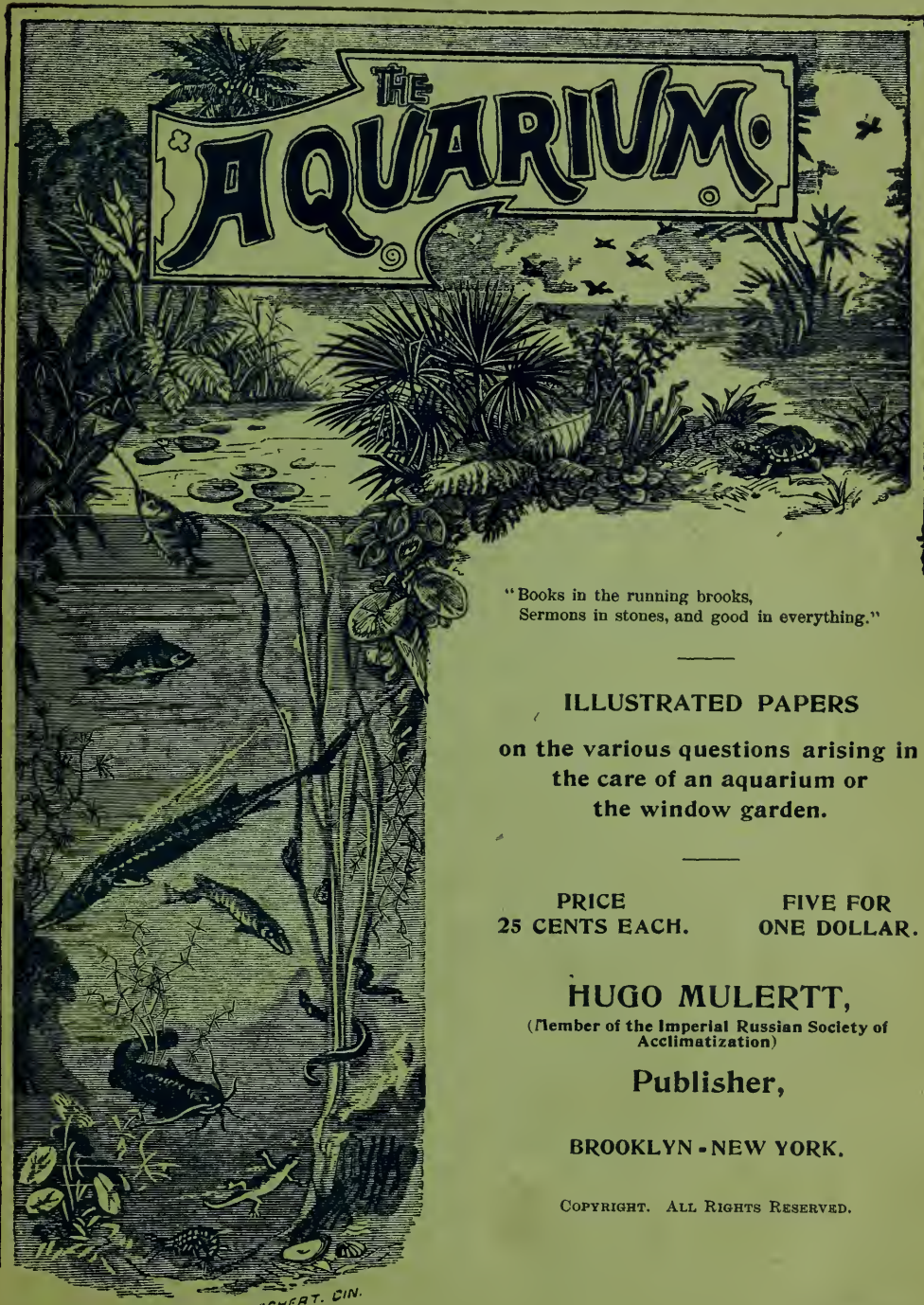


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A NATURAL AQUARIUM.

It is a curious fact how little interest most of us take in nature, when out for an hour or two's ramble, not necessarily in the solitude of the country, but anywhere. The naturalist, of course, finds something wherever he goes, that enlivens his walk, and induces a train of thought; but how many ordinary mortals pass by some of the most interesting spots without taking the slightest notice of the rich field of observation that they might afford. I know of nothing that can give greater pleasure than to follow some little babbling brook, either wending its way through the underbrush of a wood, or creeping its sluggish way through the open meadow. Coming upon such a brook, we will say, where it ripples over a shallow bottom, sparkling and flashing in the sunlight with its "many twinkling smile," there is lots of material, even in that shallow, to while away an hour; but, follow its course a little further round the point beyond, where the slow current over a muddy bottom is only evidenced by a curling eddy here and there, near the bank, or by some floating leaf quietly gliding along the surface, with just

speed enough to show that there is a current. This sluggish channel generally ends in a pool, somewhat deeper than the channel of the brook itself, and this pool constitutes a veritable natural Aquarium.

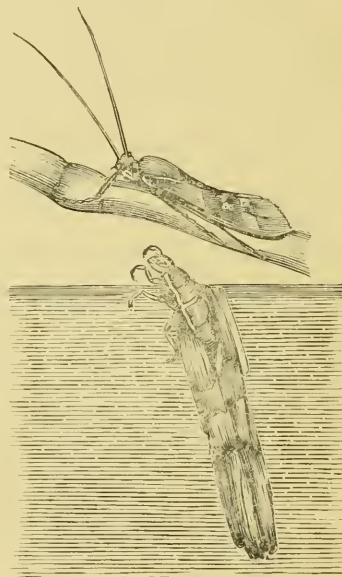
Be very careful not to let your shadow fall athwart the water, for if it falls there, even for a moment, you will then see no trace of life whatever in those waters. The reeds, the sedges, and the willow herb, along its banks, whose verdure is enhanced by the moist surroundings, will afford a screen sufficient for you to drop beside and there to take up your quarters for a quiet observation of the pool.

