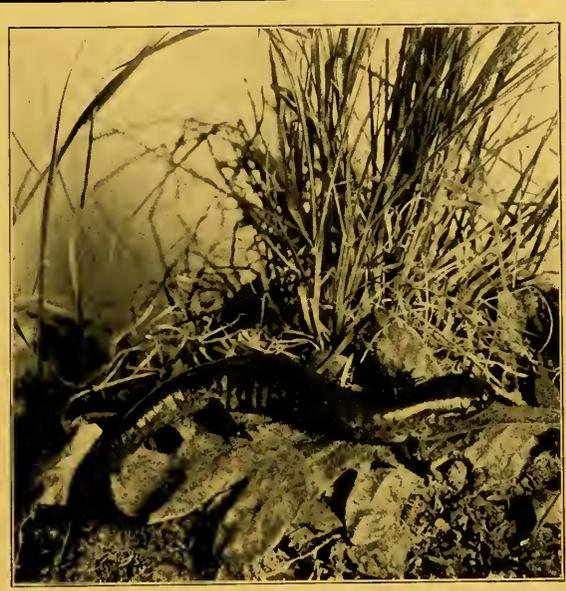


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THE AQUARIUM

ISSUED IN THE INTERESTS
OF THE STUDY, CARE AND
BREEDING OF AQUATIC LIFE



THE RED TRITON—(*Sperlerpes ruber*)
Photo from life by Dr. Shufeldt

SEPTEMBER 1912

590.773
Fishes

Vol. I

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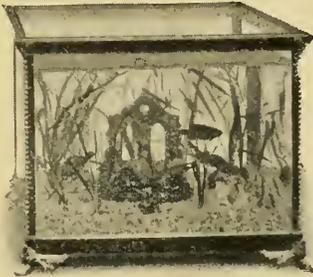
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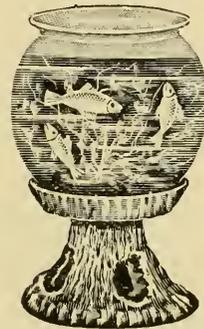
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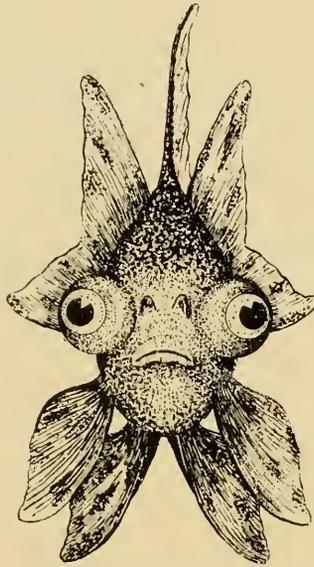
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THE AQUARIUM

VOLUME I

SEPTEMBER, 1912

NUMBER 4

Aquarium Notes

R. W. SHUFELDT, M. D., Washington, D. C.

IT was with especial pleasure that I read every line of the first number of the new nature magazine, THE AQUARIUM, and no one wishes you more substantial and continued success in this venture and much needed publication than I do. The magazine promises to be everything we need in this important and interesting department.

At different times in my life, I have kept aquaria of various kinds; examined those kept by my friends, and accomplished something in the way of photographing live fishes and other living forms in aquaria. To me it is truly remarkable that some such publication as THE AQUARIUM has not appeared in this country sooner; for, as we all know, there are many such magazines published in Europe and elsewhere; and, what is more to the point, the aquarium is one of the important adjuncts we possess to aid us in the study of living aquatic forms of all kinds, to say not a word in regard to its use in securing ac-

curate photographs from life of so many forms for illustrative purposes. In former years, we were obliged to rely entirely upon the brush and pencil to obtain our pictures of fishes, fresh water and marine vertebrata, and the entire list of aquatic plant-life and invertebrata, wherewith to illustrate our literature; while, at the present time, these tedious and expensive methods are giving

way before the work of the camera with its far more accurate and beautiful results.

Some ten or twelve years ago, I made my first experiments in the photography of living fishes in their natural element, the first paper having been published by the government.* When this appeared, it induced M. Fabre-Domergue to present me with a beautiful copy of his superb

work in the same field.†

A few years afterwards, I had an aqua-

*Shufeldt, R. W. Experiments in Photography of Live Fishes. Bulletin United States Fish Commission, Vol. XIX for 1899, pp. 1-5, plates 1-9.

