman. It is also difficult to preserve the larger examples of such fishes, with due attention to their natural shape, on which account a figure taken from a stuffed specimen is likely to be less exact than even a drawing made under the first-named inconveniences. The figure I give is from a specimen taken in Cornwall before the example had fallen into the hands of preservers, and the description is from the same, enlarged from other sources, and especially from the authority of Dr. FLEMING, in his "History of British Animals."

The food of this fish is not known, and it is doubtful whether it takes a bait. Of course no line would be sufficiently strong to hold it; and I have been told that the example referred to in the description, of 31 feet in length, was able to break a 6-inch hawser, and the doubling of a net alone was able to control its strength.

We also refer to the circumstance that this fish has been confounded with the whales, to which mistake its quiet and peaceable habits did not a little contribute; for there are times when it appears to enjoy the sunshine and a calm, and then it basks so much at ease as to suffer itself to be approached without showing any sign of being alarmed, or of a disposition to inflict injury. From this habit it has received the name by which it is now generally known, and from which also it has been termed the sun-fish, although this latter name has led to a remarkable error in Lacepede, who, mistaking it on that account for the *Orthogoriscus mola*, which is also called the sun-fish, has described the latter as having been found of the surprising length of 25 feet. By his reference to Borlase's Natural History of Cornwall, his mistake is rendered plain.

I have already taken occasion to mention the confusion that has resulted from the supposition, so long retained, that this fish was to be classed among the whales; and a remarkable and a somewhat amusing result was the consequence of the error, which has had the effect of unexpectedly bringing us into acquaintance with it under circumstances the least to be expected. Whales, even of large size, were at one time a fashionable dish at noble and royal tables; and the dolphin and porpoise especially were admitted to that dignity so lately as in the time of King Charles the First, although Willoughby and others are so candid as to admit that they were not thoroughly relished by all tastes. Rondeletius goes further, and says that the smell itself was so nauseous as to destroy the appetite for all besides that was on the table. The leading whale, (*Delphinus melas*), which exceeds the length of 20 feet, was one of those that were thus elevated into a dainty; for it is to this that I would without hesitation refer the account given in *Notes and Queries* for June 27th, 1857, as an extract of an ancient chronicle of Jersey. From this we learn that in the month of May, 1575, a herd 87 in number, ran themselves ashore in that island, and were taken possession of by the Governor. Each one was a load for a waggon; but they were sent as presents, not for their oil, but as delicacies, to the principal persons of the island. Pomet, an apothecary, who

wrote a history of drugs in French, gives an account of the value then set on these whales ; but by comparing his text with the figure he gives of the creature so highly esteemed, there is no mistaking the fact that the basking shark is the species represented, and which had thus been advanced to an honour not properly due to it, without the discovery of that error by the guests ; their politeness of course preventing the expression of dislike, however nauseous the taste of the dish might be.

This fish performs a regular migration along the west coast of Ireland, to the western islands of Scotland ; and it is at this time that a regular fishery is carried on for taking them, of which the following description is given by W. BRABAZON, Esq., in his account of the Fisheries of Ireland :—

“If the end of April is hot, the sun-fish (locally so named) are certain to show above the water, and remain on the (Clew) bank till the middle of May. This large shoal of sharks pass annually at this season along the west coast, on their way from the southern to the northern seas. They are taken on the sun-fish bank, situated about 100 miles west of Clew Bay, and extending many miles north and south. The fishermen there reckon it a day's sale out of sight of land. They are found on the bank in great numbers, and their large dorsal fin is seen at a great distance, as it rises three or four feet out of the water, while they lie motionless on the surface basking in the sun. At this time they are easily approached and struck with a harpoon ; the boat employed for this purpose approaches the fish with a man in the bow ready to harpoon it ; the line attached to the harpoon is 200 fathoms long, and is coiled up in the bow ; a man stands by with a hatchet ready to cut it, should it get entangled or foul of anything in running out. When the fish is struck, he will at the first dart carry out from 70 to 150 or 200 fathoms of line ; he makes this rush to the bottom, where he rolls himself, and rubs his wound against the ground to free himself from the harpoon. The fishermen generally allow him an hour to tire himself before they begin to haul upon the harpoon line ; they coil up the slack of it again ready for him to make another rush, and play him in this way sometimes for eight or nine hours before they can get him to come to the surface, and when he does so they are ready to strike him with two or three more harpoons, and when these are fixed in him they are able to pull him alongside the vessel with the harpoon lines ; they then stretch him fore and aft along the vessel's side, and get a jowl rope round his head, and the bight of a hawser round his tail ; they then give him two deep cuts, one on each side of the tail, with a hatchet. In his agony and his efforts to get free, he works his tail so hard, that he snaps the bone across where the cuts were made ; they then cut flesh holes in the body of the fish on both sides, that will take a large rope through them ; they then reeve ropes through these holes, and by hauling taut on the side of the fish next the vessel, and slacking away rope to the other side of the fish, it will cant him over on his back. They then split down the stomach, take out the liver, which is the only part they use for oil, and let the rest of the fish go adrift. There is no blubber between the skin and the flesh, as in the whale, but the oil extracted from the liver is as fine as the finest spermacetti. The liver of these fish is generally two tons in weight, and makes from six to eight barrels of oil.

“These fish are most powerful in the water, and if harpooned in the shoulder they are very hard to kill, often carrying off the whole harpoon line ; but experienced harpooners strike them in the body near the dorsal fin, rather low down, where it will go through into the intestines, or near the vertebræ towards the tail.

They must be struck with great caution as they will stove in the boat with a blow of their tail, if it is at all within their reach. These fish are worth from £35 to £50 each, and when so many as 500 have been killed in one season I think this class of fishing should be well attended to for the short season it lasts, if the weather be favourable to it, especially as it is at a time when other fish are out of season. The fishermen on the coast have a superstition that the fish will leave the coast if the bodies of these caught were brought to the shore.

"The sun-fish has been met in large numbers off Tory Island, and along the north coast of Donegal, where the Skerries men have found them at different times lying so thick over the ground where their cod lines were set, that they would not venture to put to sea in their open boats to lift the cod-lines for fear of the sun-fish striking their boats. They have counted from 60 to 100 basking in the sun of a morning towards the latter end of June, and they did not lift their lines till late in the day when the fish had gone down. This proves that the sun-fishery is not confined to the sun-fish bank of Clew Bay, but shows that if the weather is not suited for the fishery there, by following on the course taken by the fish, if the weather turns out hot, they may make a good fishing at any point from Clew Bay to the Scotch Islands. It seems to me that as the sun-fish bank is the first soundings made by the fish coming in from the Atlantic, they may make a longer stay there than in any other part; but boats have gone round from the east coast to sun-fish, beginning to work off Tory Island, and making a good season, though late, when they arrived there."

From the following paragraph, extracted from a newspaper of Orkney, it is rendered probable that the basking shark sometimes visits that neighbourhood:—

"A very large shark was caught (near Whalsey), by one of the fishing boats (in November). None of the fishermen here ever saw the like of it. Its length was $27\frac{1}{2}$ feet; thickness; 16 feet; from its nose to the last gill, 7 feet; its mouth when open 30 inches across; the foremost fins 5 feet 3 inches; and the tail from point to point 7 feet. The liver yielded 165 gallons of oil, and was sold for £16 10s. The whole body could not have been less than six tons. It was caught by a six-oared boat, and the men had great difficulty in getting it on shore. Instead of landing at six o'clock in the morning, it was seven at night before they got to the shore, and had they not been assisted by other boats' crews, they would not have managed it in two days. When caught it seemed to have taken a mouthful of herrings, and then rolled itself up in the net. When the men began to haul in the nets, which were new, they found them twisted with the ropes five times round it. It died in a very short time, or the men would have run a very hard chance for their lives."

This is the largest of the sharks, and of all true fishes; so that from its size, and partly from its habits, it was, as we have seen, formerly regarded as belonging to the class of whales; and it was only so lately as the time of the British naturalist, Pennant, that it was discovered, not indeed to be a whale, but in all its characters to belong to the family of sharks. If, however, we may take *Ælian* as our authority, its true position among the sharks must have been understood in ancient times, for it is not easy to refer an observation of his, in his work on the particular nature of animals (B. i. c. 55), to any other than the basking shark, the occurrence of which in the

Mediterranean Sea appears to be intimated by the French writer, Pomot, to whom we shall have occasion to refer again. Ælian says that there are three sorts of sea-dogs, the largest of which might be reckoned a whale of the largest size. The other two are very much smaller, and are the Centrine and Galeus. Lacepede doubted whether the white shark does not reach an equal size; but there is no account of the latter fish as attaining anything like the length of 36 feet, which was the case with the example of basking shark seen at Brighton by Mr. Yarrell. One was taken in Cornwall that measured 31 feet 8 inches, from which our figure was taken, and the circumference of body, great even in proportion to such enormous length. Lacepede speaks of one that measured 33 feet in length, and 24 feet in circumference.

We are not to place credit, however, in Baron Haller's assertion, that cartilaginous fishes are ever growing, and find no limit to their size ("First Lines of Physiology," 8vo., Edin., p. 463), for some species are never other than small, and others at first starting into existence are of considerable size, and yet are never met with above a certain bulk. The example particularly referred to was thirty-one feet and about eight inches, nineteen feet round, and the mouth was five feet and a-half wide; extent of the tail six feet nine inches; the weight said to be eight tons. As it lay on the ground the height of the body was eight feet and a-half. The skin rough; eyes small; spiracles between the eyes and upper portion of the gill openings; upper jaw longest, but not greatly protruded; the teeth about an inch long, blunt at the top, and but slightly compressed; the body rising behind the eyes; a strong ridge at the sides near the tail; a depression above and below at the root of the tail. Pectorals rather long, and ending in a point. The first dorsal about midway between the ventrals and pectorals, and wide and high; the second dorsal about midway between the ventral fins and anal, smaller than the first dorsal, but larger than the anal. Colour, dark on the back, but in some examples it is described as blue, lighter on the sides, and white below. Fleming says the liver of a full-sized fish yields from eight to twelve barrels of oil; and that of the Cornish specimen, above referred to, produced 198 gals.; two examples, of about 30 feet at Broadhaven, in Scotland, yielded almost 19 barrels, of which eight make a ton.



YARRELL.

PLAGIOSTOMI.

LAMNÆDÆ.

SQUALI.

THE BASKING SHARK.

The SUN-FISH and SAIL-FISH.—HUELGI, *loales*.

<i>Selaché Maxima</i> ,	.	.	Cuv., MUL. und HENLE, p. 71.
<i>Squalis Maximus</i> ,	.	.	Basking Shark, PENN., Brit. Zool., iii. 134, pl. 16.
"	"	.	Common Sail-fish, FLEM., Brit. An. p. 164.
"	"	.	Basking Shark, JENYNS, Man. Brit. Vert., p. 503.
"	"	.	HOME, Phil. Trans., 1809, pl. vi.; wants the anal.
<i>Cetorhinus Maximus</i> ,	.	.	GRAY, Chondropt, Brit. Mus. p. 61.

SELACHE.—*Generic Characters*.—Snout short and blunt; spout-holes small. Branchial openings, vertical slits that nearly encompass the throat. Teeth very small, numerous, conical, with smooth edges, and no lateral denticles, their points retrocurved. Skin ruffled by the points of small scales, which are bent in all directions.

