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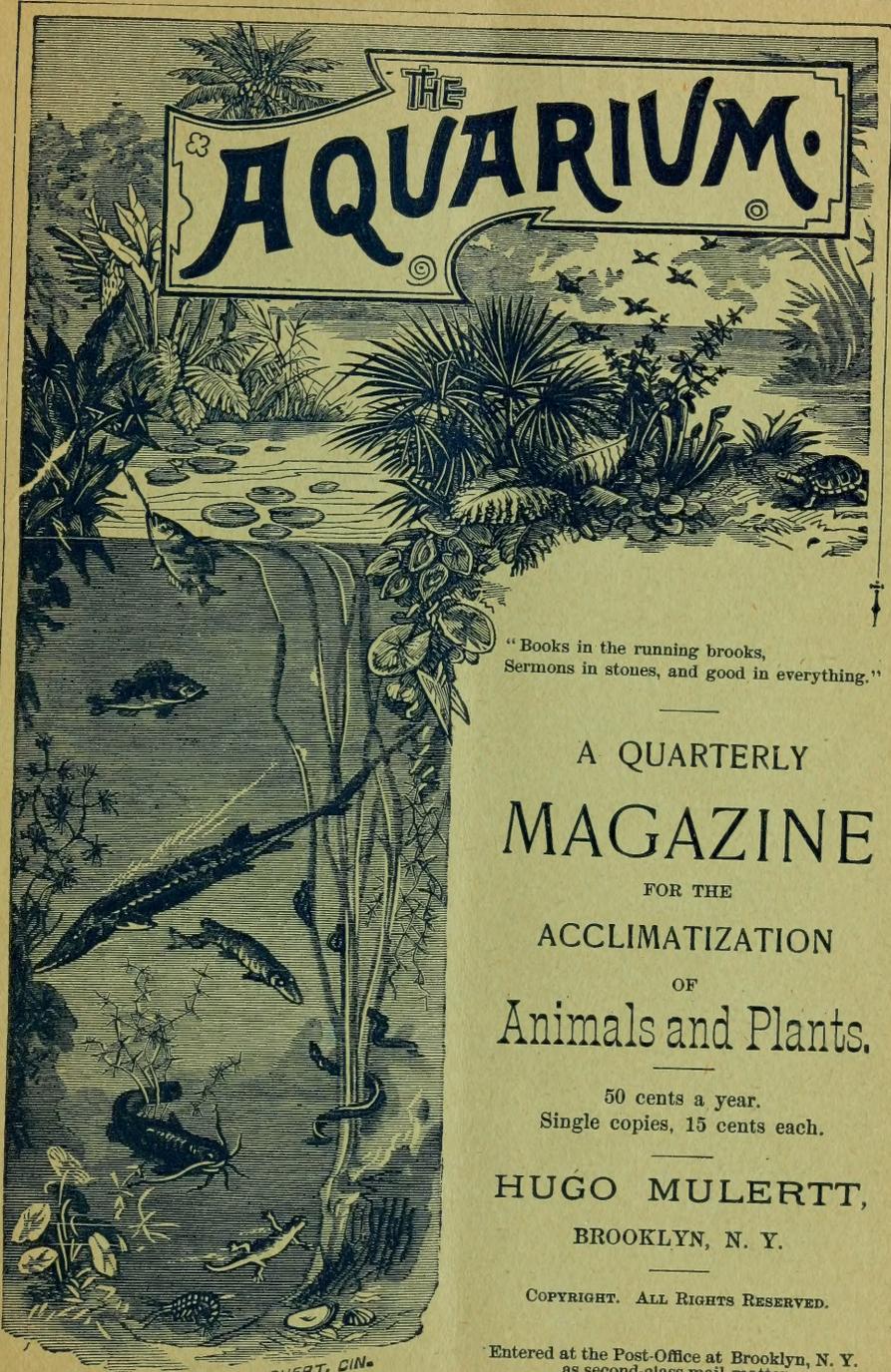
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DIVISION OF FISHES
U. S. NATIONAL MUSEUM

Vol. III.

OCTOBER, 1893.

No. 29.



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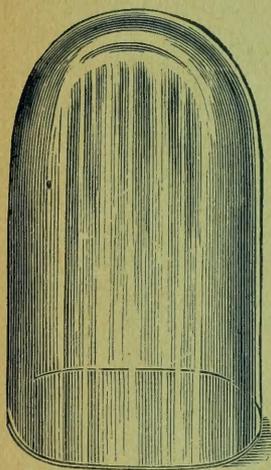
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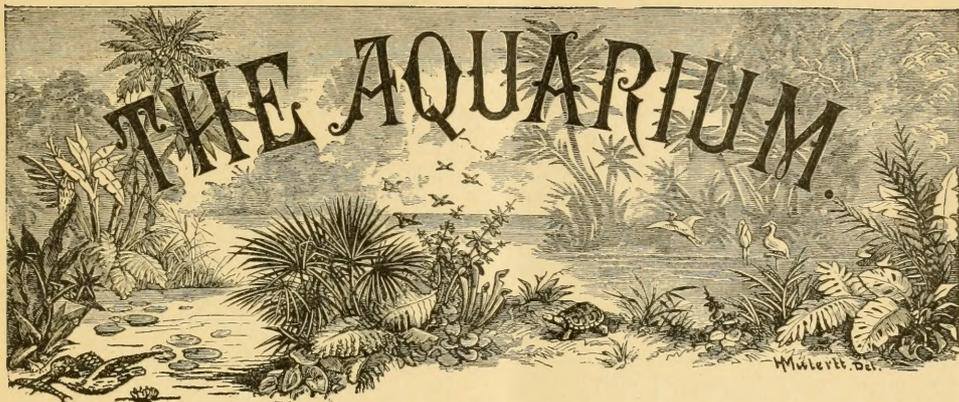
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DENOMINATIVE CHARACTERIS-
TICS OF FRESH WATER
FISHES.

III.

THE CARP-LIKE FISHES.

(*Cyprinidae.*)

This family of fishes is distributed pretty much all over the globe and comprises some very choice and valuable species, that are highly prized for the purposes of the table.

