

FRESH-WATER FISHES IN THEIR SEASON, JANUARY AND FEBRUARY.

If we except the salmon, the fresh-water fishes of the British Isles have at present no commercial value, as they are not captured, either individually or in the aggregate, for the purposes of commerce; but to persons who are fond of angling they afford sport and healthful recreation, whether they are pursued in the large English or Scottish lakes or caught in the small rivulets that feed our great salmon-streams. Although Britain is possessed of a seaboard of 4000 miles and a large number of fine rivers and lakes, the total number of British fishes is comparatively small (about 250 only), and the varieties which live in the fresh water are therefore very limited; those that afford sport may be numbered with ease on our ten fingers. Fishers who live in the neighbourhood of large cities are obliged, in consequence, to content themselves with the realisation of that old proverb which tells them that small fish are better than no fish at all; hence we have a race of anglers who are contented to sit all day in a punt on the Thames, happy, when evening arrives, to find their patience rewarded with a fisher's dozen of stupid gudgeon. But away down in the north, on the lakes of Cumberland or on the Highland lochs of Scotland, such tame sport would be laughed at, for there are heavy charr in the Derwent and splendid trout in Lochane; and these require to be pursued with a zeal, and involve an amount of hard labour, not understood by anglers who punt for gudgeon or who haunt the East India Docks for perch. To kill a 16lb. salmon on a Welsh or Highland stream is to be named a knight among anglers; indeed, there are men who never lift a rod except to kill a salmon; such, however, like the Duke of Roxburgh, are the giants of the profession. We must, however, divide our attention, for it is quite as interesting (not to speak of the convenience of the thing) for some men to spend a day on the Thames killing barbel or roach as it is to others to kill a 10lb. salmon on the Tweed or the Spey. It is good sport, as well, to troll for pike in the Lodon or to capture grayling in beautiful Dove Dale. In fact, angling is a recreation that can be made to suit all classes, from the little boy with his bit of stick and crooked pin to the gentleman with his well-mounted rod and elaborate tackle, who hires away in his yacht to the fords of Norway in search of salmon that weigh half a century of pounds and require a day to capture. For those, however, who desire to stay at home there is abundant angling all the year round. From New-Year's Day to Christmas there need be no stoppage to the sport; even the weather ought never to stop an enthusiastic angler; but on very bad days there is the study of the fishes, and their natural and economic history, which ought to be interesting to all who use the angle, and to the majority of mankind besides; and there is spread out around the angler the interesting book of nature inviting him to perusal. He can see the white seal of winter opened, and observe the balmy spring put forth her vernal power; note the turbid streams of winter slacken their volume of water; see the swelling buds and the bursting leaves; admire the cowslip and the primrose grow into blossom almost as he looks at them; hear the sweet notes of the cuckoo and the unceasing carol of more joyous birds; watch the sporting lamb or the timid hare, and chronicle the ever changing seasons on their march of progress.

Before proceeding to describe the fresh-water fishes which are figured in the following illustrations we shall, first of all, say a few words concerning the structure and the natural and economic history of fishes. In doing this it is not necessary that our essay should be exceedingly formal or severely scientific; those requiring more profound or more detailed information can readily find it in the pages of some of the large encyclopedias. Fishes form the fourth class of vertebrate animals, and consist of animals which, as a general rule, only live in the water; although in Ceylon and India there are said to be fishes that live in the earth, or at any rate in the mud, not to speak of some that inhabit trees. The classification of fishes as arranged by Cuvier is that usually adopted. That eminent naturalist has divided them into those with true bones (osseous) and those of a cartilaginous structure; and the former again are divided into acanthopterus and malcopterus fishes. Other naturalists adopt different and more elaborate classifications; but Cuvier's, being simple, is the one generally used. A fish must breathe by means of its gills, and it progresses chiefly by means of its tail. It is admirably adapted for progression through the water, as may be seen from its form, which has been imitated more or less closely by the builders of ships and the makers of weavers' shuttles. If the breathing apparatus of a fish were to become dry, it would at once be suffocated. A fish when in the water has very little weight to support, as its specific gravity is about the same as the water in which it lives. The bodies of these animals are so flexible as to aid them in all their movements, and the various fins assist either in the balancing of the body or in aiding it to progress. The motion of a fish is excessively rapid; it can dash about in the water with lightning-like velocity. Many of our sea fishes are curiously shaped, such as the hammer-headed shark, the globe-fish, the monk-fish, the angel-fish, &c.; but all of them are becomingly adapted to their mode of life and the place where they live; as, for instance, in a cave where light has never penetrated there have been found fish with no eyes. Fresh-water fishes do not, however, vary much in shape, most of them being very elegant. Fishes are nearly insensible to pain, and are cold-blooded, their blood being only two degrees warmer than the element in which they swim. So far as personal knowledge goes, we believe the senses of sight and hearing are well developed in fishes, as also their sense of smell and taste, but particularly their sense of smell, which chiefly guides them to their food. It has been said by some naturalists that fishes do not hear well; but that is contrary to our own experience, for on making trial we always found them as quick of hearing as they were sharp of seeing; and do we not read of pet fish being summoned to their food by means of a bell? Most kinds of fish are voracious feeders, and prey upon each other without the slightest ceremony; and, in our opinion, the greatest difficulties of the angler are experienced after the fishes have had a good feed, when even the most cunning artist will not induce them to nibble, far less to bite. Some of our fishes have a digestive power so rapid as only to be comparable to the action of fire, and in good feeding grounds the growth of the fish quite corresponds to its power of eating. In the sea there is a better field for observing the cannibal propensities of the fish world, where shoals of one species have apparently no other life than to chase another kind with a view to eat them; and what goes on in the sea on a wholesale scale is imitated in the river. To compensate for the waste of life incidental to their birth and growth, nature has lavishly endowed this class of animals with enormous powers of reproduction. They yield their eggs by tens of thousands or millions, according to the danger to be incurred in the progress of their growth.

In our illustration we have shown a fit dwelling-place for a couple of ravenous pike; the catraps are indicative of an excellent commissariat, and the fine bit of deep water, with its protecting fringe of vegetation, is just the place for a freshwater cannibal like the pike to take up his abode. This

"pirate of the waters," as the pike has come to be named, affords capital sport to the angler, as it is a fighting fish, and grows to a large size. Pike spawns in March and April, when the fish leaves its hiding-place in the deep water and retires into shallow creeks or ditches. The young fish are not long in being hatched, and they grow rapidly from the first, attaining a size of about 10 in. in twelve months, and they continue to grow so rapidly that by the time they are four years old they will have attained a length of 22 in. Before that period a young pike is called a jack, and its increase of weight is at the rate of about four pounds a year, when well supplied with food. The appetite of this fish is not easily satisfied, and numerous extraordinary stories of its powers of eating and digesting have been from time to time related. Mr. Jesse, in one of his works, says that a pike of the weight of five pounds has been known to eat a hundred gudgeon in three weeks; and we ourselves have seen them killed in the neighbourhood of a shoal of parr, and, notwithstanding their rapidity of digestion, have seen four or five fish taken out of the stomach of each. Mr. Stoddart, one of our chief authorities on angling matters, has calculated the pike to be among the most deadly enemies of the infant salmon. He tells us that the pike of the Teviot, a tributary of the Tweed, are very fond of the young smolts, and calculates that in a stretch of water ten miles long, where there is good feeding, there will be at least a thousand pike, and that these, during a period of sixty days, will consume about a quarter of a million of young salmon! There are many stories told about the voracity of this fish, so many, indeed, as almost to lead one to suppose that the larger part of them had been invented. But if half of them be true, the pike has certainly earned its title of the shark of the fresh waters. There is, for instance, the well-known tale of the poor mule, which a pike was seen to take by the nose and pull into the water; but it is more likely, we think, that the mule pulled out the pike. Pennant, however, relates a story of a pike that is known to be true. On the Duke of Sutherland's canal at Trentham a pike seized the head of a swan as she was feeding under water, and gorged so much of it as killed both. The servant, perceiving the swan with its head under water for a longer time than usual, took the boat and found both swan and pike dead. A large pike, if it has the chance, will think nothing of biting its captor; there are several authentic instances of this having been done. The pike is a long-lived fish, grows to a large size, and attains a prodigious weight. There is a narrative extant about one that was said to be two centuries and a half old, which weighed three hundred and fifty pounds, and was seventeen feet long! There is plenty of evidence as to the size of pike; individuals have been captured in Scotland that weighed seventy-nine pounds. In the London newspapers of 1765 an account is given of the draining of a pool twenty-seven feet deep, at the Lillishall Limeworks, near Newport, and which had not been fished for many years, and from which a gigantic pike was taken that weighed one hundred and seventy pounds! We have seen scores of pike which were upwards of seven pounds in weight, and a good few that were double that weight; but, like the salmon, the weight is now on the descending ratio, the giants of the tribe having apparently all been caught. Formerly there used to be great hauls of this fish taken out of the water. Whether the pike be good for food or not depends on where it has been fed, and how it is cooked. In fact, the animals of the water are not in some respects unlike those of the land; their flavour depends on their feeding; and pike that have been feeding daintily for a few months on young salmon cannot be very bad fare. As a general rule, however, the pike is not highly esteemed as a dish even when cooked à la Isaac Walton, who recommends them to be roasted and basted during the process with claret, anchovies, and butter. Old Isaac says the dish is too good for any but anglers or very honest men. The pike is a comparatively ugly-shaped fish; but at certain seasons is very brilliant in colour. It has been extensively distributed, and is found over the greater part of Europe, and also in America and Asia.

