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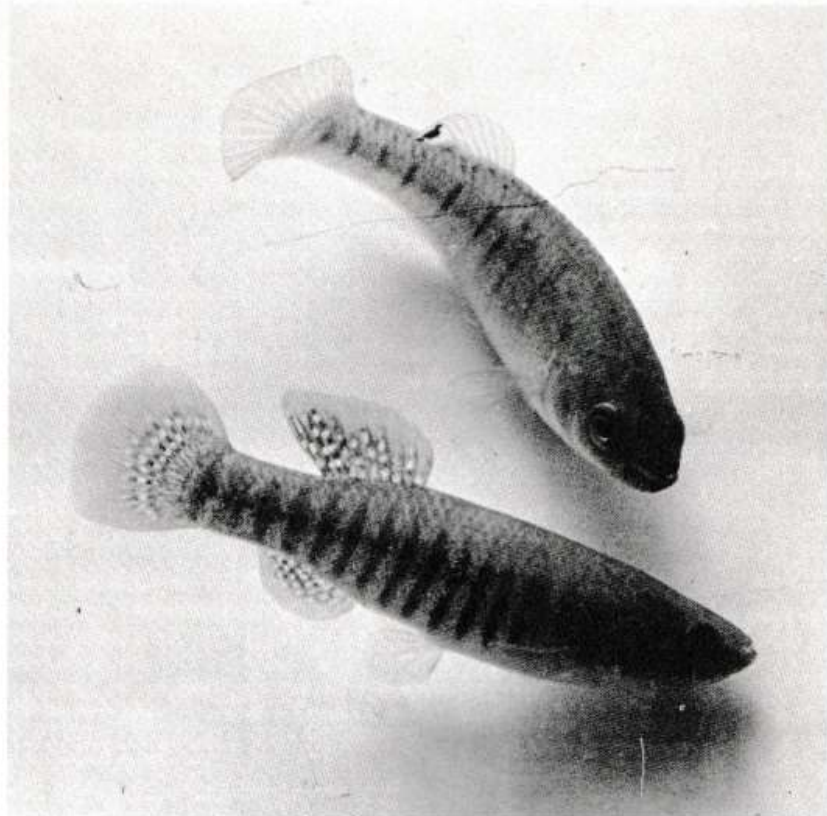
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cover photograph

*The black-lined tetra, *Hyphessobrycon scholzei*, as photo-
graphed by Dr. Herbert R. Axelrod.*





Fundulus notti pair. This fish is native to several states in the southern United States. Photo by Weitzman.

Safari in North Florida

Vera Wold
Jacksonville, Florida

I GUESS that title sounds a little weird in our so-called civilized country, but believe me, there are forests and swamps nearby the city of Jacksonville, Florida that are positively as impenetrable as those in more distant lands. Some members of our club, including myself, are native fish addicts and at every opportunity gather together and

go out for some fish hunting.

Our first major "safari" as a group took us about 30 miles northwest of Jacksonville. It was a blazing hot day (89 F. in the shade) in May. We were scouting for a fish described only as having "red jowls and zebra stripes." Having joggled along an old dirt road for miles (it seemed) we finally came to

our first brook. Nets in hand we struggled down the banks and were attacked on all sides by the most vicious blackberry brambles to be found anywhere. We finally made it to the water's edge, though not unscathed in the process.

Patiently we scanned the water's surface for some signs of life. The fishes all ducked under the grass and weeds at the approach of human beings and stayed hidden until they decided it was safe to venture forth again. The sun was gently parboiling us and various insects tested our skin for edibility. Nothing in the water moved . . . but wait! A bright spot in the dark water emerged from beneath a lilly pad and ambled slowly back and forth at the surface of the water. The body of the fish was barely discernible. A net flashed through the air and smacked into the water; however, the fish eluded the net and we had only a befuddled tad pole for our trouble. Those little killifishes sure can move when they take a notion to.

