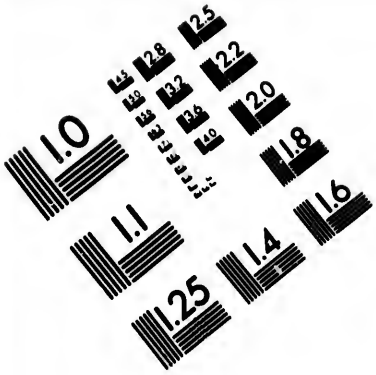

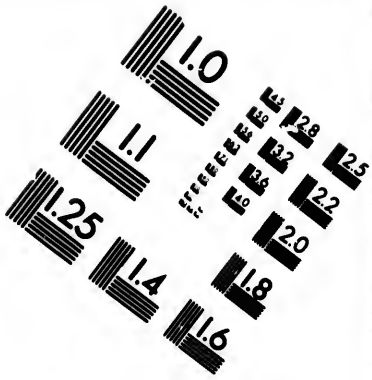

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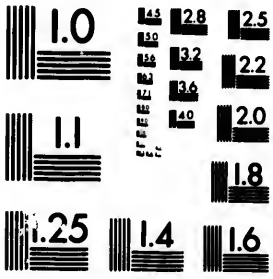

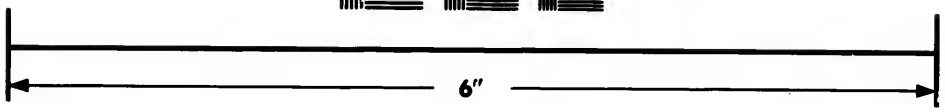

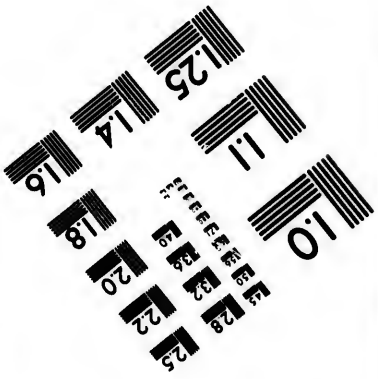

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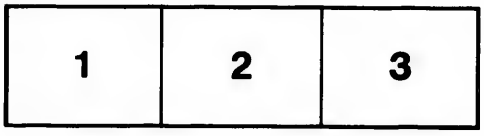

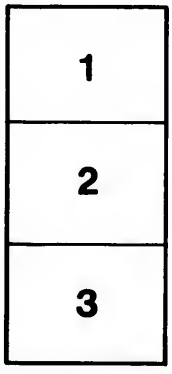

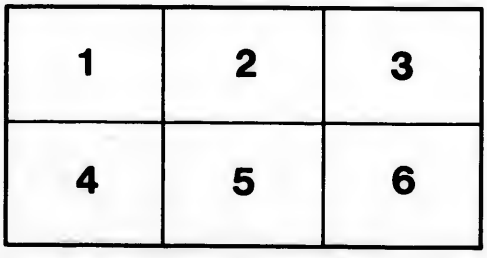

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THE

ANIMALS OF NORTH AMERICA.

SERIES II.

FRESH-WATER FISH.

"I like the society of fish, and as they cannot with any convenience to themselves visit me on dry land, it becomes me in point of courtesy to pay my respects to them in their own element."—WILLIAM SCROPE.

DEDICATED BY PERMISSION TO THE

Montreal Fish and Game Protection Club.

BY

H. BEAUMONT SMALL, S.C.L.

MONTREAL:

PRINTED BY M. LONGMOORE & CO., PRINTING HOUSE, 67 GREAT ST. JAMES STREET.

1865.

ORDER, FAMILY, AND GENUS OF N. AMERICAN FISH

WITH

THEIR POPULAR ENGLISH NAMES.

ORDER PECTINIBRANCHII

Family Percidæ.

Genus Perca (*Common Perch*).
" Labrax (*Lake Bass*).
" Huro (*Black Huron*).
" Pileoma (*Little Pickerel*).
" Lucioperca (*Pike-perch*).
" Boleosoma (*Darter*).
" Centrarchus (*Rock-bass*).
" Pomotis (*Pond-fish*).

Family Triglidæ.

Genus Cottus (*Bull-head*).
" Gasterosteus (*Stickleback*)

Family Scienidæ.

Genus Corvina (*Sheepshead*).

Family Siluridæ.

Genus Pimelodus (*Cat-fish*).

Family Cyprinidæ.

Genus Cyprinus (*Carp*).
" Abramis (*Bream* or *Wind-fish*).
" Labeo (*Chubsucker*).
" Catastomus (*Sucker*).
" Stilbe (*Shiner*).
" Leuciscus (*Dace*).
" Hydrargira (*Black Minnow*).

Family Esocidæ.

Genus Esox (*Pike* and *Maskinongé*).

Family Salmonidæ.

Genus Salmo (*Salmon & Trout*).
" Coregonus (*White fish*).
" Alosa (*Shad*).

Family Clupidæ.

Genus Hyodon (*Moon Eye, Lake Herring*).
" Amia (*Mud*, or *Beaver-fish*).

Family Sauridæ.

Genus Lepisosteus (*Gar-fish*).

Family Gadidæ.

Genus Morrhua (*Tom-cod*).
" Lota (*Barbot*, or *Dog-fish*).

ORDER APODES.

Family Anguillidæ.

Genus Anguilla (*Eel*).

ORDER ELEUTHEROPOMI.

Family Sturionidæ.

Genus Accipenser (*Sturgeon*).

ORDER CYCLOSTOMI.

Family Petromyzonidæ.

Genus Petromyzon (*Lamprey*).

The different species of each genus are described under their respective headings.

PREFACE.

THE well known and popular author of "Maple Leaves" in his Preface quotes the words of a youthful writer who says that "every book ought to have something of a Preface, were it only a note of interrogation". In the short Preface which I lay before my readers, the first point is to request that any inaccuracies, which must necessarily occur in a Work of this kind,—both from the difficulty of obtaining fresh specimens, as well as from the inutility of dried or preserved specimens as a reference, and the scarcity of any reliable works on this branch of Natural History,—may be overlooked. In collecting into a small compass extracts from the works of various explorers, with regard to the habits and haunts of the finny tribe, I have endeavoured to place within easy access of the generality of readers, as pleasing and at the same time as instructive a hand-book on the Fresh Water Fish of this continent as possible. Fishing, as a recreation in itself, to the business man as well as to the regular disciple of "Meek Walton", has been the theme of many a writer; but a knowledge of most if not all the species inhabiting our waters is so difficult to acquire, that the writer trusts his present efforts may not have been in vain, by carrying that knowledge into quarters where a more costly work could not gain admittance. At the present time, when the working of the *Fish and Game Protective Club* is being so nobly carried on, an additional interest will probably be taken in a study hitherto so neglected; and the thanks of the community at large are due to that society, for its untiring zeal in the sportman's cause. That this work then may be useful and instructive to all, is the desire of

H. BEAUMONT SMALL.

MONTREAL, 1st August, 1866.

THE

ANIMALS OF NORTH AMERICA.

Fresh-Water Fish.

CHAPTER I.

INTRODUCTORY—DIFFERENT FINS WITH DESCRIPTION—LATERAL LINE—CIRRI—FECUNDITY.

Ichthyological science, and especially the branch of it on this continent, however much it has advanced in a knowledge of groups and species, is, and must long be, from the very nature of the animals upon which it treats, considerably behind the other branches of Natural History. Inhabiting an element whose recesses cannot be explored by man, and with a peculiarity of structure and of colouring which renders their bodies very difficult to preserve, the Natural History (properly so called) of Fishes, when compared with that of terrestrial animals, will ever remain little more than a collection of a few superficial anecdotes; while from the difficulty of their preservation and the unattractive appearance they then exhibit, few will study, and still fewer will collect them. Hence the Ichthyologist has much greater difficulties to contend with, in regard to materials, than he would experience in any other division of the *Vertebrata*, while he finds himself totally at a loss for that information on their natural habits, which gives such a charm to the history of other animals, and excites such a popular interest with the generality of readers.

Fishes, along with frogs and reptiles, constitute that great and primary division of vertebrated animals which are distinguished by their *cold* blood, in opposition to the two classes of quadrupeds and birds, which have their blood *warm*. In all cold-blooded *Vertebrata*, the

body is either naked—that is, merely covered by a skin more or less thick, or it is protected by osseous pieces, or plates. In some, these plates are extremely hard, and are joined together at their edges, as in tortoises, and some few of the aberrant fishes; but in the majority both of the fishes and reptiles, the plates assume that form denominated scales, the outer edges of one reposing upon the base of the next.

Fishes constitute by far the most numerous class of vertebrated animals, whether we regard the number of individuals, or the variety of their forms. When we consider that more than two-thirds of the globe are covered by water—that element peculiarly adapted for their habitation—we shall not be surprised at this superiority of numbers. On the contrary, we may fairly suppose that not more than one-half of the species really existing, have yet been made known. The peculiarities in the inward form of fishes, by which they are distinguished from all other animals, need not be enlarged upon; yet, as many of them, like the eels, assume the form of serpents, and others resemble the young of amphibious frogs, it is necessary to characterize them as *aquatic vertebrated animals, breathing by means of internal gills*, and undergoing no metamorphosis. These gills or *branchia*, are composed of certain semicircular arches, fringed as it were, with their fleshy processes, resembling little leaves, having innumerable blood-vessels. The water taken in by the mouth, again escapes between the openings of the branchia, which are protected externally by certain bony plates united together, yet generally moveable, which are called the *opercula* or gill covers; this apparatus for breathing is variously modified, but never lost, so that it is the primary character by which fishes are at once distinguished from reptiles and amphibians.

As fish are destined to inhabit an element where motion is much more essential to them than either to quadrupeds or birds, their Omnipotent Creator has given them greater powers for sustaining this motion than are possessed by any other animals in creation. Their body in fact is surrounded by fins, and their tail (the fin of which acts as a rudder) is generally as thick, and often much larger than the body itself. These are the only members adapted for motion, possessed by fishes; but their construction, number and position, are varied in almost an infinity of ways, and thus contribute some of the most obvious and natural characters for determining the different families and genera. As the formation of the fin comes under the head of external anatomy, it is necessary to give a short sketch of these members.

There are five sorts of fins to be described, viz: pectoral, ventral, anal, dorsal, and caudal; the two first of these are in pairs, and are the most important, inasmuch as *they* represent those members in the higher organized *vertebrata*, that are called legs and wings. The pectoral fins, in fact are only the anterior feet of quadrupeds, and the wings of birds, presented under a new and strikingly different form: the three other fins are single, or in other words, they are not in symmetrical pairs.

The *pectorals* are the most important to fishes in general, because we find them in groups, where several of the other fins are wanting. In the majority of fishes they are of the same moderate size as the ventrals, but in particular families they become much more developed; they are always composed of flexible and generally branched rays, so as to yield to every stroke on the water made by fishes in the act of swimming. When the shape is pointed or triangular, the first ray is either very strong or spinous. The great importance of this fin to the rapid motion of fishes, is still further manifested by the fact that in all such groups as are peculiarly rapid, the pectoral fin is pointed, or rather triangular. In such families as live in rivers and lakes, or only in shallow, rocky shores, the pectoral fins are for the most part round. It seems probable that unusual strength is given to the pectorals of such fish as have large heads, for the purpose of additional support; and it may be further remarked, that it is among small headed fishes we find delicate pectorals

The *ventral* fins rank next to the pectoral, as representing the hinder feet of four-footed animals, and the legs of birds. That they are less necessary however to the swimming motion of fishes, than either the dorsal or caudal, may be perceived from the fact, that in the entire order of *Apodes* or eels, these fins are totally wanting; they are the smallest in size of all the others, but by no means always so. In general they are less than the pectorals, often of the same size, and but very rarely, larger. Much diversity is observable in their situation and form; like the pectorals, the rays are always soft; but those of the spine-rayed fishes are strengthened by an external spine, which of course is never branched.

The *dorsal* fin, with the *anal* and *caudal*, are the three members for progression, of which nothing analogous can be traced among quadrupeds and birds, except that the caudal fin represents the tail-feathers of the latter, but not the true tail of the former, which is an actual

continuation of the vertebræ. The dorsal, after the pectoral, seems to be the most essential for the aquatic economy of fishes, because there are only a very few instances yet known where it is entirely wanting, and all these occur in the order where fins generally disappear. There seems to have been a notion that the office of the dorsal was to preserve the fish in a perpendicular position; but recent experiments do not sanction this idea. The construction of the dorsal is so far like the other fins, that it is generally composed of rays, connected either partially or entirely by a membrane. In certain families, where there are two dorsal fins, the hinder one is adipose, *i. e.* resembling a thick, fleshy lobe attached to the back, and covered by the common skin—of this, examples occur in the salmon family; while among the cat-fish, these fins are almost universal. The number of the dorsal fins is variable; for although they are all placed on the same line, which is invariably the ridge or summit of the back, they are yet separated, more or less, into divisions; and these, when perfectly detached one from another, are viewed in the light of separate fins, though strictly speaking they should be considered as so many divisions of a single one. Where the intervals are marked by a secession of a connecting membrane between the rays, there is no difficulty in determining whether a fish has two or three dorsal fins. The general character of the rays of the dorsal is its being strong, rigid and often spinous; that these spines are used as instruments of defence, becomes evident from the fact of many fishes suddenly raising them, when captured, so as to inflict wounds on the hands of an incautious person. The first ray, being invariably stronger than the others, seems to be a structure intended to break the resistance of the water during the swimming of the fish, on the very same principle that a boat or vessel is furnished with a stem.

The *anal* fin may be termed symmetrical to the dorsal; or at least, its situation on the under part of the tail is analogous to that on the back. It must be observed however, that this fin is always placed behind the vent, so that the length of the tail in many cases is indicated by the length of the anal fin. It is subject to very little variation in form and still less in construction, for it generally corresponds with the hinder part of the dorsal; it is almost always, nearly the same breadth throughout, and without any particular variation in other respects. It is most developed in the apodal order and its representatives, where we have it sometimes extending nearly the whole length of the fish.

The *caudal* fin alone remains to be noticed. This is as important to the motion of a fish, as a rudder is to a ship, or as the tail of a swallow in directing its flight; and from the action of the caudal fin, the screw propeller of our steamers originated. The experienced Ichthyologist, well acquainted with the variation of this member, will not fail to observe that the swiftest swimming fish are all distinguished by a tail more or less forked; and the most sluggish are invariably characterized by a rounded tail. Now this is precisely what we find in Ornithology, where no instance is upon record of a rounded tail and wings being given to swift flying birds, or the reverse. The shape of the caudal and pectoral fins is almost always symmetrical; that is to say, the caudal is forked in the same proportion as the pectorals are pointed; hence we may infer that the caudal fin in fishes is more important in its offices than is the tail in birds, and this is an additional argument in favour of the importance to be attached to this member.

The *lateral* line, when it exists, deserves much attention; the scales of which it is formed are always of a peculiar construction—being perforated in the middle for the free issue of that mucous substance, which is so prevalent among fish, and which is secreted in certain glands beneath; these scales are generally of a different shape from those of the body; sometimes raised and carinated, so as to present a prominent edge like that of the sharp ridge of a triangle; in others they assume the shape of spines and prickles, while in some the line cannot be distinguished.

Many of the soft finned fish, are provided with *cirri* or barbels, placed round the mouth; these are soft fleshy processes, and are supposed to be employed both as organs of touch, and also of allurement to their prey. The cat-fish for example, safely screened from observation in the natural holes or hollows of the bank, throws out his long *cirri*, which being flexible, may well be taken for worms by other smaller fish, which are thus brought within reach and become an easy prey.

Fish are exposed, on all sides, to the approach of enemies, from whom there is rarely that facility of shelter afforded in the open water which is enjoyed by land animals. A highly developed state, therefore, of the organs of sight and smell appears to be necessary to them, not only for their own safety, but also to discover the food, upon which they subsist; with these qualities the faculty of touch is hardly required, and we consequently find it partially or not at all given.

Before closing this brief sketch of fishes, we must allude to their fecundity, which is something so prodigious as to stagger the belief of ordinary minds. When we say that a single female lays hundreds of thousands of eggs in a single season, the statement is not exaggerated; and yet the waters are not more densely populated now than they were in the last generation. All fish are more or less carnivorous, feeding on each other; to supply this food a power of reproduction without parallel in the animal kingdom has been given them; a momentary pain is all that can be experienced by a fish seized and swallowed in an instant by a larger one; and though this is probably the fate of millions, little or no corporeal pain can be experienced by a death so instantaneous.

The fishes of Canada present a field of observation as but yet partially traversed, and one which will well repay minute investigation. It is from the most minute examination of individuals that we derive our grandest generalizations; it is by making sure each step in our progress, that we gain those heights which enable us to take in at one view, the grand scheme of Creation, and trace its beautiful unity from the days when fishes were the sole representatives of the vertebrates, down to the last act of Creative Power,—man.

CHAPTER II.

ORDER PECTINIBRANCHII. (*Spine Rayed.*)

COMMON PERCH—SHARPNOSED PERCH—BLACK PERCH—WHITE LAKE BASS—BLACK HURON—CHAMPLAIN PICKERING—PICKEREL OR DORÉ—DARTER.

GENUS PERCA.—PERCA FLAVESCENS.—(*American Yellow Perch.*)—Color, greenish and gold above, with dark olive green. Vertical bands across the back, usually longest about the middle of the body, and gradually smaller towards the tail. Scales and abdomen golden yellow. Pupils black, irides golden.

The Yellow Perch is one of the best known and most widely distributed of our fluviatile fishes; it is found in all the waters of the Northern and Middle States, extending above the 50th parallel. Its distribution has been much extended within the past twenty years by the artificial water channels which have been so widely constructed. It is found in almost every pond and stream, and is especially abundant in the Great Lakes, as many as two hundred being taken in one day from the wharves therein, at certain seasons. It is closely allied to the European Perch, (Perca fluviatilis.) It varies considerably in size in different localities, but about three pounds is the extreme weight it attains; it has a dry and sweet flesh, but is ill adapted to satisfy the cravings of a hungry man, on account of its bones, which are particularly numerous, hard and pointed. They generally swim about in *schools* or shoals, and yet at the same time are not distinguished for their intelligence, being invariably lured to their destruction by the most bungling anglers, and the more common kinds of bait. They spawn in the autumn, and recover so as to be in fine condition early in the spring. They delight in clear rivers with pebbly bottoms, though sometimes found on sandy or clayey soils. They love a moderately deep water, and frequent holes at the mouth of small streams, or the hollows under the banks. In winter they are caught through

holes cut in the ice, in great quantities. Cuvier describes two or three species, which however, seem scarcely distinguishable from the one first described.

Perca Acuta,—(*The Sharp-Nosed Perch,*)—Is distinguished from the preceding by the sharpness of its nose, and having seven dark vertical bands, between which are an equal number of spots, or irregular bands. This species is very rare, and the description of it is taken from Mitchell's Cuvier, to whom a specimen was sent from Lake Ontario. DeKay doubts it being a different species, and thinks it only a variety of the common Perch. While on the subject of Perch, to avoid any confusion that might arise as to the White Perch, we have only to say that it is a migratory fish, seldom ascending the rivers higher than where the waters become brackish. In the Ohio, a fish is abundant under that name, but which on examination by any one acquainted with the finny tribe, turns out to be no other than the fish known in Lake Erie as the "Sheep's-Head." But this misapplication of the term Perch is not peculiar to the residents on the Ohio, for we know throughout the Southern States, where the Black Bass is found, it is called the Black Perch; and in the vicinity of Boston and Nahant, the miserable little fish called the *Conner* or Bergall, is there designated as a Black Perch; care must be taken therefore how we accept a name from the uninitiated.

The best bait for Perch fishing is a bright red worm, or a small live minnow; they seldom or never rise at a fly. Where they are numerous they afford good sport to the angler. In fishing for them a float should be used.