The family is characterized by the naked head, the body being covered with scales, the toothless mouth and well developed lips, the dorsal fin soft, and the air bladder large and divided, something like an hour-glass. Some species are supplied with barbules, though their existence is not a dominant feature of the family. The cyprinidae unlike the salmonidae, possess no adipose fin. The spawning season occurs during the spring and summer months, just as the circumstances of the locality may be, and they belong therefore to the great division of summer spawners. The eggs are deposited against aquatic plants or other material

in the water; they are adhesive and stick to the object until hatched, which requires from three to twelve days, according to temperature and difference of species.

The leading species are as follows :

THE SCALE OR NOBLE CARP.

(*Cyprinus carpio.*)

Der Edelkarpfen.

Le Carpe.

The body of this fish is stout and elongated, the sides being compressed. The head is small and supplied with well developed lips, the upper of which carries two pairs of barbules, the one near the corners of the mouth being much larger than the other. As stated above in the general remarks, the mouth is toothless, though the fish is provided with masticating organs. These organs are situated far back in the pharynx or throat and consist of pharyngeal bones armed with teeth. These bones are operated by appropriate muscles which give to them a motion like that of the jaws opening and closing during the act of chewing. The action may be illustrated by spreading the fingers of the two hands and moving

the hands to and from each other, allowing the fingers of one hand to pass into the spaces between those of the other. The teeth upon these bones are shed every spring, their places being supplied with new ones. The color of the body of the fish is generally of a dark olive brown on the back and sides, though it will vary according to circumstances; the abdomen may be either yellowish white or orange tinted. The entire body is covered with scales of a uniform size, of course proportioned to the size of the individual. The dorsal fin is situated on the middle of the back, extending nearly to the tail and consists of three spines, the third one of which is serrated, and has from fifteen to eighteen soft rays.

The carp attains a length of from three to four feet and weighs then between thirty and forty pounds. There are individual cases on record in which the weight has reached nearly one hundred pounds, but this is the exception. The carp has become a very important fish, because of its habits readily adapting it to pond culture.

The common carp was known to the ancients, as both Aristotle and Pliny have noticed them, though it appears the ancients did not value the fish near as much as do the people in modern times.

In central Europe, where it is difficult to obtain sea-fish, those coming from fresh water are, of necessity, greatly in demand and are prized accordingly. In view of this, carp culture has become an interest of national importance, especially so in Germany and Austria. The growth of the fish, its habits, etc., together with various methods of fattening it, have been closely and practically studied, with the most gratifying success in the coun-

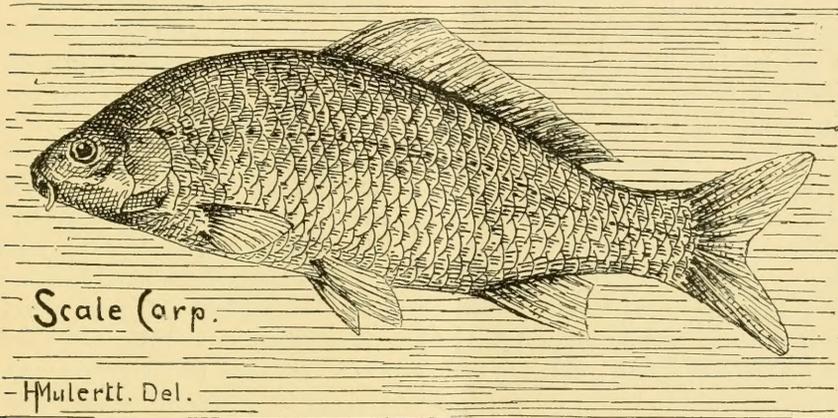
tries just mentioned. As is well known the fish declines in size, when removed from the warmer regions of the temperate zones, yet notwithstanding this fact, the Germans and Austrians have cultivated it with the most marked success.

Nearly every farmer has his carp-pond and devotes as much attention to the breeding and raising of the carp as is usually done with cattle, sheep, etc., the world over. So profitable is it, that an acre of water will yield as high a rent as an acre of the richest soil. The cultivation of the carp in Europe has grown to immense proportions, in evidence of which a few of the larger establishments may be mentioned. The carp-ponds belonging to the manor of Wittengau, in Bohemia, of which the Princess of Schwarzenberg is the proprietress, number two hundred and fifty (250), and cover an area of 22,000 acres. The annual yield of fish is one-half million of pounds. These ponds are known to be the largest on the globe, and the cultivation of the carp in them has been carried on for many centuries. Similar establishments are found on the manor Konigswartha, in Upper Lusatia, with 205 ponds, extending over an area of 9,000 acres; the manor Peitz-Cottbus (Brandenburgh), with 72 ponds, covering 5,600 acres; the celebrated ponds of manor Trachenberg (Silesia), which are the third largest in Germany. To these must be added thousands of ponds, scattered all over the country, before an adequate idea can be had of the extent to which the industry is prosecuted. The custom of keeping the fish in artificial ponds has furnished opportunities for close observation, notably so in respect to age. It is not at all unusual for specimens to live to "a good old

age," in the full acceptance of the term, and instances have been recorded where the age was a full century, though this has been eclipsed by the fish having been known to live to the ripe age of one hundred and fifty years. This would seem incredible were the fact not well authenticated. Tradition, as is always the case, tends to magnify any natural phenomena that may either be wonderful or astonishing, and has gathered about the carp a halo of romance. It is said, though the story cannot be vouched for, that the tame carp in the ponds of Fontainebleau

At the pond of Schloss-Charlottenburg, near Berlin, some very large and old carp are exhibited to visitors. When the bell is rung, it being the signal for their feeding time, the surface of the pond near the bridge from which they are fed is lashed into a foam by the large number of carp, in their endeavors to get a share of the black rye bread with which they are fed.

This fish, when purely bred and raised upon a systematic diet, is considered in Germany as a delicacy of the first rank. Should an esteemed visitor abide at the house of a German host, a



were placed there during the reign of Francis I.; this of course would give them an age of more than three and a half centuries, a thing very difficult of belief when unaccompanied with convincing evidence. However, all this may be, it is not uninteresting to know.