Tiring of waiting for the appearance of more fishes, I dragged my net along the weedy edge of the stream. Yikes! Got a baby snake, but tossed it back before anyone could tell whether it was poisonous or not. I'm mentally allergic to snakes! Next time I dragged the net through the weeds luck smiled, and a tiny musk turtle was my prize. Guess I'm the only "turtle keeper" in the bunch. I like the droll little reptiles. The tiny musk turtle baby is only an inch or so long and remains submerged except for occasional trips to the surface of the water to replenish his oxygen supply. They are unsurpassed for ridding your aquarium of unwanted rams-horn or pond snails.

Swish! Splash! Letha Hallman's net whizzed by my ear, followed by a gurgle of joy, "I've caught two!" she squealed. And sure enough she had two captive killifish of the description given to us earlier. These were two and three inches long respectively, cylindrical in

shape, olive green in basic color, and with dark thin stripes laterally the full length of the body. The larger fish also had 10 vertical stripes causing the horizontal stripes to be less noticeable. These fish also had exceptionally large eyes. The really outstanding thing about them as they were caught was the brilliant red-orange color along their under jaw and on back along the underside of their belly. This was probably a breeding color as it soon faded in the home aquarium.

We were able to catch several more along with some pigmy sunfish and young bream. We moved to several other streams without further success.

All fishes arrived home in good condition and after settling them in their new home I looked for and finally found the name of the killifish and the photo of them in *The Handbook of Tropical Fishes* by H. R. Axelrod and Dr. Leonard P. Schultz. They are listed as *Fundulus dispar notti* but I have since learned that the name has been changed to *Fundulus notti*, the starhead topminnow.

This fish is strictly a surface fish and stays at the water's surface constantly, occasionally leaping for low flying insects. The red-orange color appears quite often if a large school of these fish are maintained together. We have found these fish mild tempered if kept with fishes of their own size; however, I'm sure they'll eat a tasty baby fish along with the rest of their supper anytime one comes along.

As with many killifishes, these are tremendous jumpers, so their tank should be kept covered tightly.

The water in which these fish were found was very acid (pH 6.0 or lower) and it is only slightly hard. I could surmise that the amount of rain has softened the water considerably. The water has a deep brown color, clear, and fresh.

We have found these fishes an interesting and very satisfactory aquarium inhabitant. Eats any type of food. ◀

Pet Salamanders

Charles O. Masters
Walhonding, Ohio

SALAMANDERS are interesting creatures, relatively easy to keep, and make excellent pets. Obviously they are not of the cuddly type but are kept primarily to be observed and exhibited as objects of interest. They are held in high esteem as classroom pets in schools.

They do not belong in an aquarium with fish but instead should be given a home of their own which is certainly not hard to do. The primary methods which the animals have of defending themselves are flight and concealment so it becomes a challenge to coax them into a mutual friendship. *Taricha* secretes a poison in the skin as does the woodland dweller *Ensatina*. They do not bite and neither scratch nor sting! A newt is a small salamander of semi-aquatic habits, especially those of the genus *Triturus* which this article is about.

There are records to indicate that some kinds of salamanders will live many years in an aquarium or terrarium. One record states that a salamander lived seven years in a terrarium, another, twenty years. In Japan, a salamander is known to have lived for twenty-five years in a terrarium properly set up. In Amsterdam, a real record has been claimed for a salamander that is said to have lived for fifty two years.