Genus Labrax.

Labrax Nigricans.—(*Small Black Bass*, or *Black Perch.*)—General colour deep brownish black, more intense on the head and upper part of the body. In the older specimens there is a strong brassy hue throughout, with occasionally dark longitudinal parallel streaks on the upper part of the body. Base of the fins a light greenish yellow; dge of the membrane of the spinous dorsal, black. Upper portion of the membrane of the posterior dorsal fin, transparent, and separated from the yellow portion at the base by a tolerably well defined dark band. This species is mentioned in the New York State Reports, as hitherto undescribed. They seldom reach in weight above one or two

nch—*Bar rayé, centropome rayé.*
Canada—*Bar.*
glish—*Striped Bass, Sea Bass.*

rder of *Acanthopterygii*; of the family of *Percidæ*; of the genus *Labrax*.
Striped Bass is, incontestably, after the salmon, one of the finest and most fish frequenting the River St. Lawrence and some of its tributaries. It alternequents salt and fresh water, where it breeds during the spring. It sometimes extraordinary size; frequently some have been caught at different parts of the Lawrence, and especially at Sorel Islands and near Crane Island, weighing to 30 pounds, and even more.
the coast of the United States they are said to have been found of a still larger d in some ancient works on ichtyology, which I consulted, Bass are spoken of as eached the weight of 50, 60, and even 80 pounds. William Herbert, in his work and Fishing of the United States," mentions that he saw one of 43 pounds.
color is bluish brown above, silvery on the sides and beneath. But what dis- this fish are black parallel lines along each side from head to tail, to the number even to nine, making it one of the most remarkable species of the genus *Labrax*.
Bass, which properly speaking is a salt water fish, is also found on the south the Gulf of St. Lawrence and in the mouths of the rivers falling into it; it is great quantities in Nova Scotia and New Brunswick.
gh this fish is said to frequent the large streams of the Canadian shore of the haleurs and Gaspé, no attempt, to my knowledge, has been made to fish for it.

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mouths, whose digestion must be performed by the solvent power of some particular gastric apparatus without the aid of trituration. The life of a bass, from the egg to maturity, is a scene of constant violence and hostility to all living things that exist under the surface of the water. Notwithstanding the amazing voracity of this fish, he is capable of enduring the want of food for a great length of time; unless, perhaps, he may possess the faculty of decomposing and converting watery elements into a means of supporting life. This interesting fact remains still to be discovered. The ovaries lie in close contiguity to the abdomen, and the milt, which consists of a light colored glandular matter, is disposed in two sacs, adjacent to the back bone of the male. Of the eggs deposited by the generality of fish, not more than one in two hundred brings forth, as they form food for small fry, aquatic birds, and frequently larger fish; but those of the bass being carefully covered, stand a much better chance. The young bass do not begin to eat until they are five weeks old. The trout eat at four weeks, and the salmon at six; until this period, the yolk sack supplies all their requirements.

If it is found desirable to keep bass alive for the use of the table in sunken cars, it will be necessary to perforate the air bladder, by dexterously passing a needle through the body of

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xerel	1,639	do	"	8 00	
ion	2,802	do	"	11 00	
t	200	do	"	10 00	
but	313	do	"	5 00	
iver Oil	93,035	gallons	"	0 55	
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le Oil	14,400	do	"	0 65	
Skins	12,609	skins	"	0 90	
Sounds and Tongues	150	barrels	"	5 00	
ines	670	do	"	4 00	
xed Herring	360	boxes	"	0 25	
Total					$82

* On pages 133, 135 and 136, for Catfish read Hake.

it is called the Black Perch; and in the vicinity of Boston and Nahant, the miserable little fish called the *Conner* or Bergall, is there designated as a Black Perch; care must be taken therefore how we accept a name from the uninitiated.

The best bait for Perch fishing is a bright red worm, or a small live minnow; they seldom or never rise at a fly. Where they are numerous they afford good sport to the angler. In fishing for them a float should be used.

Genus Labrax.

Labrax Nigricans.—(*Small Black Bass*, or *Black Perch.*)—General colour deep brownish black, more intense on the head and upper part of the body. In the older specimens there is a strong brassy hue throughout, with occasionally dark longitudinal parallel streaks on the upper part of the body. Base of the fins a light greenish yellow; dge of the membrane of the spinous dorsal, black. Upper portion of the membrane of the posterior dorsal fin, transparent, and separated from the yellow portion at the base by a tolerably well defined dark band. This species is mentioned in the New York State Reports, as hitherto undescribed. They seldom reach in weight above one or two

STRIPED BASS (*Perca Labrax*)

Is a sea fish chiefly found near the mouths of rivers and arms of the sea where they remain more constantly than any other ocean fish. They are readily known from the fact that they have eight parallel lines on the sides, like narrow tape; the scales are very large and lustrous, resembling metal; the eyes are white, head long, and under jaw projects beyond the upper; it is without doubt the most beautiful of all our native fishes. I have been enabled, after many fruitless attempts, to breed this magnificent fish in fresh water, where they have now become abundant. He is a bold biting fish, except in Winter, when he becomes very abstemious, and will only bite in the middle of the day, when the weather is moderate, and continues to take the hook until the mulberry tree blossoms. The day before you intend to fish for bass, sink a glass bottle in the vicinity of their haunts, covered with a piece of pierced parchment or linen cloth; this will attract them in large numbers, and by dropping your line in its vicinity, baited with similar small fish, you may take many of them. They spawn throughout March; the female, followed by the male, opens a furrow in the gravel, and deposits her spawn; the male follows, ejecting milt upon it, and at the same time covers the furrow with its tail. This operation is performed with great rapidity and in the most scientific manner possible, so much so that no trace of the fish is left behind to indicate that the gravel has been moved. This may justly challenge the admiration of all beholders.

The bass appears to be constantly initiated by an insatiable desire of satisfying its hunger, by a wonderful predilection for everything that is endowed with life, whether fish or animal, as is the case with nearly all predaceous fishes endowed with large mouths, whose digestion must be performed by the solvent power of some particular gastric apparatus without the aid of trituration. The life of a bass, from the egg to maturity, is a scene of constant violence and hostility to all living things that exist under the surface of the water. Nothwithstanding the amazing voracity of this fish, he is capable of enduring the want of food for a great length of time; unless, perhaps, he may possess the faculty of decomposing and converting watery elements into a means of supporting life. This interesting fact remains still to be discovered. The ovaries lie in close contiguity to the abdomen, and the milt, which consists of a light colored glandular matter, is disposed in two sacs, adjacent to the back bone of the male. Of the eggs deposited by the generality of fish, not more than one in two hundred brings forth, as they form food for small fry, aquatic birds, and frequently larger fish; but those of the bass being carefully covered, stand a much better chance. The young bass do not begin to eat until they are five weeks old. The trout eat at four weeks, and the salmon at six; until this period, the yolk sack supplies all their requirements.

If it is found desirable to keep bass alive for the use of the table in sunken cars, it will be necessary to perforate the air bladder, by dexterously passing a needle through the body of

I have frequently observed bass when making progression, and been amazed at the flexibility of their bodies when exerted to attain any object; their tail, fins, and even the vertebræ of the back bone is full of vigorous motion, admirably calculated to mock the vain efforts of man's art to cope with the velocity of this noble fish, that can make a voyage of six thousand miles in a season, without showing symptoms of fatigue.

His organ of smell is large, and he possesses the power of dilating and contracting it at pleasure, as the olfactory nerve extends completely over the nostrils. He can discover food thrown in the water at a great distance behind him, by the sense of smell, and when he reaches it, if stale, turns off with apparent disgust, showing an intelligence that you would not expect to find in a fish. He sometimes spreads out his pectoral fins as oars, his dorsal as a poiser, to preserve his equilibrium, and his anal to maintain the vertical position of his body, and permits himself to be carried down the stream, that he may swim back against the current leisurely, and more readily seize upon descending prey, besides permitting atmospheric air more easily to impart to the blood, through the ramifications of the gills, the proper combustion, without depriving the food of too large a share of carbonized and hydrogenated substance, thus rendering it fit for another class of fish when voided. The brain of a bass is small, relative to the size of his head; it is divided into three equal parts, of which the anterior are nearly contiguous, the third being in the rear, forms the cerebellum. Here may be seen the olfactory and optic nerves.

The gullet commences below the throat, and descends to the stomach; it is smooth, and lined with a mucous substance. The stomach is cylindrical, and divided into two parts.

The swimming bladder is elliptical, and is situated between the vertebræ and the stomach, and wholly included within the peritonœum.

The intestines are placed longitudinally, instead of transversly as in man. They are short, and terminate in the vent. The secondary closely resemble a group of worms, are numerous, and discharge in two canals that open into the principal intestine.

The liver is yellow, and is situated in the anterior region of the body, and is divided into two lobes; it contains much oil.

The gall-bladder lies directly under the liver, and communicates with the intestines, by means of the choledochic canal.

The spleen is dark, and placed near the backbone, and is pressed upon by the air bag, which subjects it to constriction and dilatation.

The urinary bladder is oval in shape, and terminates immediately under the tail, but does not communicate with the rectum.

The heart is on the sternum, just under the posterior gills; its position is longitudinal, and consists of one auricle and one ventricle. The aorta is attached to the heart.

pounds, being for the most part about six inches long. We have taken them abundantly in the Back River, near Montreal, (a branch of the Ottawa,) but have met with them nowhere else; by the *habitants*, (whose ideas of species are as limited as their means,) they rank under the ordinary title, "Basse." They rise to the fly, and afford much amusement to the sportsman. DeKay says they are frequent in the Lakes in the Southern part of New York State.

LABRAX ALBIDUS.—(*The White Lake Bass.*)—Colour, bluish-white above the lateral line, with a few narrow parallel dusky streaks above and beneath this line; sides and belly white; pupils black, irides white, mixed with a little brown. Dorsal and caudal fins, brownish mixed with blue, pectoral fins whitish, tinged with olive green. This is a very common fish in Lake Erie, and is known and sold in Buffalo under the name of "*White Bass.*" It is a very bold biter, and is esteemed excellent as an article of food.

There is another species found only in the St. Lawrence, and said to be peculiar to it, LABRAX NOTATUS, alluded to by DeKay, who thus briefly describes it: ten parallel series of lines forming regularly abbreviated spots; it reaches a great size but is comparatively rare.

GENUS HURO.—HURO NIGRICANS.—(*Black Huron.*)—Colour, back and sides dark, with a faint longitudinal streak through the centre of each row of scales. Belly yellowish white. This is a remarkably fine and well flavored fish, taken readily with the hook during the summer months in Lake Huron, and is peculiar to those waters. Its history is very imperfect, nor with our present knowledge can we assign it its proper place in the family.

GENUS PILEOMA.—P.-FASCIATUM.—(*Champlain Pickering.*)—General hue greenish olive, a series of about twenty dark olive or brownish stripes across the back, alternately but not regularly longer, and dilated on the vertebral line. Pupils purplish, irides silvery; length from 2 to 4 inches. This fish is abundant in Lake Champlain and numerous streams falling into it, also in some of the streams falling into the St. Lawrence. We have taken it in the river Don near Toronto in great numbers. It readily takes the hook, and is extremely active and voracious. Its popular name in Vermont is the little Pickerel or Pickering—a name more apt to confuse than otherwise.

GENUS LUCIOPERCA.—LUCIOPERCA AMERICANA.—(*Yellow Pike-Perch, Common Pickerel, Pickering, Glasseye, Yellow Pike, and Doré.*)—The ordinary names given to this fish give no correct idea of its

character. It is a true Perch, though its form and habits suggest very naturally the idea of a Pike. Color, yellowish olive, above the lateral line, lighter on the sides, silvery beneath. Pupils dark, and vitreous, irides mottled with black, and yellowish. Membrane of the spinous dorsal transparent, with a few dark dashes, the upper part tipped with black. It is exceedingly voracious, and highly prized as food. It is caught readily with the hook, and appears to prefer as bait the common fresh-water cray fish. The best time for fishing for it is in the dusk of the evening, with a great length of line out, and keeping it gently in motion. The foot of rapids or beneath mill-dams appear to be its favorite haunts. In the heat of summer it seeks the deepest part of the lakes, or in streams the coolest parts concealed under weeds or grass. According to Dr. Kirtland it is one of the most valuable fishes for the table. It sometimes reaches eight or nine pounds in weight. In Chatauque Lake, New York, one of these fish swallowed a duck, which thrust its head through the gill openings of the fish, and having thus destroyed it, both were found dead on the shore. It is found from Ohio, through all the lakes, and through the rivers of the fur country up to the 58th parallel of latitude. As is the case with the Maskelongé, the Pickerel is among the first of the finny tribe that run up our rivers early in the spring, and is generally found associating with the Yellow Perch. This fish is known in the South-Western States as Salmon, but as unlike that peerless fish of the far North, as a grey wolf is unlike a deer.

An excellent method of taking pickerel is by spoon-trolling; the line should be never less than 70 feet;—100 feet would be better—as the longer the line the better the success, and it has been proved that the bait will be seized three times on the longer one, when on the shorter one it would be but once. From experience we are satisfied that long trolling lines are the best. Bass will seize a fly or a spoon at a few feet distance, but a pickerel will not. Lanman says he has tried the experiment when trolling, to attach to one hook a bait of pork and red flannel, a very common bait, and to the other a brass spoon. The latter was invariably seized first, for the only reason, he supposed, that it made more show in the water. Neither resembled a fish, fly, or any living creature, but curiosity or hunger attracted the fish to the strange bait gliding through the water, which they seized, paying with their lives the penalty for so doing.

The following night adventure is related as having taken place at

Preston Lake, Conn., by C. R. Weld, Esq.: "A couple of us had visited this Lake for the purpose of taking pickerel by torch light, having brought our spears and dry pine all the way from Norwich in a one horse wagon. It was a cold but still autumnal night, and as we tied our horse to a tree in an open field, we had every reason to anticipate 'a glorious time.' So far as the fish were concerned we enjoyed fine sport, for we caught about a dozen pickerel, varying from one to four pounds in weight; but the miseries we subsequently endured were positively intolerable. We had much difficulty in making our boat seaworthy, and in our impatience to reach the fishing grounds we misplaced our brandy-bottle in the tall grass, and were therefore deprived of its warming companionship. About midnight a heavy fog began to rise, which not only prevented us from distinguishing a fish from a log of wood, but caused us frequently to become entangled in the top of a dry tree, lying on the water. Our next step therefore was to go home, but then came the trouble of finding our 'desired haven.' This we did happen to find for a wonder, and having gathered up our plunder, started on our course over the frosty grass, after our vehicle and horse. We found them, but it was in a most melancholy plight indeed. Like a couple of fools, we had omitted to release the horse from the wagon, as we should have done, and the consequence was that he had released himself by breaking the shafts and tearing off the harness, and we discovered him quietly feeding a few paces from the tree where we had tied him. What next to do we could not in our utter despair possibly determine; but after a long consultation, we both concluded to mount the miserable horse, and with our fish in hand we actually started upon our miserable journey home. Our fish were so heavy that at the end of the first mile we were compelled to throw them away, and as the day was breaking, we entered the silent streets of Norwich, pondering upon the pleasures of pickerel fishing by torch light, and solemnly counting the cost of our nocturnal expedition."

LUCIOPERCA GRISEA.—(*The Grey Pike-Perch.*) – Color yellowish, strongly tinged with grey, always smaller than the preceding species, attaining in length from ten to twelve inches; it is found with the common pickerel, but is not so common.

LUCIOPERCA CANADENSIS.—(*Canadian Pickerel,*)—Is like the two former species in form, but with a few pale yellow spots on the sides below the lateral line; length about 14 inches, found in St. Lawrence, and many of the streams which empty into it.

GENUS BOLEOSOMA.—BOLEOSOMA TESSELLATUM.—(*Tessellated Darter.*)—Colour, olive brown, with from five to seven black spots on the back, along each side of the dorsal fin; another series of spots similar in size and shape and colour along the lateral line. Pupils black, irides brown: length from two to three inches. This singular and beautiful fish is only described by DeKay. It is usually seen at the bottom of clear springs or streams, lying for a while perfectly still near the bottom, and then darting off with great velocity after its prey. This habit has acquired for it the name of Darter. It is to be met with in many of our brooks and streams, though frequently escaping observation, from lying so near the bottom.

CHAPTER III.

ROCK-BASS—BLACK BASS—DESCRIPTION—BASS-FISHING IN LAKE GEORGE—BOYISH RECOLLECTIONS OF THE RIVER RAISIN—SUN-FISH.

GENUS CENTRARCHUS.—CENTRARCHUS ÆNEUS.—(*Rock or Fresh Water Bass.*)—General appearance dark greenish bronze, with dark spot above the posterior angle of the opercule. The sides below the lateral line, are marked with six or more longitudinal series of dark spots, giving the sides somewhat of a striped appearance. Pupils dark purple, with a narrow golden ring; the remainder of the eye blue and reddish; scales large. It occurs abundantly in the Great Lakes, and in the St. Lawrence, and almost all Canadian rivers. It is an excellent fish, and readily takes the hook, giving from its vigorous struggles great sport to the angler. It bites greedily at the worm, live minnow, and especially the crayfish; it rises also to the fly; in the dusk of the evening during the summer months, a white moth never fails to attract it, when all other baits are unsuccessful. Its favorite haunts are among large stones, around wharves and piles of old bridges, and in mill races. The weight of it ranges from one to one and a half pounds.

CENTRARCHUS FASCIATUS.—(*The Black Fresh Water Bass,*) or as it is more commonly called, BLACK BASS, is a genuine native American, and ranks high among the game fish of the country. When fully grown he is commonly about fifteen inches long, two inches in thickness, and some five inches broad, weighing from one to five or six pounds. He has a thick oval head, a swallow tail, sharp teeth, and small compact scales. In colour he is a dark greenish black along the back and sides, growing lighter and somewhat yellowish towards the belly. He has a large mouth and is a bold biter,—feeds upon minnows and insects; is strong and active, and when in season possesses a fine flavor. He spawns in the Spring, recovers in July, and is in his prime in September. This fish differs much in different localities, not only in colour but in form; and according to Dr. Kirtland, the same individual will change its hue repeatedly in a short space of

time, if confined in a vessel of water. It is found in great abundance in the St. Lawrence and all the lakes; and the very name of the fish is associated with much of the most beautiful scenery in the land. Lake George, in New York State, is famous for these fish, and a slight description of it will not be out of place here. Embosomed as it is among the wildest mountains, and rivalling, as do its waters, the blue of heaven, it is indeed all that could be desired, and in every particular worthy of its fame. Although this lake is distinguished for the number and variety of its Trout, yet the Black Bass found here afford the angler the greatest amount of sport. They are taken during the summer, and by almost as great a variety of methods, as there are anglers; trolling with a minnow however, and fishing with a gaudy fly from the numerous islands in the lake, are unquestionably the two most successful methods. As before intimated the bass is a very active fish, and excepting the salmon, we know of none that performs, when hooked, such desperate leaps out of the water. They commonly frequent the immediate vicinity of the shores, especially those that are rocky, and are seldom taken when the water is twenty feet deep. They commonly lie close to the bottom, rise to the minnow or fly quite as quickly as the trout, and are not so easily frightened by the human shadow. The following interesting account is given by Lanman of his own experience in bass-fishing there: "The idea having occurred to us of spearing a few fish by torch-light, we secured the services of an experienced fisherman, and with a boat well supplied with *fat pine*, we launched ourselves on the quiet waters of the lake, about an hour after sundown. Bass were very abundant, and we succeeded in killing some half a dozen of a large size. We found them exceedingly tame, and noticed when we approached, that they were invariably alone, occupying the centre of a circular and sandy place among the rocks and stones. We enquired the cause of this, and were told that the bass were casting their spawn, and that the circular places were the beds where the young were protected. On hearing this our conscience was somewhat troubled by what we had been doing, but we resolved to take one more fish and then go home. We now came to a large bed, around the edge of which we discovered a number of very small fish, and over the centre of the bed, a very large and handsome bass was hovering. We darted our spear and only wounded the poor fish. Our companion then told us, that if we would go away for fifteen minutes, and then return to the same spot, we should have another

chance at the same fish. We did so and the prediction was realized. We threw the spear again, and again failed in killing our game, though we succeeded in nearly cutting the fish in two pieces. 'You will have the creature yet, let us go away again,' said my companion. We did so, and lo! to our utter astonishment, we again saw the fish, all mutilated and torn, still hovering over its tender offspring. To relieve it of its pain we darted the spear once more, and the bass lay in our boat quite dead; and we returned to our lodgings a decidedly unhappy man." The maternal affection of the bass for its helpless offspring, which it protected even unto death, is in strict keeping with the loveliness and holiness of universal nature.