The basking shark, so called from its habit of remaining occasionally at the surface of the water almost motionless, as if enjoying the influence of the sun's rays, and termed, therefore, on some parts of the Irish and Welsh coasts sun-fish, is one of the largest of the true fishes, and has been known to measure 36 feet in length. It is seen generally from the month of June to the commencement of winter, when northerly winds prevail. It is most frequent on the west coast of Scotland. It is known also on the north and west coasts of Ireland, where it frequents the herring bays, and injure the fisheries. If westerly winds prevail, it is not unusual to meet with it along the whole line of the southern coast. It has been taken on the coasts of Waterford, Wales, Cornwall, Devonshire, Dorsetshire, and several times at different places on the coast of Sussex. The specimen described and figured by Sir E. Home, in the Philosophical Transactions for 1809, was taken off Hastings; and a specimen, which measured 36 feet in length, was caught some years since off Brighton. From our southern coast it frequently wanders as far to the eastward and south as the coast of France; and the fish described and figured by M. de Blainville, in the eighteenth volume of the *Annales du Museum*, doubtless is the same species as that described by Sir E. Home, which has been already referred to.

The difficulty of obtaining a perfect view of this unwieldy fish, either when floating in water, or when from its great weight it lies

partly imbedded in the soft soil of the sea-shore, has led to the differences which appear in the representations of it which have been published by different naturalists.

The basking shark is said to exhibit but little of the ferocious character of the sharks in general, and is so indifferent to the approach of a boat as to suffer it even to touch its body when listlessly sunning itself at the surface. From its habit of swimming slowly along with its dorsal fin, and sometimes part of its back, out of water, it has obtained in the north the name of sail-fish. In Orkney it is called hoe-mother, and by contraction homer, that is, the mother of the picked dog-fish, which is there called the hoe.*

If deeply struck with a harpoon, the basking shark plunges suddenly down, and swims away with such rapidity and violence as to become a difficult as well as a dangerous capture. This species has the smallest teeth, in proportion to its size, of any of the sharks. No remains of fish have been found in its stomach. One examined by Mr. Low contained a red pulpy mass, like bruised crabs, or the roe of *echini*. Mr. Low adds, that this shark's appearance, manners, and weapons, do not indicate it to be a ravenous fish. Linnæus says that its food is *medusæ*, and Pennant thought that it subsisted on marine plants.

The body is thickest about the middle, and diminishes towards both extremities. When afloat the form is nearly cylindrical; the skin is thick and rough, of a brownish-black colour, with tints of blue. The head conical, the muzzle short, rather blunt, smooth, and pierced with numerous circular pores; eyes near the snout, small, oval, and horizontal, the irides brown. Half-way between the eye and the first branchial opening is the oblique and small spout-hole; stigmata five on each side, of great vertical length, each set including the whole side of the neck, and leaving only a small space above and below; nostrils oval, small, placed rather laterally, and opening on the edge of the upper lip; pectoral fins of moderate size for so large a fish—perhaps, as before stated, the largest of the true fishes—of a somewhat triangular form, placed close to the last stigma; convex anteriorly and thick, slightly concave, and much thinner behind; the ventral fins also of moderate size, rather elongated, at the base, placed behind the middle of the whole length of the fish, convex in

* The Orkney "homer" evidently originated in the Norwegian *hømar*, by which the porbeagle and *scymnus borealis* or any large shark is designated; and the modern hoe-mother is merely an attempt to give significance to a name no longer understood.

front, concave behind; the inner and posterior half free, exhibiting in the specimen chosen for the wood-cut the cylindrical appendages peculiar to the male. The first dorsal fin, placed before the middle of the whole length of the fish, is much the larger of the two, and forms an elevated triangle. Its anterior edge is but slightly convex; the posterior one is concave, with an elongated point at the base, directed backwards. The second dorsal fin is much smaller than the first, is rounded above, attached throughout half its base only, and placed at two-thirds of the distance between the first dorsal and the caudal fin. The annal fin is still smaller than the second dorsal, but of the same shape. From the line of the annal fin to the base of the tail there is a strong and prominent keel-like on each side; and just in advance of the base of the caudal fin, both above and below it, there is a groove, the under groove being rather smaller than the upper one. The caudal fin is divided into two lobes, of which the upper one is the largest. The posterior edge of the caudal fin appears to become notched and abraded by age and use, and is frequently found unequal at its margin, and variable in shape.

CUVIER.

SELACHE,

Join to the form of the sharks, and the air holes of galeus, branchial apertures large enough to surround almost the whole arch, and small conical teeth without dentations. The known species, *Sq. maximus*, L. (the basking shark), Blainville, Ann. du Mus, tom. xviii. pl. vi. f. i., has nothing of the ferocity of the shark, although it exceeds it in size, as it does all the other squali. Individuals are found of more than thirty feet in length. It inhabits the northern seas, but is sometimes seen on our coasts, being brought hither by strong winds from the north-west.

The white shark, which is cosmopolite, ferocious, and the tyrant of all seas, must not be confounded with the *squalus maximus* of Linnæus, the *basking shark*, which is not less in dimensions than the white shark, but is confined to northern latitudes, except occasionally when it visits the coasts of these islands, and sometimes the north coast of France. The branchial apertures across the neck distinguish it generally. It is ovoviparous, and frequently swims so near the surface as to have the dorsal fin above the water, and hence becomes the more easily a victim to the har-

poon. According to Pennant, this species, which at present stands alone in its genus, distinguished by the branchial apertures nearly surrounding the neck, is well known on the south and west coast of Ireland and Scotland, and those of Caernarvonshire and Anglesea. They quit the bays of these Welsh counties about Michaelmas, and the Firth of Clyde and the Hebrides about July. They have little of the fierce and voracious nature of the sharks in general, but are so tame as to suffer themselves to be touched lying motionless on the surface of the water, as if to sun themselves, whence they are called basking sharks. A large fish will yield eight barrels of oil. When struck with the harpoon and wounded, they fling up the tail, and plunge headlong to the bottom, coiling the harpoon rope round them, and attempting to disengage themselves from it by rolling on the ground. They then swim away with such rapidity and violence, that they have been known to toss a vessel of seventy tons burthen against a fresh gale, and they will employ the fishers for twelve, and sometimes twenty-four hours to subdue them.

WOOD'S ILLUSTRATED NATURAL HISTORY, VOL. III.

BASKING SHARK.—*Cetorhinus Maximus*.

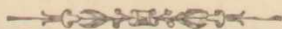
The upper figure in the accompanying illustration represents the *basking shark*, otherwise known by the name of *sail-fish*, and *sun-fish*. The first and last names are derived from its habit of lying motionless on the surface of the water, evidently enjoying the rays of the sun; and the intermediate term refers to the sail-like aspect of its first dorsal fin, which projects high out of the water when the fish is swimming near the surface, as shown in the figure. In the Orkney's it is called *homer*. This word has no reference to the Greek poet, with whom the rough fishermen are not likely to have much acquaintance, but is a contraction of hoe-mother, the fish being thought to be the parent of the hoe, or picked dog-fish, a species which will presently be described.

It is a magnificent fish, often attaining to a length of thirty-five or thirty-six feet. It does not appear, however, to be dangerous in proportion to its size, its teeth being very small in proportion to its dimensions, and the only food found in its stomach, being the remains of crustations, and probably of echini.

The basking shark is not very uncommon on our shores,

especially if westerly winds have been prevailing. It seems to be of rather dull and listless character, allowing itself to be approached quite closely by a boat, without giving any signs of alarm until the bow of the boat actually touches its person. Owing to this sluggish mode of life it can easily be harpooned, but then bursts into furious energy with startling quickness, dives like lightning to a great depth, so as to require a very considerable length of rope, and putting forth the vast powers that have been lying dormant in the warm embraces of the sunbeams, like the might of Hercules in Omphale's arms, dashes away with such speed, and plunges with such wrathful violence, that its capture is an achievement of great difficulty and no small danger.

The gill apertures of the basking shark are extremely long, reaching almost across the neck. The head is conical, the muzzle short, and the eyes near the snout. The skin is very rough to the touch, whether the hand be pressed from head to tail or *vice versa*, and the colour is blackish-brown, glossed with a bluish tint.



SECOND ESSAY, &c.,

ON THE LEAST CRUEL PRACTICAL MODES OF KILLING FISH,

WITH A VIEW TO THEIR VALUE AS FOOD.

WITH

GRATEFUL DUTY,

THIS ESSAY IS REVISED AND RENDERED

TO

THE RIGHT HONORABLE THE BARONESS BURDETT COUTTS,

WHOSE BOUNTY FIRST CAUSED IT TO BE WRITTEN :

AND WHO GENEROUSLY UNDERTOOK THE EXPENSE OF ITS PRODUCTION,

By H. ROBERTSON.

TO THE READER.

THE following memoir contains the thoroughly practical result of much experience, labour and thought in connection with the subjects treated of. No astonishing and newborn theories will be found ventilated in its pages: nor will any newfangled or untried processes for making capture and death pleasant and welcome to the fish tribes be found suggested therein.—In it I have simply endeavoured to show, briefly, yet at the same time clearly, how in the several modes of fish-capture now in vogue, cruelty may be largely lessened, or entirely prevented; by means almost always within the easy reach of fish-takers of all degrees and denominations; and that without occasioning them very much trouble to apply.

To the section devoted to the consideration of the capture and killing of the larger water species, I have devoted special care and attention; and for a long time previously to the writing of this paper. The general applicability, simplicity, and, I believe, efficiency of the new form of weapon devised for bestowing upon those creatures speedy and practically painless death; will, I think, speak sufficiently convincingly for themselves to the Reader.

With regard to the sketches and drawings introduced, they are not pretended as works of art; or even as accurate and faithful representations of the things they are intended to illustrate.—If, however, they help in any degree to render my meaning more clearly apprehended, I shall not regret the extra time and trouble spent upon them for that purpose.

H. R.

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PART I.

THE CAPTURE AND KILLING OF EDIBLE FISH.

INTRODUCTORY.—The only wise and dependable Teacher charges Humanity by many a message in this wise—"Rejoice O favored races of man! God in Creation did not blunder or make mistake!" The mere utterance of the words strikes our human souls with all the forceful ring of truth. They touch and move our consciences, making us feel the reasonableness also of the sweet injunction. And though they do not unlock for us the entire secret of the Divine intention in that creation, they help to furnish us with the key which shall do so by and by. Yet they teach us, even now, sufficiently clearly, that when The All-Beneficent Almighty called into Being this wondrous planet-home of living forms; launched it in wide yet safe career through space, and made the etherial bounds to curtain it—whose moving mingling clouds from age to age keep ever glorious ceiling overhead—decked it with smiling and luxurious verdure, refreshed its surfaces with the still circulating moisture; warmed it with comforting and vivifying sunbeams; crowned its eminences with waving woods, and parted its fruitfringed vales with meandering streams,—God, The Omnipotent Maker, intended it—this fair round world entire; this gem in a starry sky; *primarily* for the possession and enjoyment of man. That, while He did not make man indeed for the mere purpose of being His tenant only, but for another and nobler end, He created the beauteous orb of the earth *specially* for man's sake,—That He garnished its continents and ocean beds with living marvels in profusion for him of beauty and of use,—That he intended and gave the Lion to have a lair in *our* plantation, the Eagle a perch on *our* mountain peak, as the mouse his burrow in *our* habitation, and the sparrow his haunt in *our* housetop,—That he intended and gave also Leviathan to have his sporting ground in *our* ocean, and the finny tribes their weedy nurseries in *our* rivers. For do not the words distinctly imply that He so filled each variously created seat and element in and about this beautiful sunlit globe, with all the myriads of living forms it possesses; designed their various shapes and hues; implanted their different natures; and bade them teem; for this purpose alone—to serve and minister still to man here, in every necessary way? Not to stand man's equals; still less his

masters, but that their Creator placed the whole of them under man's control and subjection ; to yield him—some kinds, assistance ; some kinds, sustentation—all kinds edification, because it was His pleasure.