Tenantless at first as it looks, in a very short time you will see small fish appear as if by magic from under their covert, their tails in a perpetual motion like the screw of a propeller, to keep their heads up stream and their bodies, as it were, at anchor. Here and there a more sportive one darts out from the others as if on a tour of observation, and circles round or across the pool, returning to his fellows, one or more of whom again indulge in the same operation. Should a fly or a small caterpillar come down with the current, all is at

once activity, and a scramble takes place among them for its possession. Whilst watching these fish a number of small objects on the bottom may have been noticed, looking like bits of straw or fragments of twigs, with perhaps two or three minute shells adhering thereto. You wonder at the apparent motion visible amongst them, for you are sure that the current is not felt down where they are, and bye and bye you may notice one or more of them moving diagonally, a convincing proof that it is not the action of the water that causes that motion. Perhaps, when curiosity is so far raised, regardless of disturbing your fish, you bare your arm sufficiently to reach these objects, and on examination you find that each of them is a cylinder containing a grub which, by its own secretion, has gathered and glued together as a protection for its tender body, fragments of vegetable and other matter to form a covering, and that this is the caddis worm, from which will emerge in due course the May-fly. If you divest two or three of these grubs of their case and keep them till the alarm caused by your investigation has subsided, you can drop one of them from time to time into the stream and the excitement caused thereby will afford a vast amount of amusement, till one of the fish more voracious than the other, has disposed of it to his own benefit. It is curious to watch the suspicion with which at times a fresh object floating down the stream is regarded. Perhaps whilst watching your grub, there is a sudden dart of a dark looking object from under a sunken log, a sudden disappearance of the food, and as speedy a return to the sheltering cover before you discover that a trout, which has hitherto given no signs of his presence, has been quietly on the

watch all the time. Another habit prevalent among the tenants of the pool, is that of tossing the grub about by an upward movement of the nose, as if sending it from one to the other for inspection and report. Much fish life and their curious habits can be learned from the simple watching of their haunts, when your presence is unsuspected.

Something meanwhile moving beneath one of the large stones or sunken



THE CADDIS WORM.

logs, has attracted your attention, and ere long two antennæ are visible, with the quiet thrusting forward of a claw, and then comes out with a peculiarity of motion, a cray-fish, keen of vision, and cautious in all its movements. Eyeing the surroundings, and apparently satisfied that everything is safe, he creeps along, pausing at times in his course, till suddenly some movement on your part, or a passing shadow suggests danger, and with a flip of his tail, he shoots back in an instant to his

retreat. A rush of wings, with a strident chirp between that of a woodpecker and a jay, and suddenly there alights on a dead bough, overhanging the shallow, above you, a king-fisher. His advent probably startled the observant cray-fish, and for a minute discomposes all the finny tribe. Settling on a bough as if part of it, he takes up his position and betraying his presence with neither sound nor movement, the alarm subsides. All at once a plunge and a splashing of the water, and a more venturesome fish who had approached the unseen watcher, falls a victim to the spear pointed beak of that bird, who scurries away with his prey to be disposed of elsewhere.

These are only a few of the many and varied scenes that an hour's observation may present, but the interest awakened is great and the pleasure this insight into life below the waters has afforded is such that we promise ourselves another visit, the records of which may supply another article to your readers.

THE PARADISE FISH.

(*Macropodus venustus*.)

The Paradise fish is a native of Siam. In India and China these beautiful little fish are cultivated for ornamental purposes only. The male is the larger of the two sexes, measuring, when full grown, from the mouth to the end of the caudal fin, three and a half inches. The body is very much compressed upon the sides, and shaped very much like that of the pumpkin-seed sunfish. Its colors surpass in brilliancy any fish heretofore cultivated for the aquarium. The head is ashy gray, mottled with irregular dark spots; the gills are azur-

ine blue, bordered with brilliant crimson; the eyes are yellow and red, with a black pupil; the sides of the body and the crescent shaped caudal-fin are deep crimson, the former having ten or twelve vertical blue stripes, while the latter is bordered with very light blue. The under surface of the body is continually changing color—sometimes it is whitish, at others gray or black. The dorsal and anal fins are remarkably large: hence the generic name of the fish—*macro*, large, *podus*, the foot or fin. Both of these fins are shaped alike; they are gray in color, striped and dotted with brown, and bordered along their extreme edge with peacock blue. The dull-colored ventral fins are supported by brilliant crimson spines which, in some cases, extend over one inch beyond the fins, and in this case they appear like strings spun of red silk, streaming alongside of the lower part of the body. The pectorals, situated directly above the ventral fins, are well shaped, but being transparent, show no color. All these colors above described are most brilliant when the fish is excited. For instance, when engaged in combat for the possession of a female fish, or when courting, he shows the most brilliant colors, in order to attract the attention of his lady-love, she being especially fond of bright colors.

On such occasions he expands all of his fins to their greatest extent. The caudal fin appears then to be covered with little pearls, like the eyes on a peacock's tail, and the under surface of the fish becomes jet black. The color of the dorsal fin changes constantly from brilliant green to indigo blue, now and then showing white spots, and while the body is in a tremulous motion, radiating colors of every conceiv-

able hue. The female is smaller in size, and not quite so brilliantly colored.