We come now to the perch, a well-known because common fish, about which a great deal has been written, and which is easily taken by the angler. There are a great number of species of this fish, from the common perch of our own canals and lochs to the "lates" of the Nile, or the beautiful golden-tailed mesoprius, which swims in the seas of Japan and India and flashes out brilliant rays of colour. The perch was assiduously cultivated in ancient Italy, in the days when pisciculture was an adjunct of gastronomy, and was thought to equal the mullet in flavour. In Britain, the fish, left to its natural growth and no care being taken to flavour it artificially, is surpassed for table purposes by the salmon and the trout; but perch being plentiful, afford plenty of good fishing. The perch usually congregate in small shoals, and delight in streams, or water with a clear bottom and with overhanging foliage to shelter them from the overpowering heats of summer. These fish do not attain any considerable weight, the one recorded as being taken in the Serpentine, in Hyde Park, which weighed nine pounds, being still the largest on record. Perch of three and four pounds are by no means rare, and those of one pound or so are quite common. The perch is a stupid kind of fish, and easily captured. Many of the foreign varieties of perch attain an immense weight. Some of the ancient writers tell us that the "lates" of the Nile attained a weight of three hundred pounds; and then there is the vacti of the Ganges, which is often caught five feet long. The perch, after it is three years old, spawns about May. It may be described as rather a hardy fish, as we know it will live a long time out of water, and can be kept alive among wet moss, so that it may be easily transferred from pond to pond. Its being so hardy accounts for its being found in so many northern lochs and rivers, as in the older times of slow conveyances it must have taken a long time to convey the fish to the great distances we know it must have been carried to. On the Continent, living perch are a feature of nearly all the fish markets. The fish, packed in moss and occasionally sprinkled with water, are carried from the country to the cities, and, if not sold, are taken home and replaced in the ponds. This particular fish, which is very prolific, might be "cultivated" to any extent. We do not see why a fishpond should not be as much a portion of a country gentleman's commissariat as his kitchen garden or his cow-paddock. A sizable pond can be erected at a comparatively trifling cost, and if properly stocked would yield fish all the year round. Perch are useful in more ways than are generally known. The Laplanders make glue and also jelly out of their skins. Exquisite dishes for fastidious gourmets can be concocted from their milts, and choice ornaments can be formed out of their scales. The sea perch, as it is called (the basse), may be mentioned here. Some varieties of it are very plentiful on the coast of America, where they grow to a large size, and are much esteemed for their flavour. Another variety of the perch is the common pike-perch, which might, we think, be acclimatised in our seas, where it is at present unknown, with advantage. It is common in the Danube and the Elbe, as also in the Caspian and Black Seas. It is a fish that grows rapidly and attains a considerable weight, and its flesh is most agreeable. It is surprising that no pains are taken to acclimatise new varieties of fish in Britain, although we know it could be easily accomplished. There is, for instance, the black basse of the Huron, which might be advantageously introduced; and there are many other fishes, both of the salt and fresh water, which would flourish in this country and add to our commissariat.

FRESH-WATER FISHES IN THEIR SEASON.

MARCH AND APRIL.

THE salmon, which is our most valuable individual fish, comes into season in February, and continues legally good for food for a space of seven months; the periods for its capture being defined by Acts of Parliament. By a little arrangement, however, we might have this fine red fish on our table during the other five months of the year as well. As we now know so much about the natural history of this king of the river, we ought so to arrange its growth (for there are late and early rivers, and we have seen clean fish in prime order for the table in December) as to have it fit for use as well in November as in June. The natural history of the salmon has contributed more to scientific literature, and yielded more sport to literary controversialists, than most of our other fishes put together. There have been disputes connected with every phase of its growth; and, from being a personal property of considerable value, the history of the salmon has been more carefully investigated than that of any other fish. In fact, from its large size and migratory habits, there have been better opportunities for investigating its habits than there can possibly be in the case of fish that are never known to leave the sea. Those opportunities have been taken advantage of during late years; but the popular ignorance as to its conditions of growth led at one time to the destruction of immense quantities of salmon fry, or parr, as they are called—the destroyers being ignorant of the fact that the parr was the young of the salmon in the first stage of its growth. Before the parr were discovered to be young salmon the smolt was always held to be the yearling young of that fish. For a series of years no naturalist took the trouble to watch the spawning beds or to mark how long it was ere the eggs came to life. All winter they lay, with the cold waters murmuring over them; and at last, when the tiny fish did burst from their fragile prison, they were unheeded for a year, and not till it had attained a weight of two or three ounces did the young salmon receive any attention, or have conferred upon it a name and a local habitation. The controversy about the growth of this fish, which originated through gross ignorance of its natural history, has been carried on for more than a hundred years, and is not yet quite settled, although recent experiments in salmon culture have resolved the chief difficulties of the controversy. The little fish known as the parr, brandling, samlet, &c., according to its locality, was up to a very recent period held to be a distinct animal, and not the young of the salmon at all: therefore, none of the Salmon Acts gave it any protection, it not being, according to popular idea, a fish of the salmon kind. The result was that countless thousands of the parrs were annually massacred; and this destruction had, ultimately, a most detrimental effect on future supplies of the parent fish. The first person who began the parr controversy, in its modern phase, was James Hogg, the Ettrick Shepherd. He had, while herding his sheep, many opportunities of watching the fishing streams, and, like most of his class, he wielded his fishing-rod with considerable dexterity. While fishing in the tributaries of some of the border salmon streams he had often caught the parr as it was changing into the smolt stage, and had, after close observation, come to the conclusion that the little parr was none other than the infant salmon. Mr. Hogg did not keep his discovery a secret, and the more his facts were controverted by the naturalists of the day the louder became his proclamations. He had suspected all his life that the parr were salmon in their first stage; he would catch a parr with a few straggling scales upon him; he would look at this fish and think it queer; instantly he would catch another a little better covered with silver scales, but all loose, and not adhering to the body. Again he would catch a smolt, manifestly a smolt, all covered with the white silver scales, yet still rather loose upon his skin, and these would come off in his hand. On removing these there was the parr, with the blue finger marks below the new scales; and that these were young salmon then became as manifest to the Shepherd as that a lamb, if suffered to live, would become a sheep. Whenever this conclusion was settled in his mind, the Shepherd at once proclaimed his new-gained knowledge. "What will the fishermen of Scotland think," said he, "when I assure them, on the faith of long experience and observation, and on the word of one who can have no interest in instilling an untruth into their minds, that every insignificant parr with which every cockney fisher fills his basket is a salmon lost!" After the investigations of Mr. Hogg came the more regularly conducted experiments of Messrs. Shaw and Young, who, unknown to each other, took steps for the solution of the vexed question by growing the fish from the egg in a properly-protected piece of water. We need not enter minutely into the details of these fresh trials. They were perfectly successful, and succeeded beyond question in proving that the parr was the young of the true salmon. It is curious, however, that even after these demonstrations there were still sceptics who shook their wise heads and doubted. In fact, when we consider that even Yarrell, Jardine, and Buis, along with many other authorities, had been among the opponents of the Ettrick Shepherd, we cannot wonder that less learned people doubted the proofs set forth by Messrs. Shaw and Young. Even after it was settled that parr were young salmon, another curious matter connected with the growth of the fish was discovered. Mr. Shaw asserted that the parr did not become a smolt till it was two years of age, whilst Mr. Young asserted that the time required for the change from the parr to the smolt stage, at which period the fish seeks the salt water, was only twelve months. Each party held that his view of the case was right, and it was not till the experiments in artificial breeding were commenced at the Stormontfield ponds that another complexion was given to the parr question, when it was found that one half the brood in the ponds changed to the smolt stage at the end of twelve months, and that the other half remained another year before they took on the scale of the seagoing smolt! This fact of a partial migration of the young salmon of each particular brood has never been explained; no regulating power has been found out to account for the migratory principle. At the Stormontfield breeding-ponds various experiments have been tried with a view of solving the riddle, and the eggs of a full-grown female salmon have been in vain impregnated with the milt of a tiny parr; no difference was found. In the same way various crosses of salmon and grilse were tried, but with no result bearing upon a definite solution of the question. One person who leaped to a hasty conclusion thought the shoals would be divided according to sex; but upon examination it was found that those departing and those remaining behind were indiscriminately males and females. We have therefore, as a result of this state of matters, the curious fact that the offspring of the same parents are at one and the same time parr weighing about an ounce and grilse averaging four pounds in weight!