In Lake Erie and every river emptying into it, this fish is found in considerable numbers. The following extract from the pen of G. Clinton, Esq., of Buffalo, is too good to be omitted: "When a mere boy we had seated ourselves at the foot of an old sycamore, directly on the margin of the river (Raisin), and among its serpent-like roots we were fishing for a number of tiny rock bass that we had chanced to discover there. We baited with a worm, and while doing our utmost to capture a two ounce fish, we were suddenly frightened by the appearance of a black bass, which took our hook, and was soon dangling in the top of a neighbouring bush. Our delight at this unexpected exploit was unbounded, and after bothering our friends with an account of it until the night was far spent, we retired to bed, and in our dreams caught the same fish over and over again till morning. * * * Like the trout the black bass seems to be partial to the more romantic and poetical places in the rivers which they frequent. The rarest sport we used to enjoy was at an old and partly dilapidated mill, which was covered with moss, and at the foot of which were some of the nicest 'deep holes' imaginable. Wherever the timbers of the dam formed a loophole of retreat, there we were always sure of finding a bass. And we also remember an old mill, in whose shadowy recesses, far down among the foundation timbers, the bass delighted to congregate, and where we were wont to spend many of our Saturday afternoons; but our favorite expeditions were those which occupied entire days, and led us far beyond the hearing of the mill-wheel or the clink of the blacksmith's anvil. At such times, the discovery of old sunken logs was all that we cared for, for we knew that the bass delighted to spend the noontide hours in their shadow. And if we chanced to come across a party of fishermen drawing the seine, we were sure to forget

our promise to our parents to return home before sundown, and far too often for a good boy, did we remain till the moon had taken her station in the sky. To count the fish thus captured, and hear the strange adventures talked over by those fishermen, was indeed a delightful species of vagabondizing; and we usually avoided a severe scolding by returning home 'with the largest bass ever caught in the river,' which we may have purchased from the fishermen."

In the Red River and Saskatchewan and other waters of the far West the Black Bass is found in "numbers numberless;" and not only in the rivers but in all the lakes of the "back country." Generally speaking the Bass as well as all other kinds of fish there, are taken by the Indians with a wooden spear, and more to satisfy hunger than to enjoy sport. The angler who would cast a fly in those waters must expect to spend his nights in an Indian lodge instead of a white-washed cottage,—or to repose upon a bearskin instead of a bed (such as Walton loved) which "smells of lavender," and to hear the howl of the wolf instead of a "milk-maid's song."

Genus Pomotis.—Pomotis Vulgaris.—(*Common Pond or Sun Fish.*—Colour, greenish olive above, with irregular points of red, and broader yellow or reddish brown spots, disposed in very irregular series. Ranges of brighter spots on the bluish opercles, radiating from the mouth. On the posterior prolongation of the opercle is a black spot, terminating in bright scarlet.

This beautiful fish derives its popular name of Sunfish, from the glittering colors it displays while basking in the sun. The numerous spots on its body have occasioned it to be called in some parts of the States "Pumpkin Seed," though what connection that vegetable should have with the fish in question appears to us a mystery. In Massachusetts it goes by the name of Bream. Jardine says it vies with tropical fishes in beauty of color. It affords great amusement to the angler, being a very bold biter, and generally swallowing the hook in its voracity. Its flesh is white and very palatable either boiled or fried, but it seldom reaches above one pound in weight. Individuals of this species will sometimes take up a position under a large stone, or at the foot of a rock, and act as a kind of police for a certain distance either side of them, darting out on the approach of any intruding fish, with their dorsal fin bristling up and driving it away. It spawns in March and April, and clears a small space of stones and extraneous matter by rubbing its belly backwards and forwards over the spot

where the spawn is to be deposited. Its limit extends from Hudson Bay to South Carolina, and perhaps still further South.

POMOTIS APPENDIX.—(*Black-eared Pond or Sun-Fish.*)—Body more robust, thick, and chubby than the preceding, scales less variegated. Throat and belly pale and whitish. The prolongation of the opercle marked with black only, the scarlet termination met with in the preceding one, being absent in this species. It is found associating with the common Sunfish, and almost as numerous.

CHAPTER IV.

BULL-HEAD—STICKLE-BACK, ITS BOLDNESS—SIX-SPINED STICKLE-BACK—SHEEP-HEAD—MALASHEGANAY—CAT-FISH.

FAMILY TRIGLIDAE.—GENUS COTTUS.—COTTUS COGNATUS.—(*Bullhead.*)—Head broad, one-third length of body and furnished with strong curved spines, one near each nostril, one over each orbit, and one on the nape of the neck on each side. Gape of the mouth very large, eyes large and prominent; body diminishing from the head and compressed towards the tail. Colour, dark brown, sides clouded; length about four inches. Found in the Great Bear Lake.

C. POLARIS.—Like the above in shape, but lighter colored with minute dusky spots; two strong spines before and between the eyes; about two inches long. Found in streams running into Hudson Bay.

C. HEXACORNIS.—Like the above, but with six club shaped processes on the head; length six or seven inches: found in the Coppermine River.

GENUS GASTEROSTEUS.—GASTEROSTEUS QUADRACUS.—(*Four Spined Stickle-Back.*)—Colour olive green, whitish beneath, often marked with dusky spots or blotches. Body compressed, back arched. Length one to two inches. In front of the dorsal fin are three and occasionally four movable spines, with a small membrane attached to each, all lying in a groove; the first spine is the longest, the others successively shorter. This species abounds in our waters, and is the object of persecution by every unbreeched urchin, who can procure a crooked pin and a yard or two of thread on a willow twig. It is a bold fish, easily taken with the dip-net, and is easily kept in aquaria, but has the bad character of attacking and destroying other small fishes with its formidable spines, and by snapping at and nibbling off their fins, as we can testify in the case of some gold fish we had in company with two stickle-backs; their pectoral and caudal fins being so severely torn in one night, that for some time we thought they would have died. A peculiarity of this genus is that they do not deposit their spawn on the bottom like most other fish, but build a nest of small

GASTEROTUS BIACULEATUS.

French—*Epinoche.*
Popular name in France—*Savetier*; and on the shores of the Gulf of St. Lawrence, *sou.*
Eng'ish—*Two-spined Stickleback.*

e order of *Acanthopterygii*; of the family of *Mailed Cheeks*; of the genus *Gasterosteus.*
This curious little fish, being from two to two and a half inches long, and half an inch , is found in the rivers and brooks of the Gulf of St. Lawrence, and the species has rous kinds in Europe as well as in North America.

The variety now described, and which is caught in great quantities in the small rivers, s and *barachois* of Magdalen Islands, where it is used as food for cattle and as re (400 barrels were caught last year in the *barachois* of Basque Harbor, Magdalen ds), has two free spines on the back, of a quarter of an inch long, and a third but er, near the dorsal fin. The ventrals, represented by a single ray, look more like trong spines than like fins. The sides and the body are protected by over twenty- lates, forming a kind of cuirass, so that the *Stickleback*, besides being very active in ovements, is furnished with offensive and defensive arms, which causes it to be feared by fish larger than it.

This fish is said to be a dangerous enemy to the Pike; it suffers itself to be swal- by the latter, then with its spines inflicts, either in the mouth or inside, wounds grave gh to cause death.

But what makes the Stickleback still more remarkable is, that unlike all the other who deposit their ova either on the mud or gravel, agglutinating them to aquatic plants, ilds a regular nest to receive its very numerous eggs; the male fish being entrusted that work. Several females lay their eggs in this nest made of little sticks and s of grass, cemented together with the mucus that exudes from its skin; but a single impregnates all the eggs of one nest, and he has to defend them against the voracity her fish, and even, it is said, of the females themselves, till they are hatched. The nce of the male ceases when the young are able to do for themselves and provide for own safety.

The color of the Stickleback varies greatly, being generally dark olive-green above ually intermixing with light greenish and yellowish on the sides.

On specimens found in Esquimaux Point brook, on the north shore of the Gulf of awrence, I counted

D. 2. 1. 11; P. 10; V 1; A. 1. 8; C. 12.

The first dorsal is very long; indeed, it is actually two connecting dorsals. is composed of sixteen very unequal spinous rays, and the second of thirteen; t fin eighteen rays; the ventral two rays preceded of a spine; the anal thirtee caudal sixteen.

The Bull-head has the property of swelling up its body to an astonishi especially when provoked. Its flesh is good, though not used in Canada.

THYNNUS VULGARIS.

French—*Thon.*

English—*Tunny*, *Ablicore*, and *Horse Mackerel.*

Of the order of *Acauthopterygii*; of the family of *Scombridæ*; of the genus *Th*

This fine species of the family of *Scombridæ* inhabits the seas of Europe a America. It is found in the Mediterrean Sea; it being well known to the Ph who fished it on a large scale; also in the Black Sea, on the shores of France an Islands, in the Baltic, on the coasts of the United States, Nova Scotia, Newfound in the Gulf of St. Lawrence.

It enters Bay des Chaleurs and Gaspé Bay. I have often met it in the Belleisle, and sometimes large shoals of them off Blancs Sablons Bay.

The Tunny often acquires a very large size, and some are recorded of eight nine feet in length, weighing over 500 pounds; but the ordinary size is from f feet, and the weight from one to one hundred and fifty pounds.

This fish has an elongated form similar to that of the common mackere robust fins make it one of the best swimmers of our waters; whilst chasing shoal fish which constitute its ordinary food, it is seen springing out of water to a heig or six feet.

Color:—Upper surface blackish; sides silvery; beneath pale white. Scal anterior part of the back, in front of the dorsal, and beneath the pectorals, very

The flesh of the Tunny is considered delicious food, and is something be and meat, being pretty much like veal; the most delicate part is the stomach. fresh, salted for export or pickled with oil or salt; so prepared, considerable of it are exported from France and Italy.

It is captured in the Mediterranean Sea, and especially on the shores of Pr Sicily, with large nets called *thonaires*, and others called *madragues*, nearly simil used by our own fishermen in seal-fishing on the coast of Labra or. They chambers made with nets, in which the fish is driven sometimes in c

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water weeds and confervæ, balanced or fixed between rushes or strong water plants, in which the spawn is deposited. The following quotation from an English writer is applicable to its Canadian congener in regard to its boldness: "The stickle-back for its size, is one of the boldest fish, and withal very inquisitive too. My brother and myself were once during our holidays amusing ourselves near a pond where we saw some of these little fellows looking very independent. One of my brothers, who was very fond of out-of-the-way experiments, tied a piece of string to the neck of a small phial, which he had with him, and put it gently into the water, not for a moment thinking what was to happen. Almost immediately, one of the little fellows in his gay livery of green and red, came up in a menacing attitude to the intruder on his domain. Like the frogs in the fable, he at first kept rather aloof, but gathered courage from seeing his enemy motionless. He gradually made advances and before proceeding very near, made a circuit of inquiry round the bottle, and at last, placing himself opposite its mouth, he manfully entered it, as if devoting himself for the benefit of his race. We brought him to land, but the difficulty was how to extricate him, for feeling, I suppose, some resistance from the narrowness of his quarters, he finally stuck out his offensive weapons, and made it quite impossible to extricate him without breaking the bottle; —we did so—but he did not survive it;—he seemed to have died from his pertinacious pressure against the sides of the phial."

Gasterosteus Gymnetes.—(*The Six-Spined Stickle-Back.*)—Was first discovered by Dr. Dawson of Montreal, and was described by him in the Canadian Naturalist, for October, 1859. He says: "it makes its appearance in the brooks immediately after the melting of the snow in spring; it is then plump and active, and the females are laden with spawn, which is deposited in the end of March or beginning of April, in a globular nest about the size of a musket ball, constructed of green algæ, and placed in a tuft of submerged grass or aquatic weeds. The male remains near the precious deposit and drives away all intruders. I observed," continues the writer, "that microscopic animalculæ had obtained access to the interior of several of the eggs, and evidently occasioned annoyance to the embryo. I have reason to believe that several of the embryos were destroyed in this way, and perhaps the carefully built nest may have for one of its objects, to guard against such attacks. When alarmed it hides under stones or algæ, or remains motionless over some part of the bottom resembling its own colour,

which when it is irritated or frightened, deepens almost into black. The fry remain in the brooks throughout the spring and early summer, but the greater part disappear, descending I suppose into the river before autumn." This species is found plentifully in most of the small streams near Montreal. Its food appears to consist principally of minute worms; it is easily captured, and great numbers are taken by youthful anglers for bait.

GASTEROSTEUS CONCINNUS.—Body scaleless, tail slightly keeled on the sides, nine dorsal spines, length 1¼ inches. Found in the streams in the Northern regions of the Hudson Bay Territories.

FAMILY SCIENIDAE.—GENUS CORVINA.—CORVINA OSCULA.—(*Lake Sheep-Head.*)—Back arched and gibbous, scales shorter than wide, eyes large, mouth small. First ray of the spinous portion of the dorsal fin very short, the third slightly longer than the second, the ninth longest of all. Colour, bluish grey on the back, darker on the nape and snout. Abdomen greyish white; very common in Lake Erie, but is a poor, dry, tasteless fish, and is the pest of the angler for bass, with which it associates, continually taking his bait, and by its splashing driving away the fish he is more anxiously waiting for. It is also found though not plentifully, in Lake Ontario, though we have taken large quantities in the pools off the island opposite to Toronto. It is not known in the Upper Lakes; it feeds mostly on fresh water shell-fish, such as the cyclas, paludina, &c. Its air bladder is very large. It received its vulgar name from its resembling in appearance the *Sargus Ovis*, or salt water Sheep-Head, on account of, as Thompson says in his History of Vermont, "its arched nose and smutty face;" but the resemblance is in appearance only for a while; the former is considered one of the most delicious fishes, the latter is seldom carried to table. Its length is from twelve to eighteen inches. This is the fish which goes under the name of white perch in Cincinnati, alluded to previously.

CORVINA RICHARDSONII.—(*The Malasheganay.*)—Colour greenish grey, with dark transverse bands above; sides silvery, abdomen yellowish. Somewhat similar to the *C. Oscula*, but with a more vertical profile; under jaw somewhat the longest. It is abundant in Lake Huron, where it is highly prized as food, and is thought as much of there, as the preceding species is despised in its own locality. It is sometimes called the black sheep's-head; it feeds on crayfish, &c., and attains sometimes from one to two feet in length. It affords great sport to the fisherman, showing great resistance when hooked, and

unless carefully handled, will strain his tackle before he is aware of its strength.

ORDER II. SOFT RAYED FISH. (MALACOPTERYGII.)

FAMILY SILURIDÆ.—*Genus Pimelodus.*—PIMELODUS NIGRICANS. (*Great Lake Catfish.*)—Head broad and rounded, skin smooth, glossy, scaleless. Eyes small, barbels eight; mouth very capacious, with broad bands of recurved small teeth in both jaws, and in the throat. Palate smooth. The first dorsal fin obtusely pointed, higher than it is wide, composed of one bony and six branched rays. General colour olive brown; sides of the body towards tail, ashy white, with a few irregularly distant round black spots on the upper part of the body All beneath bluish white. Pupils black, irides varied with blackish and golden tints. Its weight is said sometimes in the Mississippi to reach 30 lbs., but in the Northern waters seldom exceeds two or three pounds. It is held in very little estimation as an article of food. It can be taken with any kind of bait; and as it is very strong the best of tackle is invariably necessary. Its flesh though not particularly sweet is said to be easily digested, and they are often sought for by people with weak stomachs, though it seems to us that it would require a very powerful stomach to eat a piece from one of the mammoths of the Western waters. It is sometimes called the Channel Catfish, and is at once distinguishable from the other species by its forked tail, and the irregular round black spots on the body.

PIMELODUS CATUS.—(*Common Catfish.*)—Color dusky, darker on back and head; two concealed spines near the base of each pectoral fin, length from six to ten inches. Sides of the head greenish tint, cupreous on the sides. Abdomen pearl grey. This is one of our most common species. A peculiarity about this fish is that it occasionally is found without any ventral fins. It has a wide range, extending from Canada to Florida. It is sometimes called Hornpout, Mudpout, and Minister. It spawns in May, and has the peculiarity of burrowing into the bank and forming a semicircular dam of mud and clay in front of its burrow, with an aperture to swim in and out of. In this burrow the female deposits her spawn, the only part visible outside of the burrow being the barbels, at which time this unfortunate fish falls an easy prey to the spear of the keen-eyed fisherman. What the object of these barbels or feelers is in the economy of nature, remains as yet an open ques-

tion; but we are inclined to favor the idea of their being used by the fish when itself is concealed in the mud, as a kind of allurement to the small fry, which imagining them to be worms or some species of food, make towards them, and so fall easy victims to their hidden enemy.

Pimelodus Felis,—Is described by Agassiz as peculiar to Lake Superior.

P. Bullus.—(*Brown Catfish.*)—From nine to twelve inches in length, of a uniform dusky brown above, bluish white beneath, fins black tinged with red; in everything else very similar to the common Catfish. Not uncommon.

P. Atrarius.—(*Black Catfish.*)—Colour deep black above, ashen grey beneath, length four to eight inches; common in Lake Ontario, and muddy streams running into it.

P. Coenosus—(*of Richardson.*)—Barbels at angles of the mouth, not reaching the gills; pectoral spines strongly serrated; length about ten inches; found in Lake Huron.

P. Borealis—(*of the same author.*)—Pectoral and dorsal fins not serrated. Caudal forked; length from two to three feet; found in the Northernmost parts of the continent.

The genus Pimelodus will reward the student's careful examination of every individual that falls under his notice, for the scientific world is yet in doubt as to the number of species that should compose Pimelodus proper.

CATOSTOMUS COMMUNIS.

rench. Catostome Improperly called in Canada, Carpe.
nglish.—Common Sucker.
order of *Malacopterygii abdominales;* of the family of *Cyprinidoe;* of the genus *Catostomus.*

The common Sucker is an important group of the genus *cyprinus*, belonging exely to America, and was well described for the first time by the celebrated French alist, Lesueur.

It is known that the real carp was not to be found in America before having been duced into the United States, which was done by means of live fish of the species conveyed about thirty years ago from France and placed in some lakes of the State ew York, and in some parts of the Hudson River, where they increased in an exlinary manner. They may perhaps have found their way by coming through the s and rivers joining the Hudson with the Richelieu and St. Lawrence Rivers; but I ot aware of their having been seen in our country.

The common Sucker is one of the commonest fish of the Canadian waters, being d in the River St. Lawrence, in all its tributaries and in every inland lake. There great number of varieties. Those called *French Carp* and *Scabby Snout Suckers*, xcellent food.

This fish is found in the rivers of Gaspé and Labrador, but generally in small bers. It is abundant in the interior lakes of these places, and constitutes one of the cipal articles of food of the Indians during the winter season. It is perhaps most ndant in St. Augustine and Pacachoo rivers; it is easily caught in this last named .

CHAPTER V.

CARP FAMILY—THE CARP AND ITS INTRODUCTION INTO AMERICA—THE BREAM — CHUB-SUCKER — SUCKER—ROCK-SUCKER—HORNED DACE—SHINER—DACE—BLACK MINNOW—&C.