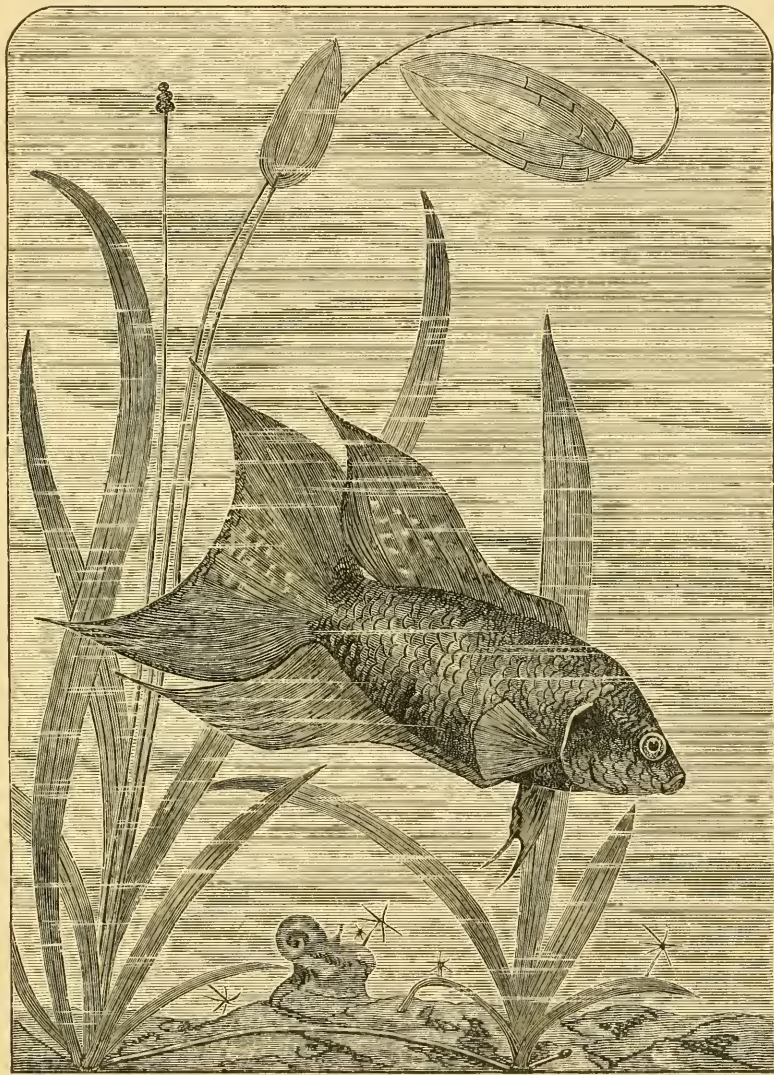
The entire body of the paradise fish, from the mouth to the beginning of the caudal fin, is covered with small round scales.

Their mode of living, when compared to American fishes, resembles that of the little dog fish (*Umbra Crameri*) and the rainbow-darter (*Poecilichthys coeruleus*). Like the former, they come to the surface of the water for atmospheric air, and owing to this faculty will live and thrive in a remarkably small quantity of water. They are also fully as inquisitive as the dog fish, and like to stay near the glass side of the aquarium, and observe what is going on outside of the water. Like the rainbow-darter, they are fond of resting on rocks, or on the branches of water plants. In fact, we have frequently seen them lie down as a person would on a lounge, their head upright and their body resting sideways on the bottom. They are graceful swimmers and peaceable, agreeing well with other fishes, except during their breeding season, when they must be kept by themselves. Their food is the same as that used for goldfish, but it should be given to them oftener. Being tropical fish, they are rather sensitive to cold, and the water in which they are kept should never be below 55° F, while 70° to 90° is their favorite temperature.

We were the first to import these interesting fish to this country, and, breeding them in the parlor aquarium are enabled to add to the above description of the fish our observations regarding their mode of reproduction.

The paradise fish is a nest builder, to a certain extent. Its nest is not as complicated as that of the stickleback, nevertheless it is a receptacle on which

it places the eggs to be hatched. As soon as the warm weather approaches the males commence fighting with each other for the possession of the females. The victor leads off his female to a suitable corner in the aquarium, and here their family life begins. The nest is constructed by the male. In building it he takes a position about an inch below the surface of the water, and frequently takes air into his mouth, which he ejects in the shape of little bubbles. These bubbles seem to be covered with some viscid substance, which makes them last for several hours. He keeps this up until a little floating island is formed of about six inches in circumference and one-fourth of an inch in thickness. When the nest has reached the sufficient size, the female approaches and swims around him several times until he notices her. He follows her now around in a circle, immediately under the bubble island, and all at once, with a very graceful motion, he seizes her by folding his entire body and fins around her, at the same time turning himself, with her, over in the middle of the water, so that the ventral parts point towards the nest. Now he presses against her and causes the eggs to flow, which in passing him become fertilized and rise to the surface. This act being over, the male's attention is occupied by gathering the eggs with his mouth and placing them on top of the bubble-island. Should one accidentally fall to the bottom, he carries it up again immediately. When all the eggs are cared for, the female makes her appearance again, and repeats the operation until about a hundred eggs are laid. The eggs are of the size of a period used in ordinary type, and of creamy-yellow color. Thirty-six hours after the eggs are laid, the young fish



H. MULERT.

HART-CO. GR.

THE PARADISE FISH AND SAGITTARIA NATANS.

make their appearance. They are very small and have the shape of tadpoles. The father takes especial care of them, keeps them together and wards off enemies, even attempting to attack moving objects outside of the tank, looking upon these as enemies coming to devour his little ones. During the first three days his object seems to be to keep his young near the surface, where they have abundance of air and where he can see them all; after that he scatters them by blowing among them. He is now seen very busy everywhere in the tank, and often gathers some weak ones with his mouth and spits them to the surface. This may be to instruct them how to breathe.

As the young increase in size his duty is to teach them how to find their food.

For that purpose he takes a mouthful of young ones from a place which, in his opinion, is too thickly settled compared to the food supply, and carries them to a less frequented spot in the tank, where food is more likely to be plentiful. In short, he has a system about raising a crop of children. During all this time the female is kept in a far-off corner. He does not allow her to go near the nest, although we have never seen a female injure any of the young, which were sometimes close around her, some even nibbling at her mouth. When the young are ten or twelve days old, they have the shape of the old ones and can support themselves. They are then one sixteenth of an inch in length. At this period the male builds a new nest and a new crop of young ones is raised; this is followed by a third and fourth, until the approach of cold weather puts a stop to it.