Who says then that it was a fraud and a blunder to create quick types in such profusion, and of such infinite complexity in mortal nature, which for sustaining each other and man must be made the cruel victims of pangsful death ? It was their Creator gave them ! He that made the gift, made also the recipient of the gift. Wherein is the fraud then ? Or who says Beneficence was clean forgotten in the scheme of nature, as we know it, because one has it to quote that the Tigers' instinct bids it tear the innocent Fawn, that never harmed it once ? Who says God created our world to slander His own character, and cheat his rational creatures of all belief in His existence ? Oh shame that we can point out such even in these clearer days.—Inhumanly deaf to every human reason ; unnaturally blind to palpable truth ; their walleyed souls though prettendingly gazing upward, still look into the dark abyss.

But with those self-ridden detractors from God's good name and denyers of His good Providence ; who will so fondly and boldly maintain that this glorious globe of living creatures and things originated itself from itself without a maker, by its own inherent forces of self development ; and can maintain itself for ever by the integrity of the same, without the aid of any other sustainer ; and who yet are not ashamed to partake of the gaffed salmon, or feed upon the slaughtered lamb ; (dainties which have been deprived of life to serve them), and whose daily existence involves the sacrifice of hundreds of other lives besides—with those we have no fellowship. But honestly and joyfully believing that "God in creation did not err or make mistake ;" and faithfully and gratefully convinced too, that since in His wisdom He has made the Earth and all its mortal contents subject, while time shall last, to the universal law, viz.—that living creature must live, and can live only, at the expense of other living creatures therein—that organism must feed on the materials of other organisms or perish out of the ranks of living generations—the goodness, the mercy is all to usward ; to whom He has given such supremacy over all His other earthly creatures, that we can bring them, even the hugest and fiercest, into subjection for our service—rejoicing, I say, in the glorious fact which shows so clearly how precious, dear and sacred evermore our souls were held in God's regard ; in that not alone

were all the treasures of this entire and splendid *mundus* prepared and given for the sustentation, instruction and advancement of our bodies ; but also were designed to serve as models, copies, and reflexions of His attributes ; standing always in the schoolroom of our lives, to aid in the training of the immortal spirit that dwells in us. With these considerations—keynotes to the whole matter—we are brought directly down to the opening of our subject.

OF LIVING GENERATIONS CONSUMING ONE ANOTHER.

I have already said, organism must feed upon organism or perish out of the ranks of living generations in this world. This law or necessity of nature is fundamental ; and applies inexorably to every living organism in the whole universe. For that every living being, large and small, lives at the expense of other living beings ; and that inorganic matters cannot sustain life in living creatures ; are ascertained and well-established facts. And we know, moreover, it is indispensably necessary that the organized* food-stuffs shall be comparatively fresh from the living state, (or preserved from decomposition) to be of any real use as food to living creatures, such as man and the higher animals. For if organized food-stuffs be decomposed, or decomposing—*i. e.*, their ultimate elements in a state of passage back again into the *unorganized* form, they are utterly worthless as nourishers of any living beings higher in the scale than the common maggot ; and worse than worthless in the case of the higher animals and man, for we find that, in their case, certain decomposed animal and vegetable matters taken into the body as food will actually poison and kill ; which in a fresh condition so taken would have been digested and assimilated. As, therefore, decomposition usually sets in within a few hours after death of organisms (unless prevented artificially or naturally) ; it is imperative, in order to their utilization as food-stuff by other organisms, that they shall be used sometime between the period of death and the period of commencing decomposition. Fresh organized food, then, or food which has been preserved (artificially or naturally) from decomposing, is absolutely essential for the maintenance of all the several more important stocks that live. This necessity is, and only could be, satisfied by the teeming reproduction of those stocks respectively,—which reproduction we have ; and by it present supplies are liberally furnished and future ones provided for.

* We use the term "organized" here in the sense of *organized by the agency of vital power*.—*i. e.*, having lived.

A sufficiency for our needs is thus assured to us. But we can only properly obtain that sufficiency by taking it in portions from the many various sources; a little from each variety. We must leave for seed. For to consume entirely any particular stock must be to cut off for ever the supply of that stock. How important a matter it is then that every food-stock should be husbanded and used with care. For although for use there is ample food in earth, there is certainly none for waste; and if not economy, at least care not to waste is manifestly incumbent upon all consumers. See how the Herbivoræ crunch and consume the living grasses as they grow, and thus supply their organism's requirements; but again the fields are replenished in due season. The caterpillars may devour some of the tender leaves; the birds in turn may devour some of the caterpillars; and in their turn again some of the birds themselves may become the food of other devourers. But by the remnants left of each and all, the stocks are still preserved; and these reproducing their kinds make good again the loss. In like manner every living thing, from man down to his minutest disease germ, is nourished and sustained by feeding upon their neighbouring living things, or things which have lived. The growing herbs and grasses are equally with animals, fishes and birds—flora and fauna—common consumers of organized matters, which have passed through the living state; and the amœbæ are consumers of it as well as the carnivoræ. Reciprocally every living feeder's body is capable of serving as a nourisher; at least to some livers; man no less than the monad; the amœbæ no less than the ox. And consequently we are prepared to find as a fact that the strongest and most numerous creatures in the struggle for existence are those which possess, together with high orders of instinct and means for making good their escape from their foes, the best means for capturing and killing their prey. Most of the higher flesh-eating creatures are specially furnished with killing apparatus in their own bodies, as fangs, poisons, claws, beaks, &c.; with which they may capture a sufficiency of living food.

And surely it would appear that even the brutes of prey themselves generally recognise and obey the above-mentioned obvious requirements of the law of the earth's living supply and demand; since economy, and not waste, characterizes them, in the main, in the satisfaction of their appetites. True there are instances of wholesale and wasteful killing of creatures more than can be consumed by certain animals of prey; but these instances, there is reason to believe, are exceptional; and occur chiefly

in cases where the circumstances are not normal. The hungry lion in his natural state, falling in with a herd of living creatures suitable for his food, selects but one to slay, and bears it off—seeks not to kill the whole herd; as if aware that by letting the rest escape he is but reserving them as food for future needs. The deadly serpent, full of meat, will let the marmot play tricks with impunity; which, were he empty, he would quickly strike and swallow. And so as a rule throughout nature, brute instinct (even in the case of the most savage their hunger appeased), seems to be eminently against a wanton, unnecessary and wasteful destruction of their living food-stuff.

THE LAW OF THE LIVING STATE.

Now the above-mentioned absolute need by all living things for organized food, or food that has lived, is consequent solely upon the peculiar nature and properties of vitality, or life, in the living things themselves. The fact that the vital must be fed with matter which has been *vitalized*, also, by the way, would seem to show that between the organized and non-organized worlds, as we know them, or between that which lives and has lived, and that which does not and never has lived, there stands a special and impenetrable wall of separation; dividing, as it were, the one state from the other, to keep them evermore two and totally distinct. At any rate, although it may be shown that some of the products of dead creatures reconvert into unorganized substances, these latter never do, nor ever can of themselves, convert into living beings. For modern science would teach us that all living beings throughout every period of their lives consist of matter of these two kinds, or at least of matter in these two totally different states—viz., (1), The *vital* or actively moving and *growing* matter, the ever-present and common component of every living thing; the seat and medium in which the wonderful and mysterious essence, spirit, or what you will, called *Life*, dwells and exerts its silent influence in forming, developing, and maintaining its various organizations; and (2), The *dead*, passive, *grown* matter; also an ever-present and common component of every living thing; and which is the result of the *life work* and *death* of the living matter. All growth and increase in bulk depends solely upon changes taking place in the former; which to maintain, and in order to the proper and natural ones only taking place, elements of matter exactly suitable for being absorbed into and changed by the living matter, must be applied continually thereto. Such elements are alone obtainable from organized food-stuffs taken into the living body in a fresh state.

But, if we would examine a little closer into the relationship of food to life * in living beings generally, or in the human being in particular, we should find that the earliest stage of existence of each living creature is represented by a single minute rounded particle of this living matter—a transparent semi-fluid, jelly-like material, in which *life power* resides; and that this particle, through the influence of the life power within it, takes into its substance, by absorption, new matters obtained from its surrounding media; (say the radicle juices of the body derived from the blood, supplied by the food); and converts these, by incorporating them with its own substance, into matter of its own nature; communicating to them its own marvellous powers and properties; and thus increases in bulk—*i. e.*, *grows*. Having reached a certain mature age and size (which mature age and size is pretty uniform in the case of the higher animals [and man,]) the mass divides into two; both of which gradually equal in size the parental mass, from the increase of new matters taken into them and converted in the same way. The two masses, or particles of living matter, continuing the same processes of absorption, conversion, and growth, again divide and subdivide; and their divisions and subdivisions upon arriving at maturity, divide and subdivide again; and these also in their turn—the process going on almost to innumerable series of divisions. Such is simply the regular course of natural *development* as it occurs in man and animals. The gradually formed walls of division between each series of masses and between each individual mass, consisting of *tissue*, is the result of the *death* of the elder portions of the living material at the circumferential parts of each mass; which takes place invariably after a certain line of orderly changes have been passed through by it. Thus gradually increases the amount of the *formed dead matter*, *tissue*, *pari passu* with the maturation and division of the several masses of living matter; constituting not only a protective covering of firm material around each of the now myriads of living masses (as in the case of the developing higher animal, or bird, or fish); but, oh, marvellous work! being built up into a homogeneous organized creature! For *dying* at their margins in this manner and becoming *tissue*, the living masses have silently wrought the miracle of *growth*; have so moulded and framed the whole spreading bulk; so laid down bones, and muscles, and nerves, and organs; with all the parts proper to the respective living creature; that it is at length (as after hatching in birds, reptilia and fishes, and as after

* See recent publications upon this subject by Dr. Lionel Beale, F.R.S.

birth in animals) capable, as a fully organized body, of independent existence; provided with its own appliances and organized machinery for taking its own food; furnished with almost infinitely minute systems of channels through which the blood and other fluids (the ultimate products of the food), may irrigate and supply every single living mass in the body with nourishment. And thus we have traced, though very imperfectly the dependence of all life, in earth, air and water, upon food; which food itself must be the express production of living matter.

MODES OF CAPTURING AND KILLING FISH.

Having said so much for the *raison d'être* of procuring for our use the kindly edible organized fruits and creatures of the earth; including the fowls of the air as well as the fishes of the waters; we now pass on to the consideration of that portion of the subject to which we are more immediately addressed in this Essay, viz.—the *least cruel methods of killing*, so as to render them fit for our service, of the due supplies of the vast and varied stores of food creatures which teem in our seas and rivers.

