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Fishes

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THE AQUARIUM BULLETIN

NOVEMBER 1917

FIVE CENTS



A UNIQUE CONSERVATORY (See page 59)

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THE AQUARIUM BULLETIN

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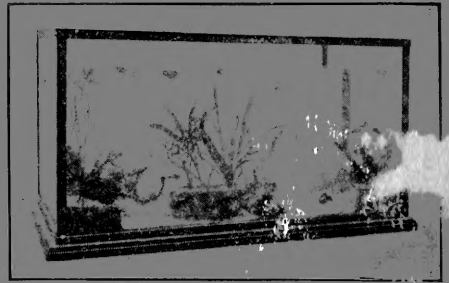
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The Aquarium Bulletin

Published monthly in the interest of the scientific
study of aquaria and allied subjects by

The Brooklyn Aquarium Society, Inc.

On the Government Collection of Fossil Fishes

By DR. R. W. SHUFELDT

Membr. L'Alliance Scientif. Univer. de France.

As is the case with so much other material of the kind, the government collection of Fossil Fishes is now to be found in special rooms, set aside for its keeping in the new United States National Museum at Washington. Here it is arranged and classified in convenient drawers and cabinets, where it may be examined and studied by students of ichthyology, who have obtained the necessary permit from the Museum authorities. Owing to the fact that this collection has been a long time in the process of formation, it is not surprising that we now find it to be quite a representative one, though not one of great extent. Many of the fine species of fossil fishes it contains are, however, more or less characteristic, and fairly represent the chief geological horizons, from the Ordovician period up to comparatively recent time.

There are nearly two hundred type specimens distributed through the material, and they are of a class which have been of the greatest possible service to descriptive geologists and students of ichthyic palaeontology. Most of the material has been acquired through the efforts of our govern-

ment collectors attached to exploring expeditions, while not a small share of it represents what formerly belonged in well-known private collections. Finally, a still smaller part has been purchased or obtained through exchange, after the methods of all museums, large and small. It is among these last acquisitions that we find some fossil fishes of foreign lands.

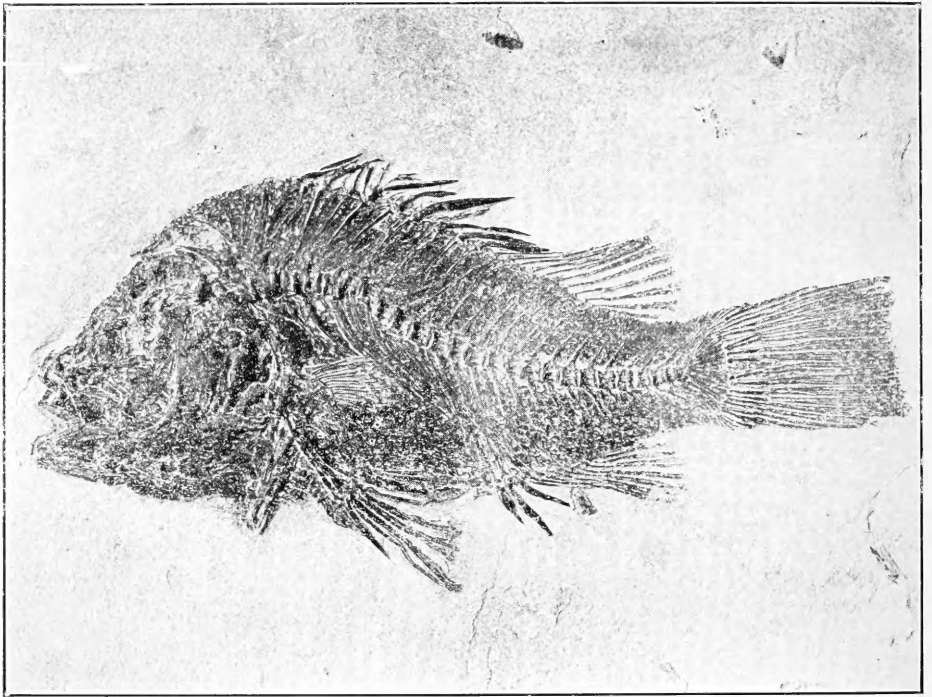
This collection has been handled, studied, described, and catalogued by ichthyologists and palaeontologists of both past and present time; so that, through the publication of all this literature, the various specimens in it are more or less known to scientific writers.

I have examined some of the specimens in the collection with more or less care; and about two years ago, I made an eight-by-ten photographic negative of a most superb specimen of a then undescribed fossil fish in that collection, which has since been named *Priscacara dartonae*. A reduced print from this negative illustrates the present article. The specimen, as will be seen from the cut, is upon its side in the usual light-colored matrix so characteristic of the

Green River Eocene, found near Fossil, Wyoming. This gives the black and shiny skeleton of this ancient fish the greater prominence through the contrast; and with an ordinary hand-lens its bones may, in a few instances, be studied almost as well as they could be in the skeleton of any teleosteon of the present time.