It was at one time also doubted whether grilse were not a distinct variety of the salmon kind, and there are some who still maintain this theory; but there is no occasion for our reopening the discussion, as hundreds of experiments go to convince us that the grilse certainly become salmon. There are other controversies likewise connected with the growth of this fine fish, as—What is its

food? Where does it go to when it reaches the salt water? &c. The salmon must feed largely, for there is no other way of accounting for its rapid growth; and in the sea it no doubt finds congenial food and a plentiful supply. The old story of its rushing away to the North Pole is totally without foundation. The salmon, like all other fishes, is very local, and never goes far away from the estuary of its own particular stream. It is said to be driven from the salt water in consequence of becoming infested with some kind of vermin, which can only be killed by fresh water; and, vice versa, fresh-water lice impelling it again to seek the sea. The average period of life given to a salmon is seldom more than four years—such is the demand for the fish, and such the variety of means adopted to capture it. The eggs are deposited from October to January, and they take various periods to come to life, according to the temperature to which they are exposed: some ripen and burst the shell in ninety days, while others will require another month before they are hatched. Half the quantity hatched, for instance, last year (viz., 1863) will be descending to the sea about April or May (1864)—a few even earlier than that. These will return as sizeable grilse in June, July, and August. Next year the second moiety of the fish will depart for the sea, and come back also as grilse, whilst all that are left of last year's fish will be returning at the same time as salmon eight or ten pounds in weight! Salmon seldom now attain a weight of more than from fifteen to eighteen pounds. Long ago sixty-pound fish were by no means rare, and twelve years back salmon weighing thirty and forty pounds used frequently to be seen on our fishermen's counters. In the golden age of the fisheries salmon are said to have been very plentiful and attainable for food by all classes of the community, the price being a mere trifle; but railways now carry away our sea produce with such rapidity to far-off cities and populous towns, where there is an increasing demand, that the price has risen to such a point as to make this fish a luxury for the rich. It adds to our regret to know that this exceeding demand has led the proprietors into a system of fishing that has already exercised a fatal influence on some of the chief English salmon streams, and which is also likely to tell with fatal effect on the rivers of other countries as well. The tenants of the fisheries thought of nothing but to catch all the fish they came upon. They were only tenants, and had no care for the supplies of future seasons; it was not their interest to leave a breeding-stock for succeeding years; and so, what fish were in the river were eagerly caught. In fact, the fecundity of the salmon is so great that unthinking people have never realised the fact of its being possible to exterminate it. But if a ten-pound salmon yield 10,000 eggs, there is no guarantee that even 5 per cent of that number will reach the table as eatable fish. When we deduct the percentage of eggs that are never fructified, the quantity that never come to life, the number that is devoured by water-fowl and other enemies, it will be obvious that we obtain only a comparatively small number of fish, and of these thousands are devoured by pike, and perch, and yellow trout, and others long before they are out of their "parrool." Then, when the army of smolts enters the sea, the carnage among them is fearful, at least two-thirds of them being eaten by sea fish that are lying in wait for their arrival. It will be seen, therefore, that very few of the fry come back to their native river as grilse, and still fewer of these grilse are allowed to return again to the sea, for grilse brings nearly as good a price in the fishmonger's shop as salmon; therefore we kill the goose for the sake of the golden egg. It is in saving this waste of eggs and in protecting the young fish that there is so great an advantage in the artificial system of hatching. At Stormontfield upwards of a million eggs have been reared into life, and the young fish protected till able to fight their own battle, and with such a favourable result as already to have increased the rental of the river Tay very considerably.

Some of our anglers will not waste their time on any fish less noble than the salmon; indeed, for sport there is no fish like it. An angler on the Tay or the Tweed, or on a Welsh river, with a sixteen-pound fish at the end of his line, is not in the enjoyment of a sinecure, although he would not for any money have his work done by deputy. We have seen before now a gentleman play a fish for seven hours rather than yield his rod to the attendant gillie, who could have landed the fish in half an hour's time. It is a thrilling moment to find that for the first time one has hooked a salmon; it produces a kind of nervousness that does not at all tend to the speedy landing of the fish. The first idea is to haul our scaly friend out of the water by sheer force; but that plan must be speedily given up, for the fish makes a dash up stream that runs out the line in the style; then, when once he gets a bite of his bridle, down he comes, or away he goes sulking into some hiding-place. In a brief time he comes out again with renewed force, and dashes about till you become so fatigued as almost not to care whether you land him or not. It is impossible to say how long an angler may have to "play" a salmon or large grilse; but if he sinks himself to the bottom of a deep pool, it will likely be a business of hours to get him safe into the landing net, if he be not lost altogether, as, in his exertions to escape, he may chafe through the line, and so regain his liberty; and during the progress of the battle the angler may have to wade or be pulled into the stream once or twice, so that he comes in for a thorough ducking, and may, as we have seen, have to go home, after a hard day's work, without being rewarded by the capture of a single fish. Plenty of good salmon angling can be had in the north of Scotland, where there are always fishings to be let; and there is nothing better, either for health or recreation, than a day on a salmon stream. The plan which every angler ought to adopt on going to a strange water is to place himself under the guidance of some shrewd native of the place, who will show him all the best pools and aid him with his advice as to what flies he ought to use, and give him many useful hints on other points as well.

In former times there were more ways of killing a salmon than by angling for him. Parties used to be made up for the purpose of "burning the water," a practice which prevailed largely on the Tweed, and which afforded good rough sport. The burning took place a little after sunset, when an old boat was commissioned for the purpose, and flaming torches of pinewood were lighted to lure the fish to their destruction. The leister, a sharp iron fork, was used on these occasions with deadly power. Rude mirth and song were usually the order of the night on these occasions; and the practice, being illegal, was not without a spice of danger, or at least a chance of a ducking. Burning the water it must, however, be confessed was more a picturesque way of poaching than a means of adding legitimately to the produce of the fisheries as a branch of commerce. It would have been well for the salmon fisheries had the arts of poaching never extended beyond the rude practice we have alluded to; but now poaching has become a business, and countless thousands of the fish are swept off the breeding-beds by means of a rude net or a few blankets joined together. There is on most rivers an organised system of taking and disposing of the fish, France affording the chief outlet for this kind of food, an outlet, however, which we hope a recent Act of Parliament will effectually close up. Legislation on the salmon question has of late been greatly extended, various powerful Acts of Parliament having been passed for the better regulation of the fisheries.

FRESH-WATER FISHES IN THEIR SEASON.

MAY AND JUNE.

The salmon family embraces all kind of trout and also some of the curious fishes peculiar to Scotland—as the powan and the vendace, likewise the grayling and hebridal argentine, and, of course, the exquisite fish taken in Lochleven, as well as the pollan of Ireland and the great eriox of the Tweed; indeed, of all our fresh-water fishes, the one that is most plentiful and the one that is most worthy of notice by anglers is the trout! It can be fished for with a crooked pin in the most tiny stream, or be captured by elaborate apparatus on the great lochs of Scotland. There are so many varieties of it as to suit all tastes; there are well-flavoured burn trout, not larger than a small herring, and there are the lake-giants that, when placed in the scales will pull down a 20 lb. weight with the greatest ease. The mountain streams or lochs of Scotland, and the placid and picturesque lakes of Cumberland and Westmoreland, are the paradise of anglers. For trout fishing we would name Scotland as the king of countries. It is true the railway and other modes of conveyance have carried of late years a perfect army of anglers into its most picturesque nooks and corners, and therefore fish are not so plentiful as they were thirty years ago, in the old coaching days, when we saw a washing-tub filled in the space of half an hour with lovely half-pound trout from a few pools on a burn near Moffat; but there are still plenty of trout. Scotland is still the "land of the mountain and the flood," and there is abundance of water, for the lochs and streams of that country are numberless. One county alone (Sutherland) contains a thousand lochs, and one parish in that county has itself two hundred sheets of water, all of them abounding with the finest trout, affording rich sport to the angler, and rewarding those who persevere with rich baskets of fish. At the same time the physical exertion undergone by the angler flushes the cheek with the hue of health, and imparts to the human frame a strength and elasticity known only to those who are familiar with country scenes and pure air. May and the May-fly are said to inaugurate the angler's year, for although a few of the keenest sportsmen keep on angling all the year round, most of them lay down their rod about the end of October, and do not think of resuming it till they can smell the sweet fragrance of the advancing summer. Although few of us busy Englishmen can forestall the regular holiday period of August and September, yet there are some who manage to run to the country at this charming season, when the days are not too hot for enjoyment nor too short for country industry. In August and September the landscape is preparing for the sleep of winter, whilst in May it is being robbed by nature for the fêtes of summer, and, despite the sneers of some poets and naturalists, is new and charming in the highest degree. Town-living people should visit the country in May, and see and feel the charms of its scenery in all its freshness and fragrance.