†Fabre-Domergue. La Photographie des Animaux Aquatiques. Paris, 1899, p. 5. 10 photogravure plates and 2 text cuts. This work is not nearly as well known in this country as it deserves to be; its author had special facilities for pursuing the experiments he did, as he was, at the time, adjunct director of the zoological and physiological laboratory of marine forms of the College of France. (Concarneau).



THE RED TRITON—(*Spelerpes ruber*)

Photo from life by Dr. Shufeldt

rium made to order for the special purpose of photographing all kinds of animals, under water or not, as the case might be. With this device I secured some beautiful negatives of living fishes, turtles, marine invertebrates, newts, etc. Subsequently, I studied the results obtained through the employment of similar aquaria used by Spencer of the New York Aquarium, and others. At this time, I am about to order a similar device for photographic purposes, and I trust to publish, in the present magazine, a few of the results I obtain.

Some days ago I succeeded in securing a few excellent negatives of a fine adult specimen of *Spelerpes ruber*—the Red Triton—which is fairly abundant in the country districts about Washington. My pictures, so far, are of the animal out of water, and one of the best of them is here reproduced as an illustration to these notes. It was collected for me by Mr. G. W. H. Soelner, of 3436 Seventeenth Street, this city, a naturalist who has made a specialty of mollusks, and has a fine collection of them, including many rare species.

Many of the *Urodela* are most interesting and instructive forms to keep in aquaria, their several metamorphoses and life affording some of the most important and instructive data in the entire range of biology. I have frequently kept the Spotted Triton (*Diemyctylus viridescens*) and photographed it alive under water. Its habits in captivity are well worthy of study.

Years ago I had them breed in an aquarium, but the young were all killed by a small pike that lived in the same tank. My Red Triton has now lived over a month in a small china-lined receptacle, without having eaten anything, and yet it appears none the worse for the experience. I may say that I have next to it, in a glass jar half full of water, a large specimen of the Giant Water-bug (*Belostoma americanum*), which has not eaten anything for nearly six weeks. He is in fine condition, and a day or two ago I threw him a small, live grasshopper,

which he at once seized in his mandibles in the most voracious manner possible. He did not consume it, however, being apparently satisfied by sucking the fluid parts from it and ignoring all the rest. This specimen spends nearly all his time floating just beneath the surface of the water; but if one jars the receptacle in which he lives, the least bit, he at once swims about in the most frantic style imaginable. I have obtained good photographs of *Belostoma*, but have never experimented with keeping them in aquaria with other animals.

On the whole, I have been very successful in keeping native fishes—for I care but little for goldfish in comparison—such as several species of sunfishes, the pickerel, catfishes, eels, sticklebacks and some dozen others—alive. My best object lesson, however, was gained from the study of a large number of *Amblystoma tigrinum*, which I kept for long periods together. My observations on the subject appeared in several letters to the editor of *Science*, beginning in the issue of October 22, 1886 (p. 367), where some of the points in the habits of these animals were published for the first time.