In life this fish was twenty-eight centimeters in length, that is, to the

describer and may have no significance. Whether it occurs in its extinct or now-existing modern relatives, I cannot say at this writing, as the material has not been examined by me. There are numerous existing fresh water fishes found in the tropics and subtropics related to this long extinct one; they constitute the family *Cichlidae*, while *Priscacara* is the sole Eocene genus known to us at the



base of the tail fin, and thirty-five in total length. The form of this species and the evident character of its skeleton are, together, ample testimony of its probable habits, external contour, and appearance. As to its coloration, that is a matter we shall never know anything about. On the head of the specimen, above the frontal bone, there appears to be a small, downward-projecting, osseous spine, which is not mentioned by its

present time.

There are many other slabs containing fossil fishes in this collection, which are quite as perfect and equally as interesting and important as the one which I have taken occasion to refer to quite fully as being representative of this most valuable material in its entirety.

In a short article like the present one, it will not be possible to further describe any other of the specimens

in this government collection, especially as I desire to utilize the balance of my space here for the purpose of giving, in *tabulated form*, an orderly arrangement of all this material, in that palaeoichthyologists may appreciate at a glance what they will find in the collection of fossil fishes at the United States National Museum.

There are other species and genera of American fossil fishes which have been collected, described, and are now known to science in addition to those tabulated below; but at the time I prepared the below table they apparently did not exist in the Museum's collection.

The Table I have compiled is as follows:

SYSTEMS.	GROUPS.	FAMILIES.	GENERA.	SPECIES.
A. Ordovician.		Astraspidae.....	Astraspis.....	Astraspis desiderata
B. Silurian.		Pteraspidae.....	Palaeaspis.....	Palaeaspis americana
	1. OSTRACODERMI.	Asterolepidae.....	Bothriolepis.....	Bothriolepis colpadensis
			Bothriolepis nitida	Bothriolepis nitida
			Psammosteus sp.	Psammosteus sp.
C. Devonian.....	2. HOLOCEPHALI	Psammosteidae.....	Heteracanthus.....	Heteracanthus addeni
		Ptyctodontidae.....	Dipterus.....	Dipterus angustus
	3. DIPNOI.	Ctenodontidae.....	Dmichthys.....	Dmichthys tuberculatus
		Cocosteidae.....	Sauripterus.....	Sauripterus taylort
	4. TELEOSTOMI	Rhizodontidae.....		
		Cladodontidae.....	Cladodus.....	Cladodus spinosus
			Cladodus aculeatus	Cladodus aculeatus
			Dicrenodus.....	Dicrenodus texanus
			Polyrhizodus.....	Polyrhizodus concavus
		Petalodontidae.....		
	5. ELASMOBRANCHII.	Psammodontidae.....	Psammodus.....	Psammodus grandis
			Psephodus.....	Psephodus legratensis
			Deltodus.....	Deltodus occidentalis
			Ctenacanthus.....	Ctenacanthus gracillimus
			Physomeus.....	Physomeus gemmatus
				Physomeus arcuatus
D. Carboniferous		Cochliodontidae.....	Erismacanthus.....	Erismacanthus formosus
			Harpacanthus.....	Harpacanthus niacovanus
			Oracanthus.....	Oracanthus procumbens
			Edestus.....	Edestus triangularis
				Edestus behrriehi
			Coelacanthus.....	Coelacanthus elegans
		Coelacanthidae.....	Coelacanthus exiguus	Coelacanthus exiguus
			Palaeophichthys.....	Palaeophichthys parvulus
			Radnichthys.....	Radnichthys gracilis
			Elonichthys.....	Elonichthys hypsilepis
		Palaeoniscidae.....	Elonichthys perennatus	Elonichthys perennatus
			Cheirodus.....	Cheirodus orbicularis
		Platysomatidae.....	Catopterus.....	Catopterus gracilis
		Catopteridae.....	Seminotus.....	Seminotus elegans
			Lepidotus.....	Lepidotus walcottii
		Semionotidae.....	Belonostomus.....	Belonostomus tenuirostris
E. Triassic.....		Aspidorhynchidae.....	Notagodus.....	Notagodus minutus
			Gephyura.....	Gephyura concentrica
F. Jurassic.....	6. TELEOSTOMI	Cyprinodontidae.....	Parafundulus.....	Parafundulus nevadensis
	Order	Cyprinidae.....	Amyzon.....	Amyzon breviline
	Crossopterygii.....		Leuciscus.....	Leuciscus turneri
		Siluridae.....	Ameiurus.....	Ameiurus primaevus
G. Tertiary.....		Percidae.....	Plioplarachus.....	Plioplarachus scissipinosus
		Cichlidae.....	Priscacara.....	Priscacara dantonae

The Philadelphia Display

When they do a thing in Philadelphia, they do it right—this has no reference whatever to their traffic regulations—and as a result their Annual Exhibition was a thing of beauty to the observer.