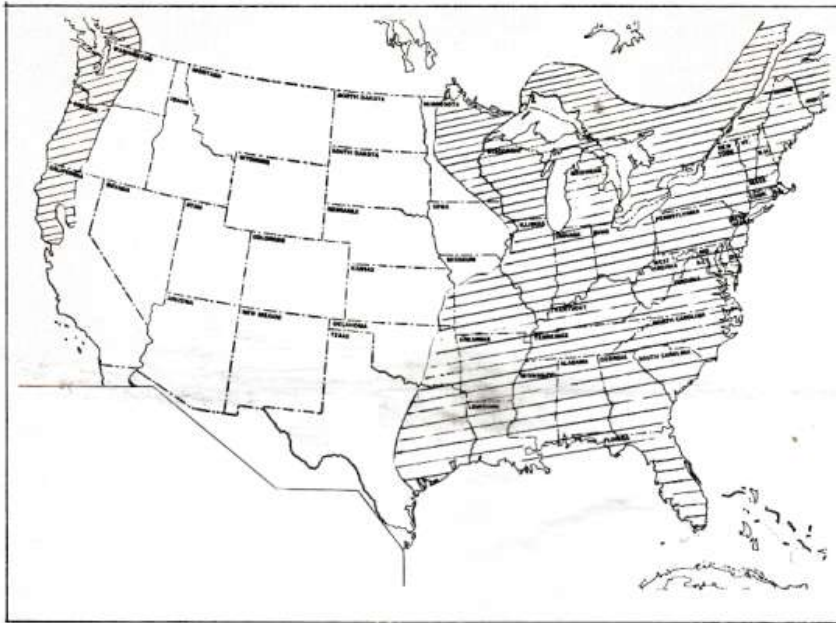
Although this particular article is about small salamanders, an Asiatic species, the Japanese giant salamander, the largest living amphibian, reaches a length of five feet.

No part of the United States is without suitable native species so that the pet salamanders can be acquired quite easily. Those which are so common are of the genus *Triturus*. In the eastern United States and Canada, *Triturus viridescens* is of special interest. The shaded area of the map shows where they can be collected.

The shaded area in the West illustrates where the species *Taricha granulosa*, the rough-skinned newt, can be collected. *Taricha torosa*, the California newt, and certain forms of subspecies of *T. granulosa* can also be collected in spots south and east of this shaded area. To be sure,

The adult aquatic stage of *viridescens* is reddish or olive brown or green in color, with underparts which are lemon yellow having fine black dots. Along each side of the back there is a row of scarlet dots ringed with black. The long tails which are about half the total length of the body suggest to many that the animals are lizards so they are continually mistaken for them in spite of their soft, scaleless skins. The salamander's head is small but its eyes are conspicuous. The hind legs of the male are relatively large and flat. Those of the female are more delicate and smaller. The females are more lightly colored.

The larval or terrestrial stage of this particular species is brick or orange red in color and has a single row of scarlet, black bordered dots on each side of their backs. For many years they were con-



There is practically no area in the United States where salamanders are not found. The shaded areas on the map above indicate regions with fairly heavy salamander populations. Lighter concentrations of the animals are found for many miles from any point on the borders of these regions.