Fish Life of a Florida Swamp

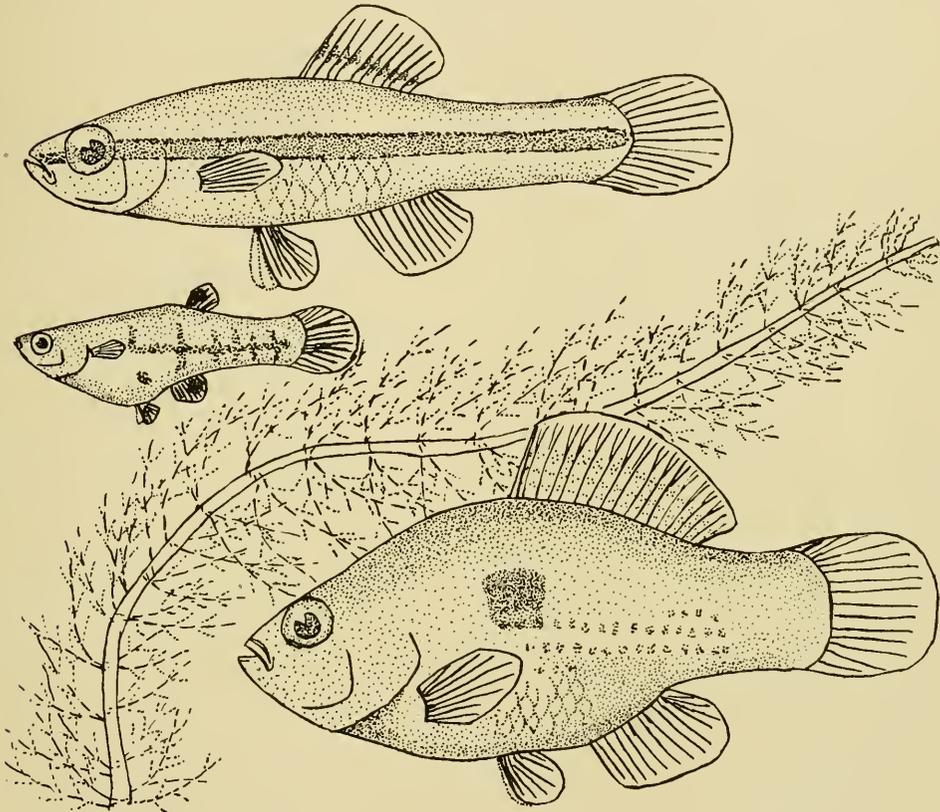
JOHN TREADWELL NICHOLS, New York

WE have left the shallow waters which fringe the Gulf of Mexico and entered Shark River, an opening between the strange mangrove trees growing in the water, and which here stretch north and south for miles, forming the west coast of Florida. The channel is deep enough for a large boat to penetrate far into the interior to clear, fresh water, and a few more miles in small boats bring us to a stretch of river between banks of mangrove trees, bushes and grass, glistening under the sun, which is uncomfortably hot, though the month is February.

The whole scene teems with life. "Yip, yip, yip!" comes the cry of a fish-hawk

from high up in the dazzling sunny sky. Far above him, balancing black turkey buzzards look down upon his back, and others drift by low, near the tops of the trees. A gray-blue kingfisher, the same species that fishes the northern streams in summer, flies along the creek, and flocks of herons and white ibises are squawking and grunting everywhere. A reddish serpent, lying

where myriad swarms of little fishes are drifting. About a half of these are *Gambusia*, with only here and there a black-spotted *holbrooki*. About a third are *Fundulus goodei*, a wonderfully pretty little fish with red fins and a bold black stripe the length of the body. *Fundulus chrysotus* is a beautiful green species, spotted with silver, golden or red; and there is *Girardinus*



Upper—GOODEI

Center—GAMBUSIA

Lower—JORDANELLA

looped across a slimy patch of water-weed, shoots into the depths like a fish when I strike at him with an oar. Here and there great thick skinned spotted gar pikes (*Lepisosteus*) are dozing just beneath the surface, and several species of sunfish, as also the large-mouthed bass (*Micropterus salmoides*), are swimming restlessly about in the more open water, making occasional predatory rushes into the shallows along the shore and among the clogging green weed which here and there rises to the surface, and

formosus, a minute live-bearing species; *Cyprinodon variagatus*, the sheepshead minnow of the north; *Jordanella floridae*, something the shape of the last, with usually a squarish black spot on the side, and *Fundulus ocellaris*, with a black spot on the back fin.

The most northern fresh water fishes known are two salmon fish which still occur in latitude 82° N. in Grant Land, less than 500 miles from the pole.

THE AQUARIUM

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VOL. I SEPTEMBER, 1912 No. 4

Aquatic Plants Worth Cultivating (CONCLUDED)

W. A. POYSER, Chicago

3. THE QUILLWORT AS AN AQUARIUM PLANT.

Even to botanists the Isoetaceae, regardless of its interesting characteristics, is a comparatively little known group of plants comprising about fifty species. The generic name *Isoetes* is said to be derived from two Greek words meaning "equal" and "year" and was applied because of the perennial character of the leaves. While the purpose of this article is, primarily, to direct attention to their interest as aquarium plants, inasmuch as they are usually ignored or given scant attention in works on the aquarium, it may not be amiss to give a brief description from a botanical point of view which should aid in identification.