Held in stately Horticultural Hall at Fairmont Park as heretofore, the last exhibition was memorable. One could search for a long time to find a more truly fitted place in which to stage such a display. Getting back to nature is accomplished here as it could be in no other place except under the open skies.

Those who have visited Horticultural Hall know how beautiful it is, with growing palms and other tropical vegetation in profusion, some specimens reaching to the arched dome high above. The aquariums, all of uniform size, were backed with plants which alone would attract no small amount of attention.

The so-called Goldfish are the thing in Philadelphia, the Mecca of fine specimens of this type. In size, color, and fine formation they were, as usual, to be admired and wondered at. Young specimens, bred in 1917, were on display, some of which were so large that it seemed impossible they could be other than adult fish. As usual, Mr. Joseph Bausman carried off premier honors, well deserved. In point of color, size, and excellent shape, these fish stand in a class by themselves.

Many other beautiful specimens were shown by Messrs. Graff, Smith, Heilman, Christy, De Muth, Peters, Barrett, Heida, Klippen, Ayling, Dr. Leffman, Eck, Hinkle, Paullin, Troemer, Wilt, Williams, Weider,

Walton and the "Goldfish Exhibitors," twelve in number.

Messrs. Visel and Phillips of Brooklyn staged liberal sized displays and from the appearance of their tanks, Philadelphia had better watch its laurels carefully in the future.

Mr. Christy showed a finely shaped goldfish over thirteen years of age, still vigorous and proudly carrying its fins.

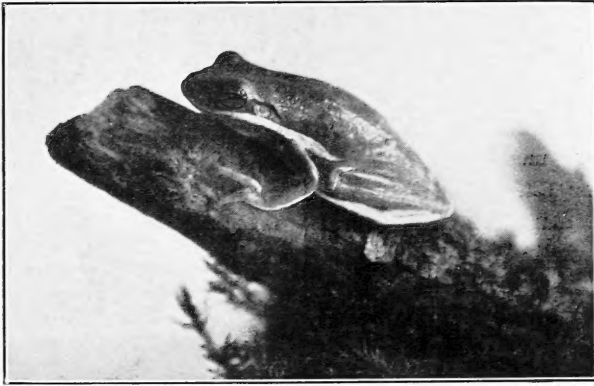
On the opposite side of the Hall were the tropical classes. Young Scalare bred by Mr. Paulin held first honors.

These little replicas of their elders were of intense interest. They proudly carried themselves, remaining always in schools. They are really the first which have been bred in this country.

Jos. Heilman exhibited the most unusual Chanchito ever kept in captivity. It has always been considered that a specimen measuring six to eight inches in length was large; this one measured *Fifteen Inches* over all and was only one year old at that. Great credit is due this breeder for his results.

Most persons unfamiliar with the various kinds of fish are compelled to ask someone to point out the various types. The necessity for such inquiries was eliminated by a series of charts gotten up by J. Louis Troemner of Mt. Airy, Pa. These were in natural colors and pictures and explained in detail the different types of fish.

Among other Brooklyn visitors were Messrs. Froelich, Johonnot, Petersen, Wilcox, Phillips, Berneburg, Mr. and Mrs. Visel.



Green Tree Toad

*(HYLA CINEREA)
By RICHARD DECKERT

The Tree Toads are among the most attractive of the Amphibians, and can easily be kept for years in a Terrarium.

Three species are found on Long Island, the largest of these being the Gray or changeable Tree Toad. It is well known from its ability to change color, which it shares with many other species. Contrary to the generally accepted belief that this color change is induced by the color of the object on which the toad finds itself, this is true only to a limited degree. Temperature, moisture or dryness, light or darkness, are the real causes for this habit. When the Tree Toad is in a well lighted cage, kept dry, it assumes pale tints, such as pale gray, pinkish, very pale green or even white, provided the temperature is high. In a cold room, or in a terrarium planted with ferns, etc., he will change to bright green, dark gray, many tints of brown and, if kept very cold, almost black.

When the Tree Toad has taken on his white or palest gray or green tint, the star-shaped spot on his shoulders vanishes or is only faintly outlined. This spot, which is so characteristic of this species, shows

boldest when the Toad has his "medium" tints on. It again disappears when the darkest dress is taken. No matter what color the Tree Toad assumes, there is always a white spot under the eye.

The skin is loose, moist, and has many small round warts on the upper surfaces, while the under sides are coarsely granular. Each toe ends in a large adhesive disk; these disks secrete a sticky substance, by means of which the Toad can climb and adhere to any object, even glass.