"What," it has been asked, "is a Scottish stream without its trout?" Doubtless, if a river has no trout it is without one of its greatest charms, and it is pleasant to record that, except in the neighbourhood of very large seats of population, trout are still plentiful in Scotland, and, indeed, we have heard of a noted angler who can fill his basket even near the large cities; but then it is given to him to be a man of great skill in his vocation, and, moreover, capable of instructing others, for he has written a work that has revolutionised the art and practice of fishing. The place to try an angler is a fine border stream or a grand Highland loch; but we shall not at present presume to give minute directions as to how to angle; for an angler, like a poet, must be born: he can scarcely be bred; and no amount of book lore will confer upon a man the magic power of luring the wary troutlet from its crystalline home. The best anglers, and we may also add poachers, are the gypsies. They can raise a fish when no other class of human beings will move them. If encamped near a stream the gipsy band are sure to have fish as a portion of their daily food; and how beautifully they can broil a trout, or boil a grilse those only who have had the good fortune to dine with them can say. Your gipsy is the best fisher we know, and the attributes of a good angler are like those of a poet—they can be felt, but are only seen when he is in action. Have we not seen the veteran Dryden, with only half a rod, so to speak, taking out his fish on some fine border stream by the minute—that is to say, eight dozen in a couple of hours; while men with elaborate fishing-machines, fitted up with costly tackle, industriously flogged the water without obtaining more than a distant nibble. It is all in vain for men to fancy that a suit of new Tweeds and a fair acquaintance with Stoddart and Stewart and a large amount of angling "slang," will make them fishers. There is more than that required. Besides the natural taste, there is wanted a large amount of patience and skill; and the best place to acquire these best virtues of the angler is among the brawling hill streams or on the expansive bosom of some of the great Cumberland lakes while in search of the delicious char. A congregation of fishes brought together by means of a scatter of food, and then taking advantage of the piscine convention to kill and slay, is no more angling than a battue is sport. An American that we have read about has a fish manufactory in Connecticut, where he can shovel the animals out by the hundred; but then he does not go in for sport, his idea is money. To come back, however, to the trout; that particular fish is the stock-in-trade of the streams and lochs of Scotland; but it may be hinted, for the benefit of strangers, that in coming to fish a strange water they ought to consult with the "natives" of the district as to what kind of fly they ought to use, and what particular pools or runs of a river they should cast their lines over. Many is the time we have flogged away at a hole that was troutless, and oft have we anatomised our bad luck through not knowing what kind of insect would please the dainty palates of some of our refined and pinky trout. There are a thousand thousand streams in this Great Britain, Ireland, and Wales where we can fish; but it is not our purpose to dogmatise on the best whereabouts to send the angler. There are the Tay and the Tweed, with their wealth of affluents; and there are rivers further away, so that on his second day from London an active angler may be whipping the Ness; and then there is the Dove, the Severn, and, for stay-at-home fellows, the Thames. There are trout to be had in the Thames, and from what frank Dr. Buckland tells us, we may believe that in a year or two that stream will contain finer trout than any river in all the three kingdoms; but we fancy, for the monsters of the race, that we must still resort to Scotland. In Loch Awe, for instance, there is the great lake trout, which, combined with the beauty of the scenery, has conspired to draw to the neighbourhood some of our best anglers. The trout of Loch Awe are described as being very ferocious, hence their scientific name of *Salmo ferox*. This trout grows to a large size, individuals weighing more than twenty pounds having been frequently caught. Its flavour, however, is against it: the flesh is coarse, and of a bad colour. This trout is found in one or two other lakes besides Loch Awe; in fact, it is found in most of the large and deep lochs of Scotland. It was discovered scientifically about the end of the last century by a Glasgow merchant, who was proud of sending samples of it to his friends, as a proof of

his prowess with the angle. The usual way of taking the great lake trout is to engage a boat to fish from, and which must be rowed gently through the water. The proper bait is a small trout, with at least half a dozen hooks projecting from it; and the tackle requires to be prodigiously strong, as the fish is a powerful one, although not quite so active as some others of the trout kind, but it roves about in these deep waters, enacting the part of the bully and the cannibal to all lesser creatures, driving before it even the hungry pike. Persons residing near the great lochs capture these trout by setting night-lines for them. As has been already mentioned, they are exceedingly voracious, and have been known to be dragged for long distances, and then, having lost their hold of the bait, have seized it again with the greatest avidity, and so been finally captured. Another speciality among Scottish fresh-water fishes is the Lochleven trout, which is peculiar to this one lake. It is near Kinross, in Fife, and in which is the only fresh-water fish which is commercially valuable, always, of course, excepting the andromadous salmon. Little has or can be said by naturalists about this fish, except that it is a "speciality" among trouts. Some very learned people, with whom we take leave to differ, consider it to be identical with *Salmo fario*. The trout of Lochleven is narrower; never in any of our piscatorial wanderings have we found its equal in colour, flavour, or shape. It has been compared with the *Fario tenanus* of the Lake of Geneva, and it must be allowed that there is wonderful little difference between these two fishes. The Lochleven trout has never been successfully transplanted to any other water, although the experiment has been more than once tried; in fact, it would be impossible to acclimatise this trout, for, in our opinion, it is the feeding-ground which gives it its rich colour and fine flavour, and, on account of the partial drainage of the loch, the trout are said to be deteriorating in quality. There can be no doubt that fish, like cattle, are subject to the influences of food and locality. Where a trouting stream flows through a rich and fertile district of country, with abundant drainage, the trout are usually well conditioned and large, with an unexceptionable flavour; on the contrary, when the district through which the stream flows is poor and rocky, with no rich drains carrying food into the stream, the fish will, as a matter of course, be lanky and flavourless; they may be numerous, but they will be of small size. This is well exemplified in the case of the Lochfyne herrings, which are exquisite in flavour when compared with those taken in such open parts of the sea as Wick Bay. The difference is ascribed to the fact of Lochfyne being so narrow as to be quite overshadowed with overhanging banks, and consequently affording a greater abundance of richer kinds of food than a large expanse of open sea can yield. The land-locked bays of Scotland afford richer-flavoured fish than the wider expanses of water, where the finny tribe, it may be, are much more numerous, but have not the same variety of food. Nothing is so certain as this, that a given expanse of water will only feed a certain number of fish; if there be more than the feeding-ground will support, they will be small in size, and if the trout again be very large ones, we may take it for granted that there is less than the proper quantity. But, of course, private ponds may be kept up to a fine pitch by feeding the fish. We need not go over all the different varieties of fresh-water trout seriatim, for their name is legion, and every book on angling contains lists of those that are peculiar to the districts treated upon. It is surprising that no effort has been made to cultivate our great lochs on the artificial plan now coming into prominent notice. Lochleven trout, for which the demand greatly exceeds the supply, might be much more plentiful than they are at present, and every loch in the country might be made to yield a large supply of palatable fish food; the eggs might be nursed to life in breeding-boxes, and the fish be protected in ponds, till able to take care of themselves. As an instance of what can be done in trout-feeding, we may briefly describe the pond at Wolfsbrunnen, on the Rhine, which is worth seeing if it still exist; and the landlord of the little inn near at hand will not only show it, but capture and fry a dish of the trout on the shortest notice. This pond is formed by damming up the waters of a small affluent of the Neckar, near the ruins of the ancient castle of Heidelberg. The bed of the rivulet has been divided into three ponds, each separated from the other by means of an iron grating. The trout spawn naturally in the upper part of the water, and the young fish, in the course of time, find their way into the first pond. Various apparatus of wooden boards have been devised for the protection of the fry, and large trees have been planted on both sides of the ravine, which throw a fine shadow over the water and beautify the spot. The fish thus protected are daily fed with small fishes caught in the Neckar, and with other substances thrown to them by the custodian of the ponds; and under this treatment, and in corroboration of what we have already said, they speedily attain a large size—six pounds in weight not being thought at all extraordinary. The water in the ponds being exceedingly pure, the motion of the trout can be observed, and it is curious to note their habits; they are much like those of the human race who come to look at them—some are brisk and active, some lazy and indolent. When a small fish is thrown into the pond it does not fall to the nearest trout; some large fellow, a monopolist, will dart with lightning speed and seize it, and, conveying it defiantly under the bank of the pond, or beneath one of the sheltering boards, will eat it at its leisure. This suite of ponds is well worth a visit by persons who are, at any rate, "doing" Heidelberg. A pond for salt-water fish, but on too small a scale for breeding purposes, may be here referred to. It is called the Logan fishpond, and is situated in Wigtonshire. It communicates with the sea and is used as a store-pond, to admit of fish being always procured, no matter whether the weather be coarse or fine.

The scene chosen by our Artist for his drawing of the trout and charr is one of the English lakes. It would be superfluous to descant at the present day on the beauties of Windermere, or the general lake scenery of Cumberland and Westmoreland; it has been described by hundreds of tourists; and its praises have been sung by its own poets—the lake poets! It is with its fish that we have business, and honesty compels us to give the charr a bad character. It is not a great fish, so far as sport is concerned; nor is it great in size, or, in our opinion, rich in flavour. But potted charr is a rare breakfast delicacy. This fish, which is said by Agassiz to be identical with the ombre chevalier of Switzerland, is rarely found to weigh more than a pound; specimens are sometimes found exceeding that weight, but they are scarce. The charr is found to be pretty general in its distribution, and is found in many of the Scottish lochs. It spawns about the end of the year, some of the varieties depositing their eggs in the shallow parts of the lake, while others proceed a short way up some of the tributary streams. In November great shoals of charr may be seen in the Rivers Rothay and Drethay, particularly the latter, with the view of spawning. The charr, we are told by Farrell, afford but scant amusement to the angler, and are always to be found in the deepest parts of the water in the lochs which they inhabit. "The best way to capture them is to trail a very long line after a boat, using a minnow for a bait, with a large bullet of lead two or three feet above the bait to sink it deep in the water; by this mode a few charr may be taken in the beginning of summer, at which period they are in the height of perfection, both in colour and flavour."