The systematic botanist regards this group as a difficult one. Students of plant life are not by any means agreed as to what constitutes a distinct species in this family, nor its relationship to other classes of plants. They belong in that division of the Vegetable Kingdom called "Pteridophyta," which includes the ferns and some other spore-bearing or flowerless

plants called the fern allies. In the scale of plant development the pteridophytes lie above the mosses and below the flowering plants. Some botanists consider the *Isoetes* to be related to the Moonwort and Adderstongue ferns, around which so much superstition gathered in ancient times, while others consider that their structure indicates a connection with the pines and related plants which are the more primitive forms of the sub-kingdom of flowering plants. The *Isoetes*, or to use its common name, quillwort, is essentially an upright or spreading rosette of hollow cylindrical pointed leaves of a grass-like or rush-like aspect. The leaves vary in length in the various species from a few inches to two feet, and in number from ten to two hundred or even more, springing from a flat bi-lobed or trilobed tuber-like root-stock. The new leaves are produced from the centre of the rosette. The plant reproduces from spores which are born in a hollowed-out portion of the base of the outer leaves. The quillwort is heterosporous, that is, bears spores of the two sexes on the same plant but in different leaves. The megaspores or female spores are about one-fourth the size of a pin-head and few in number, while the male or microspores are about one-thousandth of an inch long and very numerous. The spores have an outer coat of silicon, that of the megaspore being beautifully sculptured. A microscope is, of course, required to see the markings. Much stress is laid on this marking in distinguishing the various species. The quillwort occurs growing in sand, mud and gravel on the bottom and banks of streams and lakes. A great many species are always submerged, while others are only partially so, or are terrestrial. Enough for the botanical phase of the subject.

While the adaptability of the quillwort to the purposes of the aquarist is not as broad as many other easily obtainable

plants, it is entitled to consideration if only on account of its interesting characteristics and position in the vegetable world. Aquarists are steadily broadening their field of interest and thus securing a far greater knowledge of nature. The day when one was content to consider himself a competent aquarist by reason of his ability to maintain a combination of glass, sand, anaeharis, eabomba, sagittaria and a few goldfish has fortunately passed. The aquarium opens up a means of readily delving into many departments of natural

of the fact that the plant is subject to attack by some species of fishes and snails it proves a most valuable and interesting addition to the aquarium. Where found it grows in abundance. Being inconspicuous it is probably often overlooked. German dealers catalog a number of species, those of North America bringing highest prices.

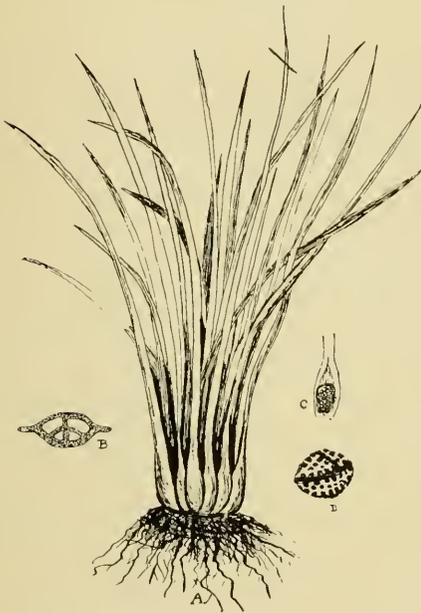
The Sex of Goldfish

CHARLES PAULLIN, Philadelphia

We all want to know, especially during the spawning season, the best way to tell the males from the females.

There are several ways of telling the sex of goldfish. First, by the spots on the gills and fins of the male, and the distended appearance of the female. Second, by the male fish swimming after the female. But the best way, and a way not generally known even to some of our most expert breeders, is the difference in the shapes of the body of the fish during the spawning season.

If you will look down at the fish from above you will find that the body of the female is uneven, extending further back on one side than on the other, for the reason that one ovary (roe) is always more developed than its mate, giving the fish a lop-sided appearance, while in the male the body extends more evenly on both sides.



QUILLWORT

science, hence it behooves us not to neglect anything that may be easily studied within its confines.

In the aquarium the quillwort forms a most excellent snail-food. Hence if one would try the plant, out must go the snails. However, it has at least one most desirable characteristic, tenacity of life. It will hang on and produce leaf after leaf while a vestige of rootstock remains. I have had, floating in a tank, splendid husky plants that sent forth leaf after leaf as long as a bit of root remained. In spite

From the Fatherland

"*Blaetter fuer Aquarien und Terrarienkunde*" after mentioning THE AQUARIUM, continues thus: "The small, well gotten up journal will be welcome to all who wish information on the subject of the aquarium in North America, or who wish to make acquaintances over there. Our heartiest greetings to the aquarium friends beyond the sea."