His food in captivity consists of all kinds of insects, small earthworms, sowbugs, etc. When none of these are available, he can be fed by means of a broomstraw, on the end of which a small ball of chopped meat has been placed. This is gently wiggled before the Toad, and he will soon learn to snap off the meat. I have kept many species of delicate Frogs and Toads in this way during winter, when it is impossible to produce living insects.

The voice of the Gray Tree Toad is a loud chatter, strongly trilled, and is heard in the Spring and Summer months, usually before a thunder storm. The scientific name of this species is *Hyla Versicolor*.

Annual Exhibition of the New York Aquarium Society

The Eighth Annual Exhibition of the New York Aquarium Society was held on October 12th, 13th and 14th, the American Museum of Natural History.

No better setting could have been desired for a display of this character. The little exotic and gold fish were merely another natural wonder added to the many thousand housed in this great public institution. The beautiful animated little fish formed a pleasing contrast to the many still-life exhibits of the animal kingdom on display throughout the big museum.

The walls of the exhibition room were hung with a large number of the vivid colored "Under The Sea" paintings by Hoffman, which harmonized with the general scheme and added a feature of interest. The tanks were nicely arranged, on tables around the sides of the room, also on two long tables holding two rows of tanks each, running the entire center length of the room, with spacious passageway between all displays. The skeleton wood work of the tables was neatly hidden with drapery of green burlap, and with a number of palms placed here and there, gave all a touch of natural beauty.

The fifty or more larger tanks, placed around the side walls contained many fine specimens of the fancy varieties of gold fish of various sizes and forms, and a combination of colors that strove for superiority, in competition with the paintings.

Brooklyn and Philadelphia were well represented in the gold fish group

by some of the best specimens. The gold fish might be said to be lacking in numbers, but this was more than offset by the high quality of the fish exhibited.

The tropical fish were arranged in smaller tanks through the center of the room. These small tanks were of uniform size and well planted with various aquatic plants. The highly colored and active little fish darting in and out among these plants, and in the clear crystal water, afforded a rare pleasure to the lover of nature. Many of the rarest varieties of the tropical fish were represented. The most popular fish of the show, without question, were the young *Pterophyllum scalare*. The home waters of this wonderful little fish are the upper tributaries of the Amazon River. The largest of these babies could have been covered by a silver quarter dollar, while a gold piece of the same area was necessary if one wished to take a sample of this beauty home.

Java was represented by two rare importations of small beautifully marked aquaria fish. One in particular was very attractive, a flat little fish, its narrow body was almost a perfect circle in outline and marked with large "polka dots" on a light silvery ground, with fins so delicate and transparent that one found it necessary to look close to detect their presence.

Another very pleasing feature was two small tanks devoted exclusively to a few small varieties of local fresh-water fish, and crustaceans.

On the afternoon of the 13th Mr.

Richard Dorn, President of the Society gave a short talk on the history and objects of the Society; the maintenance of home aquaria and descriptions, accompanied by slides, of many of the aquarium fish. This was followed by a series of motion pictures of microscopical animal life of the fresh-water aquarium, and a reel of excellent pictures of various semi-tropical marine fish.

A Few Observations

By E. A. Morrow

Fish frequently change their colors not only the young but also adult specimens. I have purchased beautifully marked calicoes and then within about eight months had them fade to almost a milky white, and in the same connection it will be equally interesting to know that sometimes they regain their colors after a period.

I would not discourage the use of the Balanced aquarium. It is one of the easiest ways to maintain fish but should not be carried too far.

Several years ago a friend who had a small aquarium prided himself upon the length of time he could keep the balance with high-bred goldfish. There were placed there in September and went through the Winter in a very satisfactory manner, but when Spring came around the fish were in a very poor condition, and until the water in the tank was changed his difficulties continued. Within twenty minutes after the fresh water had been placed in the tank the fish showed great signs of activity, and although the water in the balanced tank was as clear as crystal and the plants grew finely it was heavily poisoned and insufficiently oxygenated for their wants.

Spring is the most difficult time to keep fish, for like humanity, it is the time of the year when the vitality is lowest and they are subject to numerous ills if not cared for.

Furthermore, the Balanced aquarium is not a reproduction of nature. Compare it with the outdoor pond. The pond is replenished with the rains, aerated by the winds and the humus is worked down into the earth. In the tank this is impossible because when the decaying matter reaches the bottom of the aquarium, usually of slate or glass, it can go no further and must therefore decompose and throw off foul gases.

While it is generally believed that Tropical fish will exist in Balanced Tanks better than those where the water is changed, my own experience has been to the contrary, as it will be found that they will grow faster and larger where the water is occasionally replenished.

I do not recommend the beginner to purchase high priced fish for his first venture, but after he has the basic principles of the game he will find it will pay him far better to purchase one fairly good pair of breeders than a number of poor ones.