FAMILY CYPRINIDÆ.—GENUS CYPRINUS.—CYPRINUS CARPIO.—(*Common Carp.*)—This genus is the least carnivorous of all fishes.

There is much doubt as to the existence of the true carp on this continent in a natural state. DeKay says he is not aware that any attempt has been made to introduce the carp into this country previous to 1831, which it will be seen by the following letter from Henry Robinson, Esq., of Newburgh, Orange County, New York, was attended with complete success, and establishes the practicability of introducing foreign fish into our waters. "I brought," says he, "the carp from France in the years 1831 and 1832, some two or three dozen at a time, and generally lost one-third on the passage. I probably put into my ponds six or seven dozen. They soon increased to a surprising degree, and I have now more than sufficient for family use. They spawn twice a year, first in the middle of May, and again in July. During the periods of spawning it is very amusing to watch their habits. They come up to the surface, and the females deposit their spawn along the sides of the pond among the grass, where it is impregnated by the males. During this process they keep the sides of the pond in a foam with their gambols, and suffer themselves to be easily caught by the hand. They grow quickly, reaching three or four inches in the first year, but after that time their growth is very slow. They are very shy of the hook. I generally bait with small pieces of bread (of which they are very fond) and at the same time drop a small piece of bread into the water near the hook, when they bite readily. For the last four years I have put from one to two dozen carp every spring into the Hudson river, near my residence. They have increased so much that our fishermen frequently take them in their nets. They are larger than those in my ponds." Prof. Fowler of Montreal supposes them to exist in Canadian Waters; but whether imported direct or

otherwise is unknown. We do not describe the Carp as not considering it any more indigenous than the gold-fish of our aquaria.

Genus Abramis.—Abramis Smithii.—(*Bream or Wind-Fish.*)—General hue silvery mixed with green and blue on top, golden on sides and abdomen. Irides yellow, back dark green passing into blue. Pectorals and anal fin dull yellow. Ventrals deep orange; length nine to ten inches, said by DeKay to be found in the St. Lawrence.

Genus Labeo.—Labeo Elegans.—(*The Chub Sucker or Small Chub.*)—Colour dark bluish above, beneath whitish with pinkish suffusions along the abdomen. Head brilliant green passing into yellowish and golden on the opercles. Dorsal and anal fins brown. Pectoral and ventrals faint orange; caudal rosaceous. Length five to seven inches. Common everywhere.

Genus Catastomus.—Catastomus Communis.—(*Common Sucker.*)—Colour, head dark green above, verging to black. Cheeks bronze and golden. Body above, dark purplish, with pink and metallic tints on the sides, frequently of a resplendent golden hue extending over the abdomen; beneath white. Pectoral, ventral and anal, orange colored. Irides varied with brown and white. Very little attention has been paid to the careful discrimination of species in this genus; a better defined character of it, and a careful comparison and description of the species is still a desideratum. This fish is abundant everywhere, delighting in muddy streams or lakes where it lies on the bottom; its flesh however is meagre and tasteless. It is usually taken by the spear at night, but occasionally will take the hook, which is probably sucked in accidentally, and instead of affording lively sport, usually is pulled up almost a dead weight; it lives a long time out of the water; its length is from twelve to fourteen inches, and it sometimes weighs six or seven pounds.

Catastomus Sueuri.—(*Rock Sucker.*)—Brilliant metallic colours, scales very large, air bladder divided into three portions. This species omitted by DeKay, but alluded to by Richardson as found in the Northern regions is, according to our opinion, the sucker which is taken among the rocks in the shallows of the St. Lawrence near Montreal, in June and July, succeeding the common sucker, from which it differs in having its flesh firmer and being more free from small bones. It sometimes attains nineteen inches in length, and weighs from four to eight pounds.

Catastomus Tuberculatus. — (*Horned Sucker*, called also

Barbel, Horned Chub, and Horned Dace.)—It has from three to five tubercles on each side the snout. Colour dark olive green, back and sides green with purple and golden reflections. Sides tinged with yellow. Abdomen yellowish with a faint flesh color. Anal fin dark blackish brown, caudal lighter, remaining fins olivaceous. This fish is common in most fresh water streams, frequenting the deep holes, and being a great annoyance to the angler for trout, as its bite is very bold; it is readily taken, and being like all the rest of the genus leathery mouthed, seldom loses its hold when once hooked. It is considered by many as well tasted, but we always considered it too small for culinary purposes. The uses of the tubercles are not very apparent; LeSueur thinks they may be a sexual distinction, but this needs confirmation. Length six to nine inches.

CATASTOMUS OBLONGUS.—(*Large Chub.*)—Colour, dark brown above, lighter on the sides with a bronzy reflection, cream coloured beneath; scales large. Dorsal fin brownish, the other fins lighter and more or less ruddy, tail forked. This is a common fish, and in the Spring is caught in large quantities. It is a favorite amusement with boys to have a cast line of one or two hundred feet with a number of hooks on it, baited with bread, set for this fish, and we have seen numbers of them taken thus in an afternoon at St. Lambert's opposite to Montreal. The flesh is rather soft, and filled with the fine bones so common to this family, yet it is regarded as a good fish at table. There are various methods of cooking it, but it is generally most highly esteemed when baked. Its usual length is from fifteen to twenty inches, and weight from two to five pounds. But individuals are occasionally taken weighing eight or nine pounds.

CATASTOMUS PALLIDUS.—(*Pale Sucker.*)—Colour, head dark greenish with metallic reflections on the cheeks. Irides golden. Back light bluish, becoming mixed with yellow and paler on the sides, abdomen white. Dorsal and caudal fins dark brown mixed with yellow, anal has a faint tinge of yellow. Pectorals and ventrals are orange. This is a common species, running up the streams that empty into the Lakes or the St. Lawrence, as soon as the the thaw sets in, in Spring; the flesh is poor and tasteless. Length nine to ten inches.

CATASTOMUS AUREOLUS.—(*Mullet Sucker, Golden Mullet, Red Horse, and Mullet.*)—Colour, greenish above, sides lighter with metallic reflections; white beneath. Five dusky longitudinal lines on each side above, with occasionally a red broad line running laterally.

Pectorals, ventrals and anals tinged with a reddish hue, the other fins bluish brown. Irides golden, varied with white. This fish is abundant in Lakes Erie and Ontario, and the streams connected with them. Their flesh is firm and they are considered good eating; in the Spring they are sometimes so numerous that the farmers in the neighbourhood of the streams salt them for summer use. Length eight to twelve inches.

CATASTOMUS NIGRICANS.—(*Black Sucker.*)—Colour, blackish on the back; sides and abdomen reddish yellow with dark blotches, white beneath. Pectoral, abdominal and anal fins reddish. This fish is common in Lake Erie, where it goes by the name of "Shoemaker," probably in allusion to its being somewhat the colour of shoemakers' pitch. We have never observed it below the Falls of Niagara.

CATASTOMUS LONGIROSTRUS.—(*Long Nosed Sucker.*)—Colour above reddish, paler on the sides, abdomen white with a bluish tint, aperture of the mouth arcuated, scales small and roundish, head horizontal, terminated in a long snout. Length five to six inches. This fish is not alluded to by DeKay, but is described by LeSueur; it is very abundant in all the streams of Canada, where it is sometimes called the Brook Sucker. It is a very useful fish in an aquarium, acting as scavenger, and clearing up the refuse of other fish. A curious feature about it is, that it is very fond of drawing in by suction a small portion of fine clean sand from the bottom, and transporting it to another part of the aquarium, where it blows it out returning again for more. We were much amused once while watching this process, by a boy asking "if that was the way those fish *cleaned their teeth?*"

GENUS STILBE.—STILBE CHRYSOLEUCAS.—(*Common Shiner.*)—Colour: back, dorsal and caudal fins, greenish. Head, dark brown; irides pale yellowish, beneath the orbits pearly. Pectorals and ventrals with orange tint. Sides of a brilliant lustrous white, which has suggested the popular name; common in all fresh water streams. This fish also is a great addition to an aquarium. Length one to two inches.

GENUS LEUCISCUS.—LEUCISCUS ATRONASUS.—(*Black Nosed Dace.*)—Sometimes called Striped or Brook Minnow. Body above greenish, summit of head blackish brown; a broad dark brown or blackish band passes from the nose, including the lower half of the eyes, and proceeds in a straight line to the tail; bordering this above is a light yellow line, which however commences only from the gill covers; this is occa-

sionally inconspicuous. Abdomen silvery, with a few brownish and metallic blotches. Pectorals orange, dorsal and caudal dark brown; one to three inches in length. This is an active lively fish found abundantly in clear fresh water streams and rivulets, and is an excellent bait for fish of prey.

LEUCISCUS CORNUTUS.—(*Redfin or Roughhead.*)—Colour, above blackish brown with metallic reflections; opercles brassy, sometimes a deep bronze. Dorsal and caudal dark brown. Ventrals and pectorals light coloured. All the fins margined with a deep crimson. Exceedingly lively and active in its movements. Numerous tubercles on the head giving it the appearance of being covered with minute prickles; it is usually found in clear limpid streams, or in the "pot holes" of rapid rivers, associated with brook trout. Its flesh is sweet but soft; Length from three to ten inches.

LEUCISCUS PULCHELLUS.—(*Roach Dace.*)—Brown on the back; sides and abdomen flesh colored with metalllic reflections. Head bluish above; gill covers silvery with metallic tints; Dorsal brown with reddish tinge; pectorals brownish above, lighter beneath. Ventrals and anal light coloured. Length about 14 inches; not very common; found in St. Lawrence and tributaries and in the Ottawa, where the water is shallow and rapid. Takes the hook readily, but is poor eating. Will rise well to the fly.

LEUCISCUS NITIDUS.—(*Shining Dace.*)—Body silvery white; pectorals tinged with light yellow, and bright greenish stripe above the lateral line; head small. Length one to twelve inches. The young of this fish are abundant in the small streams, and are known under the name of White Minnow. If we are not mistaken it is the young or small fry of this fish which abounds in winter round the wharves on Lake Ontario, wherever there is an opening between the wharf and the ice, and where they can be taken in large quantities with a scoop net. When fried dry in fat, they are very similar to "white bait," that well known Aldermanic dainty of England, and are not unlike them in taste. We have used them repeatedly, and found them excellent; they require no cleaning except to be well rubbed in a dry cloth, when all their minute scales come off. As we cannot find any other fish answering the description of these small fry, we conclude they must be the young of this species.

LEUCISCUS ATROMACULATUS.—(*Black Headed Dace.*)—Body above dark olive green, with a broad darker longitudinal band, extending from

gill covers to the tail. Sides of a golden yellow. Beneath a silvery white. Head deep brownish black. Gill covers cupreous with metallic reflections. Eyes black surrounded by a golden ring. Dorsal fin with a dark spot at the anterior portion of its base. Pectorals, ventrals and anal with a light orange tint. Common, and varies in size; not unlike a large black nosed minnow, but more golden in color and larger. Length from six to twelve inches. Sometimes called Lake Dace.

Genus Hydrargira.—Hydr. Fuscus.—(*Mud Fish or Black Minnow.*) — Colour above dark olive mottled with blackish; sides mottled or variegated with brown, green and golden, with faint indications of yellowish bars; belly dull brownish, bronzy yellow; fins dusky yellow; sides yellowish at the base of the tail, crossed by a vertical black bar. Form thick and plump; upper jaw shorter than the lower. Tail fully rounded. Dorsal fin twice as long as high, greatest length five inches. Abundant in Lower Canada; being very tenacious of life they constitute a capital bait. Thomson in his History of Vermont, says: "During droughts, as the water subsides and recedes from the coves, they have the power by a springing motion of transporting themselves from one little puddle to another. They have the power of partially burying themselves, and living in the mud (hence their name) and amongst the moist grass roots, after the other small fishes associated with them are dead for want of water. In these situations numbers of them are devoured by birds, muskrats and foxes. In one small cove of Lake Champlain, which I visited on the 24th September, I found mud fishes dead in piles, in the low places which had become dry. One small portion of the cove still covered with water and leaves to the depth of four or five inches, was literally filled with fishes, struggling together for existence. This portion amounted to about one square rod, and in this space there could not have been much less than a barrel of fishes, consisting of yellow perch, shiners, catfish and mudfish,—mostly of the two last. My feelings were really pained at the sight, and moved by compassion for the poor fishes I heartily wished for rain, which on the next day came in abundance, to the joy not only of the fish and their sympathizers, but of the whole country." This fish has a peculiar habit of balancing itself in mid-water, while its pectoral fins are in perpetual motion; it will at times dart violently to the surface and down again instantaneously, and can remain a long time without going to the surface to respire.

FUNDULUS VIRIDESCENS.

French—*Fundule.*
Popular name on the Gulf shores—*Barbeau, Choquemort.*
English—*Big Killifish, Minnow, Minny.*
he order of *Malacopterygii abdominales;* of the family of *Cyprinidæ;* of the genus *Fundulus.*

The Minnow is a very pretty little fish, a quick swimmer, and is found in abundance he Canadian shores of the Gulf, and probably also in the other British Provinces, in salt water creeks and brackish streams, which it seems to prefer to fresh water. Ac- ing to Valenciennes the Minnow is peculiar to America, and is besides viviparous; it not be confounded with the European *Leuciscus phoxinus* of Cuvier. It is caught in quantities with nets or scoop-nets at Port Daniel, at the *barachois* of Malbay (*en bas*), any other places on the shores of Gaspe, and also in the Magdalen Islands *barachois* creeks, where it is very useful as a bait for cod, when other bait fails. The specimens last year from Amherst Island were from three and a quarter to four inches long, to quarters of an inch thick, and of the following description:—

Body elongated, cylindrical, flattened above and compressed on the sides of the tail. s large—(it is the opposite of the European Minnow, whose body is covered with e scales, according to Yarrell), larger on the head than on the other parts of the and extending to the end of the snout. Lateral lines very obscure. Head small, ed above. Eyes large, distant; pupil black. Nostrils form an oblong slit just or to the orbits. Mouth small but very protractile, with a somewhat vertical aspect. is something similar to a lip on the upper part of the mouth. Fine teeth on the and lower jaw.

The dorsal fin placed far back, over the anal, quadrate, and composed of eleven rays. rals rounded, and containing from seventeen to eighteen rays. Ventrals, six rays. eleven rays. Caudal fin, twenty-nine rays, broad and short.

Color:—Olive green above, mottled, and lighter in color on the sides, silvery white the belly, tinged with yellow on the abdomen. Opercles, pectorals and ventrals greenish yellow. Irides yellow.

gill covers to the tail. Sides of a golden yellow. Beneath a silvery white. Head deep brownish black. Gill covers cupreous with metallic reflections. Eyes black surrounded by a golden ring. Dorsal fin with a dark spot at the anterior portion of its base. Pectorals ventrals

The Angler inhabits the seas of Europe and North America. It is also found in the Gulf, but is seldom caught with the hook or net, and the specimens found are usually thrown on the coast when they come too near the shore looking for food. On account of the smallness of its gills, this fish can live long out of water.

The curious fish exhibited at Quebec three years ago, the name of which I forget, and which had been caught at Anse des Dunes, on the coast of Labrador, was nothing but an Angler. Another fish of the same species was also found two years ago at Long Point, near Mingan.

The ordinary size of the Angler is from three to four and a half feet.

CTENOLABRUS CERULEUS, CRENILABRUS BURGALL.

French.—Le Cténolabre chogset.

English.—Common Bergall. Blue-fish. Blue perch. Cunner.

This ... the order of *Acanthopterygii;* of the family of *Labridoe;* of the genus *ctenolabrus*

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frequenting the interior of Labrador, this fish is found in the upper part of several rivers falling into the Gulf of St. Lawrence, and in the lakes of that part of the country.

Its color varies—in some it is deep green, varying to blackish on the back, and greenish or bluish grey; in others it is of a golden yellow, especially during spawning time.

It is fished with nets in the lakes and rivers, and also with lines having little artificial baits. The apparatus called *kill devil* is especially much used.

Rod-fishing for Pike is most exciting. It is one of the favorite amusements of many of the sportsmen of the interior of Canada, though very far from equal to the trout fly-fishing, but this last enjoyment is not within the reach of every one.

ESOX ESTOR.

French.—Maskinongé

shiners, catfish and mudfish,—mostly of the two last. My feelings were really pained at the sight, and moved by compassion for the poor fishes I heartily wished for rain, which on the next day came in abundance, to the joy not only of the fish and their sympathizers, but of the whole country." This fish has a peculiar habit of balancing itself in mid-water, while its pectoral fins are in perpetual motion; it will at times dart violently to the surface and down again instantaneously, and can remain a long time without going to the surface to respire.

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HYDRARGIRA MULTIFASCIATA.—(*Barred Minnow.*)—Numerous transverse bands on the sides, alternately olive brown and bluish; body more elongated in the middle than the preceding; snout shorter; length three inches; abundant in the St. Lawrence, where in August and September they may be seen in thousands round the edge of the wharves, which stretch far out into the river, where the water is rapid. They are an excellent bait especially for black bass.

CHAPTER VI.

THE PIKE—DESCRIPTION, HABITS AND HAUNTS—VARIETY—PECULIARITIES—TACKLE FOR TROLLING—FISHING ANECDOTES.

GENUS ESOX.—ESOX RETICULATUS, or LEUCIOIDES of Agassiz. (*Common Pike.*)—The colour varies in different individuals; his body is elongated and nearly of a uniform depth from the head to the tail; the head is elongated, somewhat resembling the beak of a duck; his mouth is very large and abundantly supplied with sharp teeth, and his scales are small and particularly adhesive; the colour of his back is a dark brown, sides a mottled green or yellow, belly silvery white. Numerous irregular longitudinal dusky streaks on the sides of the body, united with similar oblique streaks, and producing an imperfectly reticulated appearance. It is a common fish in all the temperate, and some of the Northern regions of the world; but in no country does he arrive at greater perfection, than in this continent. In England he is known under the name of Pike, Pickerel, Jack and Luce. The reputation of this fish for amiability is far from being enviable, for he is called not only the "shark of the fresh waters," but also "the tyrant of the liquid plain." He is a cunning and savage creature, and fishermen are seldom troubled with conscientious scruples when they take him captive. Pliny and Sir Francis Bacon both considered this to be the longest lived of any fish, and Gesner mentions a pike which was ascertained to be two hundred years old. Of these ancient fellows, Walton remarks that "they have more in them of state than goodness, the middle sized individuals being considered the best eating." The prominent peculiarity of this fish is his voracity. He swallows every animal he can subdue, and is so much of a cannibal that he will devour his own kind full as soon as a common minnow. Wilson records having killed a pike, weighing seven pounds, in whose stomach was found another pike weighing over a pound, and in the mouth of the youthful fish was yet discovered a respectable perch.

The pike of this country does not differ essentially from the pike of Europe. His food usually consists of fish and frogs, though he is far

from being particular in this matter. He loves a still shady water, in river or pond, and usually lies in the vicinity of flags, bulrushes and water lilies, though he often shoots out into the clear stream, and on such occasions frequently affords the rifleman good sport. In summer he is taken at the top and in the middle, but in winter at the bottom. His time for spawning is in March, and he is in season about eight months in the year. In speaking of the size of this fish the anglers of Europe have recorded some marvellous stories. In this country they vary from two to four feet in length, and in weight from two to forty pounds; when weighing less than two pounds he is called a jack. As an article of food he is held by some in high repute; the best way of cooking him being to bake him with a stuffing of sweet herbs, taking care that he is well basted during the operation; but since we once found a water snake in the stomach of a monster fish, we rather object to him on the table; as an object of sport we esteem him highly, and can never mention his name without a thrill of pleasure.