Subscription to the "*Blaetter*" is 2.75 marks (70c) per quarter, postage included. Subscriptions to be sent to THE AQUARIUM.

The Little Fellows with the "Wheel"

DR. E. BADE, New York

Among the minute animals which people the water, the Rotifers or "wheel bearers" form a very interesting class, only a few of them reach even three millimeters in length and they are giants of the race. They usually vary between one-twentieth and one-tenth mm. in length. These little fellows put dramatic movement into the life of the pond. Some sport around in the clear water, "Knights of the Lists," in armor clad, bear mighty lances as do others thorns. Some are sessile on the plants, for instance, under the lily pads. A few live in the sea: some, in the intestines of worms and mollusks lead parasitic lives, but by far most numerous are those that prefer the quiet backwaters of streams, the bottoms of plant-grown ponds or the puddles of swamps. One family of them, the *Bdelloidae*, occurs in the moss of house-roofs, and in the lichen-growths of tree-trunks or rocks.

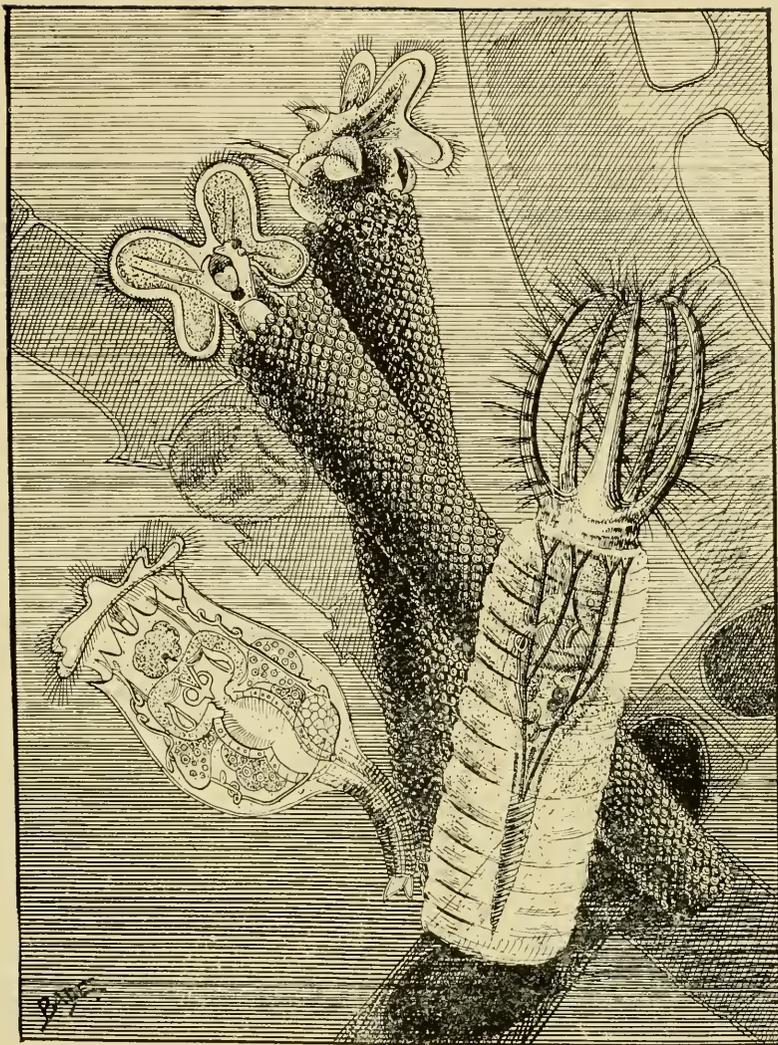
Wheel animals the older naturalists named them and this name they still bear. The anterior end of the body carries a retractile ciliated apparatus, the so-called "wheel-organ," which is of very variable appearance in the different species. This organ thickly beset with cilia is used for a two-fold purpose, for locomotion and also for creating a current in the water whereby edible substances are brought to the ever hungry maw. The "wheel" looks circular for one moment, scalloped the next, then frilled, lobed, even-branched or arm-like. Under a powerful glass this ceaseless play of the cilia looks like the turning of the spokes of a wheel. This appearance is so deceptive that the first observers assumed it as a fact that the animals carried a wheel, hence the name.