The subject of the temperature of the water during the winter time has been brought up. The scaleless fish of course will not stand as low a temperature as the scaled, nor the finer bred ones as low as the more common specimens, but at 50 to 60 degrees or even as low as 45 they will exist comfortably and practically without tail congestion.

Some of our fanciers have been very successful in keeping fish in cellars with little or poor light, but of course plants cannot be grown under those conditions.

Tail Congestion

By Joseph Froehlich

The matter of Congestion has been considered and my experience has proved that this may come from impure water, particularly in balanced tanks, although it frequently is brought about by sudden changes in water. Congestion is nothing more or less than the stagnation of blood in the tail. It is sometimes caused by a bruise and has been known to occur from striking the tail with the net in catching the fish. It is also often brought about by over feeding,—also if fish are not acclimated, whereas running water is sometimes the cause, although no invariable rule can be made in this latter direction as no two fanciers keep their stock in identical tanks and our experiments have not progressed far enough to be able to give definite advice on this point.

It is a known fact that the shorter tailed fish are not subject to this difficulty except in a very limited degree.

An easy cure is to mix ten drops of household ammonia to a gallon of water, and allow the fish to swim around for say five, ten or fifteen minutes, watching them carefully. If they show signs of exhaustion, immediately remove them. Some will stand much more than others.

Sometimes a mild solution of salt will readily remove the tail congestion if it has not progressed too far. It is not well to keep fish in water that is too freely saturated with salt. This creates an unnatural condition. Practically there is no fancier who does not regularly place small quantities of salt in his tanks. The

fish realize this and will gather around the spot for a few moments. It is good to mix this with the food occasionally.

Facts for the Fancier

One pint of water weighs about one pound.

One gallon of water weighs 8½ lbs.
231 cubic inches make one gallon.

It takes ¼ lb. of paint to cover one square yard for the first coat and 1/6 lb. for each additional coat.

One gallon of tar and 1 lb. of pitch will cover about 12 square yards the first coat and 17 yards each additional coat.

A cubic foot contains 6 gallons and one quart of water, weighing 62½ lbs.

One ton of gravel and one ton of sand contain 19 and 21 cubic feet, respectively.

One cubic foot of sea water weighs 64¼ lbs.

Four pails of finely sifted sand and 1½ pails of portland cement are required to cover 35 square feet of brick wall to a thickness of about ¼ inch.

Fifteen ordinary sized bricks laid in ⅜ inch courses of mortar will make 22½ square feet of wall, single thickness.

For a fish house 12 x 12 x 9 ft. high with less than 50% of the wall and roof area of glass, it will take about 4 tons of nut coal to heat it during the cold season of the year.

A wooden stick about 5/16 in. dia. with a V shaped notch cut into one end is very handy for setting plants into the gravel in the bottom of the aquarium.

Why the Goldfish Clucks

JESSIE A. DUNN.

Cluck! cluck! cluck!
We don't know what to do!
Our mistress says the water's fresh,
But we don't think it's true!

We swim about both day and night,
Till mistress sits down near us;
Then to the top we quickly glide
And try to make her hear us.

We cluck as loudly as we can,
With nose above the water—
She says, "Those tiresome little fish
Are really quite a bother."

But, Mistress dear, the noise we make
Is not to be annoying.
When at the top we swim about,
Fresh air to find, we're trying.

So when you hear us clucking,
Fresh water give us, please;
And do not think we make a noise
To simply try to tease.

Notice the announcement on front cover. Many of our fanciers are at the Front. Send them a copy of TAB.

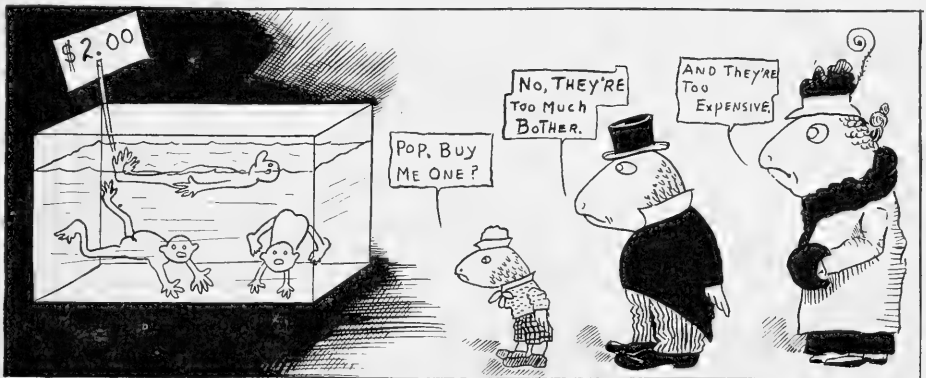
The novice who starts his first aquarium is the one who needs the kindly assistance and advice of the fancier, for his trials are many, due mainly to the fact that the dealers themselves who supply him do not, either through ignorance or prejudice, properly advise him.