The long and slender form of the pike, tapering towards the head and tail, enables him to move with great rapidity through the water, while his smooth and finless back facilitates his movements through the weeds or marine plants. Thus has nature provided this fish with a form adapted to its habits, and with large and well armed jaws, to give it a pre-eminence among the finny tribes, which inhabit the same waters. It is well known how prolific fishes are, and unless some way was provided to lessen their number, our inland waters could not contain the vast numbers which a few years would produce. Most fish live on each other, others on decomposing substances floating about. But it is not always the largest that prey on each other, for the sturgeon is one of the largest fresh-water fish, and he subsists on decomposing matter. A few pike placed in a lake would very effectively prevent an over population.

It is interesting to notice the habits of the pike, which an angler may easily do in still clear water. They have been characterized as a solitary, melancholy, bold fish. Never are they found in schools, or even in pairs, as most other fish are, nor are they often to be seen in open water, where other fish would discover them, and avoid their grasp. When they are in open water, they lie very near the bottom, quite motionless, appearing like a sunken stick. Their favorite place of resort, however, as we said before, is among the tall weeds where they cannot be seen; here they lie as it were in ambush, waiting the

approach of some unsuspecting fish, when they dart forth with a swiftness which none of the finny tribe can attain, seize their harmless victim, and slowly bear it away to some secluded spot. Here they crush their prey with their huge jaws, and leisurely force it into their capacious stomachs. Often when fishing for pike with a live minnow, from a wharf so far raised above the water that we could see every object ten feet on either side, a pike has so suddenly darted from a cluster of weeds, beyond the range of our vision, that the first intimation we had of his presence was that he had seized our bait.

"On one occasion," says Lanman, "when fishing in the St. Lawrence, where pike are very abundant, I put a minnow on my hook, and threw my line towards a mass of weeds, in the hope of tempting a perch to take it. Not many minutes had elapsed, before my silvery minnow had tempted the appetite of one, which soon conveyed him to his maw. Knowing my game was sure, I let him play about, first allowing him to run to the extent of my line, and then drawing him towards me, when on a sudden a pike shot from his hiding place and seized my perch. I was obliged to let him have his own way, and give him all the time he wanted to swallow the perch, when with a good deal of difficulty I succeeded in disabling him, and towed him in triumph to the shore. The perch weighed a pound and a half; the pike ten pounds."

There are two peculiar habits connected with this fish, mentioned by Blaine, which must not be passed over, as they probably are not known to many of our readers. The first is that the pike is as distinguished for his abstinence as his voracity. During the summer months his digestive organs seem to be somewhat torpid, and this is the time that he is out of season. During this period he is particularly listless in his movements, spending nearly all the sunny hours basking near the surface of the water; and as this is the period when the smaller fry are usually commencing their active existence, we cannot but distinguish in this arrangement of nature the wisdom of Providence: this is a remarkable peculiarity in pike economy, seeing it must be in inverse ratio to the wants of the fish, for they must be at this time in a state of emaciation from the effects of spawning. It is not a little remarkable too that small fish appear to be aware when this abstinent fit is upon him; for they then swim around him with total unconcern. At these periods, no baits, however tempting, can allure him; on the contrary he retreats from everything of the kind. Windy weather is

alone capable of exciting his dormant powers. This inaptitude to receive food with their usual keenness continues from the time they spawn until the time of their recovery from the effects of it. This listlessness, however, does not apply to the pike of the Lakes, whose waters are not so sensibly affected by the heat of summer as shallow water; it is in the smaller streams where this listlessness is exhibited, and whenever he can reach the deep water he does so.

The other habit peculiar to this fish is as follows: during the autumn he spends the day-time in deep water, and the night in the shallowest water he can find along the shores of river or lake. They frequently come so near the land as to display their fins. What their object can be in thus spending the dark hours, it is hard to determine; perhaps it is to enjoy the warm temperature of the shallow water, or for the purpose of watching for and capturing small land animals that may come to the water to satisfy their thirst. It is alleged by some that they seek the shore for the purpose of spawning, but it is an established fact that they cast their spawn in the spring; and besides, the months during which they seek the shore as above stated, are the very ones in which they are in the best condition, and afford the angler the finest sport. Autumn is the time too when they are more frequently and more easily taken with the spear than during any other season.

Pike are found in all the lakes and inland waters of the Northern and Middle States of this continent. In the great Lakes they grow to an enormous size. In colder climates they attain the largest size, and are said by Walkenburg to disappear in geographical distribution with the fir-tree. In our waters they are taken of all sizes, from four or five pounds weight, to forty. They are rarely found on rocky bottoms or bars. A high wind and rough sea often drives them from their weedy haunts into deeper water. This is particularly the case on Lake Ontario. From wharves where bass are only taken on ordinary occasions, pike will bite with avidity when a severe gale is blowing, and the water is in a disturbed state.

This fish, according to Donovan, attains a larger size in a shorter time than most others. In the course of the first year it grows eight or ten inches; the second twelve or fourteen; the third eighteen or twenty. Mr. Jesse in his Gleanings of Natural History, relates certain experiments by which to show that the growth of pike is about four pounds a year, which corresponds with the result above stated.

And now a word or two about the tackle to be used in pike-fishing.

The immense book description usually to be met with respecting its character and quality, has always seemed to us an intelligent species of nonsense, a kind of literature originally invented by the tackle manufacturers. The best and simplest equipment for the purpose is a heavy rod and reel, a stout linen line, a brass or gimp snell, a sharp hook or hooks, and a landing net or gaff-hook. For bait we prefer a live minnow, though a small shiner, or a small yellow perch with the spines cut off, is usually as sure to attract notice. Pike can be taken with a gaudy fly, and also with an artificial minnow, but you cannot depend upon these allurements. Sinkers are seldom used except on the edge of rapids, and the Cockney arrangement called a float, we utterly abominate. The best way of fishing is from an anchored boat; it is the most quiet and contemplative method, and unquestionably one of the most successful ones; for though the pike is not easily frightened, it takes but a single splash of the oar when trolling, to set him thinking, which is quite as unfortunate for the angler's success as if he was actually alarmed. Another advantage is that while swinging to at an anchor you may fish at the bottom if you please, or try the stationary trolling fashion, *i. e.* an expert angler can throw his hook in any direction from his boat, to the distance of at least a hundred feet, and in pulling it in, he secures all the advantages that result from the common mode of trolling. The pike is a fish that calls forth a great deal of patience, and must be humoured; for he will sometimes scorn the handsomest bait, apparently out of mere spite, but the surest time to take him is when there is "a southerly wind and a cloudy sky." Live fish is the best bait as we before remarked, though the leg of a frog is good, and in winter a piece of pork or anything that shines. The new spoons painted red inside are also very good in rapid water, but they cannot be relied on. As to torchlight fishing for pike, though unquestionably out of the pale of the regular angler's sporting, it is attended with much that we must deem poetical and interesting. Who can doubt this when we consider the effect of a boat and lighted torch of pine knots in its bow, gliding along the wild shores of a lake, on a still, dark night, with one figure noiselessly plying an oar, and the animated attitude of another relieved against the firelight, and peering into the dark waters, forming a contrast of light and shade that Rembrandt might have envied.

In some of the Northern States and Canada generally, fishing for pike with set lines through the ice, is practised to a great extent. The

lines are generally attached to a figure four of wood, by which the fisherman is informed he has a bite, and if he has many lines out and the fish are in a biting humour, this mode of fishing is really very exciting. Especially so if the ice is smooth, and the fisherman can attend to his hooks with a pair of sharp skates attached to his feet.

Another mode for catching fish in winter, and practised greatly by the Indians is as follows: You cut a large hole in the ice over which you erect a tent or small portable house, and after taking a seat therein, you let down a bait for the purpose of alluring the fish, and as they follow the hook even to your feet, you pick them out with a sharp spear.

The largest pike are said to be taken in the Upper Mississippi and in the St. Joseph and Raisin rivers of Michigan. They are found however in almost all the streams emptying into the Lakes. They are very abundant in the Upper St. Lawrence and in Lake Champlain. "The most successful pike-fishing," says Lanman, "we ever enjoyed, was at Crow Wing on the Upper Mississippi. We were spending a few days with an isolated Indian trader of the wilderness, around whose cabin were encamped about three hundred Chippewa Indians. Seldom was it that we allowed a night to pass away without trying our luck with the spear, and as a dozen canoes were often engaged in the same sport, the bosom of the river presented a most romantic and beautiful appearance. Each canoe usually contained two or three individuals, and our torches which were made of dried birch bark, threw such a flood of light upon the transparent water, that we could see every object in the bed of the river with the utmost distinctness. Beautiful indeed were those fishing scenes, and when the canoes had floated down the river for a mile or two, the homeward-bound races that followed between the shouting Indians, were exciting in the extreme. And what added to our enjoyment of this sporting was the idea that to grasp the hand of a white man (besides that of our host) we should have to travel one hundred miles through a pathless wilderness. We seldom took any note of time, and sometimes were throwing the spear even when the day was breaking. The largest fish that we saw taken at Crow Wing weighed upwards of forty pounds, and we have known five spearmen to take seventy pike in a single night."

But we must curtail our Pike stories and close our accounts of this bold biting fish with a few remarks from the pen of J. R. Bartlett, Esq. The pike bears the same relation to the finny tribes that the hyena and jackal do to animals, the vulture to birds, or the spider

to insects—one of the most voracious of fishes. He feeds alike on the living or the dead; and even those of his own brethren, which are protected by nature against the attacks of other fish, find no protection against him. It is remarkable in the economy of animals, that while nature provides her weaker and smaller creatures with the means against the stronger ones, she has at the same time furnished some of the latter with weapons, apparently for the very purpose of overcoming the feeble, however well they may be guarded. Thus the pike with its immense jaws, armed with innumerable teeth, is able to seize and crush every kind of fish. Its own kind do not escape, for instances are frequent where a pike of three or four pounds is found in the stomach of one of twelve or fifteen pounds weight.

CHAPTER VII.

THE MASKALONGÉ—HABITS AND HAUNTS—EXCITING SPORT IN CATCHING THEM—SPEARING ADVENTURE.

ESOX ESTOR.—(*The Maskalongé or Maskinongé.*)—Deep greenish brown, darker on the back, pale on the sides, with numerous rounded distinct pale yellowish or grayish spots on the sides, varying in size from two to three-tenths of an inch in diameter. Each scale has a bright quadrate spot which reflects brilliant metallic tints of various colours. Length from one to six feet.

The habits and haunts of this fish are the same as those of the pike, and they attain a larger size than any fish of our inland waters. We have seen them carried by two men, with a pole running through their gills, and supported on the shoulders of the men. In this position the tail of the fish dragged upon the ground. Forty or fifty pounds is not an unusual weight for them, and instances are not wanting when much larger ones have been caught. They are generally taken in seines, seldom with a hook. Their size is so large that the ordinary baits of anglers would be no temptation to them. In the several opportunities we have had to examine the stomachs of these fish, we have invariably found in them fish of large size, such as no angler would ever think of putting on his line. "The largest perch," says Weld, "that I ever saw, about fifteen inches in length, was taken from the paunch of a maskalongé, and I have often seen catfish, perch, and other fish weighing from one to two pounds taken from them; but in no instance small fish; and hence anglers have not taken them, as few could fish with bait of that size, where there are no fish but these, which would take it."

"The most exciting sport," says Lanman, "I ever had on the St. Lawrence or any where else, was capturing a maskalongé. It was a regular battle, such only as salmon anglers enjoy when they hook a twenty pounder. A friend and myself took a small skiff, with one trolling line, intending to take turns at the oars, and proceeded at once to a favorite spot among the Thousand Islands. I held the

trolling line with a spoon attached, while my companion pulled the oars. We sailed among the secluded places, wherever weeds were seen below the surface of the water, and were rewarded with good sport by taking several fine pike, weighing from six to fifteen pounds, which we managed to secure with ease, save the largest, which gave us some trouble. We then thought we would try deeper water, in the hope of tempting larger fish. A few windings among the clusters of small islands brought us to the channel of the river, when I directed my companion to increase the speed of the skiff, determined that the curiosity of no fish should be satisfied, without first tasting my gilded spoon. We pulled for half a mile, when the river wound suddenly round an island, which presented a bold shore, from the rushing of the river's current. The tall forest trees extended to the very brink of the river, over which they hung, throwing a deep shadow on the waters. This quiet spot looked as though it might be an attractive one for some solitary fish, and we accordingly took a sweep around the island. Scarcely had we entered the deep shade spoken of, when I felt a tug at my line, which was so strong that I supposed my hook had come in contact with a floating log or fallen tree. My companion backed water with his oars to relieve my hook, when another violent pull at my line convinced me that it was no log, but some living creature of great weight. My line was already out its full 150 feet; no alternative was therefore left but to give my fish more line by rowing after him. This we did for a few minutes, when I began to pull in the slack of my line, some fifty feet or more, when I felt my fish. The check was no sooner felt by him than he started forward with a velocity scarcely conceivable in the water, bringing my line taut, and the next moment our skiff was moving off stern foremost towards the river's channel. We soon perceived that our fish had turned his head up stream, and as the water was deep there was no danger of his coming in contact with weeds or protruding rocks. We therefore allowed him to tow us for about five minutes, when he stopped. Then quickly backing water with our oars, and taking in our line, we carefully laid it over the skiff's side, till we had approached within twenty feet of our fish. I then gave him another check, which probably turned his head, for he again darted off in a contrary direction down stream. We pulled our skiff in the same direction as fast as possible to give the fish a good run before checking him again, but he soon had the line out its full length, and was again towing our skiff after

him with more rapidity than before. This did not last long, however, for I then took the line and hauled towards him to lessen the distance. He made another slap, when I managed to keep my line taut, and with our oars moved towards him. Our victim now lay on the surface of the water, with his belly upward, apparently exhausted, when we found him to be a maskalongé between 5 and 8 feet in length. We had no sooner got him alongside than he gave a slap with his tail, and again darted off the whole length of the line, taking us once more in tow. His run was now short, and it was evident he was getting tired of the business. Again the line slacked, and we drew the skiff up to the spot where he lay turned on his back.

"He seemed so far gone that I thought we might draw him into our skiff, so I reached out my gaff and hooked him under the jaw, while my companion passed his oar under him. In this way we contrived to raise him over the gunwale of the skiff, when he slid to its bottom. I then placed my foot at the back of his head to hold him down, in order to disengage my hook, which passed through his upper jaw. No sooner had I attempted this than he began to flap about, compelling us to give him room to avoid his immense jaws. Every moment seemed to increase his strength, when my companion seized an oar in order to despatch him, while I took out my knife for the same purpose. The first blow with the oar had only the effect to awaken our fish, which, taking another and more powerful somerset, threw himself over the gunwale of our skiff, which was but a few inches above the water, and with a plunge disappeared in the deep waters at our side. We had scarcely recovered from our surprise, when I found my line drawn out again to its full length, save a few tangles and twists which had got into it in the struggle between us and our fish. We determined to trifle no longer with the fellow, with our small skiff, but to make for the shore and land him. A small island a short distance from us, seemed to present a convenient place, and here without further ceremony we pulled, towing our fish after us. I lept into the water about ten feet from the shore, and tugged away at my victim, who floated like a log upon the water, while my companion stood by with an oar to make the capture more sure this time. In this way we landed him in safety just one hour and a quarter after he was first hooked. This maskalongé weighed 49 lbs., and had within him a pike of three pounds weight, a chub partially decomposed of four pounds, and a perch of one and a half pounds, which appeared to have been recently

swallowed: yet this fish's appetite was not satisfied, and he lost his life in grasping at a glittering bauble. Any person who has ever killed a pike of ten pounds weight, can readily imagine the strength of one five times its weight."

The great strength of these fish was shown in a sporting adventure that happened to a gentleman spearing by torchlight. He had never before tried his hand with the spear, although he was a skillful angler. On this occasion he had killed several fish, which he secured without trouble. He was then in about six or eight feet of water when he discovered a large fish, either a very large pike or a maskelongé. He planted himself with one foot below the flaming torch, the other a little behind, when he plunged his spear into the huge fish that lay so quietly before him; but whether he was deceived with the depth of the water, or whether he had not braced himself in the boat is not known; at any rate he struck the fish, which darted off like lightning, taking the spear with him, as well as him who threw it. For the gentleman being probably deceived by the depth of the water, had reached forward too far, and thereby lost his balance. So over he went head foremost, holding on to the spear. But he was satisfied without following the fish further, which escaped with the long spear, neither of which could be again seen. The gentleman now made the best of his way back to the skiff. Two days after a huge maskinongé floated ashore several miles below the spot where the event took place, with the spear still clinging to him just before the dorsal fin.

CHAPTER VIII.

THE SALMON—ITS HABITS—ITS LEAPS—PERIODICAL JOURNEYS—HAUNTS—DESCRIPTION OF ITS SPAWNING—SALMON RIVERS.

Genus Salmonidæ.—Salmo Salar.—(*The Common Salmon.*)—Colour: the back usually of a bluish black, which diminishes in intensity as it approaches the lateral line, which is a narrow black stripe, the sides of a silvery hue, and the belly pure white. The head is somewhat darker than the back. Opercles with one or more dark spots, which are also occasionally dispersed over that part of the body above the lateral line, the females usually exhibiting a larger number of these spots than the males. The tail of the young salmon is commonly forked; but in the adult fish it is lunated or almost square. The dorsal, pectoral and caudal fins are dusky black, the ventrals are light colored, and the anals are silvery white, like the belly. The body is covered with thin oval scales, but the head is smooth and free from them. There are two dorsal fins, the first with thirteen rays, the second fatty, long and rounded, and without any rays. The pectoral fins have twelve rays, the ventral nine, the anal nine, and the caudal nineteen. The lateral fin is straight and runs very nearly through the centre. From its lithe beauty, its wonderful activity, and its value as an article of food, it unquestionably takes precedence of all the fish that swim in our waters. Such are some of the leading features by which this beautiful fish may be distinguished, beautiful indeed whether it swims in its native element, its sides sparkling like molten silver, or smoking on the table, it graces the beginning of the feast.

And now for a few words on some of the habits of the salmon. He is unquestionably the most active of all the finny tribes, but the wonderful leaps he is recorded to make are all moonshine. Scrope says he has seen them perform some superb somersets, but never yet saw one which could scale a perpendicular water-fall of ten feet. That they have been taken above water-falls three or four times as high we do not deny; but the wonder may be dispensed with, when we remember that a water-fall seldom occurs which does not contain a number of

resting places, for the salmon to take advantage of while on his upward journey. "Ephemera" in *Bell's Life in London*, January 4th, 1854, seems to doubt whether salmon can leap more than six feet. Moses H. Perley, whose accurate observations have thrown much light upon the Natural History of Fishes, says they frequently leap falls ten and twelve feet in height, and that "it is believed the utmost limit of perpendicular height which a salmon can attain in leaping is fourteen feet." W. H. Herbert in his interesting work on Fish and Fishing in America, says: "I once watched a salmon for above an hour, endeavoring to pass a mill-dam on the river Wharfe, a salmon river in the West Riding of Yorkshire. The dam was thirteen or fourteen feet at least in height, it was formed with a sort of step midway, on which the water fell making a double cascade. While I was watching him, this fish, which I suppose was seven or eight pounds, made above twenty leaps, constantly alighting from his spring about midway the upper shoot of water, and being constantly swept back into the eddy at its foot. After a pause of about a couple of minutes, he would try it again, and such were his vigour and endurance, that he at last succeeded in surmounting the formidable obstacle."

The old fable, that in making their leaps, the salmon take their tails in their mouth and rise by the force of the spring like an elastic bow, has been very long exploded. Scrope says: "they rise very rapidy from the very bottom to the surface of the water by means of rowing and sculling, as it were with their fins and tails; and this powerful impetus bears them upwards in the air, on the same principle that a few tugs of the oar make a boat shoot onwards after one has ceased to row." "Ephemera" says: "the ascending motion is caused by the salmon striking the water downwards with its pectoral, ventral and dorsal fin, aided by bodily muscular action." There is no doubt then that this muscular exertion often gives to the fish its curvilinear form.