By adding a little cocaine or quinee-gum to the water in which the animal is examined microscopically the play of the cilia slackens and thus it is plainly to be seen that there is no wheel in motion, but

simply little hairs (the cilia) which rhythmically beat the water. But the little wheel organ is not the only thing of interest with these fellows. Even now their exact position in the zoological system is not quite clear.

Ehrenberg classed them as "Infusoria." That was about a hundred years ago when the unicellular animals, the Protozoa, were not definitely known. Similar looking creatures were simply classed together, and as one-celled ciliated infusoria frequently recall many rotifers in appearance, all were promptly put together as of one relationship. Today the rotifers are classed with the *worms*—that great class of animals which still has to serve as a catch-all to the zoologist. Here is placed everything which cannot be elsewhere put. We know that these animals are many-celled and highly organized, and offer as an excuse for their position among the Worms their affinities of type with certain larval forms of the Trochophora type. In them the cilia are at first much developed, but in the end are restricted to certain localities of the body, one of which appears constant about the mouth. Hence the conclusion that our rotifers are exceedingly primitive forms with close relations to the progenitors of the phylum or genealogical tree of the Vermes (Worms).

The Rotifers have a motile dental apparatus, a stomach of many cells, an intestine, salivary and renal glands, brains and nerves and red eyes. The microscope reveals all these organs in operation. You seem to look through a window at a delicate clockwork, so transparent is the skin of most of them. Manifold are their shapes. Free swimmers have balancers and other attachments assisting them in floating and swimming. Most of the sessile ones construct protective casings of foreign material (*Melicerta*), or exude a jelly-like covering (*Floscularia*). Others simply are attached by a pedicel ending in a sucking



Brachionus urceolaris, Melicerta ringens, Stephanoceros eichhorni
 The figures in the background are algae

disc. *Melicerta ringens*, as an example of case-builder, possesses a so-called *pill-organ* which is an open sac fringed with cilia, placed immediately below the mouth. This sac catches stray little grainlets and turns them into pills with the aid of mucus or slime. These are then carried out and deposited along the upper edge of the case, the whole case being built up of such "pills." Rotifers can withstand drying up for some time, being then blown about with the dust, and thus carried far and wide. When they

again reach water they flourish as before. This state of *anabiosis* (lifelessness) is a well-known phenomenon shown by many organisms which after 200 years of observation still is not well explained. Rotifers can remain in such an inert condition for months and years with impunity. Possibly they exude a jelly-like substance which seals them up and so retains a certain measure of moisture which carries the animals through the period of drowth.

Life is very elastic and adaptable to many contradictory phases and even then may triumph over death. Perhaps even these minute "wheel bearers" may possess organs within their bodies whose significance so far is unknown to us.

The illustration shows three species very much magnified.

Mechanical Helps in Aquarium Work

A New Glass Cleaner

W. G. LAMPRECHT, Brooklyn

The following contrivance for cleaning algæ from the glass of aquaria was devised by Mr. Hubert Siegl, of Prague, and was published in *Blaetter fuer Aquarien und Terrarien Kunde*. It has proven itself so practical and useful to the writer, that it is brought to the attention of others who may have had difficulty in keeping their aquaria clean of algæ without disturbing water plants.

Various methods are used to clean glass, such as bristle, steel and wire brushes, or for the stickier brown algæ cuttle bone or a bundle of steel shavings. Plaster of Paris clouds the water; fine sand, in spite of the finest grade used, will scratch the glass, thereby not only giving the algæ a still better surface for growth, but also spoiling its transparency. The up and down movement of aquarium brushes causes quite a stir in the water, disturbing the sediment. Nor is it possible to clean the glass to the edge of the sand on the bottom, thus leaving a strip—which brushes cannot reach. To overcome all this, discarded safety razor blades are brought into use. For example we will take the "Gillette," although any other make may be used.