Hardly a beginner who started with Goldfish could keep his pets in the same apparent good health they were when purchased. Through his over solicitation they are fed, watered and kept in a warm or cold room to extremes, and as a result soon droop and then become miserable looking specimens of pity.

I have been through this and while I should not care to qualify as an expert by any means, I am proud of the fact that I can keep my goldfish in good health, barring an infrequent one. In my earlier days I lost many more fish than I cared at that time to admit.

The first consideration is a tank with a great enough capacity to comfortably house the fish; not less than 5 gallons of water to a good sized fish would seem to be a fair proportion. Set the tank in or near a window where it will receive a good strong

WHEN THINGS ARE REVERSED



light, but not direct sunlight. Too much exposure to the light will cause the unsightly growth of algae which, while beneficial, obscures the view of the contents. Too little light, on the other hand will cause the plants and vegetation to decay and the fouling of the water will follow as a natural result.

A fine layer of gravel, thoroughly washed, should cover the bottom of the aquarium to a depth of about 1½" to 2", though many prefer, and this really is the better way, the adoption of containers for the plants. The latter will admit of removing all the plants and syphoning off the bottom of the tank when it is required or desired. If the bottom of the tank is fully covered, this is difficult and permits the excrement, etc., to settle and if not absorbed by the plants, will in turn generate and throw off gases to the detriment of the fish.

In selecting your first specimens, it is well to study your facilities. By no means procure the finely bred fish. While they are without any doubt more beautiful, they are equally delicate and harder to maintain. A good strong scaled fan-tail, either Jap or Telescope, as your fancy may

dictate, will beautify the aquarium and will give you little trouble. Any of the reliable dealers who advertise in this publication can be thoroughly trusted to help you select specimens. You undoubtedly will wish a pair, male and female. They can likewise help you to pick them out as regards sex.

The aquarium should be prepared and allowed to stand for a few days to permit the water to ripen. When the fish are brought home, they should be given a mild salt bath. This may be prepared by dissolving a table-spoonful of pure (not prepared) salt in two gallons of water. Let the fish remain there for a half hour, after which they may be gently placed in the aquarium. Do not attempt to feed them now, or the next day for that matter. They are in strange surroundings, and what is of greater importance, new water, in all probability. They will gradually get over their nervousness and grow accustomed to the new tank and on third day may be fed very lightly. If they do not appear hungry, refrain from further feeding for another day or so.

C. F. F.

Snail Uses Its Brain

That a snail can pass over a razor's edge without the slightest harm has been demonstrated by a French scientist. The snail walks with the whole undersurface of its body and is provided with means to lubricate the road on which it travels. A complex system of muscles enables it to cling in any position to the smoothest objects.

In lifting itself over the razor's

edge it clings with the hind part of its walking surface to one side of the blade and extends the forepart and bends it down over the other side. Then it draws itself over gradually and without exerting any pressure on the edge of the blade.

While the common snail has lungs, heart and a general circulation, it is able to live without inhaling air. Experiments have demonstrated that

any or all of the usual life conditions may be removed without terminating a snail's existence or impairing its functions.

The snail retreats into its shell on

the approach of frosty weather and causes the mouth of its shell to be hermetically sealed by a secretion of silky texture impervious to air and water.

The Lafayette

BY JOHN TREADWELL NICHOLS
of the Amer. Museum of Natural History.

News reaches us that Lafayette are being taken in numbers this Summer, as many as 80 or 90 of these excellent little pan-fish being caught on hook and line by one person in a morning at Rockaway. There is a wide-spread belief among fishermen that this species is abundant near New York every seventh year, but this is not borne out by the records that are available. From "Forest and Stream," we learn that they were abundant in 1902, and again in 1908. Its name is said to have been derived from its presence here in large numbers in 1834, coincident with a visit paid to this country by Lafayette. Many sea fishes fluctuate in abundance in a given locality from year to year. Just why they do so has never been adequately explained.

A Unique Conservatory

Our Cover design illustrates a section of the very artistically arranged conservatory of Mr. F. B. Johnston of Brooklyn. Additional illustrations appeared in a recent number of TAB. In its arrangement, utility and beauty have been combined in a most satisfactory manner, both Gold and Tropical fish being housed. Further illustrations and a story of this conservatory will appear in an early number.

Amblyopsis,

The Blindfish

From Professor Eigenmann's essay on blindfishes in the Geographical Review for September we learn that *Amblyopsis*, the blind-fish of Ohio Valley Caves, carries its eggs in its gill cavity, and the young remain there until the yolk is absorbed. The eyes begin to develop in the natural way in the young, but soon development ceases, they degenerate, and in an old fish there is little vestage of an eye left. Like other related blindfishes, *Amblyopsis* is dull pale pink in color, and characterless in appearance. It grows to be about five inches long.