The salmon is a shy fish, and as he invariably inhabits the clearest water, it is always important that the anglers movements should be particularly cautious; and in throwing the fly he should throw it clear across the stream if possible, and after letting it float down for a few yards he should gradually draw it back again, with an upward tendency. Like all other fish that swim near the surface of the water, the salmon cannot be eaten in too fresh a condition; the texture of its flesh, which is pink, is remarkably solid; the latter circumstance is proved by the fact that you cannot carry a salmon by the gills, as you

can other fish, without tearing and mutilating him to an uncommon degree.

As soon as the rivers are free from ice, say the beginning of May, the salmon grown fat and silvery on their sea found food, appear in the estuaries, where they usually remain for a time, going up with the flood and returning with the ebb. It seems that they remain for a time in the brackish waters, as a preparatory step to their inland journey. When they first come from sea, they are fat and heavy, their sides are covered with sea lice, and their fins are soft from the action of the salt water. By remaining a short time in the fresher water of the estuaries, they rid themselves of the sea lice, gradually lose something in weight and fatness, and their fins becoming hardened, are more capable of sustaining them in their often long and laborious ascent, while the fish themselves become proportionably more active and muscular. They ascend the rivers after this, preferring a flood or freshet, and in ascending a river they invariably tarry for a short time in all the pools of the same. Their object in doing this has not been clearly defined; but is it unreasonable to suppose that they are influenced by the same motives which induce a human traveller to tarry in a pleasant valley? The only difference is that when the man would resume his journey he waits for a sunny day, while the salmon prefers a rainy day to start upon his pilgrimage. The finest places to fish for salmon are the shallows above deep pools, and it is a settled fact, that after killing a fish, another is sure to be found in the same place in the course of a few hours. It would thus seem they are partial to certain localities; yet nevertheless they are a restless fish, and seldom found a second time in exactly the same spot; but their principal travelling time is in the night, when the stars are shining brightly, and all the world is wrapt in silence.

"As the ice melts away in the spring," says Dr. J. V. Smith, in his interesting book on the Fishes of Massachusetts, "they rush to the rivers from the ocean; and it is an undeniable fact, confirmed by successful experiments, that they visit, as far as possible, the very streams in which they were born. When undisturbed, they swim slowly in schools near the surface; yet they are so timid, that if suddenly frightened, the whole column will turn back directly towards the sea. It has also been proved that a salmon can scud at the surprising velocity of thirty miles an hour."

The streams which these fish ascend, are invariably distinguished

for their rocky and gravelly bottoms, for the coldness and purity of their water, and for their rapid currents. Those which afford the angler the most sport are rather small and shallow, and empty into tide-water rivers; while in the others they are chiefly taken with the net. The rivers in the Northern part of the United States having all more or less been blocked up with mill-dams, the salmon is only found in their estuaries; and it is said the only river in the United States which now affords sport to the salmon fisher, is the Aroostook in Maine. They are never taken in any river south of Boston now. In olden times they frequented the Susquehanna, the Delaware and Hudson rivers, and were abundant in the Thames and Connecticut. On the former stream it used to be stipulated by the day labourer, that he should have salmon placed upon his table only four times in the week; and an old man residing on that stream stated to Weld, that the value of three salmon forty years ago was equal to one shad,—the former being so much more abundant than the latter. But steamboats and the din of cities, have long since frightened the salmon from their ancient haunts, and the beautiful aborigines of those streams, now seek for undisturbed homes in more Northern waters.

The process of spawning has been described by various writers; but as all may not have the facility of reading works on the salmon and its habits, we will give a slight account gleaned from authentic sources. They do not breed in lakes, ponds, or any still deep water. It is only in the shallows where the waters run clear and swift over gravelly or sandy bottoms, that they deposit their eggs. It is for this that they seek the heads of streams, shooting up the rapids and leaping water falls, counting no exertion or fatigue too great, if they may but safely deposit the hopes of future years where the highly ærated waters rippling over their procreant cradle, may quicken the embryo salmon into life.

In the ascent the females lead the way. After reaching the river sources, when the water has cooled to about 42° Fahrenheit, they prepare to deposit their spawn. By this time the male and female have put on respectively the appearance known as "Red fish" and "Black fish." The male is the Red fish, the sides taking on an orange hue, paling into yellow on the belly, the spots become a bloody red, and are seen on the dorsal and caudal fins; the back becomes greenish, and the cheek is striped with orange. The lower jaw also elongates into a hooked cartilaginous excrescence, fitting into the upper. The

females grow darker, particularly upon the back fins and gill covers, and are now called "Black fish." The females seek out their mates and pairing off, they choose a spawning place, from which if possible they drive away all other fish. "Ephemera," describing the way in which they deposit their eggs, says "a salmon spawning bed is constructed thus: The fish, having paired, chosen their spot for bed-making, and being ready to lie in, drop down the stream a little, and then rushing back with velocity towards the spot selected, dart their heads into the gravel, burrowing with their snouts into it. This burrowing action, assisted with the powers of the fins, is performed with great force, and the water's current aiding, the upper part or roof of the excavation is removed. The burrowing process is continued until a first nest is dug sufficiently capacious for a first deposition of ova. Then the female enters this first hollowed link of the bed and deposits therein a portion of her ova. That done she retires down the stream, and the male instantly takes her place, and pouring by emission a quantity of milk (better known under the name of soft roe) over the deposited ova, impregnates them. After this the fish commences a second excavation immediately above the first, and in a straight line with it. In making the excavations they relieve one another. When one fish grows tired of its work, it drops down the stream until it is refreshed, and then with renovated powers resumes its labours, relieving at the same time its partner. The partner acts in the same spirit, and so their labour progresses by alternate exertion. The second bed completed, the female enters it as she did the first, again depositing a portion of ova, and drops a little down stream. The male forthwith enters the excavation and the same operation is repeated day by day till the female has no more ova to deposit. For it must be borne in mind that no two excavations are made on the same day. The ova in the first nest are covered with the gravel and sand from the second, being carried chiefly by the action of the current. The last deposition of the ova is covered in by the action of the fish and water breaking down some of the gravel crust above and over the nest. Thus is formed a complete spawning bed, not at once, not by a single effort, but piecemeal, and at several intervals of greater or less duration, according to the age and size of the fish and quantity of ova to be deposited. They are usually occupied from five to ten days." When this task is accomplished they descend the stream to the nearest pool, and there remain a while to recruit. After they

have somewhat recovered from the exhausting process of spawning they proceed slowly down stream to the tide waters, where they linger before going out to their ocean feeding grounds. It has long been a matter of enquiry what they fed upon at sea. Upon opening their stomachs Sir Humphrey Davy found a little yellow fluid, and the parasitical worms which bred there. That they found food of some kind, and that in great abundance, was well proved by their coming back in a few months so much increased in flesh and flavor. The microscopical observations of Dr. Knox have now shown that their sea food consists of the eggs of Echinedermata and Crustacea.

Let us now go back and look after the salmon eggs which we left buried under the sand and gravel at the bottom of the stream. It is ascertained by recent experiments that the time of vivification varies with the temperature of the water: 36° taking 114 days, 43° 101, 45° 90 days to hatch. When first hatched the yoke of the egg is found adhering to the under side of the little fry; this is gradually absorbed, but does not wholly disappear till the expiration of four weeks. During this time they are entirely supported or fed by this yoke; at the end of two months they have grown to about an inch and a quarter in length. At this stage their growth is very slow, for at six months they are not more than three and a half inches long. They are now called Parr, and retain that name till they are about seven inches long, when a change suddenly comes over them;—they lose their markings and red spots, and assume a more salmon-like appearance; the back and sides down to the lateral line assume a dusky greenish hue, the sides, belly, ventral and anal fins a shiny, silvery white. The fish is now one year old, and is called a Smolt. As soon as this has taken place the young salmon seems to hear the far off roar of the ocean, and to have dreams of the pleasant feeding-grounds away down in its fathomless deeps, for now he starts seaward, nor tarries long until he bathes for the first time in its waters. Here he remains about three months, feeding on the eggs of the sea-urchin and the crab, which agree so well with him that though not weighing more than seven ounces when he left the river, he will return at the end of three months weighing not less than four or five pounds. At this stage of growth he is called a Grilse, and ascending the streams in July and August for propagating their kind, return to the sea when their work is done, where they remain till the following spring, when they appear again in the rivers as full grown salmon, weighing from

ten to twenty pounds. Thus we find these fish, which might be a source of wealth, demand of us no care for themselves, nor toil in raising food to fatten them; old ocean gives them free pasturage, and all they ask at our hands is the opportunity to propagate and grow. It is not only to the thoughtless destruction of the fish that we are to attribute their decrease. The erection of dams on the streams of such a height that few or none can ascend to the spawning grounds, necessarily compels the salmon to forsake them. All difficulty would be obviated by constructing an apron or slope on the lower side of every dam, extending from the top of the dam to the bed of the river below, with a smooth surface, sloping at an angle of about 45°. By enforcing the maintenance of such aprons, restricting the capture of the fish to proper seasons, and to that size which may be supposed to denote maturity, a vast amount of wealth might be secured from the salmon fishery. *

One of the most fruitful salmon regions for the angler to visit, lies on the north shore of the Gulf of St. Lawrence, between the Saguenay and Godbout river in Labrador. The principal tributaries of the Saguenay, particularly the river St. Margaret, afford the rarest sport. The streams of this coast are small but very numerous, rapid, cold, and clear. They abound in waterfalls, and are convenient to fish in, as the spring freshets leave a gravelly margin on either side. The only drawback to fishing in these waters is caused by the immense number of mosquitoes and sandflies. The river Restigouche, which empties into the Bay of Chaleur, is particularly famous for its salmon, which are very abundant and of great size. The Nepisiguit and Miramichi are also splendid streams for sport; in fact all the rivers of New Brunswick and Nova Scotia abound in fish.

Before taking leave of the salmon, we will remark for the benefit of those penetrating the wilderness, and yet desirous of bringing back some trophies of their skill, that there are three modes of preserving salmon: first by putting them in salt for three days, and then smoking, which takes about twelve days; secondly, by regularly salting them down as you would mackerel; and thirdly, by boiling and then pickling them in vinegar. The latter method is unquestionably the most troublesome, but at the same time the most expeditious; and what can tickle the palate more exquisitely than a choice bit of pickled salmon, with a bottle of Burgundy to float it to its legitimate home?

* Since the above was written, a law has been passed by the Nova Scotia Legislature that a fish-ladder must be placed in every mill-dam in that Province prior to 30th Sept.

CHAPTER IX.

BROOK TROUT — RED-BELLIED TROUT — FLY-FISHING — TROUT STREAMS—SALMON TROUT—NAMAYCUSH—CISCOVET, &c., &c.

SALMO FONTINALIS.—(*Brook Trout.*)—Colour: above, irregular dark markings on a horn colored ground, which in freshly taken specimens gives bluish metallic reflections. Sides bluish, mixed with silvery white, whole underside silvery. Upper part of head dark greenish brown, with obscure mottlings. First dorsal pale yellowish. Caudal reddish with obscure parallel dark bands more distinct towards the tips of the lobes. Irides white. Length six to twenty inches. Vermillion dots and larger yellow spots in the vicinity of the lateral line. Those taken in running streams are much better flavored than the fish caught in mill-ponds. Those taken from streams to which the salt water has access are to be preferred to either; the latter have brighter colors externally, and their flesh has much more of the salmon colour about it.

SALMO ERYTHROGASTES.—(*The Red Bellied Trout.*)—Dark olive green above, with confluent blotches of a lighter colour on each side of the back, resembling those on the common mackerel. Head above, uniform olive green. Sides, bronze-brown, with numerous rich rounded salmon coloured spots, becoming larger towards the tail, intermixed with smaller crimson spots. Belly of brilliant reddish orange, separated by a distinct line from the pearl color beneath. Caudal fin broadly margined with bright red. Flesh an incarnate red. Length fifteen to twenty inches. This beautiful species has long been confounded with the former, but independent of other considerations, says DeKay, the regularity and brilliancy of their colors, seem to render it proper to designate them by a distinct specific name. Between this species and the lake trout, there is a continued warfare; hence it is never found except at the outlets of lakes and in streams. It chiefly frequents rapids above waterfalls, and deep pools below them. Various causes have been assigned for the great variety in the colour of this and other congeneric species. One cause is said to be difference of food; such as live on fresh water shrimps and other small crustacea

being brightest; those which feed on common aquatic insects next; and those living on aquatic vegetables being dull and darkest of all; it is very doubtful, however, whether any trout feeds on vegetables, the armature of their mouth clearly pointing out their food. All that we know positively on the subject, is that in our brook trout those which inhabit ponds are dark colored externally; those in clear streams running over sandy bottoms are bright; and those which are found in salt or brackish streams are not only very bright externally, but their flesh has more of the salmon colour. In the species we are speaking of, which is found only in fresh water streams, not only the colours externally are extremely vivid, but the flesh is also of a bright red. In taking this species the trained sportsman will often find his gut snapped, his jointed rod broken in pieces, his rod rendered useless, while a simple native at his side with a coarse line five or six feet long, tied to a short stick, will jerk them out as rapidly as his clumsy hook (fabricated at the nearest blacksmith's) touches the water.

The trout is proverbially one of the most skittish of all the finny tribes; but when he happens to be a little hungry, he is fearless as the hawk. The great charm of fly-fishing is derived from the fact that you can see the movement of your fish, and if you are not an expert hand, the chances are that you will capture but one out of the hundred that may rise to your hook. You can seldom save a trout unless you strike the instant he leaps. If he is a half-pounder you may pull him out directly; but if larger than that, you should play him with your whole line. The swiftness with which a trout can dart from his hiding place after a fly, is truly astonishing,—and the fact that this is the only fish which nature has designated by a row of scarlet spots along the sides, would seem to imply that she deemed it the perfection of her finny creations, and had therefore fixed upon it the distinguishing mark of her skill. Were it not for the salmon, we should pronounce the trout the most superb game fish in the world—as it is, it has doubtless delighted a greater number of anglers, than any other inhabitant of the "liquid plain."

The first place to mention,—the fishing ground *par excellence* for trout,—is Sault Ste. Marie, the outlet of Lake Superior, the largest body of fresh water on the globe. The water is perpetually cold, and as clear as it is possible for any element to be. Its width is reputed to be one mile. The fish are taken with the fly, from boats anchored in the more shallow parts of the river, as well as from the shore.

The trout here is found in good condition all through the year. Another trouting region, is that of Northern New York, lying between Lake George and Long Lake. All the running waters of this section are abundantly supplied with trout. The scenery is of the wildest and most imposing character. The two branches of the noble Hudson here take their rise, and almost every one of the rapid and deep pools yield trout of the largest size. But the angler penetrating this region must be prepared to satisfy his hunger with salt pork, and at night to be well acquainted with the yielding properties of a pine floor. A few trout are to be met with among the streams of the Catskill Mountains, but their numbers are fast decreasing.

If the anglers of New York City are to be believed, there is no region in the world like Long Island for trout. We learn, however, that the fish are there penned up in ponds, and that a stipulated sum per head has to be paid for all fish captured. Another trouting region is that watered by the two principal tributaries of the Thames in Connecticut, viz., the Yantic and the Quinnebaug, whose deep pools abound with the "spotted beauties." But of all the New England States Maine is the best supplied. In the upper waters of the Penobscot and Kennebec, trout may be found in thousands; and in Moosehead Lake, salmon trout of the largest size. This is even a more perfect wilderness than Northern New York, and is distinguished not only for its fine scenery, but its forests afford an abundance of game, such as moose, deer, bears, &c., which constitute a most decided attraction to those disciples of the gentle art who have a little of the fire of Nimrod in their natures.

Another and the last region to which we would direct the attention of our readers, is that portion of Canada lying on the north shore of the St. Lawrence below Montreal. At the mouth of all the streams emptying into that grand river, and especially the Saguenay, the sea trout is found in the greatest perfection; and what makes the fishing here particularly interesting is the fact that when the angler strikes a fish, it is impossible for him to tell, before he has seen his prize, whether he has captured a salmon-trout, a common trout, or a magnificent salmon, glistening in his silver mail.

Salmo Confinis.—(*The Lake Trout or Salmon Trout.*)—Is of a blackish hue with numerous grey spots, from two to four feet in length, body stout, thicker and shorter than the common salmon. Tips of the lower fins slightly tinged with red. Average weight from eight to ten

pounds. Fishermen speak of them as weighing from thirty to sixty pounds; but, says DeKay, "there is such a strong propensity to exaggerate in everything pertaining to aquatic animals," that we refrain from citing cases derived from such sources. This fish furnishes an important and often necessary article of food to the frontier settler. As game fish, they are of little value, for they love the gloom of deep water, and are not distinguished for their activity; unlike most of their congeners they never rise to the fly. In order to take them certain particular deep spots are selected, and marked by buoys. Large quantities of small fish are then cut up and thrown in at the buoys for several days in succession. After having been thus baited and accustomed to resort to the spot, they are readily taken with the hook. If settlers would confine themselves to bait fishing, this species would be long preserved; unfortunately however they are speared in great numbers in October, when they come out in the shoal water to spawn. In spite of Fish and Game Protective Societies, any enactments of the law, in the thinly settled districts, would be next to impossible; and thus we may look for the gradual but certain extirpation of the species. This fish is seldom or never found in any of our rivers, but chiefly in the lakes of the Northern and Northwestern districts, Lake Superior, Lake George, and most of the lakes in the States of New York and Maine. It must not be confounded, as frequently happens, with

"SALMO AMETHYSTUS.—(*The Namaycush or Mackinaw Trout.*)—This is of a dark grey colour, with numerous light spots on the back and sides. Its body is more elongated than the preceding species. It is sometimes called the Longe. This magnificent trout, the largest hitherto known of the Salmonidæ, exists in all the great Lakes lying between the United States and the Arctic regions. It is exceedingly voracious, feeding on every fish within its reach; it has been known to attain the weight of 120 lbs. "When the steamer," says a popular writer, "runs into the crescent shaped harbour of Mackinaw, the visitor, when he discovers among the people on the dock some half-dozen wheelbarrows laden with fish four feet long and weighing fifty and sixty pounds, must not be alarmed at finding those fish to be Mackinaw trout, and not sturgeon, as he might at first have imagined. The very size of these fish is an objection to them, for as they have to be taken in deep water and with a large cord, there is far more of manual labour than sport in taking them. But when one of these monsters happens to stray near shore, where the water is not above fifty feet deep, it is

then, through the marvellously clear water, exceedingly pleasant to watch their movements as they swim about over the beds of pure white sand." It is a favourite article of food with the Canadian voyageurs, who frequently eat it raw; or as Richardson expresses it, in a frozen state, after scorching it for a moment or two over a quick fire, until the scales can be easily detached, but not continuing the application of heat long enough to thaw the interior. Its flesh is of a reddish tinge. It resorts habitually to the deepest parts of the Lake, and only comes near the shore in October to spawn. This trout is in fine condition through the winter months; and the Indians at that season take numbers through the ice. Their manner of proceeding is to make a large hole in the ice, over which they erect a kind of wigwam so as to keep out the light, they lure the trout from the bottom with an artificial bait, and when he comes sufficiently near pick him out with a spear; sometimes they take him with a hook. The voraciousness of the Mackinaw trout at this season is said to be astonishing; and it is recorded of a Canadian fisherman, that having lost all his artificial bait by being bitten to pieces, he finally resorted to a large jack-knife attached to a hook, and which was swallowed by a thirty pound fish. Another excellent fish found at Mackinaw is the fish known by the Indian name of Ciscovet.

SALMO SISCOWET of Agassiz.—(*The Ciscovet.*)—This is a handsome fish, a bold biter, richly flavoured, and very beautiful both in symmetry and colour. It is not very abundant, and is altogether the greatest delicacy in those regions except the white fish. They weigh from five to ten pounds, and are remarkable for their fatness. They are met with mostly in Superior and Michigan.

Under the head or name of salmon trout, we find SALMO HEARNII, of an olive green above, belly bluish, with several rows of large red spots on the sides, length about twelve inches, found in the Coppermine river.