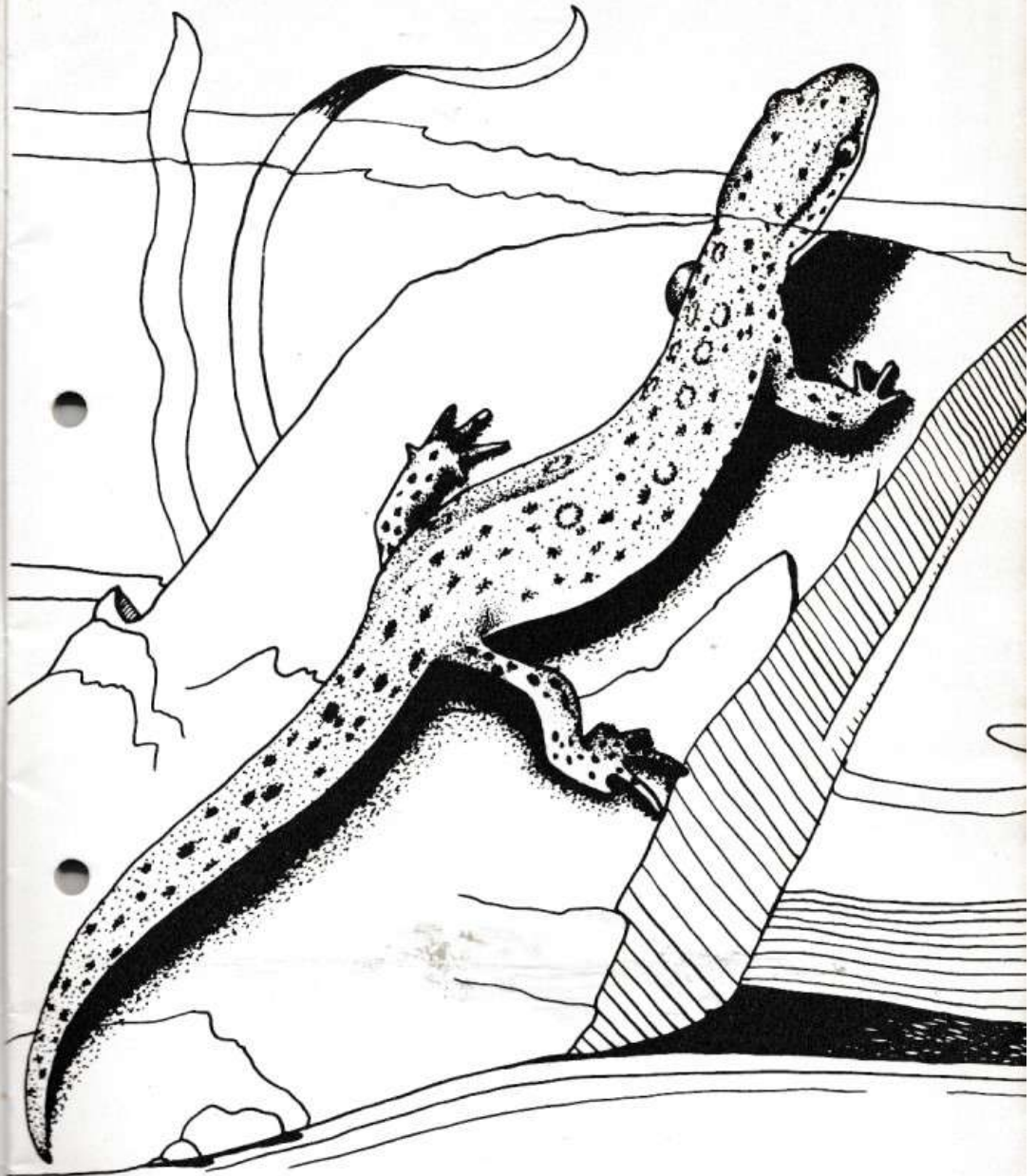
sidered a separate species and are commonly referred to as red efts.

The western species of *Taricha* are somewhat larger than the eastern salamanders and vary in color from a dark yellowish brown to a reddish or deep brown. Their bellies are yellow to deep orange. They live in ponds and in the more quiet stretches of meandering streams. Here it is rather interesting to observe the newts moving up or down in the water while remaining quietly horizontal merely by regulating the position of the air within their own bodies. During their early larval period they breathe by means of gills and later acquire lungs but all of their lives some oxygen is taken through their thin moist skins.

Salamanders, during their terrestrial stage, wander about the woodland among the dead leaves and mosses, sometimes crawling under logs or stones

but rarely more than a half mile from their home waters. It passes this stage in varying periods of time from zero to as much as seven years depending upon environmental factors but the average is two and a half years. Research work has demonstrated that if the pond dries up, the salamanders living in the water are able to change into a terrestrial form and continue to live on land until the pond reappears.

The breeding season of *Triturus* is from March to April but occasionally they mate throughout the year, especially during the autumn months. At that time from eighty to a hundred eggs are laid. The newly hatched larvae, depending upon the species, may be a dark green in color and have gills so that they breathe like fish. During this time they resemble small tadpoles somewhat in size and form. They remain as larvae for a period



In their aquatic stage, salamanders can be found with their heads above water, waiting for careless insects of which they can make a meal.

from twelve to twenty weeks, depending upon the food available and the temperature of the water. This takes them into the fall months at which time they are about an inch and a half in length and gradually lose their gills and acquire lungs. The color also changes to orange or bright red so that they become very conspicuous as they climb up on the land to spend an intermediate stage lasting at least one winter among the woodland plants as buried in the soil in cold regions.