FRESH-WATER FISHES IN THEIR SEASON.

JULY AND AUGUST.

THE accompanying scene will be at once recognised by our home anglers—it is Teddington Lock, on the Thames. We have been talking grandly about highland streams and northern lochs, but the river scenery of England is, in its way, equally beautiful, and no river is more charming than the Thames. It is a classic stream, and its praises have been sung by the poets and celebrated by the historian. After Mrs. S. C. Hall and Thorne, it were vain to repeat its praises:—

Glide gently, thus for ever glide,
O Thames! that anglers all may see
As lovely visions by thy side,
As now, fair river, come to me.
Oh, glide, fair stream, for ever so
Thy quiet soul on all bestowing,
Till all our minds for ever flow
As thy deep waters are now flowing.

The Thames takes its rise in Gloucestershire, about three miles from the town of Cirencester; and at that place, and for some miles of its course, it is known as the Isis, and not till the waters of the Thame join it in Oxfordshire is it known as the Thames. This celebrated river is small at first, and flows through some beautiful scenery and highly-cultivated country; its banks are studded with castles and palaces, beautiful towns, and snug villages; while well-stored gardens and cultivated fields give smiling evidence of plenty all along its course. When we consider that the Thames flows past Windsor, Hampton Court, and Richmond, that it laves the grassy lawns of Twickenham, watters the gardens of Kew, and that it bears upon its bosom the gigantic commerce of London, we can at once realise its importance, and can understand its being called the King of British rivers, although it is neither so long, nor does it contain so voluminous a body of water, as some other of our British streams. The total length of the River Thames is 215 miles, and the area of the country it waters is 6160 square miles. It has as affluents a great many fine streams, including the River Loddon, as also the Wey and the Mole. We are not entitled to consider it here in its picturesque aspects—our business with it is piscatorial, and we are able to certify that it is rich in fishes of a certain kind—

The bright-eyed perch with fins of Tyrian dye,
The silver eel in shining volumes rolled,
The yellow carp in scintils bedropp'd with gold,
Swift trout diversified with crimson stains,
And pike, the tyrants of the watery plains.

Considering that all its best fishing points are accessible to an immense population, many of whom are afflicted with a mania for angling, it is quite wonderful that there is a single fish of any description left in it; and yet, but a year or two ago, the "pen of the war" bagged a seven-pound trout near Walton Bridge! We may be allowed just to run over a few Thames localities, and note what fish may be taken at them. Above Teddington at different places an occasional trout may be pulled out, but, although the finest trout in the world may be got in the Thames, they are, unfortunately, so scarce in the meantime, that it is hardly worth while to lose one's time in the all but vain endeavour to lure them from their home. Pike fishing or trolling will reward the Thames angler better than trouting. There are famous pike to be taken every here and there—in the deep pools and at the weirs, and, as the fish is voracious, a moderately good angler, with proper bait, is likely to have some sport with this fish. But the speciality of the Thames, so far, at least, as most anglers are concerned, is the quantity of fishes of the carp kind which it contains, as also perch. This latter fish may be taken with great certainty about Maidenhead, Cookham, Pangbourne, Walton, Labham, and Wallingford Road; and a kindred fish, the pope, in great plenty, may be sought for in the same localities. Then the bearded barbel is found in greater plenty in the Thames than anywhere else, and, as it is a fish of some size and of great courage, it affords fair sport to the angler. The best way to take the barbel is with the "Ledger" (see the "Thames Angler, by Arthur Smith"), and the best places for this kind of fishing are the deeps at Kingston Bridge, Sunbury Lock, Halliford, Chertsey Weir, and in the deeps at Bray, where many a time and oft hath good hauls of barbel been taken. The best times for the capture of this fish are late in the afternoon or very early in the morning. Chub are also plentiful in the Thames, and Mr. Arthur Smith, who wrote a guide to Thames anglers, specially recommended the island above Goring for chub, also Marlow and the large island below Henley Bridge. This fish can be taken with the fly, and gives tolerable sport. The roach is a fish that abounds in all parts of the Thames, especially between Windsor and Richmond, and in the proper season (see September and October) it will be found in Teddington Weir, Sunbury, Blackwater, Walton Bridge, Shepperton Lock, the Stank Pitch at Chertsey, and near Maidenhead, Marlow, and Henley Bridges. At Teddington we may state that the dace is abundant, and there is plenty of little fish of various kinds that can be had as bait at most of the places we have named. In fact, on the Thames there is a superabundance of sport of its kind, and plenty of accommodation for anglers, with wise fishermen to teach them the art, and, although the best sport that can be enjoyed on this lovely stream is greatly different from the trout fishing of Wales or Scotland, it is good in its degree, and tends to health and high spirits, and an anxiety to excel in his craft, as one can easily see who ventures by the side of the water about Kew and Richmond.

With hurried steps
The anxious angler paces on, nor looks aside,
Lest some brother of the angle, ere he arrive,
Possess his favourite swim.

In our division for September and October the reader will find a few words about the natural history of the carp family, which is a numerous one, and, if not so interesting as the Salmonidae, it deserves some consideration in an economical point of view.

Dr. Buckland, in a recent lecture on fish-hatching, told us what had been achieved on the Thames in respect of adding to its funny population; and who knows, when we subtract the sewage of the great city from the river, but that we may again be able to feast on that inimitable fish luxury, the Thames salmon—an impossibility, we should fancy, in the present polluted state of the river. The Doctor's figures as to fish turned into that river last year are as follows:—

Rhine salmon	..	..	..	..	..	6,000
English trout	..	..	..	..	..	22,000
French trout	..	..	..	..	..	2,000
Ombre chevalier	..	..	..	..	..	3,000
Grayling	..	..	..	..	..	2,000
Total	..	..	..	..	..	35,000

These fish were hatched at Hampton, near Hampton Court, in two sets of boxes erected in the greenhouse of Stephen Ponder, Esq., and the experiment has proved so successful, as to induce a belief that we shall one day have back in the Thames the famous salmon for which it was once so celebrated! We are not sanguine as to this. *Salmo Salar* must visit the sea, and, how it is ever to go and return through the liquid filth of London is a puzzle that we cannot solve. When London is properly drained and the sewage not sent into the river, it will be time enough to hope for the success of such an experiment.