We have had as many as twelve different broods from one pair in one summer. Under favorable circum-

stances the paradise fish will attain their full growth at the age of one year, when they will be ready to breed. The limit of their life seems to be five years, as we have not been able to keep a pair longer than that. This fact seems to be another proof that the natural life of an animal, man included, is five times as long as the period required to attain full development.

DEVELOPMENT OF THE FROG.

Frogs, toads, tree-frogs, newts, salamanders, proteans and sirens are called batrachians. This class of animals ranks between the reptiles and the fishes, and is subdivided in tailed and tailless batrachians. The body of every member of this class is covered with a naked, moist skin; all those belonging to the tailless division breathe through lungs and their skin. They hibernate during the winter on the bottom of ponds or near springs, and during that time take no food.

With very few exceptions all the batrachians deposit their eggs, called spawn, in the water, from which, after a longer or shorter period, a larva hatches which is known as tadpole. This tadpole is from the beginning of its existence independent of its parents. It finds its own food and gradually passes through various stages of development until it has finally attained the shape of its parents. The duration of this development differs in the different species and climes, some completing it in a few weeks, others requiring months, while there are some that require a year or even longer to change to their final forms.

The exceptional cases mentioned above, where the spawn is not deposited into the water, are the fire-salamander

(*Salamandra maculosa*) of Germany, who gives birth to living young; the Surinam toad of South America, which hatches its spawn and develops the tadpoles in little cells on its back; and one or two species of tropical tree-frogs, who deposit their eggs among damp foliage, where the young hatch from the eggs as perfect little frogs.

The season of spawning differs also in the various species, ranging from the first of March until the end of June, in our climate. The spawn of the tail-less batrachians is fertilized outside of the body, and deposited against plants or other objects in the water. Frog-spawn remains together in a lump; toads deposit their spawn in strings; the different species of treefrogs in sheets, small clusters, or each egg single.

The green or spring frog (*Rana fontinalis*, Le C.) being a good representative of the North American frog, and one most frequently met with near springs or creeks, has been chosen by us for our illustration of the development of the entire order.

In Fig. 1 we see a lump of spawn, greatly reduced in size, as it appears in the water after it has been deposited by the frog. Such a lump, when first spawned is about the size of a small hen egg; the individual eggs, a couple of hundred in number, having the size of small shot. As soon as these are exposed to the action of the light and the water, each expands and the lump attains a size that would fill a large sized soup plate to the rim. Each individual egg is covered with an adhesive, transparent substance which tends to hold the lump together, and forming a covering over the entire mass, protects this. To the touch such spawn feels like a mass of jelly.

Fig. 2 shows the embryos' natural size, in the eggs, just before hatching.

Fig. 3 are larvæ of the tadpoles, just hatched.

Figs. 4 and 5, tadpoles in various stages of development. In Fig. 4 we observe gills on both sides of the head, as in a fish, the tadpole being jet-black in color; in Fig. 5, the gill on the right has disappeared, only the one on the left of the tadpole remains, and this has changed into a tube leading into the body; the coloring of the body has become an ashy gray speckled with numerous irregular dark spots. This stage completes the tadpole. It grows as such on vegetable diet to the size shown in Fig. 6, and passes the winter on the bottom of ponds or in creeks.

Towards the spring, when the temperature of the water is affected by the rays of the sun, the hind legs begin to form, budding out very small on the basis of the tail, outside of the body, while at the same time the fore legs are forming below the skin, as shown in Fig. 7. When the latter are complete in shape they poke through the skin and the animal appears like a salamander, its color having also changed to a grayish brown (see Fig. 8). While the legs are still undergoing full development the shape of the head undergoes a change, the mouth being changed in shape and size to fit it for a different diet, which will hereafter consist of live insects or other creatures; the eyes, too, are undergoing a change, and the structure of the breathing apparatus is changing from that of a fish to that of a land animal; in short, the gills change into lungs. While these radical changes in the structure of the animal are going on, the individual takes no nourishment from outside, the material necessary for the completion of its structure

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is supplied by the tail. This appendage, having served the tadpole as a propeller, was a storehouse at the same time, and it is now completely absorbed.

At this period of development the tadpole becomes greenish in color and stays near the surface of the water to breathe; finally it seeks the shore, as shown in Fig. 9, and lives on land, its breathing apparatus being no more suitable for aquatic life. After the little frog is fully developed (Fig. 10), it has also the coloring and markings characteristic of the species. It is now able to live in or outside of the water, but prefers the damp borders of ponds or springs, where it finds most of its food, and seeks the water only as shelter against the weather or some of its many enemies.

Our experience shows that ninety-eight per cent. of the eggs deposited by a frog, hatch; of these larvæ about fifty per cent. are consumed by various animals as food; the rest will develop into tadpoles; the greater part of these serve as food for other classes of animals, and less than five per cent. of the original number will ever become perfect frogs. This apparently small percentage shows the enormous productivity of the frog, and were it not for its many enemies who prey upon the adult frog, this useful animal would soon become a plague to man.

THE ORIGIN OF SAGITTARIA NATANS.

During the winter of 1878-79, while in business in Cincinnati, Ohio, we ordered from a correspondent, then traveling in the Amazon river region, an assorted lot of wild aquatic plants. In due time we received a little box full of various roots and rhizoms, some big, others small, and planted them in various tanks in our greenhouse. It is one of our peculiarities to throw nothing away as useless until it has had a fair trial. In this case we placed the moss that had been used as packing and also the trimmings of the roots in a tank of water, and the mud that had dropped from the roots we placed in another vessel, thinking that some stray seeds might possibly be among this refuse that might develop into something useful. In due time we discovered several little sprigs of vegetable growth in the vessel that held the refuse. These were carefully removed to a separate tank where they would be under better control. Among these sprigs thus removed were two grass-like blades, not quite as wide as a straw; their starting points were two little corms, each not larger than an apple seed. To all appearances these were *Vallisneria spiralis*, and we expressed our surprise regarding the wide distribution of this famous water plant, which we were in the habit to obtain from the Northern lakes.