It is not my intention, in this paper, to enter into any of the speculative theories, or fanciful surmisings, of what might or might not be done, in this connection, by the prosecution of this or that untried plan of capturing or killing of fish, which have from time to time been put forward. And here let me admit betimes that I have not indeed discovered the sweet and sovereign *pain killer* that will henceforth annihilate the painful dying throes of our water tribes, and yet not mar the flavour of their flesh. I know of no elixir safe to recommend, with which we may charm away the life of fishes, and leave their bodies wholesome as food. Nor do I believe in chloroform, or the application of the ether spray, in their case. But simply taking up the modes of capturing and killing fish as we find them practised at present (and so successfully too) my purpose is, to point out rather some of their defects, as regards the amount of suffering to fish which they entail; and which may be decidedly preventible; and in doing so, to suggest wherein and how improvements may be made in them respectively.

To do this methodically, therefore, I shall review seriatim the principal modes of taking fish in present common practice, viz., by THE NET; by THE HOOK AND LINE; by THE GUN; and by THE HARPOON OR SPEAR AND LINE. And with reference to the latter

mentioned, which is known to be a very uncertain and imperfect mode of capture, owing chiefly to the size and strength of the creatures subject to attack by it, shall bring to the reader's notice a modified form of instrument, of the harpoon kind; which I have devised for the more effectively striking and instantly killing, and for holding securely water creatures of the largest species.

The great desideratum is destruction of fish life so as to inflict the very least amount of suffering. A few remarks, therefore, in the first place as to the nature and causes of pain itself in fishes.

OF THE NATURE AND CAUSES OF PAIN IN FISHES.

Fishes of almost every species, are, as we know very well, most keenly sensitive to impressions; and capable of intense suffering. Now, the medium of communication, at least, if not the actual source and seat of all pain in them, is that portion of their body comprising their *nervous system*. Thorough and complete knowledge as to what pain *per se* really is, or even is due to, in any living creature, Science herself has apparently not yet attained to; but although the intricate *why* and *wherefore* of the real nature of pain in fishes be hidden from us so far, the fact of having cornered pain, so to say, so as to be able, metaphorically, to place our finger upon, and point out its actual seat and medium, (though this be but a "labyrinth obscure,") is sufficient for our present purpose—and that seat, that labyrinth, is undoubtedly the nervous system of fishes. It has long been known, and I myself have demonstrated the fact over and over again, that nerves in direct continuity with the brain and spinal cord, exist as interlacing networks, forming innumerable nervous circuits throughout every part of fishes' bodies. Over every individual muscular fibre and capillary blood tube, as well as upon the surfaces of all the organs and viscera; and between the different tissues and different layers of the same tissue; nerve ramifications extend. Nerves ramify in mucous membranes, penetrate every gland, and viscus; cover the heart within and without, and throughout. And ganglia, or nerve centres, from which nerve fibres radiate and join other nerve fibres, are thickly distributed over the entire organism. Now as a matter of fact, and of common observation, we know that undue disturbance of any portion of this wonderfully complex nervous mechanism, causes the occurrence or evolution of *pain* in the part so disturbed; and this is sympathised with more or less by the entire body. Thus a blow gives pain by disturbance to nerves in the tissue, the subject of or influenced by the blow; and thus a wound causes pain by the destruction of nerve

circuits and nerve tissue, and the influence thereof on the entire organism the subject of the wound. And the harder the blow (except upon certain parts called "*vital parts*," such as the brain), the greater, generally, the amount of pain. So the larger the wound (except it involve vital organs, or the brain) the severer the pain; owing to the greater amount of destruction and disturbance of nerve tissue. A blow or wound of sufficient force upon a vital part will, in all cases, destroy life more or less quickly; while the amount of suffering involved varies greatly according to the nature and force of the wound or blow; and according to the vital part affected. But the brain, of all the vital organs, is, in general, the most susceptible to fatal injury; and *speediest* death of any results from fatal injury to this organ. A blow or wound of the brain of sufficient force, not only causes rapid death,—and to men as well as to fishes—but also (though how it does this we know not yet exactly) instantaneously deprives the recipient of all consciousness to pain.

It would seem clear, then, from these and similar hints which nature gives to observation and experience, that in order to make the most speedy and least cruel death for fishes, it is necessary to derange or destroy vital parts only in their organisms, which are those parts which by their importance in carrying on the vital processes cannot be deranged or destroyed without the cessation of the vital functions, and that the most important of such vital parts are their brain, heart, &c. I am, of course, alluding here only to those varieties of fish which are more or less tenacious of life after capture. To those classes of fish large and small, especially the latter, which die of themselves almost immediately upon leaving the water, it would be ridiculous to apply treatment for the purpose of abridging suffering.

It is also equally clear that since in fishes, especially of the larger sorts, the heart is not only less conveniently assailable than the brain—not to speak of the injury done to the appearance and market value of edible fish from piercing their bodies to wound their hearts—but that considerably quicker death, (*i. e.*, *instant* death as regards pain) is bestowable by a blow upon the head, than can be brought about by piercing the heart or dividing it—it is the first duty of the reasonable fish-killer, in all the systematic modes of capturing edible fish, to find out and assail, at the earliest opportunity, this most vital and easily accessible part, and part the mere stunning of which gives practically instant death without death's sufferings. For if the dividing of the heart, or other viscera, which may quickly kill, gives much pain to dying fish, what must

be the sufferings of those poor victims which, wounded in some unimportant part, are perhaps left to die lingeringly by the exhaustion of slowly bleeding to death in the water? Or what must be the miseries of the fate, so commonly endured, when fish after being captured and taken unhurt from the water, are allowed slowly to choke in the air; as is so much the rule followed nowadays, by net fishers, hook and line fishers, and others in the treatment of their fish? What can such practice be termed but the practice of cruelty when there is so simple and ready a remedy? Should cruelty ever be charged upon fishermen? Do not the lower creatures themselves show us that in the killing of their natural prey they are far better instructed and disposed to spare the infliction of such unnecessary pain. We have already seen some instances of this—many more might with ease be given. The vehement hug of the bear is continued until he breaks down the ribs and crushes the heart, or otherwise makes a speedy end of his capture; the crushing folds of the great boa suffocate the circulation, and limit the duration of suffering within a very brief space; the effective bite of the shark, into the trunk of fish or animal, forbids the idea of much lingering pain; the swallowing down of a shoal of living fry by the cachalot involves less suffering still, for the effects of the powerful gastric juices kill them almost instantly. And the eagle, or the hawk, or the falcon could not, even if gifted with reason, devise a swifter mode of killing their prey, or one more merciful, than that they adopt, viz.—by soaring above their victims on the wing, and swooping down, braining them with their powerful beaks. Many more instances yet might be enumerated; but surely I have said enough to convince the intelligent reader that the taking of fish is a heaven-intended test task on every fisherman's humanity, no less than on his skill, patience, or courage.

OF FISHERIES IN GENERAL, AND OF THE IRISH FISHERIES.

The majority of the Fisheries throughout the world, which are carried on as of right by the natives generally of those countries which have seaboards, depend mainly upon the netting modes of fishing. For that the great bulk of the world's fish food is gathered by the net is notorious. Civilized or uncivilized, a large proportion of the coast population of each seabound country win their livelihood chiefly by what they can draw with the net, or otherwise, from the inexhaustible wealth of the surrounding waters.

All the great open waters contain fish; but the more northern waters abound with them. The higher waters around the American

continent are proverbial for their productiveness. The northern waters of Europe, and those surrounding Great Britain and Ireland especially, abound with almost every sort of edible fish. The productiveness and growing value of the Scotch Fisheries is well known. The pining away of our Irish Fisheries, from culpable neglect, is alas! also well known. For although the Irish waters contain, if possible, even more fish wealth than the Scotch, and may be safely called the richest netting ground for piscine treasure in the world, unhappily ever since the time of the famine in this country our Fisheries have been steadily declining; instead of increasing, in productiveness and value as they should, and, with fair play and proper working and management, would have done. The number of boats and their crews engaged in this industry in Irish waters, is said to have decreased to nearly one-third of what they stood at in the year 1848; and twenty thousand boats and other craft, manned by over one hundred thousand men and boys, were engaged in fishing the Irish seas at that time. The writer of an able article, in a leading Scotch newspaper, while offering an explanation of this melancholy declension, makes some trenchant and very just remarks upon this head, which, for their practical good sense and special value at the present juncture, I will quote here at length:—

“The Irish people are being constantly reminded that their waters abound with the finest fish. They are frequently counselled to be industrious, and told to put forth their hand and gather that harvest of the sea which can be obtained without money and without price. They might as well, however, be told to form bricks without clay, because at this moment they are as nearly as possible destitute of the apparatus of capture! There are hundreds of men in Ireland willing to fish, but they have nothing to fish with. They are conscious that the seas around their Green Isle teem with wealth, but alas! they can only stand by the shores and gaze upon the waters which contain the piscine treasures of the deep. About two hundred years ago, in a letter to the Earl of Essex, Sir William Temple said ‘that the fishing of Ireland would prove a mine under water as rich as any under ground.’ Sir William was right. Edible fish of all kinds are abundant in the Irish seas—as abundant to-day as they were two centuries ago; but whilst the waters are populous the fishers are poor, and without machinery of capture, or the means of distribution, even if they could obtain the most miraculous draughts. Some fatality evidently attends the working of these Irish Fisheries, for even at the zenith of their prosperity the fishing industry of Ireland did not yield a return commensurate with the expectations of those engaged in it. Companies started to fish in the Irish Seas, have, to use a homely phrase, all ‘come to grief.’ Within the last twelve months most of those that were left ‘collapsed,’ and at present,* if we are not misinformed, there is no fishing company, of any magnitude, operating in the Irish Seas, whilst as has been already said, the enterprise of individuals has been gradually withering. The truth is, that Ireland has never obtained justice in the matter of its Fisheries. Telling the people that fish are there waiting to be caught is of no avail. They know that fact very well; but their boats are unseaworthy, their sails are ragged, their nets are rotten, and there is no market for the finny produce of the waters when caught. Such is the sad complexion to which the Irish Fisheries have been brought. Look at Scotland! See how prosperous the Fisheries of that country have become, say some of our rigid Par-

liamentary economists. We echo the exclamation. We are well acquainted with the Scottish Fisheries, and we know that they have become what they are by the careful nursing of successive governments and by considerable expenditure of public money. At one time the Scottish Fisheries were as backward, and the Scottish fisher people were as miserable as the fisheries and fishermen of Ireland are at present; and had generous assistance not been accorded to Scottish fishing enterprise, they would so have remained. If some assistance of a kind kindred to that given to Scotland be not speedily accorded to Ireland, the Fisheries of that country will still further decline, and ultimately we shall have brought home to us the striking fact of waters populous with fish remaining unfished. 'Bounties' were at one time given in Scotland for the encouragement of the Herring Fishery: good harbours were ultimately constructed for the fishing boats; and, as regards salted herrings for exportation, Government gave, and yet gives, (for a consideration) a certificate of cure. Then, of late years the railway system of Scotland has extended to all the chief towns on the coast; but in Ireland it is not yet so, and the industries of that country are suffering in consequence. Surely the Irish fishermen are as much entitled to have good harbours erected for their boats, at the cost of the Imperial purse, as the Scottish fishermen are. The money aid which has tended to the development of the Scottish Fisheries would undoubtedly be good for the Irish Fisheries. If there be a difficulty in carrying the fish inland from want of railways, the next best thing is to cure them; and if a certificate of quality be required, let the British Government supply it in Ireland in the same way that it does in Scotland. There is for all kinds of fish a Continental demand, which is apparently insatiable; and if the fish curers of Ireland could but obtain the *entree* of foreign markets, the prosperity of their particular enterprise would be at once assured."