In this chapter, before going further, we intend to say a few words about the gastronomy of fish. It is quite possible to have one's fish cooked by the river side; and, as we have been dwelling on river scenery, nothing will be easier than to introduce into the foreground of our picture the gipsy kettle on its tripod, over a brisk fire of turf or drift wood gathered on the river's bank. A picnic or fisher's camp is nothing without its living fire for tea or toddy. Long ago the Lords of Lovat used to cook a kettle of salmon at the river side. There is a story told of how salmon were boiled at the fall of Kilmorac, a noted salmon leap on the Beaulieu, in Inverness-shire. An immense boiler used to be erected at these falls, and kept at the boiling point by means of a brisk fire, and the fish, in their endeavour to attain the upper waters, used to leap right into the kettle; so that visitors to these falls were enabled, for luncheon, to partake of salmon, boiled to a nicety, and served up with the national sauce—whisky. Few of our town-dwellers ever feel the real flavour of a fish for want of knowing how to cook it, and also from not obtaining it fresh enough. The real Tweedside way of cooking a salmon, for instance, produces a dish fit for any Lord Mayor's banquet. There are several recipes for this pretty kettle of fish; but we prefer Mr. Stoddart's, which we give literally:—Crimp the fish immediately on its being killed, making the cuts slantwise, and at a distance of two inches from each other; separate also the gills, and, holding the fish by the tail, immerse its body in the stream for a space of three or four minutes, moving it backwards and forwards, so as to expedite the flowing off of the blood. In the meantime, if you have not previously done so, give orders to have the fire briskened, and the pot or cauldron filled, or nearly so, with cold spring water, which set on to boil. The fish, after being crimped and bled as directed, must then be conveyed to a table or kitchen dresser, and there be thoroughly cleansed inside. This done, divide it through the backbone into cuts or slices, of the slices already indicated in the crimping, throwing them into a large basin as you proceed. When the water in the kettle is at the boiling point, convey to it a large bowlful of kitchen salt, and it is necessary not to scrimp this part of the material, or you ruin the fish. Allow the water thus checked again to bubble up, and then pop in the cuts of salmon, head and all. Several minutes will elapse before the liquid contents of the pot once more arrive at the boiling point; whenever they do so, note the exact time, and when you do, touch up the fire and make it a brave one. For all fish under nine pounds weight allow ten minutes brisk boiling; and when exceeding nine pounds grant an extra minute to every additional pound. When ready, serve hot along with the brine in which the fish has been boiled; and, N.B., be sure and keep the brine for future uses of the same kind. This is salmon in perfection, and constitutes the veritable kettle of Tweedside such as frothed and foamed in the days of the merry monks of Melrose and Kelso. Salmon is usually spiced in the eating by being saturated with melted butter, or some other gravy, as if the fish were not rich enough in itself, and thoroughly independent of all such aids. Long ago, when there was only a local demand for fresh salmon—in the days, we mean, when there were no railways to whirl away the produce of the deep with magic celerity to London or Manchester—pickled salmon was the usual shape in which this fish was provided, and immense quantities of it were sent over the country packed in kits, and it was esteemed a great delicacy. The way of cooking it was something similar to the plan of boiling the Tweedside kettle, vinegar, of course, being poured over the kit, in order to preserve the contents as long as possible. The fish eaten out of the pickling-kettle is a superb treat, having a flavour that fish sent to table in the usual way never yields. Another way of preparing salmon is to "kipper" it, and kippered salmon is an excellent dainty for the breakfast-table. Dealers in fish kipper those salmon which they are unable to sell in a fresh state. When a salmon is to be kippered, the fish must be cut up at the back, and the bone must be neatly taken out; it must then be well rubbed with equal quantities of sugar and salt, to which has been added a very little lump of saltpetre; pepper may also be added. Let the fish lie between clean boards, on which place a heavy weight, or, what is still better, stretch it out with pins across it, and hang it up to smoke. For use, it must be cut into thin streaks and then broiled, when it forms a famous addition to that rare selection of good things—a Scotch breakfast. We have seen a grise cut up and cooked in an old kettle at the waterside; we have also seen salmon steaks splendidly cooked over the fragments of a wood fire; and we have asked half a dozen perch in an extemporised oven made of waterside stones. We placed the fish on one flat stone and built the others over it, heaping over all a brisk fire of wooden debris gathered on the spot. Here is an angler's simple recipe for making ready a whittling or good trout by the river side:—Kindle a fire of dry wood. Take the fish just as it is landed from the water, put a pinch of salt into its mouth, then roll it up in two or three folds of paper—an old newspaper will do, taking care to twist the ends very tightly together. Steep the little packet in the river till it is thoroughly saturated, then lay it among the embers of your fire. When you see that the paper is becoming thoroughly well charred you may consider that the fish is thoroughly well done; dish up, therefore, at once, and set to work; the meal will be savoury and acceptable. Of course, the fish has not been cleaned or drawn; *n'importe*, the intestines will not in the least degree injure the flavour. Angling parties ought always to carry some kind of vessel in which to boil or fry a trout; it affords the means of enjoying a fish dinner while the fish are fresh and highly palatable. There is no scene so joyous as to see a few jolly anglers at luncheon by the river side—the blazing fire, the simmering kettle, the free-and-easy attitudes of the party make up a pretty picture; and the joke and anecdote go their round, causing the scene to echo with hilarious song and story. When the angling party do not picnic at the immediate scene of their piscatorial triumphs there is usually had by a nice clean "public," where a pretty parlour and good ale may be obtained, and where the landlady is a famous cook. There are many such places on the Thames, and in one or other Mr. Arthur Smith's angler's dinner may be enjoyed. It consists of fried gudgeon, baked pike, a little ham and peas, concluding with an apricot tart. Then, perchance, some of our readers, whilst fishing in Scotland, may have put up for a day or two at Mrs. Richardson's (better known as "Tibbie Shiel's"), at lone St. Mary's, and may have been regaled with her homely but healthy fare, and have heard her choice anecdotes of Christopher North, the Ettrick Shepherd, and Walter Scott. There is no place like Tibbie's for passing, in self-communion, a thoroughly rural Saturday and Sunday amid the great solitudes of Nature. There is nothing of art at hand but the monument to "Jamie Hogg."

FRESH-WATER FISHES IN THEIR SEASON.

SEPTEMBER AND OCTOBER.

THE carp family is very numerous, embracing the fishes illustrated in July and August as well as those of September and October; and we may, perhaps, be here allowed to state, in admiration of the power which illustrates this Almanack, that it is not an easy matter to paint a fish so accurately to transmit to canvas its exquisite shape and glowing colours. The moment it is drawn from out its own element the shape alters and the colours fade; and in different localities the fish have, like the chameleon, different colours, so that the artist must have a quick eye and a responding hand to catch the rapidly-fleeting hues. Nothing, for instance, can be more beautiful than to watch the hauling of a drift of herring nets. As breadth after breadth emerges from the water, the magnificent colours of the fish flash with ever-changing hues upon the eye, a wonderful pantomimic mixture of glancing blue and gold, and silver and purple, blended into one great burning glow of harmonious colour. But, alas for the painter! unless he can instantaneously fix the burnished mass, the light of its colour will be extinguished, its beauty be dimmed long before the boat has time to reach the quay. The brilliant and gaudy fishes of the tropics are indeed gorgeous, as is the plumage of tropical birds; but for fine taste and beautifully-blended colour they are not to be compared to the common herring of our British waters. There is one of the carp family which is of a beautiful colour, and with which all are familiar—we mean the golden carp, which may be seen floating in its crystal prison in nearly every home of taste, and which swarms in the ponds at Hampton Court and in the tropical waters of the Crystal Palace at Sydenham. These gold and silver fish are supposed to be natives of China, whence they were introduced into this country by the Portuguese about the end of the seventeenth century, and have become, especially of late years, so common as to be hawked about the streets for sale. In China, as we have read, every person of fashion keeps goldfish by way of having a little amusement. They are contained either in the small basins that decorate the courts of the Chinese houses or in porcelain vases made on purpose; and the most beautiful kinds are taken from a small mountain lake in the province of Che-Kyang, where they grow to a comparatively large size, some attaining a length of eighteen inches and a comparative bulk, the general run of them being equal in size to our herrings. During the proper season the spawn of the golden carp is carefully collected and exposed for sale, and numbers of boats may be seen on the rivers and canals waiting to purchase it. These lovely fish afford great delight to the Chinese ladies, who tend and cultivate them with great care. They keep them in large porcelain basins, and a common earthen pan is generally placed at the bottom of these in a reversed position, and so perforated with holes as to afford shelter to the fish from the heat and glare of the sun. Green stuff of some kind is also thrown upon the water to keep it cool, and it (the water) must be changed at least every two days, and the fish, as a general rule, must never be touched by the hand. Great quantities of goldfish have been bred in ponds adjacent to factories where the waste steam being let in kept the water at a warmish temperature. In England the golden carp usually spawns between May and July, the particular time being greatly regulated by the warmth of the season; the time of spawning may be known by the change of habit which occurs in this fish. It sinks at once into deep water instead of basking on the top, as usual; previous to which the fish are restive and quick in their movements, throwing themselves out of the water, &c. It may be stated here, to prevent disappointment, that the golden carp never spawns in a transparent vessel. When the spawn is hatched the fish are very black in colour, some darker than others: these become the golden-coloured ones; while those of a lighter hue become silver. As is the case with the salmon, it is some time before this change occurs, some colouring at the end of one year, and some not till two or three seasons have come and gone. These beautiful prisoners seldom live long in their crystal cells, although the prison is beautiful enough, one would fancy:—

I ask, what warrant fixed them (like a spell
Of witchcraft fixed them) in the crystal cell;
To wheel with languid motion round and round,
Beautiful, yet in mortal darkness bound?
Their noses, perhaps, our slightest footsteps near'd,
Or their quick sense our sweetest music fear'd;
And whither could they dart, if seized with fear?
No sheltering stone, no tangled root was near.
When fire or taper ceased to cheer the room,
They were away the night in starless gloom;
And when the sun first dawned upon the streams,
How faint their portion of his vital beams!
Thus, and unable to complain, they faded,
While not one joy of ours by them was shared.

Goldfish ought never to be purchased except from some very respectable dealer. We have known repeated cases where the whole of the fish bought have died within an hour or two of being taken home. These golden carp which are reared for sale are usually spawned and bred in warmish water, and they ought in consequence to be acclimated or "tempered" by the dealer before they are parted with.

Returning to the common carp, we may speak of it as being a most useful pond fish. It is a sort of vegetarian, or, at any rate, we may class it among the least carnivorous fishes; it feeds chiefly upon vegetables or decaying organic matter, and very few of them prey upon their kind; while some, it is thought, pass the winter in a torpid state. There is a rhyme which tells us that—

Turkeys, carp, hops, pickered, and beer,
Came into England all in one year.