The easiest way to remove young tropical fish that have just been born, is to take a piece of glass tubing about 12 inches long, place the thumb over one end and plunge other end into the water immediately above the fish, release the thumb and the in-flowing water will take the fish with it. Then replace thumb, withdraw the tube out of the water and empty it into a suitable receptacle.

Among the remedies used by aquarists for the cure of the various ills of fishes are rocksalt, epsom and glauber salts, phenol sodique, peroxide, permanganate of potassium, glyco thymoline, castor oil, bichlorate of mercury, salicylate of soda and ammonia.

The
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Meetings Every Month
(except July and August)
Second Tuesday, Business, etc.
Fourth Tuesday, Exhibitions of Fish,
Lectures, etc.

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THE AQUARIUM BULLETIN

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Vol. 4 November 1917 No. 3

In the October number of The Aquarium Bulletin there appeared an article on the thermometer in which, we regret to say, a typographical error passed unnoticed.

In Formula No. 1, page 34, and again in the example illustrating Formula No. 1, the factor $(32-1.8n)$ should have read $(32 \times 1.8n)$. The answer to the example, however, was correct.

For the benefit of our readers who may have occasion to convert temperatures from the Cent. scale to the Fahr. scale or vice versa, we repeat the formula below in a little different manner that we think will make their use more clearly understood.

Given a temperature of N degrees C, to find the equivalent temperature in degrees F, use Formula No. 1:

$N \text{ degrees C} - (32 \times 1.8n) \text{ degrees F.}$

Example—10 degrees C— $(32 \times 1.8x$

10)—50 degrees F. Given a temperature of N degrees F, to find the equivalent temperature in degrees C, use Formula No. 2:

$N \text{ degrees F} - 5(n-32) \text{ degrees C.}$

Example—68 degrees F— $5(68-32) - 20 \text{ degrees C.}$

The December number will offer some unusually interesting articles. Among others is the explanation of Dr. F. A. Lucas, Director of the American Museum of Natural History, New York, of the changing of colors in Shubunkins and other fish, both domesticated and wild.

Dr. R. W. Shufeldt of Washington, whose works are well known to TAB readers, will present a finely illustrated article on The Different Fishes of Bermuda.

Miss Ruth of the Children's Museum, Brooklyn, will write an intensely interesting story.

Something never before attempted will be the article by Mr. Joseph Froehlich "How to Distinguish the Sex of Our Aquarium Fishes." A study of this series will enable the aquarist to instantly determine the sex of the various aquarium fish.

Mr. Richard Deckert of the N. Y. Zoological Society will write on Frogs.

Other good things too numerous to mention will be presented.

At the November 13th, meeting of the Society three members of the Nominating Committee will be elected.

The December 11th meeting will be the only one for the month. It will be a Social evening, refreshments and music being prominent on the programme.

OFFICIAL SOCIETY NOTICE.**Meetings of****November 13th and 27th, 1917**

On Tuesday Evening, November 13th, will be held an Exhibition of the Prize Winners from the recent Annual Exhibit, and the Exhibit Committee requests the members involved to be sure to bring these fish. Following the usual routine of business, including the report of the Annual Exhibit Committee, those present will have an opportunity to listen to a short address by Mr. Chas. L. Tricker on a subject of aquatic plants.

November 27th, starting at 8.15 P. M., will be devoted entirely to an illustrated stereopticon lecture by Mr. Herbert Lang, on his experiences in Central America, including remarks on fishes and fishing.

In 1909, the Congo Expedition of the American Museum set out to collect zoological material in the hitherto slightly explored northeastern region of the Belgian Congo.

In 1915, Messrs. Lang and Chapin, the leaders of the expedition, reached New York with an unrivalled collection of several hundred thousand specimens, among which were some six thousand fishes. Some of the more interesting colored projections, reproduced from the five thousand photographs brought back from Central Africa, will be shown on this evening.

Applications for membership have been received from the following:

Charles Moody, 1305 3rd Avenue, New York City.

Hugo C. Nelles, 1305 3rd Avenue, New York City.

Fredrick Witschieben, 879 Putnam Avenue, Brooklyn, N. Y.

F. E. Plumer, 34 Weirfield Street, Brooklyn, N. Y.

The recent Auction sale on October 23rd was very successful, enjoyable, well attended whereas there was a very handsome amount realized. We also had a fine business meeting on October 9th, one that every member would have enjoyed.

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Interesting Fish for the Aquarium

By C. J. HEEDE

It is very difficult to explain here which kinds of fishes are the best to keep, as it is greatly a matter of taste or a fascination for one or more particular kinds. The very rare and costly fishes are generally not so very interesting and do not always give the greatest pleasure to their owner. The ordinary or most easily obtainable kinds are generally the most desirable to keep, some for their beautiful colors, others for their interesting breeding habits and the ways in which they care for their young. Of the spawning fishes: the Paradise Fish, *Betta Splendes*, *Betta Rubra*, *Trichogaster Lalius*, *Trichogaster Labiosus*, all belonging to the family of Labyrinth fishes, which are nest builders. Their habitat: the Eastern part of Asia.