At an advanced age the carp loses the golden hue of its scales, assuming a dull ashy color, while at the same time moss is found to grow upon the head and back.

By long care and training the carp, like many other fish, seem to recognize certain sounds, as for instance, when they are called to be fed.

rich and delicious carp is served up with all the honors of the household. Indeed, with the Germans, the carp is the beau ideal of a Christmas dish, just as with us is the turkey. Great carp festivals (Karpfen Schmauss) are celebrated in the fall of each year, to which many people from a distance repair to regale themselves upon the fish they love so much. On these occasions all the resources of the culinary art are drawn upon to prepare the carp in the most appetizing and enticing forms, no trouble being thought too great to make the feast thoroughly enjoyable and a gastronomic success. The

fish selected are those that weigh about three or four pounds, as at that period of their growth they exhibit the most delicate and delicious flavor. To preserve this in the cooking, the coat of scales is not removed and besides, when so prepared, the shape is not altered much, thus making a much more presentable appearance when served upon the table.

A remarkable peculiarity of the carp is that it will live for a great length of time out of water, if kept moist with damp grass or moss.

It is said that the dairymen in Holland take advantage of this fact and suspend the fish in their dairies to fatten them. The food given them is bread soaked in milk, and under this treatment they are said to fatten quickly, while at the same time the flesh acquires a most delicious flavor.

The history of the carp is somewhat obscure, and though, as already stated, it was known to the ancients, no mention is made of its nativity. It appears, however, that the fish either originated in the Danube, or was introduced from Persia into Europe, and gradually became distributed and acclimated all over that continent.

From Germany the carp was brought to the United States for the first time in 1872, by the late Mr. J. A. Poppe, a native of Germany, but at that time residing on his farm in Sonoma, Cal. The specimens he left Europe with were of various sizes and age, to the number of 83. They were bred near Reinfeld (Holstein). Upon arriving at New York there remained alive but 8 out of the whole lot. On the way to San Francisco they remained alive, but after reaching there two more succumbed, and still another on the journey to the farm. There remained then to Mr. Poppe, with which to stock his

pond, but five three-inch carp. From this small beginning all the others sprang, and were the only carp in this country until 1876, when Spencer F. Baird, Esq., the United States Fish Commissioner, perceiving the value of the fish to the farmers of the country, imported several other varieties. These varieties were still further supplemented by the importation of others by the author.

Carp are now bred in the so-called National Carp-ponds at Washington, D. C., and distributed free of charge to anyone making application for some. Several State Fish Commissions have also engaged in this laudable enterprise and furnish the people of their several states with stock to breed from, also free of charge.

The carp is easily raised in this country, for our climate is varied and offers every opportunity for the culture. The habits, too, of the fish are such that it readily adapts itself to new localities. It prefers sluggish water, in a warm location, and thrives upon insects, crustacea and vegetable matter. If kept in ponds, its omnivorous appetite will be satisfied with anything that a hog would eat. However, it is not to be presumed that such a promiscuous bill of fare would be conducive to the production of a delicately flavored fish, for dieting is a most important essential element in bringing about a successful result.

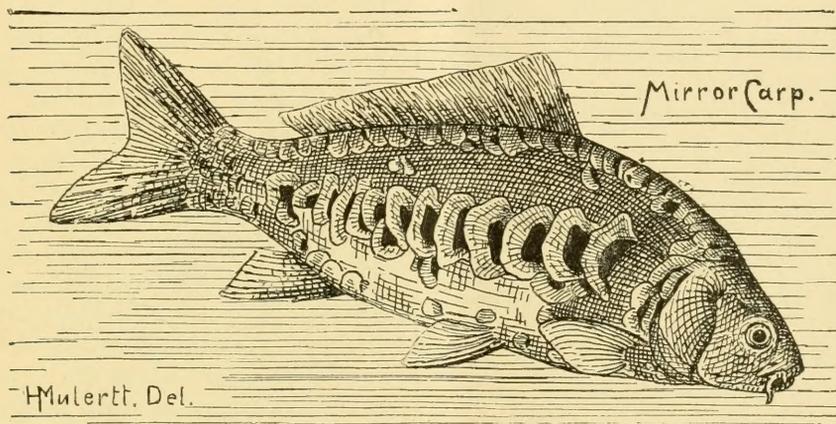
At the third year, the carp arrives at maturity and begins to spawn in the summer of that year, when the temperature of the water rises to about 70° F. At this time they become lively and vivacious, losing all timidity and precaution, so that they easily fall a prey to numerous enemies. Two, three or more male fish follow a female,

chasing her to some shallow place where there is an abundance of water plants. They lash the water in a lively way, twisting the posterior portion of the body energetically and shooting through the water near its surface, with short, tremulous movements of the fins. At places they gather together in a compact mass, one tumbling over another; this is the moment when the female drops her eggs, which are immediately impregnated by the male.

As this process is repeated several times, the female probably drops but a few hundred eggs at a time and she

examination, be found covered very profusely with little yellowish eggs about the size of a pinhead. These hatch variously in from six to fifteen days, just as the circumstances of the locality and the temperature of the water is favorable. As is the case with many other kinds of fish, it is only during the spawning season that the sexes may be distinguished with certainty.

The skin upon the forehead and parts of the back of the male become covered with tubercles, which again disappear when the spawning time is over. About three days after hatching, the



may, therefore, consume days or weeks even in depositing her full quota of spawn.

A female weighing from 4 to 5 pounds, contains on an average between 400,000 and 500,000 eggs; it is on account of this enormous fecundity that the fish has received the name of "carp," which means productive.

The eggs are covered with some adhesive substance, mucous probably, and adhere to anything they may happen to touch. The water-plants in the immediate vicinity of the place where the fish had been rolling about will, upon

young have absorbed the yolk-bag, and begin moving about in search of something to eat. By the following November, if the circumstances have been very favorable, the young can have attained a length of ten inches; this is unusual, the rule being a length of from four to six inches. They are then of a brilliant silvery color, the fins presenting beautiful tints of bright vermilion.

During the winter, in cold climates, carp do not increase in weight, doing well if they hold their own. They pass that season in a torpid state, buried in the mud; forty or fifty group together

for the purpose and burrow or dig a hole in the bottom of the pond in some suitable place. This hole is known as a "kettle," in which the fish remain head downward and closely packed against each other, until the pleasant weather of the spring again revives them.