It was about the middle of March, these two little plants had completed their third leaf, when a lady, a faithful customer of ours, called at our store for a small *vallisneria* for her aquarium. The two above mentioned plants being the only ones we had in foliage at the time (our native *vallisneria* starts much later), we sold her the biggest of them for ten cents, making apologies at the



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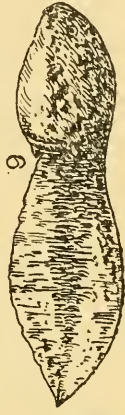
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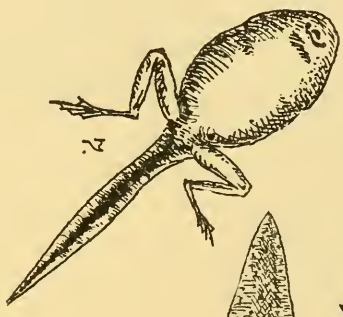
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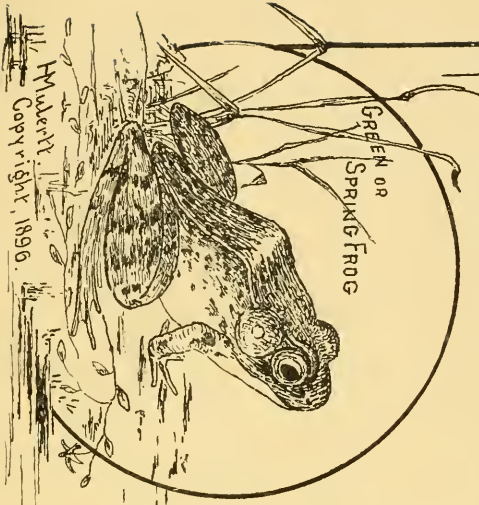
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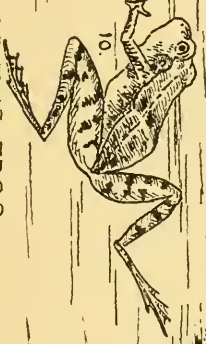


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GREEN OR
SPRING FROG

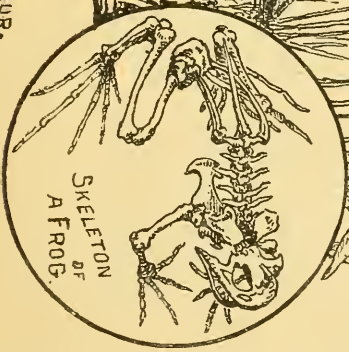
Wm. H. Bennett,
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SKELETON
OF
A FROG.

DEVELOPMENT OF THE FROG
TO THE PACKER COLL INSTITUTE, BROOKLYN, N.Y.
RESPECTFULLY DEDICATED BY THE AUTHOR.

same time regarding its inferiority to what we used to supply. About the end of April a carriage drove up in front of our store from which the same lady alighted. She came to ask the name of that little plant which we had sold her some time ago. We informed her that it was a *Vallisneria spiralis*. No, no, said she, I know *vallisneria* well enough; the plant which you gave me the last time when I called here is not a *vallisneria*; it is much more beautiful and is now in bloom, proving by its flowers that it belongs to an entirely different order. We were unable to give its name from a verbal description of the flower, and were invited to ride down to her residence, in her company, and see it, she being anxious to know the correct names of her plants.

When we saw the little white flowers floating on the surface of the water in her aquarium, and the graceful shape to which the plant had developed, we were agreeably surprised, for this little plant certainly was a prize for the aquarium. We explained its origin. The lady then voluntarily offered to give it back to us in order to propagate it. Soon after this, when she had left for the seashore, we took possession of it again.

It was very fortunate indeed that this little plant had come in such careful hands, where its characteristics had been noticed. We were as happy as if we had discovered a gold mine. We felt like "running" home. The street car seemed too slow for us so anxious were we to find out whether the other plant, its mate, was still in our possession. What then—if it had just been sold to some careless, strange person for ten cents? Every person we met, as we neared our store, we observed closely, for he might have just carried

off our prize. Had we met some one with a tin pail in his hand, we would have surely asked where he came from. On our arrival at home we found the plant in the same place where it had been put about six weeks before, the *real* *vallisnerias* having started to grow, no particular attention had been paid to this "odd one." Now, however, it was removed to our private collection in the sitting room upstairs, where it was safer, and where it soon developed into as pretty a plant as was its mate. When it bloomed we analyzed it and found it to be a *Sagittaria*. Owing to the fact that the flowers and also the characteristic leaves, which this plant produces during the warm weather, always float on the surface of the water, we added as specific name *natans*, which means floating. At the Cincinnati Industrial Exposition, in the fall of 1879, we were awarded a complimentary medal for it.

The *Sagittaria natans* proved to be a great plant for the parlor aquarium; in fact it is to the present day the most reliable aquarium plant under cultivation. We had soon propagated a good stock of this plant, and by judicious advertising we disposed of several thousand dollars worth in a very short time. We have supplied it to all continents, Africa alone excepted, and the annual sale of this aquarium plant to-day can be estimated to several thousand dollars.

By careful cultivation we have greatly improved on the original type, and by cross-fertilization and hybridizing with other species we have produced new types. The "New Era," "Frances M." and "Windermere" are some of its descendants.