We will now at once proceed to bring under review the principal modes of capturing fish prosecuted at the present time; and suggest, as we proceed, the best means and methods to be practised for lessening or preventing the infliction of pain in each mode, and will deal with them in the order already laid down, viz.—first, fish-taking with the aid of the net; second, fish-taking with the aid of the hook and line; third, fish-taking with the aid of the gun, by shooting; and fourth, fish-taking with the aid of the spear or harpoon and line.

OF THE NETTING MODE OF FISHING; AND OF THE PREVENTION OF UNNECESSARY PAIN TO FISH WHICH ARE NETTED.

With regard to the capturing and killing of fish by the net, I think we may fairly say that less suffering is caused to fish by this mode than by any of the others, and chiefly from the fact of there being no preliminary wounding, or injury done to their bodies whilst alive, for the purpose of securing them. Yet even by the netting mode it is unquestionably true that much unnecessary suffering is caused;

simply because fishermen are not disposed to take the trouble to dispatch their captured fish after they have secured them.

I have a vivid illustration of my meaning in a recollection of fishing on the great cod banks of Newfoundland, where immense quantities of these cod fish are taken. I will point out a cod boat, into which I can mentally see quite distinctly : at the moment we view it how busily engaged is each member of the crew upon his particular duty connected with the fishing ! You may notice that all around them, and even under their feet, the fish are thrown carelessly down alive as captured. The fact is, the fishermen are too intent upon securing more fish, to take any notice of the struggles and piteous dying spasms of those already caught ; and therefore, poor unpitied victims ! they must be left writhing and lashing about, and beat their painful lingering life out as best they can. It would not take an instant of time to bestow the merciful blow upon the head of each fish, as soon as caught, which would effectually prevent the occurrence of those pangs to them ; but so great, so all-engrossing is the business of capturing them, that even a single instant cannot be spared in the gentler interest of humanity !

Another instance, and one with which we are perhaps more familiar, of the infliction of unnecessary pain to fish, comes from nearer home. We are in the midst of one of those immense periodic shoals of fish that fishermen delight to fall in with, and welcome when it comes. Our crew eagerly avail themselves of their lucky opportunity, and have what they call a 'paying' take. Now here again note the procedure. As in the other case the netted fish, as soon as they come to hand, are tossed down on the drenched deck or hold, and there left perhaps partially covered with water, to gape and gasp till death comes to their relief. Or else they are, as often happens, thrown into receptacles which are imperforate ; and take enough water in with them to quite fill up the interstices between their respective bodies. The consequence is that many of the fish whose chance it is to be at the bottom of these receptacles, find moisture sufficient to keep their dying pains lingering for many hours ; and die indeed at length, rather from the crushing pressure of their fellows upon them than from even the ordinary fish death of strangulation.

A very great amount of suffering thus caused could be prevented by fishermen using none but perforated receptacles or

baskets, for containing fresh-caught fish, in cases where they can not be left in the nets till they are dead; and by avoiding depositing them in deck or hold puddles. And, wherever practicable, and always, certainly, in the case of those fish which do not quickly die when taken out of water, by the application of a smart knock upon the head of *each* fish, immediately over the seat of the brain; which may be given of sufficient force to deaden their pain, without in the least injuring their appearance or value, or leave any mark of bruising. Of course, where there are large draughts of the smaller kinds of netted fish, most of which, are such as die generally very quickly out of water, time would not permit of doing this, nor is it, in their instance, necessary. But with reference to the longer-lived and larger species of netted fish I would recommend, if it cannot be otherwise accomplished, that every crew engaged in fishing for them should even tell off one of their number for the sole business of stunning the captured fish as they are hauled in. With the majority of fishermen, naturally enough, the all important matter is, to have the fish secured, and whatever their species, or whether tenacious of life or not, not to be too nice as to what their captives feelings may be when once in their custody. And indeed truth to tell there are times when they are too much engrossed in the process of catching them to be able to do much in the way of mitigating suffering to their fish, however much disposed they might be to do it.—But it is quite certain that were fish of those larger and longer lived species simply stunned in the way I have mentioned, as soon after leaving the water as possible, the minimum amount of suffering attainable would be inflicted by the netting mode of fishing.

The principal kinds of edible fish taken from the seas by the net are those of the migratory species, which at certain periods and in routes well known to the fishermen who devote themselves to their capture, swim in shoals. Such are the herring, the cod, and the salmon groups. Also the mackerel, mullet, anchovy, &c.; the various flat species, as the sole, plaice, turbot, skate, &c.—The shad, whiting, haddock, as well as some of those already mentioned, though largely caught by nets, are also taken in considerable quantities by other modes of capture, as by hook and line, &c. But the majority of them, whether caught by nets, hook and line, or other modes, are entirely amenable to the quick and merciful dispatch from suffering, by the simple method of stunning above alluded to.

THE HOOK AND LINE MODE OF FISHING—ANGLING.

In bait-fishing with natural and artificial baits affixed to hooks and lines, as at present practised, there is large scope for improvement as regards the lessening of cruelty to fish. This particular mode of fishing is universally in use, and is adopted by many classes of fishermen; and both by those that fish for pleasure as well as by those that fish for profit. And is practised both in the seas and in fresh waters.

It cannot be gainsaid that the prosecutors of this method of fishing cause considerably more pain and misery to fish than the followers of the netting mode can be charged with. And yet while the net gathers its hundreds and thousands at a cast, the hook, if effective, can only hold but its one fish, notwithstanding that some fishers in this mode use many hooks at a time on one line, and with success. I suppose every one is familiar more or less with the operation of this mode of taking fish. We will, however, very briefly here examine the principle of hook and line fishing, and see how it works. A baited hook connected with a line is thrown into water where there are fish. A moderately heavy fish is felt on the hook by the fisher, almost immediately it has taken the bait into its mouth—(in some fishing of this kind *floats* are used for enabling fishers to detect the bites of fish). The fisherman on perceiving a bite jerks the line and the sharp barbs of the hook (which had been concealed in the bait) enter the jaws of the unwary biter—pierce through skin, muscles, and even bones—destroy a thousand nerve circuits and tear asunder innumerable blood tubes, which at once begin to pour forth their crimson currents into the gash. The barbs passing quite through these tissues the hook is securely locked in the jaw of the fish.

The shock of such a wound must necessarily put the fish to extreme pain. But although it puts it in agony the mere hooking of a fish in the jaw or lips thus, without injuring any vital part, will not kill it but very lingeringly and barbarously.—The poor deceived victim quickly recovering the first sharp shock of the wound, frantically begins to tug at the line, in most instances, in a wild endeavour to release itself from the cruel sting. But this only serves to tear the wound wider, or drive the barbs deeper into the tissues of its maw. In the event, it almost always finds that it is far too weak to prevail against its captor, or break the galling tackle with which it is fettered; and, after considerable struggling and vain resistance, it is at length drawn

out of the water, the hook is torn or cut out from its hold, and the fish is usually thrown down out of hand, not only to endure the death by ordinary choking, but the pain of its wounds in addition.

Such roughly but truly penned, is the typical history of the fish captured by the hook and line process. Happily for themselves the majority of our edible and sportable fish species do not live a very great while after they have been removed from their natural element; but it would be idle to deny that the intervening period, however brief it may be, between their being hooked and the moment of their death is a period of mortal anguish and distress.

OF THE PREVENTION OF UNNECESSARY PAIN IN KILLING FISH TAKEN WITH THE HOOK AND LINE.

To abridge, if not to cancel altogether, the unhappy interval between the moment of their leaving the water and the moment of their so-called *natural* death by suffocation, the same simple plan already recommended for adoption in the case of fish taken by the net, viz.—the plan of stunning them as soon as they leave the water, is recommended as being equally efficacious for saving suffering to every fish, and every species of fish taken by the hook and line. And as this plan is universally applicable, and is so entirely simple and easy to put in practice that in the more ordinary cases of hook and line fishing a child may employ it as readily and effectively as a strong man, and the most ignorant and unskilful as surely and easily as the most skilled and scientific, it is the more valuable. Moreover, it is the only plan which while it applies to all edible fish, will, without in the least damaging the beauty of the creature's appearance, or its quality and value as food or article of commerce, completely strike out the painful and more or less protracted interval between capture and death which all must deplore. For whatever the physiological phenomena may be which take place when a fish is stunned in the way recommended, by a smart blow upon the back of its skull, they are constant; and follow invariably to the complete answering of our merciful purpose. A result so important and manifest speaks for itself; and it is no reproach to the principle we advocate that we are unable to describe fully or understand perfectly the nature of the changes which are wrought in the system of the fish when we apply it—i. e., when we stun the fish.

To elucidate the matter as much as we can, however, we will attempt the description here, of the result of the

application of stunning, as far as it may be said to be typical of the process of stunning in all cases. A healthy fish, say a pike, or a trout, or a salmon, or other fish has taken the bait, and upon being lifted from the water is in almost full possession of all its powers and functions. Its muscular movements are strong and perfect—its nervous system highly sensitive, so much so that even the warmth of your hand in handling it, to remove the hook, irritates it.—Now in this alert condition you administer a sudden jar or knock upon the back part of its head over the seat of the brain. The effect of such a blow is the immediate *concussion and paralysis of the brain*, the great organ and centre of sensation. And not only so, but in addition to paralysing the brain, the blow at once suspends or destroys the nervous organization of the creature's whole body; for the action and function of every nerve current and minor medium of sensation and feeling is apparently destroyed also. Consciousness, feeling, sight, hearing, are gone for ever, or mysteriously held in abeyance, and the very existence of the creature, late so full of life and motion, is, to all intents and purposes, annihilated. Thus practical extinction and death is the certain, direct and instant result of but one slight blow. Thus suffering is done away completely, and the slow horror of dying, with all death's attendant pangs, compressed into the duration of a flash of light which darting across the eye is gone even upon its arrival. For although muscular contractions and contortions of the body—and vigorous one too—sometimes occur after the stunning, or even after the destroying of the brain, in fishes, it may be laid down as quite certain that the effectually stunned fish is entirely unconscious of suffering. And, as we before pointed out this method of stunning, and of bestowing instant and comparatively easy death upon fishes, is one that works no injury to them either as articles of food or commerce. While in its general application the plan is quite within the reach of every piscator, and needs no expensive or cumbrous apparatus for carrying out. In our accompanying sketch, the Boy tapping the stone, which he has picked up from the river's bank, with the back part of the fishes' skull, will serve to show how simply and readily the merciful relief may be given.* †

Seeing then the absolute simplicity of the plan; and the perfect ease with which any fisher may put it in practice; and the largeness and certainty of the benefits accruing from its use in

* See Plate I.