But this couplet must, we think, be wrong, as some of these items were in use long before the carp was known; indeed, it is not exactly known when this fish was first introduced into England, or where it was brought from, but we think it extremely possible that it was brought from Germany. In ancient times there used to be immense ponds filled with carp in Prussia, Saxony, Bohemia, Mecklenburg, and Holstein, and the fish was bred and brought to market with as much regularity as if it had been a fruit or a vegetable. The carp yields its spawn in great quantities, no fewer than 700,000 eggs having been found in a fish of moderate weight (10 lb.); and, being a hardy fish, it is easily cultivated, so that it would be profitable to breed in ponds for the fish-markets of populous places, and the fish salesmen assure us that there would be a large demand for good fresh carp. It is necessary, according to the best authorities, to have the ponds in suites of three—viz., a spawning-pond, a nursery, and a receptacle for the large fish, and to regulate the numbers of breeding fish according to the surface of water. It is not our intention to go minutely into the construction of fishponds; but we may be allowed to say that it is always best to select such a spot for their site as gives the engineer as little trouble as possible. Twelve acres of water divided into three parts

would allow a splendid series of ponds, the first to be three acres in extent, the second an acre more, and the third to be five acres; and here it may be observed that, with water as with land, a given space can only yield a given amount of produce, therefore the ponds must not be overstocked with brood. Two hundred carp, twenty tench, and twenty jack per acre is an ample stock to begin with. A very profitable annual return would be obtained from these twelve acres of water; and, as many country gentlemen have even larger sheets than twelve acres, we recommend this plan of stocking them with carp to their attention. There is only the expense of construction to look to, as an under-keeper or gardener could do all that was necessary in looking after the fish. A gentleman having a large estate in Saxony, on which was situated no less than twenty ponds, some of them as large as twenty-seven acres, found that his stock of fishes added greatly to his income. Some of his carp weighed fifty pounds each, and, upon the occasion of draining one of his ponds, a supply of fish weighing five thousand pounds was taken out; and for good carp it would be no exaggeration to say that sixpence per pound weight could easily be obtained, which, for a quantity like unto that of this Saxon gentleman, would amount to a sum of £125 sterling. Now, we have the authority of an eminent fish salesman for stating that ten times the quantity here indicated could be disposed of among the Jews and Catholics of London in a week, and, could a regular supply be obtained, an unlimited quantity might be disposed of.

As showing what can be done in the way of growing pond fish, we may state that near Brussels there are several ponds for rearing the kind of fish we have been alluding to. They are the property of Mr. Malby, and we here transcribe, but not literally, the following account (by Mr. Simeon) of some of the operations performed on that gentleman's fish-lakes of La Hulpe and Boisfuit. Although the proprietor has a pretty good supply of water for these ponds, in fear of the qualities of the streams being different, he exchanges his fish from one lake to the other every year, transporting the smaller fish from Boisfuit to La Hulpe, and vice versa, an operation which is easily effected by means of large barrels filled with water. The jolting of the cart keeps the fish lively, and a wisp of straw at the bung-hole admits a plentiful supply of air. The effect which such a change has upon Jack is very remarkable. Mr. Simeon, who is well acquainted with the facts, tells us that the increase in their weight after removal is about ten pounds a year! In 1856, Mr. Malby marked and transferred from the large lake at Boisfuit to the pond of La Hulpe forty-five 2-pound jacks. After being eighteen months in the latter pond they were found to have attained a weight of from fifteen to twenty pounds. This increase in the size was so sudden and unexpected that nearly all the smaller fish were killed by the jack before they could be removed to some of the smaller ponds. "In the beginning of 1857 Mr. Malby had purchased and turned into the lake at Boisfuit 900 carp of a particularly good breed, weighing one with another a pound each; but of these, when the water was let out in the month of October, not a single one was to be found, the jack not having suffered a solitary individual to escape them. Since that time Mr. Malby has allowed no jack to be put into his water as stock above a pound in weight, which (as younger fish do not gain weight so fast) will not increase in a year to more than about three or four pounds. It is only after attaining that weight that their growth becomes so astonishingly rapid. In the lake at Boisfuit jack, perch, and white fish breed fast, but the fish born in that lake do not increase so fast by two-thirds as those born in La Hulpe; so that, although their transport from the one to the other is expensive, yet it is made up for by the increase of weight in the fish transported."

The carp spawns about the end of May, and the eggs that escape the animals that prey upon them become attached to weeds and pieces of wood, and so, in time, get hatched; but, although large quantities of them are deposited, a very great percentage, as is the case with most other fishes, never comes to light. The carp must have room to grow, and it grows much more freely in some waters than in others; in Scotland it does not thrive at all, we cannot say for what reason. The carp is not so rapid in its growth as some of the other fishes we have been describing, although quite rapid enough to be profitable, as they grow at least half a pound a year; and specimens of 20 lb. and 30 lb. weight are by no means rare. They attain a great age if not disturbed, specimens having been known that were more than a century old. On the estate in Saxony to which we have referred the proprietor had breeding carp that were old fish when he bought the estate, and he had been in possession of them for fifty years. The carp is greatly indebted to the cook for the good appearance he makes at table. In our opinion the flavour and quality of the fish, considered gastronomically, are by no means exquisite, when compared with other fishes. Isaac Walton says that angling for carp requires no end of patience; and again, when a net is used, there is a difficulty, as the fish bury themselves in the mud. In the Thames there are specimens of the "crocodile," or, as the fishermen call it, the German carp, to be found; and the gibel, or Prussian carp, is pretty common all over England.

Roach are in fine season in October and November. It is a pretty fish, with a bright red eye, fins tipped with red, and brilliant scales of silver. It is a very foolish fish, and is easily taken by means of ground bait. We hear of great shoals of this fish inhabiting Loch Lomond and some other waters in Scotland; but, from all we can learn, we may look upon the home of the roach, so far as the angler is concerned, as being the Lea or the Thames; and the roach, it may be stated, is eminently a fresh-water fish. As to the Loch Lomond roach, Dr. Parnell found that it left the loch in great bodies to ascend the tributary streams in order to spawn; and that during this period, which is rarely prolonged beyond three days, the rivers literally swarm with them, and on such occasions immense quantities are taken by the poor people for food in baskets and other utensils; and it has been noticed by anglers that when these fish are on the march, so to speak, no other kind can be caught, because they are all gorged with the spawn of the roach. The barbel and the dace are also members of the carp family, and the former is sometimes called the bluish-white carp, and is a very handsome fish, and also a prolific one. It spawns in May or June, and, in course of time, grows to a large size, specimens having been taken which weighed 20 lb. Dace are in season from August to April, and afford tolerable sport to anglers who don't know any better; and the same may be said, generally, of the carp family. There is the gudgeon, for instance, which is known as the silvery olive carp: it will take any sort of bait, so that a mere child may capture it.

His bait the least red worm that may be found,
And at the bottom it doth always lie,
Whereat the greedy gudgeon bites so sound
That hooks and all he swalloweth by and by.

Gudgeons were, and indeed are still, so numerous that it was at one time supposed that they spawned twice a year. This arose, no doubt, from the fact of the fish of different waters spawning at different times. Every river has its own season; some are earlier than others—some later. Hence, if a proper study of the different spawning seasons of all our British rivers was entered into we might have clean salmon and other wholesome fish all the year round.

FRESH-WATER FISHES IN THEIR SEASON.

NOVEMBER AND DECEMBER.

THE grayling, as may be seen from our Drawing, is a delicate but beautiful fish. The grayling possesses more than usual interest just at present from the many successful attempts which are being made to acclimatise it in rivers to which it has hitherto been a stranger. It is supposed by some writers on natural history to have been originally introduced into British rivers by the monks. There is every probability of this having been the case; indeed, from what we know now of pisciculture, we can readily guess how the feat was accomplished, although Yarell and others thought that the fish was too delicate to bear removal. The ancients were adepts in the art of propagating fish, and able to transport the ova to long distances, and so people rivers and ponds that had hitherto only contained common trout, or perhaps eels and carp, with the finest kinds of the Salmonidae. In Scotland, for instance, there are some mysterious fish, the presence of which in the lochs of that country cannot be otherwise accounted for than by their introduction from some of the Continental fish-preserves. The Lochleven trout we need not again revert to, as it, we think, owes its peculiar flavour and fine colour to the kind of food to which it has access. But the vendace of Lochmaben deserves some little attention. So far as we know, this fish is not found elsewhere than in Dumfriesshire. The history of this mysterious fish is that it was introduced to this country by Mary Queen of Scotland from France or Italy. The vendace is called by the common people a fresh-water herring, and in general appearance it is not unlike the *Clupea harengus*, and it is also remarkable that in some of their habits vendace very much resemble herrings. They spawn about the commencement of November; and at that period they gather into shoals, and occasionally rise to the surface of the water in the same manner as the common herring, making at the same time a similar popping noise by their rise and fall in the water. The vendace is a remarkably tender fish, very prolific, and very shy in its habits, requiring to be caught with a net; and when once taken from the water its death is certain, even if it be immediately restored to its native element. This fish is known by naturalists to be so tender that it could not bear transportation even the length of a few miles, and it must, therefore, have been introduced into Lochmaben by means of its spawn. The late Dr. Knox gave us some interesting information about this fish; but most of it is too scientific to be stated in these pages; and in some of his disquisitions he has gossiped pleasantly enough of the "vendace," as the country people call the fish. Shorn of its mystery, it is still fished at stated intervals, and eaten at homely festivals, got up for the occasion much in the same way as people go down to Blackwall, or Greenwich to eat whitebait. It brings the country folks together for a "jollification," suspends the little rustic animosities which lairds and farmers indulge in, and benefits the fairs. The vendace is a moderately good fish to eat, but in no way particular as to flavour; and the persons who introduced it into Lochmaben may have failed to take into account that it was being brought to a very different feeding-ground from that which it enjoyed in its Continental home. The professed naturalist, it may be remarked, arranges the vendace in the family of the Corrigoni. Another fresh-water herring may be here alluded to—viz., the powan of Lochmond, which is also worthy of notice as one of the specialities of fish peculiar to Scotland. The powan, as it is called by Pennell, is classed among the Salmonidae, and is found in great quantities in the lochs we have mentioned. Although we have once or twice seen a few powan taken by clever anglers, with a small artificial fly, the fish is usually caught by means of a net, and they have never been known to be taken by bait. In the months of August and September the powan is in the best condition for the table; they are then considered to be well flavoured, wholesome, and delicate food. They shed their spawn from October to December, and remain out of condition till March. The grayling, we have no doubt, was once a rare fish in this country as the vendace is at present, and by means of fructified eggs we believe both the powan and the vendace could be acclimatized in most of our English lochs. In the Clyde, where the grayling has lately been introduced, it is already affording sport to the angler, and in November it will rise to the fly, when there is no possibility of rousing a trout. As to the habits of the grayling, it is a great ground feeder, and eats up the spawn of other fishes; but for all that it forms a fine addition to the fishes of any particular stream, and would be a capital substitute for some of the coarser fishes.