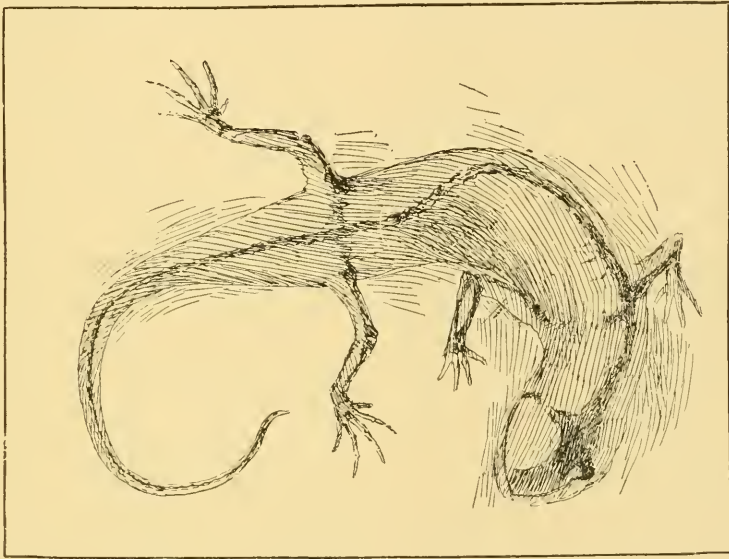
By the above sketch it is shown how, by perseverance, insignificant things

may be turned to usefulness. We are sure that if some one who is favorably located, be it man or woman, would try in the same direction, plenty more pretty and useful aquarium plants could be secured for cultivation. Another manner to get novelties, which we have repeatedly practised, is to secure the contents of the stomachs of water fowls and sow these. Another

prove as great an assistant to the practices of these callings as the microscope.

At the present time, while curiosity is awake, we thought it of interest to our readers to show them how one of our pets appears under this new light, and had one photographed.

We selected for this purpose a specimen of the German fire salamander



Fire salamander, from a photograph taken with X rays expressly for THE AQUARIUM.

one of our celebrated aquarium plants originated in this manner. But some other day about that.

THE SALAMANDER IN MODERN LIGHT.

The wonderful discovery of Prof. Roentgen has created quite a sensation. So far, however, we don't see in which way this new discovery will affect the aquarium or fish culturist. It may, however, later on, when better developed,

(*salamandra maculosa*), the same species that during the "dark" ages was surrounded with so much mystery. The plate was taken in our presence by Dr. McKay, Professor of Physics at the Packer Collegiate Institute, of Brooklyn.

The process differs from ordinary photography considerably. In ordinary photography the picture of the object to be photographed is focused by a condensing lens on the prepared plate or film, which is contained in the dark

chamber of the camera, where it is fixed; whereas, in the process by Roentgen light, no lens or camera is necessary. A sensitive dry plate, such as is used for instantaneous process in ordinary photography, is carefully wrapped in black paper to protect it against the daylight. The object which is to be photographed is simply placed upon the plate thus prepared and exposed for a longer or shorter duration, according to the nature of the object, to the X rays, as this light is called. These rays are produced by the discharge of a high potential electric current, in a so-called vacuum tube, which is a small air-tight glass cylinder, about five inches long and one inch in diameter, from which the air has been exhausted. As soon as the current is started the interior of the tube seems to be filled with a greenish-yellow light which accompanies, or, as some physicists think, is the source of the X rays. These rays, although very powerful, are not visible either in a darkened room or in daylight, but will pass through many substances which are opaque to ordinary light.

In this case the salamander was set upon a black cardboard; this was placed on top of the wrapped dry plate and then exposed, at a distance of about eight inches, to the action of the rays for about twenty minutes. After this the plate was taken to the dark room and developed in the same manner as any other exposed plate. After development the negative showed the form and natural size of the salamander as a dark shadow, while the entire skeleton appeared in white. Nothing was visible of the cardboard.

The accompanying line drawing is a correct reproduction of it.

Together with the salamander (of

course on different plates), the pictures of a frog with a broken hind leg and that of a young turtle were taken. The break of the bone in the frog could be plainly seen on the picture thus produced; and so was the picture of the turtle quite a success, although it had walked off the plate once. The structure of its skeleton was plainly shown.

THE GOLDEN TENCH.

(*Tinca aureus.*)

One of the many missions the aquarium has to fulfill, is that of resting the nerves. But it stands to reason, that when an aquarium is expected to spread a feeling of peaceable quiet and contentment around us, an effect which is so beneficial to invalids or aged people and for overworked business men, that we should select such specimens for our collection as are through the traits, peculiar to their race, best fitted to accomplish that end.

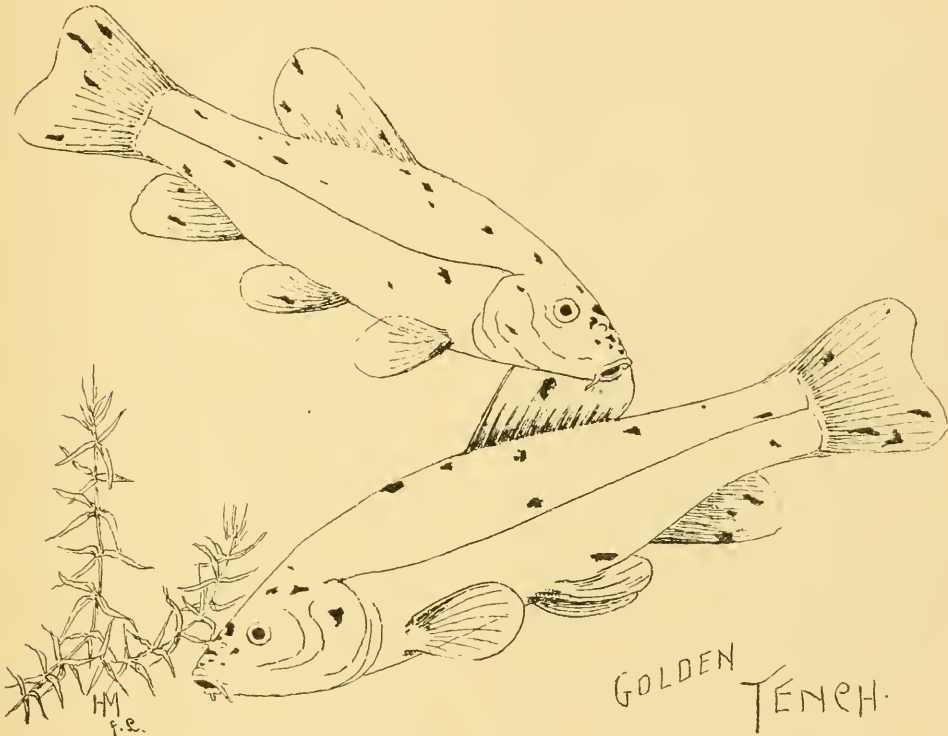
In the tench, the Green as well as the Golden, we have a fish that possesses all the qualities required to produce the desired effect. The tench seems to have been created for the purpose of spreading salvation over the entire finny tribe. Its character is absolutely peaceable; its manners are modest, but by no means cowardly. It is not at all particular in regard to its food, thriving well on the ordinary, easily obtainable foods used for other aquarium fish. It becomes soon accustomed to its master, and then prefers to take its meals from his or her hand. This sign of confidence especially has a wonderful soothing effect upon most people.