† For the application of the same principle to the capture of the giant fishes and Whales.—See Part II.

the matter of suffering saved to fish ; I would say to all fishermen who fish with hooks for profit, "adopt my simple plan of *stunning* at the earliest opportunity for all your fish, and reduce the amount of suffering incident to the mode of fishing you use to its lowest thereby," and this I would urge most earnestly.

To those who fish with hooks for sport, especially in our rivers, but with whom unfortunately the sport only commences after the pain has commenced with the fish, I would say this much—"although the pain is rather too nearly related to the sport, too close to it, to allow you as much scope for the cultivation and exercise of 'soft-eyed pity,' as for the cultivation and exercise of infinite skill, tact and patience, yet when tact and skill and patience have conquered your victims, then let mercy come in and end their sufferings, by promptly *stunning* them as they come to your hand. Bearing in mind the circumstances and necessities of the mode of fishing you adopt and delight in, and that it is essential to success in most instances, that none but the very finest tackle, such as will not bear the strain of a struggle with a strong and active fish of any weight, be used, it would, of course, be childish to expect that you can draw in your fish immediately upon their being hooked. It is admittedly an imperative part of the process of capture, and one that cannot be done away, that you "play" your fish after hooking it, to exhaust its strength somewhat, to "*drown*" it as the phrase goes. But do not, as I have known some anglers do, allow your sport to linger exhausted in the water an unnecessarily long time. Draw it out, at the very earliest possible moment consistent with the safety of your tackle, and immediately stun it.

We well know the exquisite delight attendant upon the successful prosecution of the gentle craft. So do *not* our victims that afford it ! The salmon or the trout upon finding the make-believe fly's tail lacerating his lips, will dart wildly away to escape the tormentor from the top to the bottom of the pool ; will tug at the line and feeling still the prick, rush madly to the surface once again. It holds him still. He feels it ; tries to snap it. It gives upon his strain, and he finds he cannot break himself free. Then will he bend his back, and springing high in the air, so seek to twist his painful fetter off. It will not be.—It holds him still. Now, Oh ! now is the supreme moment of delight to the patient angler. To make his delicate tackle hold out intact to the end ; to baffle the fishes desperate, and often extremely cunning efforts to get free, he yields and yields the line

AT THE BEND OF A RIVER IN COUNTY WICKLOW.



Forster & Co Lith. Grow St Dublin.

The Angler stunning his fresh caught Fish.

To face Page 38.

to its more determined assaults. He knows he cannot reasonably hope to "land" or "kill" his capture until its strength is somewhat played out; and naturally, and very properly too at such a time, his chief aim is not so much the sparing of pain to the fish—which the least hastiness on his part is likely to set free—as it is to hold it securely until sufficiently mastered to be drawn to the bank, or the boat, as the case may be, and landed.—Then will he think of humanity and end its struggles.

Amongst devoted anglers, will, I know, be found some of the most gentlehearted and considerate persons in the world, who need no appeal for mercy or humanity to their captured fish from me or any one. Unfortunately, however, there are others, of the *Genus* Angler, who so long as they can succeed in securing and dragging the prey from their element, bestow no further thought upon them to mitigate their dying sufferings, though nothing in the world could be easier, or take less time to do; and to these I do appeal. I am sorry to have to say it, but frequently by the sea and river sides we may meet with takes of fish, gaping and writhing about in all the acute anguish of more or less slow suffocation (besides the pains of their hook-wounds,) some of which have been out of the water for hours, and to which the simple operation of stunning herein recommended might have spared much miserable suffering.

By the aid of properly baited hooks almost any species of fish in the seas may be taken; and there is no known fresh water species but will, if large enough to swallow it down, take the baited hook. Amongst others in the sea may be mentioned the shark, dolphin, sturgeon, salmon, cod, whiting, shad, turbot, haddock, mackerel, eel, &c., and in fresh water lakes, rivers and ponds: salmon, trout, pike, perch, carp, chub, gudgeon, barbel, and many others,—the dying agonies of every one of which may, upon their being captured, be largely lessened or entirely prevented by the application of the above setforth plan of stunning.

ON FISH-TAKING WITH THE AID OF THE GUN BY SHOOTING

The taking of fish with the gun by shooting, may truly be described as one of the most effective and painless, and at the same time one of the most untrustworthy and torturing of the practices followed for their capture; according to the facilities afforded the fisher for taking accurate aim at his fish, and the parts then pene-

trated by the shot. And whether it will be the one or the other—a painless or a torturing capture—is always, under the most favourable circumstances, uncertain. The uncertainty depends upon various causes, some of which we may mention.

Doubtless in surface fishing of this nature a good shot will, if all goes well, reckon upon maiming, if not killing, his fish. But in underwater shooting the case is different, and the chances are much greater against success. Fish may lie just as still and the shooter may even stand nearer to them, or immediately over them, yet the exact position and whereabouts of the fish, as it is seen lying, in its gravelly bed perhaps, will be so deceptively rendered, as looking down through the water; and the refracting power of the water itself upon the shot as it passes through it to reach a fish, is often so great, that the surest of shots at other objects, frequently fail to hit their mark in these. As before observed there can be no doubt that the swiftest and most painless death possible to be bestowed upon fish would be that by a shot through the brain. And if success in hitting this part could be ensured, there could be no objection to this mode of fishing on the score of cruelty. But it is equally certain that nothing can cause a greater amount of agonizing pain than gunshot wounds in non-vital parts, or in vital parts if insufficient to kill outright. And we know that fishes, as well as other creatures, may be shattered with shot, and yet linger on in agony for a long time before actually dying of their wounds. For instance a salmon which had been fired at by a fisher with the gun, and was supposed to have been missed by that gentleman, was picked up twenty miles higher up the river a week afterward in a dying condition; when it was found to be riddled with shot, with old woolly blood-coagula in all the shotholes. And, in another instance, a pike which had had its jawbones completely splintered by a ball from a rifle, lived for more than five weeks after.

ON THE PREVENTION OF UNNECESSARY SUFFERING TO FISH IN CAPTURING THEM WITH THE GUN BY SHOOTING.

Considering the nature of the weapon used, the uncertainty in using it, and the unerring instinct of self-preservation in fish, which governs them and makes them, immediately upon being wounded, dart away as fast and as far as they can, it is to be feared that it will never be possible to do much to obviate the occurrence of grievous suffering to fish, as long as this mode of taking them is used. One or two suggestions, however, I would offer

in this connection, the following out of which may tend to diminish fish suffering in some measure as inflicted by it:—

In the first place I would recommend every fisher who shoots at fish to forego his shot on every occasion, unless he has a reasonable probability of wounding his fish disablingly.

In the next place I would certainly advise that no one should shoot at a fish unless he has means at his command for getting it at once out of the water in the event of disabling it. I once witnessed a sportsman shoot at a large trout from off the parapet of a bridge. Upon being wounded the fish came to the surface of the water tumbling over and over. It then laid motionless for some time upon the surface of the water in the middle of the stream. If the fisher had had a boat at his disposal he might then easily have secured his sport and put it out of pain. As it was, however, the trout seemed gradually to revive, and at length slowly swam away under the bridge out of sight—perhaps to linger in great torment for a long time.

Most of the fishes that bask or are visible as they lie motionless in clear water, are made the subjects of this mode of fishing.—Amongst others the sharks, the dolphin, porpoise, sunfish, sturgeon, &c., in the ocean—and the salmon, trout, pike, chub, &c., in freshwater lakes, rivers and ponds.

PART II.

On the best means for Capturing and Killing the Largest species of Water Creatures, including the Whale, Basking Shark, Sunfish, &c.

OF THE INDUSTRIES DEPENDING UPON THE CAPTURE OF THE LARGEST SEA SPECIES.

The teeming produce of the world's waters, furnishes not alone food to mankind, but also serves to create some of the most important and valuable of human industries; to which millions of hands are constantly and profitably devoted. Not only does it furnish employment and subsistence to those who are directly

engaged in gathering and distributing that produce, but many other great branches of industry are engrafted upon it; as for instance the fish-curing industry, the retailing industry, the boat and craft building industry, the net making, the sail making, the tackle making, &c., &c. The value of the floating stock alone, of all kinds, in use throughout the known waterways of the globe, for fish and whale capturing, has been estimated at a sum representing no less than £10,000,000 sterling. The greater part of this floating stock is of course engaged in what may be roundly termed 'the edible fish industry.' Besides these figures it has been computed that the crews which man this floating stock number between three and four million hands; which are directly and regularly employed throughout the maritime world in fish-gathering. Great Britain and Ireland together yield nearly a half a million workers; and floating craft to the estimated value of between one and two million pounds sterling—the greater proportion of which is of course engaged in gathering such fish as are marketable as food.

Yet although a less number of vessels and men are engaged in the capture of those larger kinds of fish and whales, whose capture we have now to consider; and although the flesh of these giants of the deep is not generally marketable as food, this branch of the industry is a most important and an immensely valuable one. For within a little the enormous creatures in question may be truly said to be worth their weight in bronze currency for the oil which they so abundantly contain, and which finds a ready market in every civilized country.

This section of the subject—relating to the capture and killing of the larger Sea species—having been proposed as the principal topic for discussion in this paper we purpose treating it somewhat more in detail than preceding ones and from an entirely practical point of view.

PRESENT METHODS OF CAPTURING THE LARGEST FISHES AND WHALES.

Owing to their great size and immense strength rather than to any difference in their nature and habits, the systematic capture of these creatures by any of the means and modes of fishing already described as practised for the taking of the lesser species is quite impracticable. They cannot easily be netted. If by any accident one should happen to get enclosed in a net the net is never found

sufficiently strong to hold it against its will. And to attempt their capture with baited hooks is, as a rule, equally unsatisfactory. So also is the method of shooting them with guns; for even when fatally wounded with the balls their capture is seldom the result.

Unobtainable by the ordinary methods, our fishermen have, and have long had, a plan in use for their capture; by which, faulty as it is in many respects, and cruel as it is in the extreme, they yet pretty frequently manage to bring their oily quarry to the tub. The principle of this plan may be briefly epitomized as that of *snaring* the creatures in question as they lie upon the surface of the water. It depends in great measure for success upon the fact that particular species of them at certain times lay themselves open in considerable and profitable numbers to being so snared, through a remarkable habit they have of floating in a quiescent state for a greater or less length of time upon the surface of the seas they haunt. It is said that some of them will bask or sleep in this manner in one spot without moving for several days together. As is very well known, the Whale family are necessitated to rise to the surface of the water at intervals for the purpose of taking in air. But in addition to the periodic rising for this purpose, the Whale family, as well as the Sunfish, Basking Shark, and some others, are known to lie for hours perfectly still upon the surface of the Sea. It is contended by many that the phenomenon of basking as manifested by these creatures, would be more correctly termed *sleeping*. Some authorities will on the other hand go so far as to deny that these creatures really sleep at such times, supposing that they merely delight to feel the warmer medium of the atmosphere, or even the rays of the sun, upon their backs. Whichever view is right or or whatever the solution of this intricate but not very important question may be, the fact remains that they lie quiescent on the surface of the water, and so give the fishermen, as we said before, the golden opportunity for getting their oil. For certain it is the unlucky habit gives the fishermen who are lying on the lookout in the fields of their accustomed haunts, their opportunity for sighting, approaching and occasionally fatally harpooning them.