During the months of May and October, the salamanders are most easily collected outdoors but they can be found at other times too. Especially in California where early rains of October and November may bring *Taricha* out along trails in the woods and along ravines. In spring and summer *Taricha* can be found in ponds and slow parts of streams. The secret is to know when and where to look. In the early morning after a night rain, woods close to shaded ponds are sometimes "alive with salamanders." For this reason for many years it was believed that the salamanders actually came down with the rain but the truth of the matter is that they come up out of the soil and leaves. They do most of their wandering about at night when the humidity is greater than it is during the daytime. So these are the times to collect.

One of the advantages of salamanders as pets is that they require a relatively small space for housing them. They will live the year 'round in shallow water in an aquarium with a stone or two placed in it so that they can crawl about. The red efts are most at home if some damp fernery is added along with a quantity of soil in part of the tank. Frequent changes of water is sometimes necessary if the addition of food particles causes the water to become foul.

The stones can be arranged to form a cave-like retreat in one end of the tank or a small piece of bark may prove satisfactory. A shelter area, however, is neces-

sary. A piece of glass placed on top will maintain proper humidity.

Temperature, light and especially moisture are very important. The shelter area is placed at one end of the tank with a *small* light, rarely more than a forty watt bulb (15 would be better), placed at the other. Sunlight is definitely not a reliable source of heat and may do more harm than good. Salamanders do not want too much heat. The terrarium, therefore, should not be placed in strong direct rays of the sun. An incandescent lamp is easiest and safest to use because it can be varied by using bulbs of different sizes.

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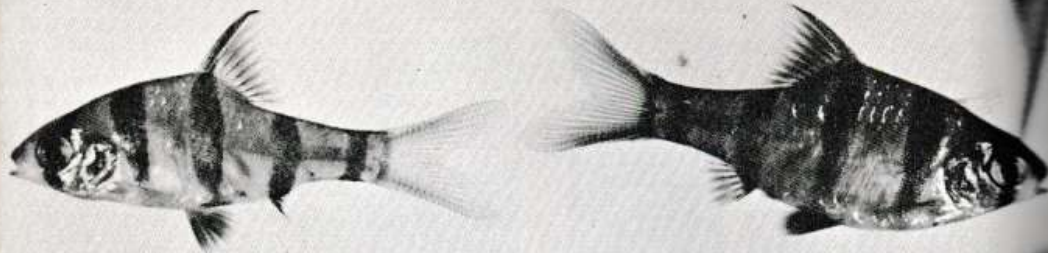
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Both the aquatic and terrestrial stage salamanders are carnivorous in nature and can be fed bits of meat, earthworms, whiteworms or raw beef. The red eft is fond of plant lice and sow bugs, *Oniscus*, which can be collected in large quantities in damp areas of back yards.

Care should be taken to learn to handle the salamanders correctly if they're to be handled at all. The aquatic species should be handled only with a wet net.

If there is sufficient water in the aquarium, the salamanders will breed rather readily, especially if there is a large quantity of vegetation present. The salamanders soon become real pets, taking bits of liver or fish from the fingers and learn to haunt the parts of the aquarium where the food is offered. ◀



A pair of belted barbs. Photo by G. J. M. Timmerman.

The Belted Barb *Barbodes hexazona*

Ong Kay Yong

Singapore

THE BELTED BARB is a species of barb which calls for special treatment. The fish are most difficult to breed and raise. Under inexperienced handling, a whole brood will die off very rapidly. After several experiments with *Barbodes hexazona*, I found that they have a very peculiar temperament of their own. The secret in working with them lies in the grouping of a school of fish caught in a particular spot into a single tank without mixing them with another school of the same species caught in another stream or even in the same stream but some distance away. So, success cannot be assured unless you are lucky enough (as I am) to be able to capture the fish yourself in their native waters.