At the present time we possess two specimens of the Golden Tench, in dif-

ferent tanks, who enjoy to suck at the end of the little finger of our hand when it is held in the water for that purpose. Nearly every one of the tench that we have had in our collection would allow us to stroke the sides of its body after the fashion in which one would fondle a dog or cat.

The Common Tench (*Tinca vulgaris*),

by the monks, who were in those days the principal fish culturists. It was asserted by them that when any fish had been externally injured by some accident, it would seek to find a tench, and, when found, would rub the injured part against the body of that fish, with the supposed intention of re-covering the injured part with slime to prevent



of which the Golden Tench is an ornamental variety, is a native of Germany. It has been cultivated in ponds and the moats of castles in that country for many centuries, and at the present day it is one of the most salable fresh-water fishes, being in constant demand for the table. During the middle ages the tench was called the "fish-physician" (Fisch Doctor)

the formation of fungus. We have not been able to prove or disprove this belief, but it seems plausible to us. Fungus, which in most cases proves fatal to specimens attacked by it, will form on such parts of the fish's body, from which the protecting slime has been rubbed off. As we protect our furniture or other articles with a coat of varnish against the injurious influ-

ences of the weather, so is the fish's skin protected with this coat of slime against the dangerous influences of the water. It is for this reason, therefore, that we advise our readers to handle their fish as little as possible, and then with the utmost care.

In our experience we have found that the tench proves very beneficial to any collection, as we have never had a disease of any kind occur in a tank in which one or more tench formed part of the stock. These monks of old must have had founded reasons for the application of such a title to a fish.

The tench belongs to the carp family and, as is already stated above, the Golden Tench is a variety of the Common or Green Tench. This ornamental variety originated very many years ago, perhaps centuries, in the moat of a castle in Silesia (Germany). The color of its body is chrome yellow or light orange with a golden lustre, here and there spotted with irregular, intensely black spots, no two specimens being spotted alike. It is covered with very small scales, and these are in turn covered with an unusually thick coat of slime, the latter making it feel to the touch as slippery as an eel. The fins are whitish and almost transparent; their location upon the body and also the shape of the latter may be studied in the accompanying outline drawing of the fish. The individuals that "posed" for the sketch are two years old, and are represented in the cut one-half of their natural size. The head of the tench is naked, which means that it is not covered with scales; the eyes of the Golden Tench are dark brown, almost black, while those of the Green Tench are blood-red, now and then with a streak of yellow in it. On each corner of the mouth all true tench have but one barble. The motions of the tench are graceful and gentle; their mode of spawning is like that of all carp-like fishes, and takes place in the spring of the year.



A MERCHANT IN SIBLINGEN, Switzerland, has lately purchased two hundred thousand snails, from which he intends to breed for the Paris, France, market, where a certain species of this mollusk is sold in enormous quantities for the table.

A WHITE MARÉCHAL NIEL ROSE.—For many years the florists have experimented to produce a white flowering variety out of the beautiful golden yellow Maréchal Niel rose, which was first produced by Mr. Pradel, a rose culturist of France, in 1864. Mr. Franz Deegen, Jr., of Köstritz, Thüringen, Germany, whose rose nursery has a world wide reputation, has at last succeeded. The flower is of the same size and shape as the original, white in color, showing a yellowish-white center which, when the flower is fully open, becomes cream-colored. The odor of the flower and the foliage is identical with the old yellow type. It is equally well adapted for greenhouse or garden culture.

MUCH ADO ABOUT NOTHING.—From the Rangeley Lakes.—A tender-hearted citizen of Hallowell has been bothered by skunks lately and so baited an old-fashioned box trap the other night for them, and on finding it sprung he felt relieved to the extent of one less skunk. Being humane he didn't want to kill him, so he concluded to turn him over to a man who has a skunk farm near by. But as the proprietor of the farm did not come after the animal for a matter of twenty-four hours, our kind-hearted citizen, through compassion, dropped a little food through the spindle hole in the trap. Finally the man came for the skunk, and as a convenience took him home in the trap. On the way a friend, learning by inquiry what was in the box, asked to look at him. As the box was quite heavy they remarked that "he must be a big one." Cautiously they opened the trap, but no skunk appeared—in fact it was empty. The trap had been accidentally sprung.—*Maine Sportsman.*

"The midget of the whole tree family is the Greenland birch," says the *Lumber Trade Journal*. "It is a perfect tree in every sense of that term, and lives its allotted number of years (from 75 to 130 years), just as other species of the great birch family do, although its height, under the most favorable conditions, seldom exceeds ten inches. Whole bluffs of the east and southeast coast of Greenland are covered with 'thickets' of this diminutive species of woody plant, and in many places, where the soil is uncommonly poor, and from eight to ten months a year, a 'forest' of these trees will flourish for half a century without growing to a height exceeding four inches."