Take a piece of brass about 1-16 inch in thickness and cut two plates, boring holes to conform with those of the blade. In each of the outside holes of one of the plates in-

sert a short brass peg, made either of brass wire or screws, which are then soldered fast. Then lay the razor blade between the two plates, cut the projecting part of pegs off and file even. Now bore centre hole B through both plates suitable for a round headed (brass) screw with nut, a stove bolt will do. To complete the contrivance a handle is made of iron or brass (bent to an angle of 40 or 45 degrees) fastened to one of the plates, making it ready for use. Anyone handy with tools can construct this simple appliance. Although somewhat clumsy, one of the plates and the handle may also be made of hard wood, using wood screws for pegs which hold blade in place. The handle can easily be fastened with screws on a wooden plate. This will work quite as well as the all metal arrangement.

It is, of course, necessary to adopt a certain make of blades as standard before making the plates, as each style differs in dimensions.

To clean the glass move the edge of the tool (with handle held in an upright position)—slowly down along the glass surface to a little below the top of the sand and "shave" clean. The algæ will roll up on the edge of the blade like shavings and finally sink to the bottom, without clouding the water in the least, after which the refuse can be gathered with a dip tube, or, if preferred, left for the snails to devour.

The practicability of this device will please everyone using it. Of course, this is suitable only for an aquarium with a perfectly smooth glass surface.

There are now known about 13,000 species of fishes. Contrast this with the 115 species which Aristotle knew. About 4000 of the species are found in fresh water, the others are marine.

Letter Box

What is a good general food for goldfish? A. J. E.

One of the best foods for goldfish and other fish which are not strictly carnivorous is boiled oatmeal, cooked with a slight amount of salt exactly the same as for table purposes. If the fish are small it is desirable to strain the oatmeal through a coarse cloth so as to take out the large kernels which they could not swallow. This is an excellent food on which to raise fish after they have attained a size of about three-eighths of an inch. Goldfish will for the first several months eat their own bulk of this food daily. There is no danger of oatmeal fouling the water if only a small quantity is used. Young fish in a large outdoor tank may be safely fed enough at one time to last all day, but when the winter season comes on or fish are past their first summer, they should only have as much of any kind of food as will be consumed in a few minutes.

Goldfish like and ought to have variety of food. It is a good idea to occasionally mix into the oatmeal a good grade of prepared fish food in the smaller sizes; or shrimp, fish-roe or daphnia in the dried form also do very well for mixing in. Chopped small earthworms is an excellent food. Scraped raw beef may be used occasionally and sparingly. A number of very excellent prepared foods are advertised in this magazine, but in their use one should see that very large grains are not fed to medium sized nor small fish. Too large grains often produce indigestion and sometimes strangulation. Some of our expert friends in Germany recommend that all granular foods first be steeped in boiling water.

I am unable to keep snails alive in my aquarium. Can you tell the reason? H. F. W.

If you have the so-called African snails,

your trouble is probably because they are naturally short-lived. It may be that the water in your aquarium is slightly acid, which is fatal to all snails. A small lump of hard plaster of Paris put in your aquarium until dissolved would correct this condition, as well as be of benefit to the plants and fishes. A piece as large as a shellbark nut should be sufficient for a 20-gallon aquarium.

What are "dried African flies"? H. B.
They are dried "water-boatmen."

My goldfish are pestered with a flat, transparent insect about one-eighth of an inch across. What is the best way to get rid of them? C. P. C.

Pick them off is the only known method that does not kill the fish. They are known as "fish-lice" and are very troublesome when they become established. Take all fish out of the tank or aquarium, clean them as well as you can and put a moderate solution of permanganate of potash into the aquarium from which the fish came. Allow this to stand for a few days, change the water and return the fish. Repeat if necessary.

Where do tropical fresh-water aquarium fish come from? W. P.

They are principally sent to Germany from different parts of the world and distributed from there. South America and India are two of the principal sources of supply.

It is understood that members of the societies receive their notification of meetings through the Society Bulletins in THE AQUARIUM, thus making easier the secretaries' work as well as saving the cost of printing and mailing notices each month.

Next month we shall start an article on "Aquarium Management"—something of great value to the beginner and well worth while for the old hands.

SOCIETY BULLETINS

Brooklyn Aquarium Society

Officers for 1912

President W. F. DEVOE, Box 383, Baldwin, N. Y. Vice-President DR. RUDOLPH C. LIENAU Local Editor, SYLVESTER C. LLOYD 924 Gates Avenue	Corresponding and Recording Secretary OWEN H. SMITH, 52 Wall St., New York Treasurer HARRY ROESSLE Financial Secretary THEODORE P. FRITZ Local Business Manager, OWEN H. SMITH 702 Fulton Street
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Regular meetings are held on Fourth Tuesday in every month except June, July and August, at Fairchild Building, 702 Fulton St., at 8 P. M.
First meeting of the season, September 23d. Sale and exchange of young fish, any variety. Address by the President, W. F. De Voe. Visitors and prospective members urged to attend.