In the art of transporting fishes from stream to stream, and in many of the other points of the artificial breeding and nursing of fish, we have much to learn. The Chinese, we believe, have taught all the world how to hatch and propagate on the artificial system now coming into vogue. It is known that they carry on the system of fish-breeding to a vast extent, and that, in consequence, the whole of the great inland rivers and canals of that immense country teem with good eatable fish, chiefly of the carp or perch kind. We have been told that they collect the eggs of the fish, and, cramming them into an eggshell, have them hatched with great celerity by placing them under a fowl! As is now well known, the ancient Italians were adepts in the art of pisciculture, deriving the rudiments of their knowledge, no doubt, from the Celestial world; the famed gourmets of ancient Rome were celebrated for their fishponds, and for their different ways of crossing and breeding fish. When do we ever hear now of a single carp being so fine in flavour and so large in size as to be worth £50? When do we ever hear now of a man leaving behind him at his death thirty thousand pounds' worth of fish? Or when are we likely at Whitstable or Colchester to breed oysters worth their weight in gold? Such things were accomplished, and such prices attained, however, by the art of pisciculture in the palmy days of ancient Italy. The luxurious Romans had attained to the greatest possible perfection in the arts of flavouring and breeding fish; but for a long period the art became lost, and not till exactly a century ago (1763) was it again made known, when it was re-discovered by an ingenious German named Jacobi, who reared trout by the artificial impregnation of the ova. After Jacobi's experiments the art again fell into disuse, and it was not discovered, so far as commercial purposes are concerned, till 1842. The person who re-discovered pisciculture, in its exact modern phase, was a fisherman of the Moselle. In the course of his avocations he had been much struck with the rapidly diminishing supply of fresh-water fish—so much a necessity of life for the good Catholics of inland France. It now became clear enough to Remy and a coadjutor who worked with him that "unless something could be done" the supply would speedily become exhausted. Setting his wits to work, he arrived at the conclusion that the demand for fish had become greater than the supply, and that, unless the supply could be increased to an unlimited extent, the capital stock at that period in the rivers of the Vosges would speedily be so exhausted as to be incapable of the power of reproduction. Remy, of course, knew that fish of all kinds were extraordinarily fecund, and he never could see that the yield of mature animals fit for the purposes of the table was at all in proportion to the quantity of eggs deposited by the fish. It therefore gradually dawned on Remy that the cause

of the scarcity must be in the waste of the eggs and the destruction of the fry, and the true way to restore the *status quo* was to afford the young fish protection, which he concluded must be done by securing the eggs and guarding them till they came to life, and afterwards feeding the fry till they were able to seek their own living. Acting at once upon this idea, Remy set to work, and in this simple way inaugurated the present gigantic system of fish-culture which is now giving fresh life to the French waters. He began at first by collecting the eggs of trout and other fish, and also by confining the gravid animals till they spawned in his preserves. He was thus enabled to protect the spawn from all kinds of enemies, having before him, at the same time, the certainty that all the eggs, deducting a slight percentage, would come to life. Then, again, the young fish, being protected from their numerous enemies, adds enormously to the percentage of animals annually reared to a productive point. Growing bolder in his operations as his experience increased, Remy and his coadjutor next began to capture the fish as they were about to spawn, and thus make sure of their eggs by hand manipulation, the fructification of fish eggs being an external act. This plan answered admirably, and in the course of a few years the rivers of France—we mean, of course, that division experimented upon by Remy—became once more so populous as to attract the attention of some of the great scientific men of the country. The result may be easily foreseen—the French Government at once took up the subject of artificial cultivation, Remy and his coadjutor were rewarded with great liberality, and the system of fish-breeding became henceforth blended in one of the French departments. We now trace it under the thoroughly-scientific management of M. Jacques Coste, of the French Institute, under whose advice has been created the great piscicultural laboratory at Huingue, near Basle, from which has emanated an annual supply of fish-eggs sufficient to repeople nearly all the rivers of France with the best of fish. This establishment is well worth a few words of description. It has been in existence for a period of ten years; it occupies a space of about seventy acres, and contains a residence for the superintendent and suitable offices for the transaction of business. It requires and obtains a perpetual supply of pure spring water, and is fitted up with troughs and cisterns for containing the eggs. These are not obtained from the fish in the establishment, but are collected in Switzerland and elsewhere, and brought to the establishment by persons who make it their business to gather them, and for which labour they are paid at the rate of about twenty pence per thousand. To prevent immature eggs being brought to the establishment, none but respectable fishermen are communicated with, and an attendant is sent, when requested, to take charge of the eggs and bring them safely to Huingue. Large numbers of eggs are obtained from the Rhine and from the rivers and lakes of Germany; and the question naturally occurs to us, how about the lakes and rivers whence the eggs are taken? Does this plan not injure them? On consideration, however, it will be easily seen that here the wonderful fecundity of fish comes into operation. Say that a fish contains ten thousand eggs, and that ten such fishes are captured and robbed of their spawn, and that the male fish is made to yield his milt—and one or two males will fructify thousands of eggs—the loss to the lake or river from the annual destruction which goes on is almost infinitesimal, whilst the general gain is undoubtedly very considerable. Eggs of all the best known fresh-water fishes can be obtained from Huingue, and there are many kinds which we have not in England. It is noteworthy, also, that the French Government are by no means liberal in their dealings, as we could name several gentlemen in this country who have received supplies. The eggs, after being detained for a certain time at Huingue, are sent out packed in damp moss, and it has been found that they can be sent in this condition to great distances, to the Thames for instance, with perfect safety.

Fish fecundity is the foundation of artificial hatching. The female salmon yields a thousand eggs for every pound of her weight. The trout, according to situation, is equally fecund; in good feeding-ground it yields eggs by the thousand, but in poor places, where the food is scarce, the growth is stunted, and the eggs only come by the hundred. A moderate-sized perch will contain a hundred thousand eggs, and a jack (the young pike) will yield forty thousand, whilst a large pike will give double that number. A carp, again, exceeds the perch, and will yield two hundred thousand eggs; but all these are overtopped by some of the sea fishes, as, for instance, the codfish or the sturgeon, which yield their eggs in millions! This fecundity is not more, however, than is required to meet the loss consequent on the unprotected state of the young fish and the loss of eggs from various causes, already particularised in another page of this gossip.

But there is a still more curious fish-breeding establishment than Huingue, a knowledge of which may interest our readers. We allude to the great eel-breeding depot at Comacchio. This is an exceedingly primitive and curious place, which has existed for several centuries, and annually produces a vast amount of fish food; in fact, it is the largest fish-breeding establishment we know of. It has been formed in a vast lagoon near where the river Po debouches into the Adriatic. Canals and pools have been formed, and a series of entrances and exits for the fish have been constructed with great engineering skill. So productive has the fish commerce of Comacchio ever been, that even so far back as the year 1597 the annual income derived from the eels and other fish was £12,000, whilst in 1792 it was £16,000. The eel, as our readers may know, migrates to the sea to spawn, and ascends the fresh water to live; this is the fact on which the establishment at Comacchio has been founded. The seeding of the lagoon begins at an early period of the year, so early as February, when the gates are opened, and then hundreds of thousands of young eels find their way into the water; so many that it takes two months for them to ascend, and, certain kinds of fish being provided for them to feed upon, they speedily attain a cookable size, for the community at Comacchio not only grow their fish but cook them as well, having immense kitchens provided for that purpose, and in this cooked state the fish are sent for sale to the chief cities of Italy, where they are very acceptable during Lent. Other fish besides eels are cultivated—soles, plaice, and dory being abundant. The chub is also grown in great plenty. At one stage of its existence it takes more than a thousand of this fish to weigh a pound; but at the end of twelve months, so good is the feeding-ground, the fish attains a length of twelve inches, and has of course added greatly to its weight. On some occasions great hauls of fish are taken, one thousand baskets being taken at a few hauls. The people inhabiting the islands of this lagoon are quite as primitive as the general run of fisher people, and, being good Catholics, they are more than usually observant of the fasts and festivals of their Church, in addition to which they have many little ceremonies of their own—a great feast is held, for instance, when a certain amount of fish is taken in any one morning. The labours of the fishermen are pursued under a rather strict discipline, but all are healthy and happy; and we can learn from this quiet fish farm that it is as easy, and more profitable, to cultivate the water as it is to cultivate the land; and it is certain that by so doing we might largely augment our food supplies and add to the productive resources of this great country.