SALMO ALIPES.—Slender, of a greyish color, with lighter spots, scales small, fins remarkably long, length about two feet, found in the rivers emptying into the Arctic Ocean.

SALMO NITIDUS.—Deep green above, orange red beneath with small red spots in two or three series along the course of the lateral line; length about twenty inches; found only in the Arctic regions.

SALMO HOODII.—(*Quinnat.*)—Met with in the Arctic regions, and but little known; and the SALMO CANADENSIS of the St. Lawrence, about ten inches in length, with white circular spots along the sides, with a red central dot; pectoral and caudal fins barred with black.

COREGONUS ALBUS.

French—*Poisson Blanc.*
In Europe—*Lavaret.*
English—*White fish* and *Gizzard fish.*
Indian name in New Brunswick—*Attihawmeg.*

Of the order of *Malacopterygii abdominales*; of the family of *Salmonidæ*; of the ge *Coregonus.*

The White fish occurs more in the lakes than in the rivers. It is most abundant the large lakes of Canada, especially in Lake Huron, where fishing for it is carried on on arge and advantageous scale, and it is also found in all the inland waters of the northe part of our continent, as far as the Arctic Ocean.

Several of our lakes, and amongst others Lake Temiscouata, are renowned for the White fish, and they appear in the St. Lawrence and some other rivers falling into it being very common in the inland lakes of Labrador. They sometimes go to sea and ar often caught by Canadian fishermen at the mouths of the rivers flowing into the Gul They are seen perhaps the most often in Little Romaine River.

The White fish is so well known here that it is useless to give a long description of it It will suffice to mention that its ordinary size seldom exceeds a foot and a half in length and its weight five pounds, although some are taken weighing as much as fifteen and twent pounds.

Its color is greyish blue or yellowish brown above, with grey spots before the dorsa sides and belly white.

One of the two specimens I studied, which had been caught in the St. Lawrence, wa nine inches and a half long, and two inches and a quarter thick. The fin rays were as follows :

D. 13.0; P. 15; V. 12; A 13; C. $19\frac{6}{6}$.

The other specimen measured twelve inches, and was three and a half inches thick Fins: D. 14.0; P. 14; V. 11; A. 13; C. $19\frac{6}{6}$. Caudals forked.

As in the other species of the family of *Salmonidæ*, the second dorsal of the Whit fish is formed of an adipose substance, without rays.

CHAPTER X.

WHITE FISH OF THE LAKES—SHAD SALMON—AMERICAN SHAD-MOON-EYE—BEAVER FISH—GAR OR BILL-FISH—HABITS, &c.—TOM-COD OR FROST FISH—BURBOT OR LING—EEL-POUT.

GENUS COREGONUS.—COREGONUS ALBUS.—(*White Fish of the Lakes.*)—This fish is of a bluish grey on the back, lighter on the sides, white on the body; length from eighteen to twenty inches. It is most abundant in Lake Huron, and found also in Lakes Erie and Ontario. Dr. Richardson (vol. 3, p. 196,) asserts that it does not exist below the Falls of Niagara; but this is erroneous, as it is found in many of the smaller lakes connected with the St. Lawrence. It is universally considered a delicacy, and nearly all are disposed to acquiesce in the opinion of Charlevoix: "whether fresh or salted, nothing of the fish kind can excel it. In hot weather it should be either cooked or salted soon after it is taken, as it quickly becomes soft, and is spoiled. It is excellent either boiled or fried." The mode of cooking it at the North West, according to Dr. Richardson, is as follows: "After the fish is cleaned, and the scales scraped off, it is cut in several pieces, which are put in a thin copper kettle with water enough to cover them, and placed over a slow fire. As soon as the water is on the point of boiling, the kettle is taken off, shaken by a semicircular motion of the hand backwards and forwards, and replaced on the fire for a short time. If the shaking be not attended to at the proper moment, or be unskilfully performed, the fish coagulating too suddenly, becomes comparatively too dry for the taste, and the soup is poor." The white fish is very thick and fleshy, and on account of the smallness of the head, fins and intestines, the waste in dressing is less than in any other fish. It subsists principally upon small molluscous animals, and aquatic algæ. Thomson says he has found more than 100 univalve and bivalve shells in the stomach of a single fish.

COREGONUS CLUPEIFORMIS.—(*Common Shad-Salmon.*)—Body more elongated than the preceding, compressed, arched above and beneath; length one to two feet, caudal tail forked; found in Lakes

Erie and Ontario, and in some of the smaller lakes in New York and Canada.

Genus Alosa.—Alosa Præstabilis.—(*American Shad.*)—Body oblong, compressed, back rounded. Scales large, easily detached; no lateral line visible; caudal fin deeply forked. When the scales are detached, a series of from five to eight dark spots are observable along the sides. When the fish have been kept some time, these spots are apparent through the scales, but in the fresh unscaled fish, are not seen. In the stale fish moreover, there are traces of parallel lines along the sides. Unlike most of the genus which appear to reside in the Northern Seas, this species comes to us from the South to spawn; at Charleston it is found in January or February, at Norfolk still later, at New York end of March and April, in Canada in May. Of late years it has become more scarce, owing to the increasing number of nets. It closely resembles mackerel in flavour.

Family Clupidæ.—Genus Hyodon.—Hyodon Clodalis.—(*Lake Moon-Eye.*)—Dorsal outline forming a regular curve to the snout. Length about seven inches. Mouth large; under jaw shutting into the upper; caudal fin forked; of a uniform metallic silvery hue, bluish above. Common in Lakes Erie and Ontario. It is sometimes called the lake herring, and is considered a very tasty fish, and similar in flavour to the white fish. Hyodon Chrysopsis of Richardson, is found in the Northern rivers and but little known. It is about sixteen inches in length. This is the fish called Bastard-Shad in Lake Ontario. (?)

Genus Amia.—Amia Calva.—(*Mud Fish or Beaver Fish.*)—Body cylindrical, elongated; scales large, thin and membranous. Lateral line distinct. Head broad and flattened above; length about two feet. The dorsal fin reaches to within about an inch of the caudal, which is rounded. Colour, dark brown. It is found in Lakes Erie and Ontario, and abundantly in Lake St. Peter, between Montreal and Quebec. It is called the *Dog Fish* by Dr. Kirtland, and is remarkable for its ferocious looks, and voracious appetite. (But this name more properly applies to another fish mentioned and described hereafter.) It is a great nuisance to those angling near its haunts, by taking their bait, and breaking their hooks. Its scales are square where they insert into the skin. It is not esteemed as an article of food.

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BISON.—(*Gar Fish.*)—Body elongated, compressed towards the tail, cylindrical. The scales are thick, smooth, rhomboidal, firmly attached

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taken abundantly in the St. Lawrence as far up as Three Rivers, and

French—Petite Morue. Improperly called Loche, in the lower parishes, and Poul mont on the coast of Gaspé.

English—Tom-cod. Frost-fish.

Of the order of *Malacopterygii sub-brachiati;* of the family of *Gadidoe;* of the gen *Morrhua.*

The Tom-cod is found in North America, on nearly all the shores and in nearly the rivers from the latitude of New York to Hudson's Bay, and perhaps in the Arc Ocean. They enter the mouths of the rivers in the fall or early in the winter, to rea the fresh water, sometimes at a considerable distance from the sea. The females bei then full of eggs and the males of melt,—these pretty little fish undoubtedly repair fresh water for the purpose of spawning, and are then met with in thick and numero shoals. I need not mention that they are a savory and healthy fish, this is too well kno in the lower part of Canada East, where they are caught in large quantities with lin seines, nets and boxes. This last named apparatus is used with much success at Cha plain and the neighboring parishes on the north shore. They are mostly used there food; some are sold or used for feeding cattle.

The Tom-cod is most abundant in autumn on the coast of Gaspé, in Bay des Chaleu especially, at the mouths of the rivers and *barachois.* But on account of the limit consumption, they are fished for only during a few weeks, merely to satisfy the wants the inhabitants of the adjoining localities. In the lower parishes of the south shore th appear in summer as well as in the fall, and are caught in large quantities during th winter when they are kept fresh by being frozen.

The small size and softness of the flesh of the Tom-cod prevents it from being pickled It must therefore be eaten fresh and cannot be brought far during summer. They ar kept frozen in winter, care being taken to keep them as much as possible from the contac of air.

According to some United States naturalists, there are several varieties of the Tom cod, and the one I examined, though nearly the same as that described by De Kay, differ in the number of the fin rays. Our variety has

D. 13.16.18; P. 17; V. 6; A. 19.19; C. $26.\frac{5}{5}$.

and De Kay's,

D. 12.20.18; P. 17; V. 6; A. 20.18; C. 37.

The size of the Tom-cod varies from 6 to 12 inches, and sometimes more. They are voracious as the large cod, and feed on all little fish. I found in the body of one of the measuring eleven inches, a bass two and a half inches long, and a carp of four an a half inches

Bison.—(*Gar Fish.*)—Body elongated, compressed towards the tail, cylindrical. The scales are thick, smooth, rhomboidal, firmly attached to each other by their upper and lower margins, and of a stony hardness. The snout or jaws much elongated, like the snout of an alligator or porpoise; the upper extending somewhat beyond the lower; both furnished over the whole internal surface with rasp-like teeth, and a row of long pointed teeth along their edges. The jaws are hinged similar to the alligator's, its vertebræ of the regular ball and socket formation, and it is evidently a connecting link with the Saurians. Many of the fossil fish of the Ganoidei of Agassiz come under this genus. When thoroughly investigated it will doubtless admit of subdivisions. This fish is peculiar to the rivers and lakes of America. It is sometimes called the *Bony Pike, Bill Fish, Alligator Gar,* and *Buffalo Fish.* The young has the lateral line strongly marked, causing Thompson to call it a distinct species under the name of Lepidosteus Lineatus. This fish is very voracious, and when they are taken or seen in the water, fishermen calculate on little sport to take others. Charlevoix says they not only prey upon fish, but also birds, and thus describes their mode of capturing them: "concealing himself among the reeds, growing on the marshy borders of a lake or river, he thrusts his bill out of water in an upright position. A bird wanting to rest takes this for a broken bough or reed, and perches upon it; the fish then opens its mouth and makes such a sudden spring, that the bird seldom escapes." This however, we must confess, savors somewhat of Herodotus. The same writer also assures us that "the Indians regarded the teeth of this fish as a sovereign remedy for the headache, and that pricking with them, where the pain was sharpest, took it instantly away." The scales form a perfect coat of mail, so thick as not to be pierced with a spear. The flesh is rank and tough, and not used for food by any civilized people, though the Canadian habitants think much of it.

Family Gadidæ.—Genus Morrhua.—Morrhua Pruinosa. —(*Tom-Cod.*)—Scales small; barbel on lower jaw; minute small teeth. Colour, dull olivaceous green, with irregular darker streaks and blotches, giving a mottled appearance. Beneath of a silvery white; in old females this becomes a golden yellow. Dorsals and caudals a dark brown tinged with reddish. Length, from four to twelve inches. After the first frost, (hence a common name for it *Frost Fish,*) and in early winter, they ascend the rivers even into fresh water. They are taken abundantly in the St. Lawrence as far up as Three Rivers, and

have been taken, though seldom, at Montreal. The specific name Tom Codus of Mitchell, has frequently been made the subject of animated discussion; it ranks with cattus, rattus, &c! It is caught in large quantities during the winter, by cutting a hole in the ice, and lowering a deep net, or even a basket, baited with offal; this being drawn up rapidly every three or four minutes is sure to enclose more or less of these fish, if at all numerous. This method is also adopted from the wharves on the Hudson river, and with great success; as many as twelve or fifteen being captured at a single haul. The best bait for it is the hard-shell clam. In the St. Lawrence below Montreal, they are so numerous that they are frequently brought to market in cart-loads.

Genus Lota.—Lota Maculosa.—(*Spotted Burbot, Methy, Dog Fish, Eel-Pout, Ling, &c.*)—Body strong, compressed, anguilliform. Head broad, depressed; scales minute, round, deeply imbedded; eyes small, oval. Colour deep Chestnut brown, marbled with lighter spots. About two feet in length; abundant in Erie and Ontario and the St. Lawrence. It is very voracious, feeding on cray-fish and all kinds of small fish, but worthless as food, even the Arctic dogs refusing it. Their livers and roe however are considered palatable. According to Dr. Richardson, it is very common in every lake and river from the great Lakes to the frozen Ocean. It is frequently taken with the abdomen so much distended with food, as to give it the appearance of the globe or toad fish. Thompson says of one he examined, that it was so filled with fish, that their tails were actually visible in its mouth, and he found no less than ten dace (Leuciscus Pulchellus) inside it, none of which were less than four inches in length.

Lota Compressa.—(*Lesser Eel-Pout.*)—Body much compressed, becoming more so until the caudal fin appears like a membranous continuation of the body. The upper jaw is the longest; the second dorsal fin is continued to and joins the caudal fin, which is rounded. Its colour is a yellowish brown, varied with darker spots. The edges of all the fins are bordered with black; length from six to eight inches. It is found in the same localities as the preceding, preferring a soft muddy bottom, or deep swamp outlet.

LOTA INORNATA, LOTA VULGARIS.

French—*Lotte commune. Lotte de rivière.*
In Canada—*Loche.*
English—*Plain Burbot. Eel. Pout.*
the order of *Malacopterygii. Sub-brachiati;* of the family of *Gadidæ;* of the genus *Lota.*

The size of the Burbot, better known in Canada under the name of *Loche*, ranges m one to three feet. It closely resembles the Eel, but the body is more developed.

Color, dark brown, the head being almost black; ordinary sized mouth, armed with merous minute teeth. The first dorsal and the caudal very long. The specimen fur- shed to me was thirteen inches long, and the fin rays were as follows:—

D. 12.7; P. 19; V. 7; A. 64; C. 43.

The flesh of the Burbot is good. It commonly occurs in the River St. Lawrence, d is taken in brush fisheries or with the line, in winter as well as in summer.

I did not meet with the Burbot in the Gaspé and Labrador rivers, but have been formed that it often appears there; and the finest species of fish abounding in these laces; no attention whatever is paid to it.

have been taken, though seldom, at Montreal. The specific name Tom Codus of Mitchell, has frequently been made the subject of animated discussion; it ranks with cattus, rattus, &c! It is caught in large quantities during the winter, by cutting a hole in the ice, and lowering a deep net, or even a basket, baited with offal; this being drawn up rapidly every three or four minutes is sure to enclose more or less of these fish, if at all numerous. This method is also adopted from the wharves on the Hudson river, and with great success; as many as twelve or fifteen being captured at a single haul. The best bait for it is the hard-shell clam. In the St. Lawrence below Montreal, they are so numerous that they are frequently [illegible] taken weighing as much as fifteen and pounds.

Its color is greyish blue or yellowish brown above, with grey spots before the sides and belly white.

One of the two specimens I studied, which had been caught in the St. Lawrence nine inches and a half long, and two inches and a quarter thick. The fin rays were as follows:

D. 13.0; P. 15; V. 12; A 13; C. $19\frac{6}{6}$.

The other specimen measured twelve inches, and was three and a half inches
Fins: D. 14.0; P. 14; V. 11; A. 13; C. $19\frac{6}{6}$. Caudals forked.

As in the other species of the family of *Salmonidæ*, the second dorsal of the fish is formed of an adipose substance, without rays.

MORRHUA PRUINOSA. GADUS TOMCODUS.

French—Petite Morue. Improperly called Loche, in the lower parishes, and mont on the coast of Gaspé.

[illegible] (*Lesser Eel-Pout.*)—Body much compressed, becoming more so until the caudal fin appears like a membranous continuation of the body. The upper jaw is the longest; the second dorsal fin is continued to and joins the caudal fin, which is rounded. Its colour is a yellowish brown, varied with darker spots. The edges of all the fins are bordered with black; length from six to eight inches. It is found in the same localities as the preceding, preferring a soft muddy bottom, or deep swamp outlet.

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CHAPTER XI.

COMMON EEL—METHOD OF CATCHING IT—SILVER EEL—LAKE STURGEON—ROCK STURGEON—LAMPREY OR LAMPER-EEL—CONCLUSION.

ORDER APODES.

FAMILY ANGUILLIDÆ.—GENUS ANGUILLA.—ANGUILLA TENUIROSTRIS.—(*Common Eel.*)—Body long, cylindrical, compressed on sides of the tail. Surface covered with thick mucous, concealing scales so minute as to be visible only under a lens. The head small and flattened above, pointed; lower jaw longest; eyes placed just above the angle of the mouth. The dorsal, caudal and anal fins are united; pectoral fins narrow, ventrals wanting. Colour, greenish olive above, yellow beneath; length one to two feet. When skinned and properly dressed, it is an excellent article of food, but many persons find it difficult to surmount the prejudice of its snake-like appearance; though certainly those fastidious people would doubtless prefer the serpentine form of the eel to the so-called *Bush Fish*, eaten by the early settlers in the valley of the Mohawk, on Fridays, which legendary lore tells us, in the absence of real fish, were nothing more or less *than snakes, cooked as eels!* In spring and summer the eel is taken in large wicker baskets, called eel-pots, which are baited with offal, and from which, when the eel has once entered, it is impossible for it to make its exit. Night-lines, laid with numerous hooks, are also a sure method of capture, and spearing by torchlight affords a favourite amusement. All dead animal substances are a great attraction for eels. Those taken from running water are the best flavored, since those which lie in deep holes, or about stagnant pools, taste strongly of the muddy bottom. The structure of the branchial organs of the eel, enables it to live for a long period out water, and as they can move along the ground, it is not uncommon to find them shifting their quarters from one creek to another, by crawling through the grass when wet. It lives equally well in salt, brackish, or fresh water. It is a powerful, muscular fish, and should one, having seized the angler's hook, contrive to entwine

a pile or stone with his tail, its strength is such that woe to the tackle, unless of the strongest description; and it is only by patiently waiting till the fish disentangles itself, that the prize can be secured. The *Silver Eel* is only a variety, though by some it is mentioned as a different species; it is silver grey above, clear white satiny abdomen. This is doubtless the ANGUILLA ARGENTEA of Leclaire.

ANGUILLA BOSTONIENSIS.—Greyish brown above, grey beneath. Vent, yellowish ochre; about twenty-four inches long; a line of red about the tail; not at all common.

ORDER ELEUTHEROPOMI.

FAMILY STURIONIDÆ.—GENUS ACCIPENSER.—ACCIPENSER RUBICUNDUS.—(*Lake Sturgeon.*)—Body most elevated at the nape of the neck. Head flat, obliquely descending to the end of the snout; covered with rough radiated bony plates. Eyes round, with vertical pupil. Four barbels transversely arranged under snout. Dorsal fin, a series of tubercles nine in number, broad and flat, little elevated; lateral series, thirty-nine in number, lozenge shaped; the skin covered with minute prickles. Length, four to six feet. Colour of the back, yellowish red, of the sides olivaceous red. Bones cartilaginous, the backbone being like a long piece of gristle. They abound in all the large lakes and rivers. Its flesh if properly cooked is very good, resembling veal more than fish; it is generally cut into steaks and fried. In New York it is vulgarly called "Albany Beef," from the numbers taken at that part of the Hudson river. Before cooking, the skin should always be taken off, as the oil in it is very strong. Charlevoix thus describes the Indian mode of capture: "two men placed themselves in each end of a canoe, the one behind steered, the other stood holding a dart in one hand to which one end of a long cord was fastened, and the other end to the canoe. When he saw a sturgeon within his reach he threw his dart, and endeavoured to strike where there was no scales. If the fish was wounded he darted off, drawing the canoe swiftly after him, but after swimming about 150 paces, the fish generally became exhausted and died, and was then drawn into the canoe by hand."

ACCIPENSER OXYRHYNCUS. — (*Sharp Nosed Sturgeon.*) — Body elongated, tapering; form pentagonal. The angles cov with rough and bony radiated plates. The rest of the skin rou ned by small scabrous particles of bony matter, resembling the spicula of minute

ACIPENSER OXYRHINCHUS.