In the succeeding fall, at an age of 16 months, a carp under ordinary circumstances will weigh from one and one quarter to two pounds, and may, if everything has been propitious, double that weight. Some maintain that the carp at an age of 16 or 18 months will weigh eight or nine pounds, but this is extremely doubtful, even should the fish have been bred in the richest pond in America.

Carp mix very readily with other fish of their kind, especially with our common goldfish (*Carrasius auratus*). This may cause great trouble to those not well posted, for the young and uncolored goldfish very closely resemble young scale-carp: it is easy to separate them, if one but remembers that the carp carries upon the upper lip two pairs of barbules, which feature is lacking in the goldfish. It is necessary to mention this distinction in order to guard against the worthless hybrids that already exist in this country.

We now proceed to describe the acknowledged best varieties of carp, all of which, the "golden carp" excepted, are now cultivated in the United States.

Each variety of carp has some peculiarity or other of its own, and it is the proper development of these that makes the successful culturist, when he studies the circumstances that produce the best results.

A certain variety of apple or potato is most successfully cultivated in one locality when intelligently handled,

while in another place, and ignorantly treated, it is an ignominious failure. Why should the same not apply to the carp? The phrase "the right fish for the right water" explains the idea in terse and forcible language.

THE MIRROR OR KING CARP.

(*C. rex cyprinorum.*)

Der Spiegel Karpfen. *Carp à cuir.*

This variety has a higher body than that of the preceding and is but partly covered with scales. The latter are of different sizes and shapes, some of them three or four times the size of those of the scale carp. This variation has given rise to the false impression that carp shed their scales, the fact apparently seeming to prove the idea.

The color of the scales is deep black in the centre and edged around with silvery white, giving each scale the appearance of a miniature mirror; hence the name.

The skin, where it is not protected with scales, is of a rich creamy yellow on the back, inclining to olive brown.

In some localities this fish is prized above all other varieties of the family. This is not so much a matter of taste as many would suppose, but depends upon the success with which the fish is cultivated in places that suit it best.

THE NAKED OR LEATHER-CARP.

(*C. nudus.*)

Der Leder Karpfen.

As the name indicates, this variety is very nearly or entirely naked, its skin as soft as that of the catfish. Its shape is the same as that of the mirror-carp, differing only in color; the back and sides are of a brownish gray and the belly white.

THE GOLDEN-CARP.

*(C. aureus.)**Der Gold Karpfen.* *Carp d'or.*

This variety is very popular in France and is cultivated to a considerable extent. It must not be confounded with our common goldfish, as it is in no wise identical. The flesh is salmon-colored and of an exceedingly fine flavor, which, together with the rich golden color of the scales, are due to the circumstances of locality and the quality of food upon which it subsists.

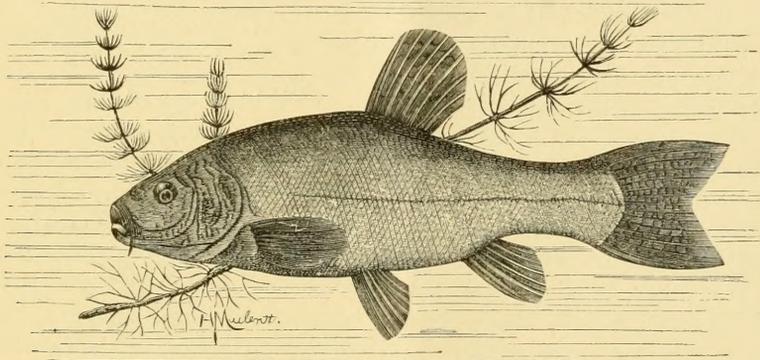
With the exception of the color of flesh and scales, it otherwise resembles the noble carp

The large pond situated in the city park of Leipsic, in the rear of the Opera House, and known as the "Swan-pond" (Schwanen-Teich), is stocked exclusively with blue carp.

THE TENCH.

*(Tinca vulgaris.)**Die Teich Schleie.* *Le tanche.*

This species, although very closely allied to the carp proper, differs somewhat from it in the shape of the body (which in young specimens is cylindrical,) and to some extent in habits. It has but one pair of barbels, one situated at each corner of the mouth. The color



THE TENCH.

THE BLUE-CARP.

*(C. nobilis.)**Der Blaue Karpfen.* *Carpe-bleu.*

This variety, like the one above, also greatly resembles the noble carp. It is highly esteemed, especially so in and around the city of Leipsic, Saxony. When cooked, it still retains the blue color of its scales, though this is ingeniously imitated by placing some other variety in vinegar for awhile, the scales thus turning blue. In such cases the fish is known as "Karpfen blau," instead of "Blauer Karpfen," the name of the genuine fish.

of the body is a beautiful golden-green, darker on the back and shading off to a golden-yellow on the abdomen. It is protected with a coat of innumerable small scales (some 30,000 or more), this in turn, covered with a thick coating or skin of slimy mucous, making the fish "as slippery as an eel."

The head is small, the eyes comparatively so, but of a rich blood-red. The dorsal fin is small, consisting of but one spine and eight rays. It is a beautiful fish, and one very tenacious of life, thus rendering it easily cared for and a desirable addition to the aquarium.

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It thrives best in ponds, the bottom of which is muddy, and feeds upon such food as may be given the carp. It is cultivated together with the latter, but is of much slower growth, rarely exceeding eight pounds in weight. It has many admirers as an article of diet and is a profitable, good selling fish.

At the age of three years it commences to spawn, at the same season and after the same manner as the carp. The eggs are less adhesive than those of that fish, and when extruded, drop to the bottom among the water plants, remaining till hatched. The tench is also very productive, as much so as the carp; and is found pretty much all over Germany, in fact being native there.

THE GOLDEN-TENCH.