Initiation Fee, \$1.00
Annual Dues, \$2.00

Chicago Fish Fanciers' Club

Officers for 1912

President	F. S. YOUNG, 428 West 66th Street
Vice-President	DR. G. A. PREUSKER, 457 North Avenue
Secretary	F. G. ORSINGER, 123 South Oakley Boulevard
Treasurer	CARL FOSSETTA, 1500 Diversey Boulevard
Librarian	TRACY H. HOLMES, 2816 Logan Boulevard
Local Editor, W. A. POYSER, 106 Carroll St., Hammond, Ind.	
Local Bus. Mgr. J. G. PIESER, 3800 Grand Boulevard	

Regular meetings are held on the Second and Fourth Wednesday of each month, at 809-812 City Hall Square Building, 127-139 North Clark Street, at 8.30 P. M.

Initiation Fee, \$1.00
Annual Dues, \$1.00

September 11th: Field work during post summer, by F. S. Young.
September 25th: Goldfish and Goldfish breeding, by W. A. Poyser.

New York Aquarium Society

Officers for 1912

President	ISAAC BUCHANAN, 143 Liberty Street, New York
Vice-President, RICHARD DORN, 7 Norman Rd., Upper Montclair, N. J.	
Recording Secretary, ARTHUR OSBORN, 42 South St., Jersey City, N. J.	
Cor. Sec'y, REV. HENRY S. COFFIN, 129 East 71st St., New York	
Treasurer, H. A. RICHTBERG, 85 South 16th St., East Orange, N. J.	
Librarian, HERMANN HOFFMEISTER, 165 Webster Av., Jersey City, N. J.	
Local Editor, JOHN TREADWELL NICHOLS, Am. Museum of Nat. Hist.	
Local Business Manager, CARL P. ORDING, 1931 Broadway, New York	

Regular meetings are held on the Second Thursday at the German - American School, Sherman Ave., Jersey City, and on the Fourth Friday at the American Museum of Natural History, 77th St and Central Park West, New York, each month except July and August.

Initiation Fee, \$1.00 Dues, \$2.00

September 27th: "Fish Hatcheries of Germany" by Rev. H. S. Coffin

Philadelphia Aquarium Society

Officers for 1912

President and Local Editor, WM. T. INNES, JR., 1 2th & Cherry Sts.	
Vice-President	CHARLES PAXSON, 2521 N. 9th Street
Treasurer	FRED SCHAEFER, 1610 N. 2d Street
Secretary and Bus. Mgr., HOWARD S. CREES, 3744 N. 13th St.	

Initiation Fee, \$1.00 Annual Dues, \$1.80
Corresponding Membership \$1.00 Annually

Regular meeting are held on the Fourth Wednesday, at 1414 Arch Street.

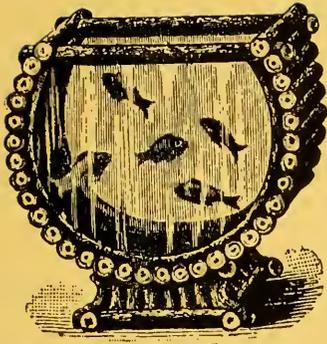
September 25th—Annual Election. Sale and exchange of fish. Special exhibition of Mexican sword-tail fish.

Mr. Innes will distribute specimens of red Copenhagen snails among the members.

Milwaukee Aquarium Society

Officers for 1912

President	C. G. B. SCHENCK, 105 Grand Avenue
Vice-President	AUGUST GRAU, 3110 Grand Avenue
Secretary	REVEREND PAUL ROTH, 2602 Prairie Avenue
Treasurer	M. J. C. STEFFEN, 950 First Street
Librarian	AUGUST W. POLLWORTH, 1816 Wright Street



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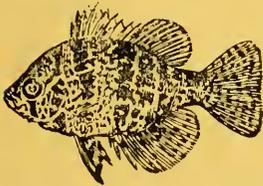
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President of Aquarium Society of Philadelphia

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