French—*Esturgeon á bec pointu.*
Known in Canada under the name of *Ecaillé* or *Maillé.*
English—*Sharp-nosed Sturgeon. Common Sturgeon.*
e order of *Chondropterygii; with free branchiæ;* of the family of *Sturionidæ;* of he genus *Sturgeon.*

his species of the family *Sturionidæ* much resembles the common Sturgeon of pe (*Acipenser Sturio,*) and is peculiar to North America. It has been well described esueur.

The ordinary size of the Sturgeon is from two to three feet, but larger ones are often t. It is at once known by its elongated snout, its numerous and strong plates, varyn number according to the age of the fish, and resembling spinuous shields, covering ody in five series, one on the back, two on the sides, and two underneath. Mouth ath the snout, transverse, without teeth and very protactile, with barbels under the t. The dorsal fin rises far behind, is pretty large, and deeply concave at its margin. orals short and obtusely pointed, ventrals still smaller, anal pointed; caudal fin, with pper lobe elongated, which makes the tail of the Sturgeon resemble that of some es of sharks.

The flesh of the Sturgeon is very healthy and agreeable, although disliked by many anada. It is the reverse in Europe, where it is highly estimated, and preserved d and pickled. This fish is very common in the whole of the St. Lawrence, and in y streams emptying into it. At certain periods of the year it is caught in great ntity. It is often seen on our markets.

There is another species of Sturgeon commonly called here *the racer,* having a nded and shorter snout than the sharp-nosed Sturgeon, with less projecting scales on body. It is probably the *Acipenser brevirostris* of Lesueur. Having had no opportty of examining it I cannot give a description of it.

Sturgeon of a very large size are often caught on the Gulf shores resembling very ch the variety known in Europe under the name of *Acipenser Sturio.* It is the com- Sturgeon of Western Europe.

I hope to be able next year to get a specimen in the Gulf, to make a minute study of n order to determine its species.

a pile or stone with his tail, its strength is such that woe to the tackle, unless of the strongest description ; and it is only by patiently waiting till the fish disentangles itself, that the prize can be secured. The *Silver Eel* is only a variety, though by some it is mentioned as a different species, it is [illegible]

The stuffed shark exhibited at Quebec and Montreal belonged to that variety had been caught off Matane.

SQUALUS ACHANTHIAS. SPINAX ACANTHIAS.

French.—Aiguillat Vulgaire. Chien de Mer.
English.—Spinous Dog-fish. Dog-fish.

Of the order of *Chondropterygii*, with *fixed branchiæ* ; of the family of *Squalidæ* the genus *Spinax*.

The Dog-fish, which is very common on the shores of the Gulf during the [illegible] is viviparious, as ascertained by means of [illegible]

species of this fish. Some naturalists pretend that the Lump fish going to spawn and the spawning being over, they return to the bluish color; whilst others hold the males are always red, and the females blue. This is certainly a wrong assertion eggs are found in the bodies of the Lumps of both colors.

The Lump fish are generally one foot long, but measure sometimes two feet weigh as much as twenty pounds ; they are short and thick, and being bad swimmers account of their shape, are preyed upon by seals, sharks and other large fish.

The first fin is covered with a thick skin, and closely resembles a hump. The dorsals, anal and caudal are comparatively small. The ventral has a peculiar shape rays united beneath form a sucker, resembling an oval and concave disk, which enables them to adhere firmly to the rocks or any solid substance. The pectorals are very partially concealing the disk of the ventrals.

The flesh of the Lump fish, especially in the spring, is very healthy and good, slices and fried in butter. It is sometimes served on the table in Bay des Chaleurs to my knowledge, I am not aware of its being used elsewhere in Canada, as food Europe it is considered a great delicacy, and is seen on the fish markets along with highest prized fish.

CYCLOPTERUS LYPARIS. LIPARIS VULGARIS.

French.—Liparis.
English. —Unctuous Sucker. Sea-snail.

fish generally became exhausted and died, and was then drawn into the canoe by hand."

ACCIPENSER OXYRHYNCUS. — (*Sharp Nosed Sturgeon.*) — Body elongated, tapering; form pentagonal. The angles cov[illegible] with rough and bony radiated plates. The rest of the skin roug[illegible]ned by small scabrous particles of bony matter, resembling the spicul[illegible] of minute

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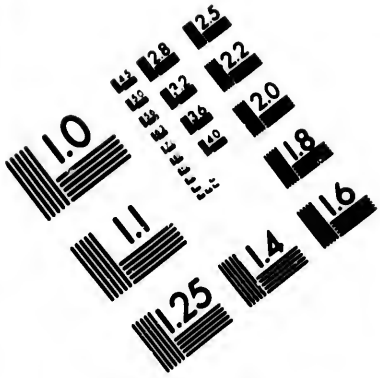

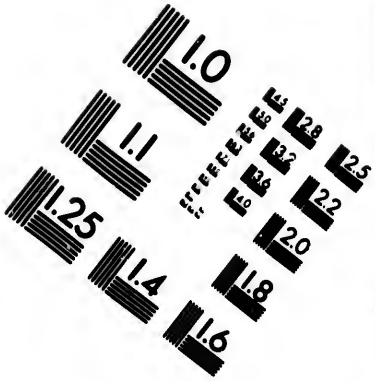

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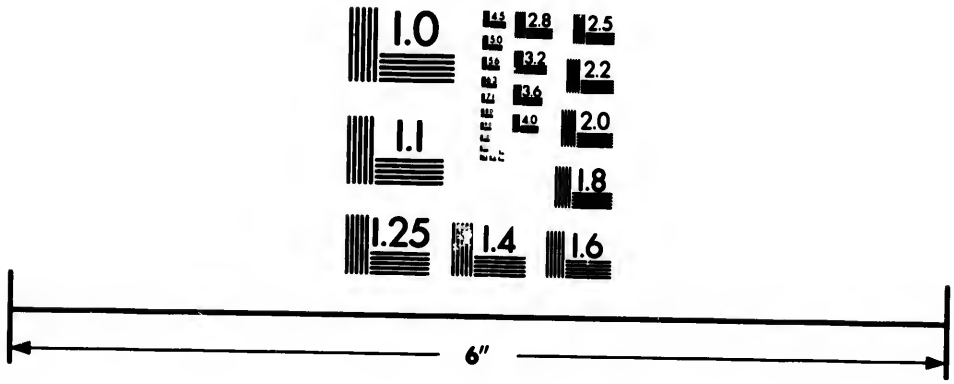

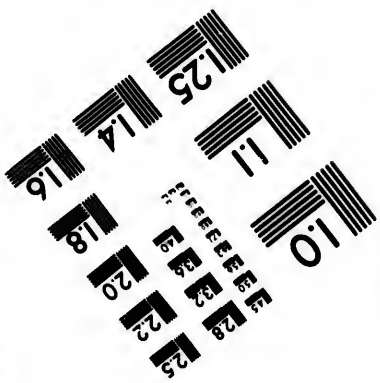

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crystals. Head encased in a bony covering, and lengthened with an acute conical snout; mouth on the under side of the head; four barbels between the mouth and the snout; the upper lobe of the caudal fin elongated and forked. Colour, dark olive, grey above, occasionally brownish or rose coloured; light ash grey beneath; fins often red. It is sometimes called the *Rock Sturgeon*, and is much better eating than the former species. Both kinds are very destructive to fishermen's nets, their bony serrated plates cutting the meshes in their endeavours to escape, and injuring the nets to such a degree, if several are caught during the same tide or draw, that it takes days to repair the damage done; and even captured, their market value does not reward the trouble.

ORDER CYCLOSTOMI.

Family Petromyzonidæ.—Genus Petromyzon.—Petromyzon Nigricans.—(*Blue Lamprey.*)—Body cylindrical, compressed behind; head oval, flattened on the top. Seven branchial apertures or small round openings on each side of the neck, running obliquely backwards and downwards from the eyes, giving it a remarkable appearance. Mouth circular, cartilaginous, half an inch in diameter, surrounded by a fleshy margin. Eyes, moderate size. A spiracle on the top of the head, anterior to the eyes; the dorsal fin is attached to the caudal, which is a simple membrane, triangular at its termination and uniting with the anal which is very small. Color, upper part of the body bluish grey; below, dingy white. Several rows of blackish dots about the head and neck; on the top of the head between the eyes a small white spot. Length, five to seven inches. The *Lampreys* or *Lamper Eels*, as they are called, resemble in their habits the blood-sucker, much more than the ordinary fishes. They obtain their subsistence principally by attaching themselves by their mouths to the bodies of the larger fishes, and drawing nourishment from them by suction; for this purpose their mouths and tongue are admirably adapted, the latter acting in the throat like the piston of a pump, while the circular formation of the former adheres closely to the side of its prey, and by this means the softer portions of the larger fish are drawn into the mouth and swallowed by the parasite. When a lamprey once fastens itself in this manner upon a large fish, it adheres with such force as to baffle all the efforts of the fish to rid himself of his unwelcome incumbrance. Fishes are frequently taken with lampreys adhering

to them, and others with flesh wounds on their sides, bearing indubitable marks of their having been attacked by these rapacious "vermin of the waters."

AMMOCÆTES CONCOLOR, or UNICOLOR.—(*Mud Lamprey.*)—Form cylindrical for two-thirds of its length from the head, becoming slightly compressed near the vent, very much compressed and pointed at the tail. Colour yellowish brown above, lighter towards the belly. Eyes so minute as hardly to be seen by the naked eye; sides with an annular or ribbed appearance, somewhat resembling a large lob-worm. The fin of a dark yellowish colour, commences near the middle of the back, passes round the tail and terminates just behind the vent. Length from three to five inches. Common in most of the muddy streams of the West and North; it varies in thickness from that of a common earthworm to a swan's quill. Abundant in Lake Champlain, where it is best known by the name of *Mud Eel* or *Blind Eel.*

Having now given a brief sketch of the different varieties of North American Fish, with their haunts and habits, we will close with a few remarks on the pleasures and recreations an angler meets with in his various excursions. He bends his steps into the most wild and beautiful scenery of nature, amongst the mountain lakes and the clear and lovely streams that gush from the higher ranges of elevated hills, or make their way through the cavities of calcareous rocks. Dearly, in the long winter nights does he recall to mind, whilst preparing his tackle for the coming spring, not only the recollections of wild scenery, but of wild legends and strange characters, bright skies, poetic conceptions, and soul instructive lessons from nature. Yes, and the secret of his attachment to the streams, may be found in the very character of their associations. The streams of England are mostly famous for the battles and sieges which have taken place upon their banks: but the streams of this continent, even now, water a virgin wilderness, whose only human denizens are the poor but noble Indian tribes, who "live and love and die" in their peaceful valleys; and the unshorn forests, with the luxuriantly magnificent mountains sing a perpetual hymn of praise to One who is above the sky, and King of Kings.

As to torchlight fishing, though unquestionably out of the pale of the regular angler's sporting, it is attended with much that we must deem poetical and interesting. Who can doubt this, when we consider the picturesque effect of a boat and lighted torch gliding along the wild shores of a lake, on a still dark night, with one figure noiselessly

PETROMYZON.

French.—Lamproie.
English.—Lamprey.

f the order of *Chondropterygii, with fixed branchiæ;* of the fam ly *Petromyzonidæ;* of the genus *Petromyzon.*

There are several varieties of the genus *Petromyzon*, nearly all found, probably, in anadian fresh and salt waters; such as the sea and fresh-water Lamprey; according to nformation received. I cannot give a description of these two varieties, having none in my ossession.

The Lamprey I examined was caught in the River St. Lawrence, below Quebec, and ppeared to me to be the same as the small European Lamprey or *Sucet* (*Petromyzon Planeri, Bloch*), and the small Lamprey of De Kay, called *Petromyzron appendix*, although I did not find this appendage at the anterior part of the caudal fin, from which his species was called *Petromyzron appendix* by the author above cited. It might ave been on the fish when alive, but destroyed by the rough handling of buyers and shermen.

Characteristics of this fish: Length, eight inches.—Seven well defined branchial pertures. Eyes, moderate. Irides, yellow. A spiracle on the top of the head, anterior the eyes. Mouth (opened), circular, armed with numerous incurved and sharp teeth. n one side of the throat one large and semi-circular tooth, with seven well-developed oints; on the other side, a group formed of three large teeth, two on the same row, the her farther in the throat. Only one dorsal, beginning at the centre of the back. (This ature distinguishes this species from the *Petromyzon Americanus* and *Nigricans* of De ay, having two distinct dorsals.) The anal fin is nearly one third of the dorsal.

Color, dark plumbeous above and along the sides, somewhat paler underneath. Fins, rk brown.

I hope to be enabled next year to describe the other species of Lampreys found in the lf and rivers that fall into it.

The Lamprey is well liked in many parts of Europe, and especially in France, here a large consumption is made. The Sea Lamprey is preferred; its flesh is ore delicate. As an article of food it is hardly known here, as well as in the other ritish Provinces; whilst in the United States it is held in high estimation, and is often en on the table of the epicure.

The Lamprey appears to be very prolific, and they ascend streams in the spring to posit their spawn.

to them, and others with flesh wounds on their sides, bearing indubitable marks of their having been attacked by these rapacious "vermin

"	Left Pt. des Monts.....10 00	"	"	"	Anchored at House Harbor.. 1 15 p.m.
"	Anchored at Trinity.....11 00	"	"	17.	At House Harbor.
"	Left Trinity..... 4 00 p.m.	"	"	18.	Left House Harbor..... 4 00 a.m.
"	Arrived at Caribou Islets... 7 00 "	"	"	"	Anchored at Amherst Harbor 7 00 "
"	Left Caribou Islets..... 9 00 "	"	"	"	Left Amherst..... 3 15 p.m.
4.	Anchored at Pentecost River 7 00 a.m.	"	"	"	Anchored at Entry Island.. 8 30 "
"	Left Pentecost River..... 9 00 "	"	"	"	Left Entry Island..... 9 30 "
"	Stopped at Ragged Islands.10 00 "	"	"	"	Anchored at the Basin (Amherst).....11 45 "
"	Left Ragged Islands.. . .10 15 "				
"	Anchored at Seven Islands.. 3 20 p.m.				

with great dexterity to wound their enemies. They have no anal fin.

Color. Slate above; abdomen greyish white.

Our fishermen pretend that the wound of the fin spines is venomous, and fe
much. I could not ascertain the veracity of this opinion, and the naturalists I have
sulted do not mention it.

The Dog-fish occurs in Europe as well as in America, and is found in the nort
seas.

RAIA INTERMEDIA. RAIA OCELLATA.

French—*Raie Tachetée.*

English—*Ocellated Ray.*

Of the order of *Chondropterygii;* of the family of *Raiidæ;* of the tribe *R*

During the month of October last, I got, at Bryon's Island, where this species of
s very common, several specimens of this variety of Rays.

Here follows a short description of the largest:

Length of the body,	2 ft. 10½ in.
" " tail,	1 " 10 "
Thickness of the body,	3 " 8 "
Distance from the end of the snout to the mouth,	0 " 10 "
Breadth of mouth,	0 " 5½ "

Branchial apertures, five on each side, underneath the stomach; pectorals la
entrals divided in two lobes; two dorsals on the tail; mouth transverse and f

the regular angler's sporting, it is attended with much that we must deem poetical and interesting. Who can doubt this, when we consider the picturesque effect of a boat and lighted torch gliding along the wild shores of a lake, on a still dark night, with one figure noiselessly

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plying an oar in the stern, and the animated attitude of another relieved against the fire-light, standing in the bows, spear in hand, recalling to the classic mind the Stygian marshes, with their dusky ferryman. What a pleasure to behold by the glare of the pine-knots, the various finny tribes amid their own chosen haunts, leading as Leigh Hunt has exquisitely written:—

> "A cold, sweet, silver life, wrapped in round waves,
> Quickened with touches of transporting fear!—"

And now brothers of the gentle art, may ye lure many a speckled beauty from the mountain stream, and silvery salmon from the placid pool; may you return from your summer expeditions with a stock of that glorious fresh feeling, which even a slight taste of bush life and mountain solitudes afford; and in the moments of silent contemplation by the river's brink, recall those fishermen of old, to whose simplicity of life and innocence of mind, we owe our hopes of eternal happiness through the Son of Him who "saw everything that he had made, and behold it was very good!"

CHAPTER XII.

APPENDIX.

The following interesting letter is taken from the *Field* newspaper published in London:—

"During three seasons past I have observed salmon whilst breeding in one of the tributaries of the Saguenay. The *locus in quo* is a shoal and rapid spot, with sheltering boulders, and long spits of pebbly bottom. The current is lively, but not heavy or strong. Autumn leaves cannot lodge in it, and branches or small drift-wood sticks hurry past upon its rippling surface, as if conscious that their presence might inconvenience the family parties already in possession of the shallow homestead. Many preconceived and some favorite notions about the habits of this fish were rudely shaken. Books had taught me peculiarities such as at no time could I then actually observe. The most prominent of contradictions were, that the fish did not root with snouts amongst the gravel to make troughs for the ova; nor did the pairs work by turns; neither was the male accustomed to perform alone his milting in the furrow where her ladyship had just left those delicately-colored, eggs, of the 'pale pearly pink of sea shells.' I saw nothing of such ascribed habits. The female alone was industrious; the male fierce and pugnacious. She, filled with the cares of her maternity, seemed diligently absorbed in the success of her feminine instincts; he, sexual, masculine, selfish and bullying—a very 'fancy man:' ever and anon jostling her; now running his beak into little ridges of sand or gravel in some furious rush after rival salmon or maraudering trout and kicking up a most unbecoming dust: then, again rudely overturning her in the awkward conflict, and tumbling into the nest a new pile of gravel, to her intense disgust. The way this active and tidy fishwife does her busy duty is curious. She wriggles herself among the small stones, and with rapid motions of the caudal and anal fins, and a winnowing action of the tail and body (turning over

alternately upon one side and another), she keeps quantities of gravel in suspense, almost afloat on the eddying hollow. Sand and lighter particles trail down the current behind her. It seemed to me as if the power exercised by her motions in the water had almost, if not quite, as much to do with the displacing of gravel and sand as the bodily movement against them. The same thing may be seen where the screw of a steamer stirs and draws up mud and dirt from the bottom of water several feet beneath the keel. The bed once made to her satisfaction, she settles down into it, as if resting from her labors; and should her attendant lord be not near and ready, she turns over upon her side as if to signal and invite him. The bully of the throng then settles alongside her; and, as nearly as I could perceive, their milt and ova are thus expressed in actual contact, both lying almost upon their sides during a strong quivering pressure. The function performed, she slinks lazily away. She remains for a few moments quiet, as if to let things settle; and soon recommences her previous winnowing along either side of the furrow, but this time advancing a little, and stirring down some gravel from above. I was much interested, and not a little surprised, with what I saw. You may depend upon it, sir, although the salmon is a fine, genteel and noble fish, he is not half so platonic a breeder as some amateur and theoretic naturalists have reported him to be. He is a creature of like passions with all others—cold-blooded, if you please, but not therefore insensate. A trout can be tickled; why should not the higher and richer-fed member of that respectable family—*Salmonidæ*—feel occasionally a trifle ticklish? Oh, no! Mr. Salar is not a sentimental and ultra-domestic Chinaman. He does not lie a-bed and sympathise, pain for pain, with his laboring mate. He has more of the Indian nature, and if he had 'portages' to make, would leave his squaw to bear the heaviest burdens. My native gallantry forbids me to think so highly as before of this king of fresh-water fish. Bold, agile, powerful, sagacious (though sometimes suicidally bent on poking his head into meshes, and darting into apertures that he *won't* again come out through), often, too, wide-awake for anxious anglers, and too fertile in combative resources for the hand and tackle of nervous fly-fishers,—withal I put down this lord of salmondom as a selfish water-type of that terrestrial lord of creation sung about in the old song."

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