The species is very fragile and very sensitive to any kind of change. They are best reared outdoors in soft stream water if possible. The expert will recreate the spot from which the fish were caught as accurately as possible. This means that if the spot is sandy with pieces of dead wood and rocks, some of these materials will be brought back and used with the fish. Also

important, some plants from the spot should be utilized, and aeration is a must.

If all this is difficult or impossible for you, there is a second-best way to deal with these fish successfully. Get your hexazonas while they are still very young. Buy at least 15, and give them a large aquarium of their own. Such young fish should be able to acclimatize themselves to life in the water you provide. By the time they are half grown they should be acting as they do in the wild. They will swim about the bottom slowly, grouped together for safety. When they are fully grown, they should pair off to spawn. The female will probably drop about 50 eggs, which can be removed and hatched in a separate container filled with water from the parent's tank.

The young fish are difficult to raise. They have six distinct vertical black bars. As they grow larger (to a maximum of about 2½ inches), the last bar, at the base of the tail, gets narrower and fainter until it sometimes becomes indistinguishable. Younger fish will also often lose this bar for a short time if they are frightened.



The springs feeding the tropical water plant colony in Eger. The water, flowing out of the concrete tubes, is at a temperature of 90°F. and is radioactive.

American Fish Species and Tropical Aquarium Plants in the Waters of Hungary

BY DR. GYORGY LANYI
Budapest, Hungary

With photos by the author

To the readers of TFH, it probably seems very curious that there are ten different species of fish from North, Central, and South America living freely in the natural waters of Hungary despite its middle European continental climate. These fishes are not only able to survive the hardest winters, but they also reproduce themselves here quite well. It may also seem strange that many species of aquarium plants from the tropics are flourishing in these same waters. A mention of the tropical fishes living here as well as a brief description of aquarium-plant colonies in Hungary's town of Eger and spa, or mineral spring, of the Miskolc-Tapolca area have appeared in an issue of TFH*.

*The Aquarium Hobby in Hungary, by Dr. Herbert R. Alexrod, *Tropical Fish Hobbyist*, Vol. X. No. 12, August 1962, p. 11.

Let us begin with the plants. It is not surprising to find that the idea of cultivating subtropical and tropical aquarium plants in bodies of water that are fed by springs with constant warm temperatures originated with aquarium hobbyists. Several Hungarian aquarists decided, independently of each other, to introduce various exotic aquatic plants into the waters of Hungary. The areas they chose were the lake at the spa in Hévíz, which is fed by 95° F. spring water; the 74° F. lakes of the Fényes Spring in Tata; the Lukács-bath in Budapest; the Rómaifürdő (Roman baths) on the outskirts of Budapest; the ornamental ponds at the fashionable resort of Eger, which are fed by 90° F. spring water; and the boating pond of the Miskolc-Tapolca, which is also fed by warm springs. The plants introduced in these places with a notable degree of success include eel grass, *Vallisneria spiralis*; *Elodea gigantea*; Milfoil, *Myriophyllum scabratum*; *Limnophila sessiliflora*; and blue water lily, *Nymphaea coerulea*.

The *Vallisneria* formed very large underwater fields. The *Elodea*, *Myriophyllum*, and *Limnophila* spread from the pond in the Miskolc-Tapolca area into the bed of the adjoining Hejo stream, where they now grow in profusion. Unfortunately, these wild-grown plants are not always conveniently accessible to the hobbyist, nor, for a variety of reasons, are they always desirable for use in aquariums.

In Eger, however, aquarium plants are under commercial cultivation. The water used here comes from a 90° F., radio-active spring. The plants are raised in a series of adjoining rectangular concrete pools, or boxes, that are covered with wire. The cultivation area consists of 29 lake-units. The entire cultivation project is under the management of the Society for Propagation of Scientific Knowledge.