Of the Danio, the four best varieties of these are: *Danio Rerio*, *Danio Analipunctatus*, *Danio Albolineatus*, *Danio Malabaricus*, all fine looking, hardy and easy to raise. These fishes also have their habitat in Eastern Asia and they belong to the so-called egg-dropping fishes.

The *Haplochilus* Family which greatly resemble a pike or pickerel, although much smaller, are seldom over three inches long. The principal varieties are the *Cameroniensis*, the *Faciolatus*, and the *Lineatus*, and the *Chaperi*, their habitat Africa, the pink colored and very prolific *Latipedes*, the green *Lineatus* from Asia. These are among the prettiest varieties.

The mouth breeders. (*Paratipalia* multi-color), lately renamed *Haplochromis Strigigena*, are a very interesting fish on account of their

peculiar breeding habits. After the female lays her eggs she places them in her mouth, where the young fishes are hatched out and still remain in her mouth for several days. Even after that the young fishes seek shelter in their mother's mouth on being suddenly frightened. This fish is not difficult to keep; it is a fine shape and color. The male in breeding time appears as though covered with precious stones. Their habitat: Egypt.

The *Pyrrhulina Filamentosa* have a most wonderful way of caring for their spawn. It is deposited above the water on the sides or cover of the glass tank and the eggs are kept moist by the male fish splashing water up at them every 15 to 20 minutes. When the young fish appear they will drop down into the water and are able to care for themselves if the water contains a supply of Infusoria. These fishes, besides their peculiar ways of spawning and raising their young, are of an elegant slender shape and beautiful color with fine markings. They are found in Central and South America.

The Bitterling (*Rhodeus Amarus*) is another interesting breeder. The fishes deposit their spawn and fertilize it in the inside of a fresh water mussels wherein the eggs hatch. After leaving their foster mother, the mussel, they receive and need no care from the parent fishes. The male is very prettily colored with red. These fishes are found in Europe.

The *Tetragonopterus* (*Rubro Pictus*), also called Red Fin or Blood Fin, is one of the prettiest looking

aquarium fishes; its silvery and bluish colored body and its partly pink and blood red colored fins make it exceedingly beautiful. They will breed in Aquaria but water must be changed often. Their habitat: Argentina.

Of the Live Bearing fishes we have many friends. For example: The *Xiphophorus Helleri*, habitat Mexico, also known under the name of Mexican Sword Tail or Sabre Tail, one of the best in shape and color. The *Platipoecilia* of the varieties of *Rubra*, *Pulchra* and the *Maculata*: habitat Central and South America. The *Guppyis*, lately renamed *Libistis Reticulata* also sometimes called the Million Fish, or the Peacock of the fish family, as no two fish are colored and spotted alike. The male fish is beautifully colored and marked, and the female fish is very plain and much larger. They are very prolific and exist in their native waters in great abundance,—hence the name Million Fish. They are great destroyers of the larva of mosquitos. They are found in Trinidad and Venezuela and neighboring islands. The *Girardinus Reticulata*, also sometimes called the um fishes, the male and female both black spotted on a light yellow background. They breed well, are hardy, easy to raise and not at all cannibalistic. The young fishes of the *Girardinus* family, when born, have a little black spot on each side of the body and as they grow up other black spots appear on both body and fins. The habitat of these fishes in Central and South America.

Not everybody could keep all these fishes mentioned and have the time to take proper care of them. I have

only called your attention to some of the great family of fancy fishes; to give a full description of all those known up to-date would take a great deal of time.

Literature on this line must be consulted for extensive information; for instance, the recently commenced publications by Dr. E. Bade largely illustrated with photographs taken of live fishes in the aquaria, also that of W. L. Brind with full description and pen and ink drawings of fancy fishes.

I have called your attention only to the more common varieties of fishes, I will now also mention a few of the rarer species; for instance, *Pterophyllum Scalare*, *Gasteropalecus Stellatus*, *Ambassis Lala*, *Myletis*, *Scatophagus*, *Polycentrus Schomburghi*, *Fundulus Gularis* blue and yellow, *Pantodon Bucholzi* or Butterfly Fish, and the beautiful *Rasbora Heteramorphia* and *Maculata*. All the last mentioned are very rare and fine looking aquarium fishes but as a rule not hardy, very costly and difficult to breed.

Experience teaches us to provide a tank for each kind of fish, which is preferable for the following reasons. Most young fishes look alike; if the parent fishes have their own tank we know when we see the young born or raised from spawn, where they originated from in case of sickness, which is often brought about by newly acquired specimens or by parasites being mixed in with the live food, taken from ponds which, of course, will only spread throughout the one particular tank.

(Continued in December issue.)



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