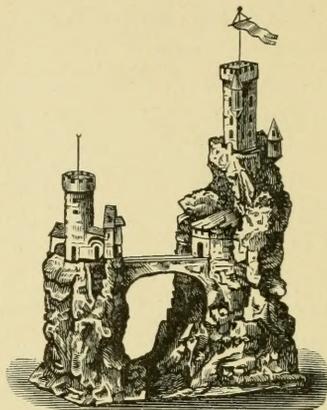
(*Tinca aureus.*)

Die Goldschleihe. *Le tanche d'or.*

The ground color of this variety, which is also a native of Germany, is chrome-yellow, speckled here and there with intensely black spots; each scale is ornamented with a dot of reddish-gold, giving the fish a beautiful appearance and making it very desirable as an inmate of the aquarium, in which it does remarkably well, becoming very tame.

(*To Be Continued.*)

ERRATA—On page 51, third line from below, read 40° F. instead of 10° F.



DESIGN FOR AN AQUARIUM ORNAMENT.

The part of the rockwork for below the surface of the water is Tuffstone, the miniature castle and bridge are fired clay.

VALLISNERIA FOR THE WINTER.

Vallisneria spiralis that is to be used in the laboratory during the winter and in early spring, should now be collected and planted in a pot, using ordinary gravel, as found in the creeks, for soil. The pot is set in a tub of pure water of sufficient depth to cover the *Vallisneria* about three inches. The tub is placed in the open air, in the garden, or on some roof where the sun will strike it, and left there until ice, to the thickness of about half an inch, has formed on the water. This ice is broken, and the pot containing the root or sets of the *Vallisneria* removed to an aquarium tank or similar vessel holding water, and kept in a cool place in the house.

About Christmas this vessel is moved into a warmer room and placed where it will get a strong light—sunlight, if possible. Here the sets will start almost at once. If wanted sooner, some sets may be started earlier, but they should have had frost, and a little rest after that.

CARNIVOROUS PLANTS.

(Continued from last number.)

Still more wonderful were the communications made to the Paris Academy, in the beginning of 1872, by the botanist Ziegler. He claimed that all dead albumen only then caused the leaves to be irritated, after holding it between the fingers for a short time, but if he would place it on the leaves by means of forceps, he claimed it produced no motion in the leaf. He claimed still further that by fastening, at a small distance from the leaf, a bit of albumen obtained from blood and held in the hand for half an hour, the leaf lost all irritability for the albumen in twenty-four hours. Contrary to this the leaves were now susceptible to Quinia wrapped in tissue paper. May this be as it will, one cannot think of any other explanation than that of nerve irritability, which is transmitted and calls the muscular apparatus into activity. Darwin destroyed the activity of these leaves by means of pricking them with needles, and Heckel, of Montpellier, like other botanists before him, has shown that the vapors of ether and chloroform obtunded the sensibility of these plants in the same manner as in the smaller and larger animals. Naturally we cannot claim a nervous centre like in higher animals, but must be content by attributing the actions to reflex nervous actions, like that of a beheaded frog, who will withdraw his leg on being irritated. The botanist, Nuttall, noticed the same motions in newly plucked leaves, the same as in those remaining on the plant, but to a less degree, and the excitability soon subsiding. Bennett states as a settled fact that the exudation is augmented as soon as an insect is caught, similar to the

gastric secretion in the stomachs of animals as soon as food is introduced. Meat is altered in appearance in a short time by this fluid. The fluid of the *Drosera* was known in olden times, and to the bruised plant, mixed with salt, were attributed the properties of drawing blisters. The leaves were always likened to the stomach of an animal on account of the power of digestion, but it was not thought that they were possessed of glands of digestion and absorbents to take up the digested material like the stomachs of animals.

Attention was now drawn to a species of plants, the leaves of which always contained a fluid in their hollow interior, the so-called *Pitcher plants*. To these wonderful swamp plants, belonging to the species *Nepenthes*, *Sarracenia* and *Darlingtonia* (see illustration in last number), many poetical allusions were made, in that they preserved to the wanderer through the swamps a fresh and invigorating drink, and Darwin noted that the fluid of the *Sarracenia* refreshed thirsty birds. One truly finds that the fluid in the artistically formed pitcher (the contents of which are protected from evaporation and rain by a lid) is full of dead insects, which may be an inducement for insect eating birds to avail themselves of these opportunities. The brilliant colors and the honey-like exudation at the entrance of these pitchers (those of the California species resembling an open reptile's mouth) coax the insects to enter, where they drown in large numbers. Wm. Batram, in 1791, assumed that the fluid contained in the pitcher-shaped leaves of one (North American ladies' saddle flower) to possess properties of digestion, and in 1829 Bennett confirmed these assumptions, while Dr. Mellichamp, of South Carolina, proved it to be so

without doubt. He describes this fluid as having a styptic taste, being poisonous, or at least having a narcotic influence on insects. Insects that have fallen into this fluid lose the power of motion in half a minute, but will recover if soon removed from its influence. The process of digestion, he claims, is nothing more than a form of decomposition. The juices of the many varieties of pitcher plants found in greenhouses have been examined by Dr. Hooker, and he found that their properties of digesting boiled albumen, raw meat, cartilage, etc., was really wonderful. The pieces were fully dissolved in from two to three days and that more readily in the pitcher shaped leaf, than when the fluid was put in a glass vessel. Dr. Hooker, therefore, comes to the conclusion that the glands on the interior of the leaf secrete a fluid containing a substance similar to pepsin of the animal stomach. This characteristic trait of preying, seems to be limited to the small family of sun-dew plants, to which class Venus' fly-trap belongs.