A DEALER OF MEIRINGEN, Switzerland, shipped in one week this winter 110,000 snails weighing two tons (4,000 pounds), to the Paris market. These snails, known as "Burgundy snails," or "Vineyard snails" (*Helix pomatia*) are carefully cultivated in gardens. The business is said to be very profitable. See another note on this subject above.

A CAT'S FUNERAL AS CONDUCTED BY A DOG.—"Every one has observed instances of affection between those proverbially hostile animals, the dog and the cat," says *The American Naturalist* (February). "but a case cited by *l'Eleveur* merits especial attention. A dog and a cat belonging to the same master were the best friends in the world, and spent their time in frolicking together. One day, while playing as usual, the cat died suddenly, falling at the dog's feet. The latter at first did not realize what had happened, but continued his play, pulling, pushing and caressing his companion, but with evident astonishment at her inertness. After some time he appeared to understand the situation, and his grief found vent in prolonged howls. Presently he was seized with the idea of burying the cat. He pulled her into the garden, where he soon dug a hole with his paws, and put in it the body of his former companion. He then refilled the hole with dirt, and stretching himself out on the grave, resumed his mournful howling. The idea of burying the dead cat was extraordinary. Whence came the thought? Could it be imitation, or, which is a better explanation,

did the dog have a vague idea of concealing the event which might possibly be imputed to him? But then it would seem unreasonable for him to call attention to the fact, by installing himself on the grave and howling. However, even human criminals are sometimes equally inconsistent. It is difficult to form an exact idea of what gave rise to the dog's conduct in this case."

WHY PEOPLE LIKE DOGS.—And why do people keep such lots of dogs themselves and go in such numbers to see other people's dogs? Because the dog is at once the sincerest flatterer and the most successful cheerer that the human race ever had. A good dog always gives us the feeling that we men and women are a sort of gods. No other animal does anything of the kind. The cat treats us as an inferior, and the horse will treat us as a dear friend, not a divinity. The dog, moreover, imparts something of his peculiar gayety to us in a way that is irresistible. He mingles his suggestions of gayety with his flattery, for he not only leaves his dinner untasted to walk with us, but the mere fact that we are apparently giving ourselves the pleasure of a walk raises him into such a delirium of delight that the sight of it puts all our dumps and blues to such reproach that we shake them off in very shame. And when we don't walk, but sit moodily at home, the dog curls up lovingly at our feet and looks up now and then into our eyes and "glides into our darker musings with a mild and healing sympathy." Yes, there is a solid reason for the fondness of men for dogs, and it will never come to an end until either men or dogs become very different beings from what they are now.—*Boston Transcript*.

Uncle Jack returns from a long walk, and being somewhat thirsty drinks from a tumbler he finds on the table.

Enter his little niece Allie, who instantly sets up a cry of despair.

Uncle Jack—"What's the matter, Allie?"

Alice (weeping)—"You drank up my 'quarium, and you've swallowed up my free pollywogs!"—*American, Philadelphia*.

Have any of THE AQUARIUM readers discovered that the little Florida lizards (called chameleons in New York, but

"darts" in their native state) are the green aphids' enemies? They will clean a plant of these little pests in a short time, and thrive and grow fat on this diet. I have three in my conservatory, and the plants are being kept free of bugs without any trouble on my part. Keep tiny dishes of water around, so the "darts" can find it to drink, and give sweetened water and milk also. They are bright little creatures, and soon become tame.



For the small sum of one dollar in advance, which pays for a year's subscription to THE AQUARIUM, you are entitled to ask information on any point regarding the aquarium or the window garden. We offer no other premium to our subscribers than that of putting over 25 years of practical experience in these branches at their disposal. Ask as many questions as you please, but please to enclose postage for reply. All questions are answered by mail, and we publish only such in these columns as are of general interest.

C. P. B.—Kans. The points of excellence in fringe-tail goldfish are: short, egg-shaped body; short-domed head; large, expressive eyes; large, graceful fins; the caudal fin (tail) should be double and split in the middle, drooping like a "fringe" or a bridal veil. In Germany this breed of goldfish is called "Schleierschwanz," meaning "veil-tail."

The fan-tail goldfish should have the same shaped body as the preceding. Its fins should also be large, but more robust in structure and not drooping; their tail should be double, but united in the middle, and be carried straight out, with a tension to upright, similar to the tail of a fantail pigeon.

The color of these fish is of less importance, this being a matter of fancy or fashion.

H. D. R., Iowa.—The fish that you sent to us for identification is a fifteen-spined stickleback (*Gasterosteus spinachia*). It is a saltwater fish, and may have been overlooked when the "Russian" sardines were put in pickle. This fish is native in the Baltic ocean, but it is quite frequently taken on our coast, so his appearance among a lot of sardines would not necessarily prove that these fish were packed in Russia.

J. L. W., Pa.—The new fish that you placed into your aquarium may have been affected with the disease, and your old fish infected by them. One should be very careful when adding new fish to a collection. We find it safest to keep strange fish by themselves for at least a week, for observation—put them in quarantine, so to say. To feed goldfish three times a week is insufficient, they should be fed daily and at a regular hour. The pouring in of fresh water now and then, as drawn from the hydrant, does not hurt the fish if it is done carefully. We would never pour it in such a manner that the fish would be touched by the current, as this will chill them and may affect their gills. Paradise fish do not care to eat the same kind of food all the year round; you should change about, feeding them on scraped raw beef or chopped earth worms, young snails, etc., now and then.

C. D. H.—N. Y. The fish you sent for identification is the lesser dogfish (*Umbra Crameri*). It is a very interesting little fish, especially when young; it becomes very tame. It can be kept in company with goldfish, but should be fed at least once a week on scraped raw beef or chopped earth worms. We would build a greenhouse pond out of brick, using Portland cement as mortar. When properly dry, the cement dressing should receive a good coating of asphalt. Before putting fish in a new pond of such nature, it should be well soaked with water to remove the injurious effects of the cement.

Subscriptions to THE AQUARIUM are now due. Those who know themselves to be in arrears are politely requested to remit.