The usual mode of procedure followed for the capture of the larger species of fish and Whales, is generally as follows, viz.:—A fishing crew especially provided of course with the necessary gear in their boat, and properly equipped for the mode of fishing—having sighted a basking fish, or Whale, basking, or blowing, as the case may be, and having cautiously approached quite close to it, the

striker standing in the bow of his boat drives with all the strength of his arm, or throws with all his force, the barbed spear or harpoon—to which a strong line many fathoms in length is attached—into the soft tissues of the back or other exposed part of the creature's body. Upon being thus wounded the huge creature dashes away with great velocity and force, for the first wound is generally merely a flesh wound, however deeply driven—drawing out the line rapidly as it goes. At each successive rising to the surface of the water the fishermen endeavour to get near to it and wound it afresh—either with other harpoons, or with long piercing weapons which they have for the purpose—and this treatment is repeated and continued until the captive is sufficiently exhausted to be drawn to and dispatched. It is found to be absolutely necessary so to alternately wound and play them, otherwise they could never be mastered and killed.

Such, with some slight modifications to suit the requirements for the different species attacked—is a fair general description of the method at present in vogue for the capture of the largest fishes and Whales.

Cruel and painful as is the mode of fishing here described it is effective only where the playing is successfully carried through. This, however, owing to the difficulty of getting at vital parts to wound (and even of deeply piercing non vital parts) at the attacking opportunity, is frequently not done. Thus very many of them get away after being wounded. Individuals of the Whale species, even if pinned by the harpoon, must still, of course, rise to the surface for air at intervals or be drowned; consequently in spite of their tremendous size and strength, if the harpoon hold but firmly, their capture may be pretty safely calculated upon. There is no such necessity, however, for the rising to the surface of the Sunfish, Basking Shark, &c., which on this account are often much more difficult of capture than the largest Whales. For after being wounded with the harpoon it often happens that their temper becomes so stubborn, and the strength they exert is so great that it is found utterly impossible to hold them; much less raise them from the deep water to which they betake themselves immediately upon being struck. In such cases their would-be-captors, however unwillingly, are obliged to acknowledge defeat and give up their hopes of the prize.

OF THE PREVENTION OF SUFFERING IN CAPTURING AND KILLING THE LARGEST SEA SPECIES.

It will be apparent from the foregoing that the great cause of the present infliction of extreme suffering upon these giant creatures of the seas, and also of the frequent failures in securing them after they have been wounded, is the inability of fishermen to attack directly parts in them that are vital. And it is obvious that the same cause must remain and operate so long as the present weapons in use and modes of using them are retained. The strength of a strong man's arm may be wonderfully great, its force terrific, but yet we know it to be physically impossible for a man by his unaided arm alone to plunge the present form of harpoon, or indeed any other, through the solid thickness of the massive bone coats of the skull which protect the brains of these creatures. And any attempt made to reach the heart by it, through the nimious substance of the trunk of most of them, would be equally futile. Various other modes have indeed from time to time been suggested for killing these creatures more humanely and quickly; such as for instance by shooting with heavy guns which is unsatisfactory, and by poisoning the waters they haunt, which is absurdly impracticable, and some others, none of which, however, were ever found to answer.

For surmounting difficulties of the character indicated and rendering capture speedy and certain it is clear that the right direction in which means should be sought and found—if ever to be found—would be in the way that leads to improvements in the weapons and gear which are at present in the hands of fishermen. It is in this direction that we have carefully studied and patiently worked for a considerable period of time. We now therefore purpose to give here the result of our labours therein, and shall describe such a modification of the present form of harpoon and such a mode of using it, as will, we think, go far towards supplying a much needed desideratum to fishers and others interested in the capture of these larger sorts of sea creatures.

ON A NEW FORM OF HARPOON WITH TRACTABLE BARBS AND LEVER HANDLE CAPABLE OF INSTANTANEOUSLY DESTROYING THE LIFE OF THE LARGEST WATER SPECIES.

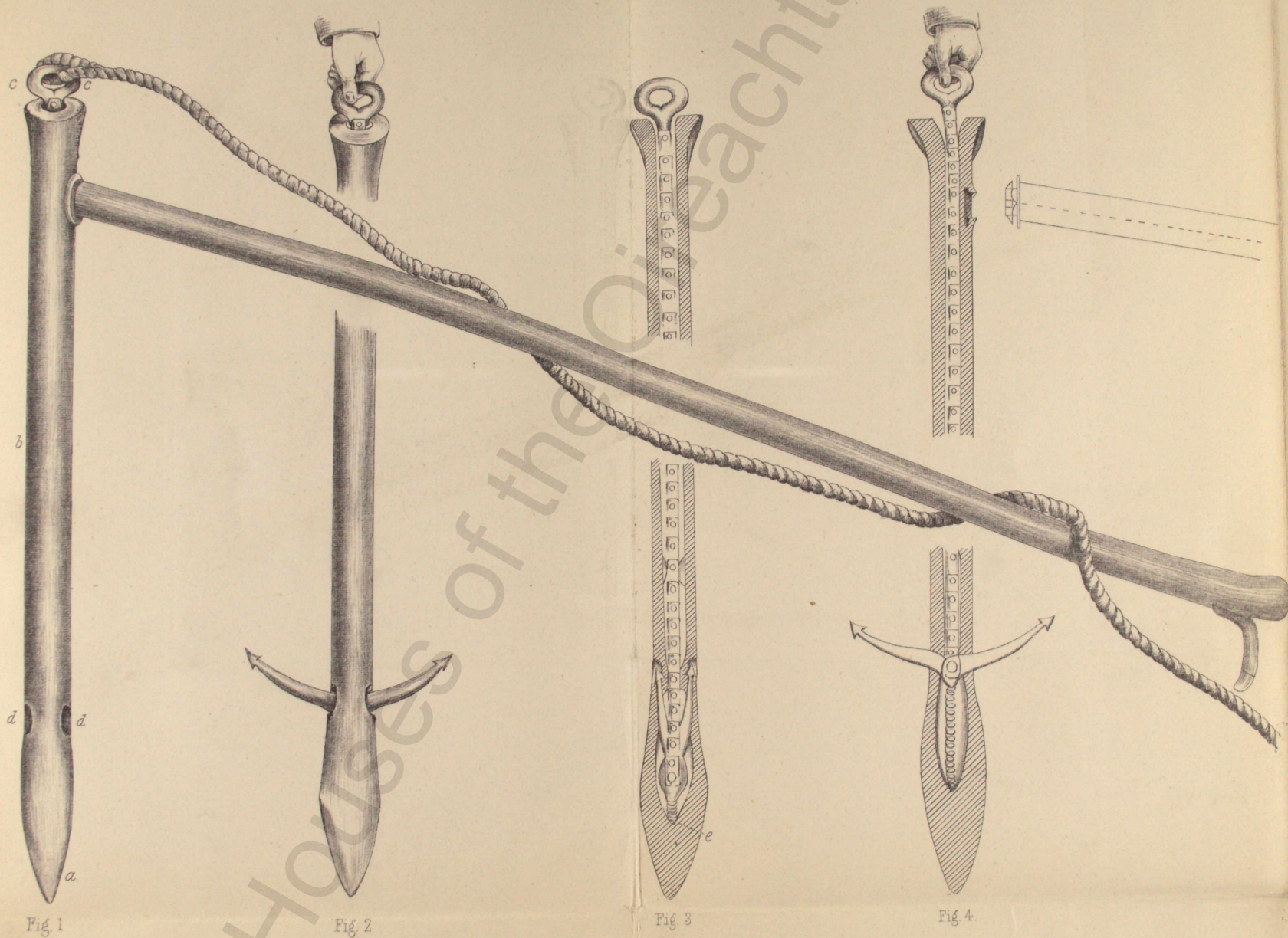
In previous paragraphs we have endeavoured to show that instantaneous death was readily conferrible on all the ordinary

species of edible fish by simply disturbing or destroying their brain structure. In like manner, wherever it can be effectually accomplished, disturbance or destruction of the brain structure of those larger species, now under consideration, would be equally instantaneous in its results—equally mortal. But merely to stun or destroy the brain structure of these gigantic creatures without having some provision made for securing them afterwards—some attaching gear—would be to sink them in deep water from whence in all probability they could never be raised again; not to speak of the wonderful resisting power possessed by their skulls against the assault of any of the weapons at present in the hands of fishermen and whalers.

Under all the circumstances we have been led to the conclusion that the best, most effective and by consequence most humane and merciful way of meeting most of the requirements of the case—the chief of which are speedy killing, and secure attaching—would be by the actual penetration and destruction of the brain or spinal cord through the skull bones or spinal column. This is proposed to be done by piercing these with a weapon capable of penetrating the skull of any of the creatures in question, and capable at the same time of holding them secure against risk of after loss by sinking &c. Such a weapon it was necessary we found to invent *ab initio*; which in reality we have done, though we have spoken of the invention to which we now ask our reader's attention as a *modification*.

Our proposed new spring-barbed lever-handled Harpoon, is represented complete and in section in Plate II. Sufficient force for driving this weapon through the massive skulls of monsters such as we now have under consideration—which is unattainable by the unassisted arm of man—we command by providing it with a long, stout, yet springy, handle, usable with all the immensely augmenting force of leverage. (Fig. I). The body of the harpoon consists of a very stout steel cylinder, terminating in a heavy and almost solid penetrating head, (Plate II. Fig. 1. *a*.) At a proper distance from this head or point, are situate a pair of apertures, through which a pair of massive barbs for holding fish securely, are tractable and retractable. (Plate II. Fig. I. *c. d*.) In a quiescent state, or when there is no strain upon the rope with which they are connected by the ring at the top of the cylinder (Plate II. Fig. 1. *c*.) the barbs are held completely within the tube of the harpoon's point by means of a simple spring, (Plate II. Fig. 3. *e*.) (Consequently there can be no resisting power whatever from these barbs when driving the weapon home, say through

DIAGRAMS OF A NEW KIND OF HARPOON - THE WEAPON COMPLETE AND IN SECTION



Houses of the Oireachtas

the tissues of any of the giant fishes). The barbs, however, being arrow headed, must, on that account, upon being driven into the tissues of a fish, be retained therein in spite of the little spring, which is fixed upon the floor of the interior chamber of the point. The handle or lever portion of the Harpoon can be instantaneously affixed to and detached from the body of the weapon by means of simple catchbolts, which catchbolts are fixed in the fitting end of the handle and are withdrawable at once by means of the strap which hangs loose at its free end. The lever portion of this weapon is perhaps the most important feature in the invention. By its aid not only may we obtain sufficient force for readily driving the penetrating point of the harpoon through the brain coverings and brain of any of the giant water species; but from the advantage of length of reach which it gives, a striker with this new form of harpoon can aim at and hit the middle parts of their skull surfaces with far greater accuracy and without even touching the creatures' body with his boat* (Plate II. Fig. 1.) See also, Plate III, in which drawing, the lever harpoon is shown as in use—the picture representing a "Shorthead," or young Whale in the act of being struck with the lever weapon.

MANNER OF USING THE LEVER HARPOON.