The head gardener, B. Stein, of Berlin, noticed a plant in the South of Europe with the same characteristics. This plant was introduced from India about the same time as the *Drosera*. The name it received is *Aldrovanda vesiculosa*. (See illustration in last number.) He found this plant growing in ditches in great masses, not far distant from Rybrink, and convinced himself that every closed leaf contained an insect. This plant showed that in water of a temperature of (30° C.) 86° Fahrenheit, to be the most sensitive of the whole family, because he only had to touch the leaf with a wire to make it close itself along the central rib most energetically. A pin thrown on the surface of the leaf was

caught and held from 18 to 20 hours before it was again let fall. This high degree of sensibility was only noticed in a very warm atmosphere. At a low temperature several of the leaves remained closed, and this also occurred when the plant was removed from the water. Since this Prof. Cohn, of Breslau, has discovered in a plant found in the ditches of meadows in Germany similar phenomena. This plant, the Helm or Bladderwort (*Utricularia vulgaris*), (which, by the way, is very abundant in several species in many parts of the United States), possessed small bladders or dilatations on the thread-like leaves under the water. The bladders have valve-like openings, which can only be opened from the outside, giving easy entrance to small animals, but preventing all escape. These bladders, when opened, are filled with the skeletons of water fleas, worms, smallest of crabs and waterbugs, the softer parts of which having been absorbed by the plant. We can obtain a very excellent description of these plants of prey in a book, from the masterly pen of Emil Schmidt. In conclusion, we would draw the attention of the readers to the pleasure that can be derived from the observation of the chase and waylaying of these plants. They may be found in swamps in any warm climate. Taking these plants from the swamp with considerable of the earth or moss adhering to the roots, and planting them in a pot containing the same sort of soil, they may very readily be kept for some time. We have amused ourselves for weeks with these plants, which always showed the dew-like exudation and retain their sensibility. We can find no finer ornament for our Terraria than this sun-dew. What pleasure it is, after feeding the Gold-fish in the morning, to also present

this plant with a small piece of meat and see it relish it. Proof against the prayers of the fanatics on fasting, we take our seat at the table, and think that a fine roasted duck is not harmful on Friday, because the flowers themselves do not refuse a small beef steak.

WEEDS AND WATER FOWLS IN RELATION TO WATER.

It is pleasant, if only for the sake of variety, to be able to say a good word for weeds. Into my pond, so writes a gentleman of our acquaintance, runs a stream of 25 gallons per minute of pure water, from a drain which I cut 12 feet deep, some 30 odd years ago. Weeds will thrive and grow in this pond, and we have annually to rake out large quantities of them. They look very beautiful as they grow in the pellucid water, which is used for household purposes. Said a visitor to me one day, "If you had a pair of swans your pond would be free of weeds;" so a kind friend presented me with a pair and very soon they cleared the pond, picking the weeds up by the roots and feeding on them. My family were delighted with the graceful swans and the removal of weedy obstructions to boating; but although the pond was free of weeds, the water was no longer pure and pellucid, but most decidedly muddy in taste, and when the steam issued from the kettle, the smell of the mud was unmistakable. Well, no one thought it could be the swans; but at last I came to that conclusion, and despite family and other remonstrances, returned them to their original owner. After a short period the weeds reappeared, and as they increased in bulk, the water gradually assumed its pellucidity and purity, and "Richard was

himself again." What the weeds do for the water and its occupants, the land vegetation does for the air: man, animals and other living creatures poison it, while vegetation absorbs the injurious gases, and reconverts them into wholesome food and fuel for man and beast, filling the atmosphere with that precious oxygen without which man and animals and other living creatures could no longer exist. So it is in the vast ocean, whose living occupants and vegetation probably exceed in quantity that which is on land. We owe to the river vegetation much of the purity of water. It is the excess of impurities from our towns which are beyond its powers of appropriation.

AUTOINTOXICATION IN GOLD- FISH.

Since last winter we received nearly a hundred inquiries from all parts of the country regarding a disease which caused the death of a great many choice goldfish. The symptoms were in each case described alike. We deem it of sufficient interest to our readers to devote some space in these columns to its cause which, we hope, may tend to prevent this fatal disease, as its cure seems as yet out of the question. The following typical letter sent us recently by one of our patrons describes the disease very clearly, and it will be recognized by many of us at once as the "forlorn hope." The lady writes as follows:

"Taking advantage of past kindness, I write to ask for information regarding a disease prevalent among my goldfish. A white scum or mould appears on the tail, most frequently, but sometimes on the fins. It eats toward the body until the tail is destroyed, and the fish then dies. I can stay the disease, I find, by salt-bath, and carefully removing the mould, but the fish finally dies. It has

proved very fatal to mine. Often I do not have a case for some weeks, and then it will again appear. Can you explain the cause or give any remedy for the evil? I keep my fish out of doors, some in cypress tank, others in a fifteen hundred gallon cement pond. My fish have been changed about and mixed so I cannot say that my trouble originated in any particular receptacle. All my water plants are in fine growing condition, and that I have always been told was a proof of healthy surroundings."

The cause of this disease is self-poisoning (Autointoxication), brought about by over-fatigue and scare. We have frequently had it among goldfish, especially among imported stock or such that was bought from inexperienced dealers. Stock of our own breeding or that which has been raised and shipped to us by careful breeders has never been affected by it. This seems to be proof that the germs of this disease are laid while the fish are cooped up in large numbers in an insufficient quantity of water while on the road, and by rough handling of the cans containing them, all of which causes a severe shock to their nervous system.

Let us see what these little creatures, that are intended to become our pets, are expected to stand from ignorant or heartless people.

Goldfish are raised in quiet, sunny ponds, generally pleasantly located. They are seldom scared, and when they are, the scare is not very severe, because they know they can find shelter in deeper water or among aquatic plants if need be. Neither are such occasional scares of long enough duration to have serious effects. The first trouble begins when fish are removed from their ponds. They are then unavoidably more or less scared by the process of fishing them out; and when caged-up in dark cans with too many others of their kind,

their excitement is increased; but when the oxygen in that can becomes exhausted then they are nearly scared to death; they struggle then for dear life, try to leap out of their horrible prison, but are prevented by the closed lid of the can.

With a jolt, that must seem to the little fish an earthquake, the can is lifted in the wagon. On their way to the depot or to the store the can is jolted about in a more or less rough way. This, while it has the benefit of aerating the water, puts a new tax on the already much exhausted fish; they have to use what little strength they may have left, to swim in the swinging water, against a current of water as it were.

In a perfectly exhausted condition such fish arrive at the store. Here they are, in most cases, liberated in a very rude fashion. The can, being "slammed" out of the wagon, is emptied by simply "dumping" its contents, helter-skelter into a tank.

If such a journey requires but one or two hours, the fish will recover from the shock if afterward under proper care (See particulars under "Transportation" in *The Gold Fish and its Culture*), but when such fish are again put under similar tortures, to last for days or weeks without their accustomed nourishment and without rest to recuperate their strength, their system is completely disarranged, their nerves and muscles are inflamed, the free circulation of the blood is hindered, and the fish begins to decompose, although still alive.

It is a well known fact that wild animals can be chased to death by dogs. Even if they are not caught and killed outright, they often die sooner or later thereafter of the effects of the great

scare or shock which their nervous system experienced. Excited animals consume oxygen faster than it can be supplied; the consequence is that a chemical process takes place in the blood of the fatigued animal which is called "self-poisoning" (Autointoxication). This is what causes the "haut-goût" in game, so much admired by gourmands, which really is nothing less than the beginning of decomposition in the living animal.

Goldfish traveling in insufficiently aerated cans long distances, are as much fatigued and scared as is a stag in a chase by hounds. Weaker individuals die first of suffocation; the stronger ones linger longer, their gills become inflamed, and these finally die of consumption, while others have their interior structures disarranged by innumerable minute sores. No visible sign indicates this terrible condition, except that the victim moves slow, appearing very tired. At last, these little sores unite in one or more larger ones and open outside of the body, generally along the back of the fish, or they appear as a white mould at the base of the fins, destroying their structure, when death soon relieves the poor sufferer.

Fish that are intended for pleasure or science should be handled gently and carefully at all times. And since we all agree that only healthy fish, that have no fear, are fit objects for our hobby, dealers should see their interest in supplying their customers with no others.

If THE AQUARIUM does not reach you in proper time, you will oblige the publisher by informing him of the fact, and a duplicate copy will be mailed to you at once.

FREESIAS.

In the ever-lengthening list of winter-flowering bulbs which the enterprising florists yearly place before the flower-growing public, there are none which produce sweeter or more truly beautiful flowers or give more satisfaction than the Freesias. Nor are there any of the winter-foreing bulbs that are more easily grown, and in consequence of these combinations of desirable qualities one continues to cultivate them year after year having once made their acquaintance.

The stems branch freely, producing several clusters of flowers, which make up very gracefully in bouquets and other floral work, their beautiful forms, exquisite colorings and delicious perfume rendering them highly suitable for these purposes, as well as for window garden decoration. Another admirable point in their favor is their keeping quality, for when cut and placed in vases of water they will keep perfect for two weeks, the buds opening as well as if kept on the plant.

One author, in writing of the merits of this beautiful flower, says truly: "The Freesia seems to have been designed by nature for wear in a lady's hair, at her throat or breast, or in the button-hole of the ruder human being. Six or eight florets, trumpet-shaped, one to two inches long, appear close together at the end of the stem, but instead of being clustered they grow in a row. The stem bends at a right angle just where the first floret appears, so no matter how carelessly the stem is thrust into coiffure, dress or button-hole, it hangs as if on a hook, and makes the greatest possible display of its bloom. Two or three sprays of the Freesia worn at a party or theatre will

give occasional relief from close air, and a little cluster of it in water will retain bloom and fragrance for a fortnight, the unopened buds all coming into bloom as the older flowers decay and fall."

A moderately good, light, sandy soil, the same as used for other bulbs, with good drainage and plenty of sunlight, meets its requirements, and after the bulbs are potted it is not necessary to set them away in the dark to form roots, as they commence growing right away and begin flowering early. If planted at intervals from September to November they will give a succession of bloom during the winter months. Fortunately, the bulbs are so cheap that every one can afford to pot up a good supply of them.

The Giant Bermuda Freesias, introduced last year, form a magnificent strain of mixed hybrids, producing flowers of various colors, from fine white to deep orange, shaded, blotched, straw-color, etc., and are very large.—*Mayflower*.

WATER LILIES.

The beautiful flower beds of Lincoln Park, Chicago, could not detract the attention from the ponds containing the aquatic plants. From early morning until night the World's Fair visitors surrounded these ponds. We noticed nearly all the known species and varieties in the collection and nearly all of them were in bloom when we saw them. As could be expected the two *Victoria Regias* in bloom, with the curious tray-like leaves of the plant, were looked upon with great admiration.

While in Washington this summer we saw the Parrot's feather (*Myriophyllum proserpinacoides*) very advantageously used. The basin in front of the

U. S. Treasury building is planted with various rich colored varieties of nymphaeas. Out of the center of this large basin, rise, arranged above each other, two smaller ones, bowl shaped, in which the water falls after leaving the jet. The lower of these contained the Parrot feather, growing luxuriantly and overhanging the edges of the bowl like a great mass of *Lycopodium*. The effect was very beautiful and novel.

The basin in front of the White House, also that in the grounds, contained besides other choice aquatics the most brilliantly colored and largest nymphaeas we ever saw. All the new varieties were represented.

We saw a great many beautiful fountains and lily ponds this summer and shall return to this subject in our next issue.

HYACINTH BULBS WITHOUT MONEY.

In order to increase the circulation of *THE AQUARIUM*, we make the following offer: *For every name and address you send to us* of a person interested in aquarium, window gardening or natural history, who is not already a subscriber of *THE AQUARIUM*, *we will send to you, free by mail, one imported Dutch single Hyacinth bulb; choice of color left to you.*

SHIPMENT OF FISH, EGGS, ETC., FROM N. Y. STATE HATCHERY.