There can be no doubt that such an instrument as here described must be much more convenient for use and efficient for piercing than any hand-thrown harpoon could be. And in practice no difficulty could occur in placing it as a new weapon in any fisherman's hands who has had experience in the modes now adopted for the capture of the larger species of fishes. Being already familiar with the harpooning of fishes, in following out any suggestions contained herein nothing would be strange or new to him, but the form of the weapon and the mark to be struck for instantly killing his fish. With regard to the novelty of using a lever harpoon, one lesson should perfect the novice for his life in the way of wielding it. Nothing in the way of learning could be simpler. We will suppose a boat's crew provided with exactly the usual gear and tackle as at present employed in the capture of the larger species. Instead, however, of the common form of harpoon we furnish them with our lever weapon. Now let us note them as they sight and stealthily approach a floating Basker. (It may be either a Basking Shark, Sunfish, or calf Whale, &c.) The striker with his

* For a full detailed description of the weapon.—See Appendix. p. 53, 54.

weapon raised well over his head discovers the skull of the creature favorably posed for his aim. (See plate III.) Observe how with both his feet firmly planted in the bow of the boat, he is gradually stealing within striking distance. And now he selects a spot in the huge skull, as his mark to be hit, and throws upwards the lever harpoon with both his arms, and backwards so as to increase the impetus of the coming stroke. Then with all the force of his body he brings it crushing down through the solid brain coverings and into and through the substance of the brain; utterly destroying with that organ, in an instant of time, all the powers of the giant creature's life. Simultaneously with the completion of the fatal stroke, slipping his hand down to the strap which hangs at the extremity of the lever or handle, the striker immediately disengages the handle from the body of the harpoon, which latter, now from the force of the blow, is deeply buried in the tissues of the head. What follows? No frantic lashing and spinning of the creature maddened with the anguish of an ineffectual flesh wound. No desperate, shot-away rushing off to escape the torture of the spear. The huge creature has been instantaneously brained at a stroke. It has in fact been struck dead by the blow. It may perhaps sink leaden down in the deep water like another inanimate mass, but immediately upon being checked by the cord of the harpoon the moveable barbs shoot out into the soft contiguous parts, probably of the mouth and lower jaw, and obtaining such a hold as cannot possibly give way, fix and attach the bulky carcase perfectly securely; when it may either at once, or at convenience, be drawn up and dismantled.

OF OVERCOMING DIFFICULTIES IN THE WAY OF USING THE LEVER HARPOON.

On the score of humanity we are advocating and recommending the destruction of the life of these creatures by attacking their most vital part, and part the destruction of which gives speediest death, the brain—wherever possible. But it will occasionally happen that upon approaching a fish it is found that its head cannot at all be got at by the striker. In cases where the head of the creature is so withheld under water, the next best mark to aim at would be, of course, such an one as being struck would bring about the next speedy death to the victim. We would recommend the striker to seek for the medial line of the dorsum or back of the fish, carefully keeping as near to the head as feasible, so as, if possible, to involve, in the descent of the



Forster & Co. Lith. Crow St. Dublin.

Striking a "Shorthead" or Calf-whale with my Proposed New Lever Harpoon.

harpoon, the penetration and destruction of the spinal cord near up to the brain. Or failing that, the piercing of those other vital parts, the heart and larger arteries; which latter lie and take their origin from the heart, very near up to the head in the Sunfish, Basking Shark, and most of the larger species, and almost in a perpendicular line between the *fossa* or dents at the junction of the head with the body. If successful in piercing through the spine, or opening or entering near to the heart or large arteries, the sudden plunge of the fish (in either case) consequent upon the wound, will serve to send the long sharp barbs deeply into those or contiguous parts, and be the means of more quickly bringing it to a stand-still.

APPLICABILITY OF THE LEVER HARPOON FOR INSTANTLY DESTROYING THE LIFE OF THE WHALE.

And now we would say a few words with reference to the application of the proposed new weapon to the capture of members of the principal giant water species *individually*.

And first with regard to the Whale. We have mentioned the young of the Whale kinds only, as being susceptible to the certain and less cruel death bestowable by the lever harpoon, by the piercing of their brain. For the capture of the great Greenland "Skullfish"—whose brain coverings on account of the immense thickness of their compact and solid shields of bone would *seem* to be impregnable to the assaults of every devisable engine, even to the terrific force wielded by the user of our lever harpoon, the services of such a weapon would nevertheless be invaluable for their capture, even if only for the more efficiently penetrating and holding them by their softer parts, as in the method at present in fashion. For it will, manifestly, be better and more humane to have them pierced firmly and held securely, so that they may eventually be put to death outright, after experiencing the cruel sufferings of harpooning as in the present slow way, than to allow them after being pierced to get away with huge holes, and frequently with several fearful gashes, in their sides and backs. And how many of them so escape, from the fact, as before explained, of being too shallowly pierced by the hand? But the employment of the lever weapon upon them would most surely reduce their chances of escape to a minimum, for struck with this more trenchant weapon, pierced entirely through the comparatively soft and yielding layer of blubber, and deep down

into the tense and firm muscular tissue beneath, such a hold would be obtained by the barbs, as it would be next to impossible to tear out or break away.

APPLICABILITY OF THE LEVER HARPOON TO THE CAPTURE OF THE BASKING SHARK.

The Basking Shark, usually so unwary and easy of approach, and lying as it mostly does so straightly along in the water, will give but little difficulty in capturing, to the user of the lever harpoon. Perhaps of all the larger fishes it is the most completely amenable to the stroke of the lever's sudden death; partly because it may in most instances be so deliberately dealt him, and partly because of the more porous structure and fragile nature of its cranial bones.

The manner of using the lever weapon upon the "innocent" Basking Shark, would be exactly the same as described for following out in the case of the Whale, &c., in page 48, and figured in plate III.

APPLICATION OF THE LEVER HARPOON TO THE CAPTURE OF THE SUNFISH.

The life of the Sunfish also will be very readily and speedily destroyed, and its capture expeditiously made, by the employment of the lever harpoon in the penetration of its brain. This fish, as is well known, makes, upon being wounded in the soft parts (the present mode of attacking it) most desperate and continued efforts to break away from its captors—and so ungovernable is it in its fury and regardless of pain, that unless very firmly pinned and featly managed throughout the long struggle, it not unfrequently succeeds in making its escape after being struck, either by tearing the weapon from its hold, or taking away with it the harpoon and rope bodily. But the length of reach, and the thorough penetrating power commanded by the wielder of the lever form of weapon, as well as the greater holding power of the barbs in this harpoon, would prevent the possibility of escape in the case of any Sunfish attacked by it. The skull being drilled completely through at a stroke, their well-known plunging and rushing away which are always so dangerous and dreaded by fishermen, must be impossible; and their capture, instead of being a matter of long doubt and much anxiety, would be rendered immediate and sure.

GENERAL APPLICABILITY OF THE LEVER HARPOON TO THE CAPTURE OF ANY OF THE LARGER SPECIES OF FISHES.

And lastly in the taking of any of the larger fishes, and such as may be but casually met with by regular fishers, as for instance the great white Shark, certain Dolphins, and others, some of which are at times tempted by baits and when hooked are drawn in and dispatched by very slow degrees, the lever harpoon would be found most advantageous for giving them the *coup de grace*. By its employment therein would be prevented all that flouncing about in the water, or upon the deck, and the sorry exhibition of their beating or hacking to death, so commonly the finale of their capture.

Such the weapon, and such the results of employing it. If it should prove effective to the lessening of cruelty in the capturing of but one individual alone, out of all the millions comprised in the many various species, the saving of but one single protracted death struggle, it would be a consideration of much satisfaction. And the fact of sparing our fishermen the infliction of the customary lingering tortures upon the monster fishes and Whales, and the witnessing of the long familiar scenes of slow slaughter, so frequent at present, would surely tend to have at least a kindly—not to say humanising influence upon them also.

CONCLUSION.—Much that ought to have been mentioned as belonging to the subject, has been left unnoticed herein; particularly with reference to the habits, haunts and structure of the several fish species respectively. The length, however, to which the inclusion of these topics would have extended our essay forbade their introduction; and confined us to this our uninteresting exposition of what we deem to be the least cruel way of killing fish.—It now remains for us to say but one word more, and we address it to fishermen of every degree who may read this paper. It is this. As far as any suggestions herein contained may be practicable, as far as they may be calculated to promote humanity and merciful dealing towards your captive fish, as far as they may be deemed suitable to the requirements of your particular kind or kinds of fishing, and worth following out, make them your own, and put in practice. For this very reason are they here put forward. Our only object in writing this little Essay is, if possible, to further the mitigation of unnecessary suffering in the capturing and killing of fishes. And this we have endeavoured to do by proposing our one efficient

universally applicable and speedy method for destroying the life of every species of them; having thereto, briefly set down for your consideration—

- 1.—The most easily assailable vital part in all fishes the sudden deranging or destroying of which brings about practically instant death to them, and which may be accomplished in a very simple and ready manner.
- 2.—A detailed description of a new weapon by which this vital part in the larger species of fishes and Whales, may without difficulty, be reached and destroyed, which weapon will at the same time serve as a secure holder of any fish or whale penetrated by it, and
- 3.—Full explanations as to the *modus operandi* proper to be followed for ensuring the realization of our wished result; simple in the extreme and involving but a very slight addition to or departure from present customs, and therefore so much the more easily learnt and adopted by Fishermen.

THE END.

APPENDIX.

DESCRIPTION OF THE LEVER HARPOON.

THE LEVER HARPOON may be divided into two portions, the spear or harpoon portion, and the handle or lever portion.

The spear portion comprises (1) a nearly solid, heavy, well-tempered steel penetrating point, especially adapted for piercing through bone structures, (Plate II. Fig. 1 *a*), and (2) a body and upper part consisting of a massive steel cylinder (Plate II. Fig. 1 *b*), containing within its tube, the strong linkchain in connection with the bases of the barbs, and terminating at top in a heavy iron ring (Plate II. Fig. 1 *c*).—About ten inches or less from the point of the spear are situate two apertures (Plate II. Fig. 1 *d*) through which a pair of arrowheaded spring-withheld barbs emerge, on the ring and linkchain being tightly drawn out, (Plate II. Fig. 2).—These moveable barbs which are normally retained within the tube of the penetrating head by means of a simple spring affixed to its floor, (Plate II. Fig. 3 *e*), work upon a common axis, and are so arranged as to shape, and fixed as to size, with the space which they occupy in the hollowed chamber, that in the quiescent state of the weapon (*i. e.*, when no strain upon the retaining spring) every portion of them is enclosed therein; or, drawn out to their utmost limit, their bases combine to form a solid wedge-shaped mass of metal, at rest against a shoulder in the interior of the chamber, capable of resisting the force of any possible strain, while the outstretched arms of the barbs have a crosswise (anchorwise) holding, of from sixteen to eighteen inches span, (See Plate II. Fig. 4). The linkchain, freely moveable up and down within the tube of the cylinder, connects the holding barbs securely with the rope, which is affixed to the massive ring, (Plate II. Fig. 1, 3, 4).

The lever or handle portion consists of a strong ash or yew staff which is furnished at the fitting end with metal double catchbolts for firmly locking it to the spear portion; the catchbolts being worked by means of an iron wire rod, which runs in a groove from them, down to the extremity of the handle, and is there connected with a short strap which hangs free.—The handle is thus instantaneously removable from the body of the harpoon, after striking a fish, by grasping the strap, which unlocks the catchbolts. (See Plate II. Figs. 1, 4).



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