Total shipment of fish, eggs, etc., under my supervision, from the Caledonia (N. Y.) Hatchery for the year 1893:

Lake Trout Fry	2,715,000	Whitefish Fry	18,850,000
Brown "	805,000	Ciscoes "	4,255,000
Brook "	1,315,000	Muscalonge "	2,150,000
California "	145,000	Lake Trout Eggs	1,030,050
Matured Bass Fry	26,750	Brown "	250,000
Pike "	8,370,000	Brook "	150,000
Bullheads "	750	Shrimp	1,500,000

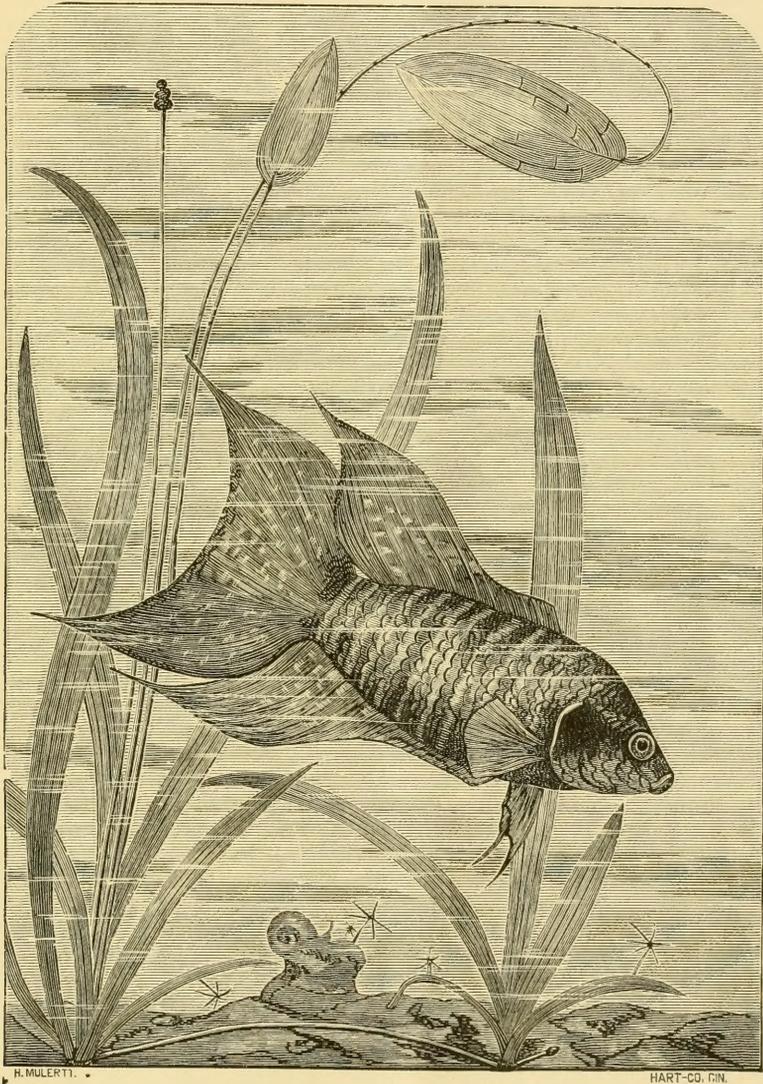
Total production of fish, eggs, etc., 41,562,500.

MONROE A. GREEN,
Superintendent.
WM. H. BOWMAN,
Commissioner in charge.

DAFFODILS GROWN IN WATER.

When planting your bulbs for the window garden this fall, don't forget to plant some Daffodil Bulbs (*Narcissus trumpet major*) in a dish filled with pebbles and water. Treat the same as

you would Chinese sacred lilies, exposing them to light at once. They will bloom excellently this way, and if planted at intervals of a couple of weeks they may be had in bloom from Christmas until Spring.



The Paradise Fish, male (*Macropodus Venustus*).—*Sagittaria natans* "New Era,"
Ramshorn Snail and Hydra. All Natural Size.

IN THE FISHERIES BUILDING.

When a man who is interested in fish nets comes along he asks a good many questions; but the ladies only say, "Oh, how lovely this netting is! Are you in charge of this exhibit? How long is fish netting? How wide is it? How much is it a yard? He sells it by the pound, how funny. Do you have all colors? Could I get some by sending for it? Which kind do you think would look best in a pink room? How much would that kind be? and this kind? and that over there? I notice that which is hung away up there out of reach has a different tint; it is so gauzy and delicate. Oh my, he says it's dust that makes that. Well, give me your card, please. I'm going to send for some fish netting as soon as I get home—a lot of it—enough for a large curtain. Thanks for answering my questions. Good day."—*Fishing Gazette*.



We cheerfully answer at once, all queries made in regard to Aquariums or Window Gardening if return postage is enclosed.

Miss A.—Ch. After the young goldfish swim about in the water, which is generally about three days after they were hatched, they should be separated and only ten or a dozen of them allowed in a vessel, containing about two gallons of water, with aquatic plants, and sand at the bottom. Place such a nursery-jar in a very light position in order to

stimulate the production of natural food for the young fish, but protect it against the hot sun. During cool nights the jar should be in a sheltered position.

When the young are about three or four weeks old, you can begin to feed them on powdered I. X. L. fish-food, prepared fish-food (wafers), also powdered, and small mosquito larvæ. The feeding should be frequent, say four to six times a day, but each time very small portions should be given.

A temperature of 60 to 90° F. is all right for young fish, provided that they have a sufficient quantity of water and access to shade, but 70 to 80° F. is best for them. If you find that you feed too much, you should remove the surplus by means of a dipping tube, at least once in three days. We don't agree with you in thinking that you are over anxious about your fish; we have numbers of patrons of your sex who take as much interest in their aquarium as they do in their garden or greenhouse, and we are pleased to acknowledge that not a few of them are very successful fish culturists.

Miss B.— Use nothing else but table salt and water to clean the glass of your aquarium. It will remove any growth or sediment from the glass without scratching it.

The *Sagittaria Francis M.* which we described in our last number is still in bloom in our aquarium. To-day, September 9th, it has its ninth flower spike.

With this number begins a new subscription. Those who know themselves to be in arrears are kindly requested to remit.



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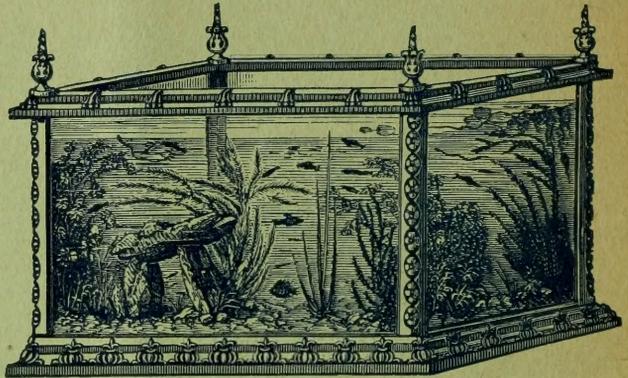
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