One difficulty in the cultivation of these plants is the high lime content and subsequent marked hardness of the waters of Eger. This makes the water unsuitable for a wide variety of subtropical and tropical aquarium plants. Nevertheless, several species from the ever-popular genus *Cryptocoryne* do very well under these conditions. These species include *C. ciliata*, *C. haerteliana*, *C. nevillei*, *C. willisii*, and *C. griffithii*. Even as late as the end of November, stocks of *C. griffithii*, with purple calices, can be seen. Although all the cryptocorynes are cultivated in very shallow water, they grow much larger and stronger than they do in the aquarium, and when they are transferred to a large aquarium they are very decorative indeed.

Beside cryptocorynes, many other aquarium plants are cultivated in the warm-water lake-units of Eger. These include *Cabomba caroliniana*, *Elodea gigantea*, *Limnophila sessiliflora*, *Ludwigia mulertii*, *Bacopa caroliniana*, *Myriophyllum scabratum*, *Hygrophila polysperma*, *Vallisneria spiralis* var. *torta*, *Vallisneria spiralis* var. *gigantea* and several others. All of these grow in

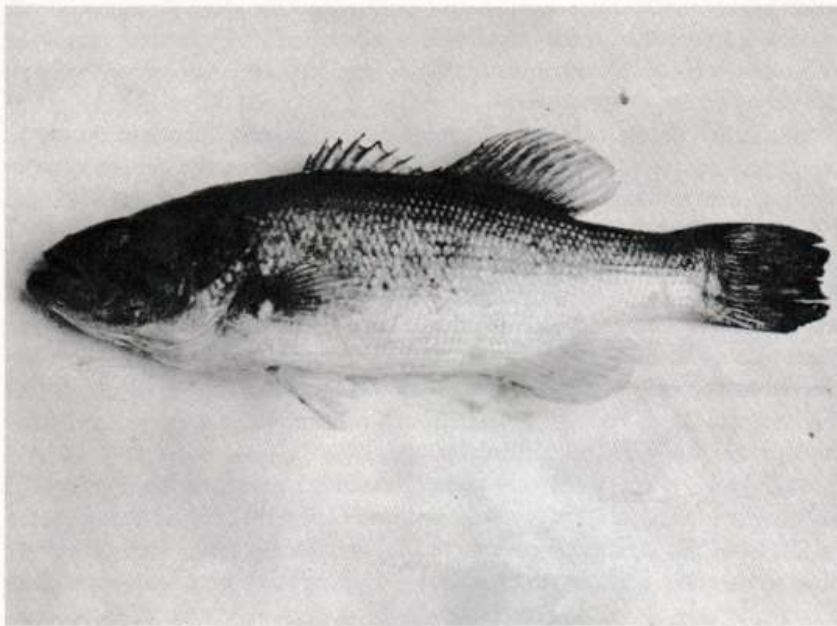
large pure colonies. In comparison with cryptocorynes, all these other species grow much more rapidly and abundantly. However, when the cultivation area is increased, most of the new area is used to grow more of the very-popular cryptocorynes.

In addition to the commercial exploitation of aquatic plants in the warm ponds of Eger, there is also the possibility of broadening the cultivation area into an open-air aquatic botanical garden. Toward this end, in 1955 and 1957, attempts were made to establish both the Amazon water lily (*Victoria amazonica*) and the thorny water lily (*Euryale ferox*) in some parts of the Eger cultivations. The giant Amazon water lilies have produced leaves, which, though not as large as they might be, are of normal shape. In October, these lilies produce flowers. There can be no doubt that adding to the commercial water plant culture an open-air aquatic botanical garden (serving for both education and to attract tourists), will make this spectacular display in Eger unique in all of Central Europe.

The presence of tropical and subtropical water plants in the open waters of Hungary is fascinating, but it is also interesting that ten different species of fish from the Western Hemisphere are reproducing themselves generation after generation in Hungarian waters. Five species were implanted here

The concrete pools of plants at Eger are fenced in. The plants are protected further by metal gratings which cover them but allow them to get sufficient sunlight. Here, the director of the establishment is selecting Cryptocoryne stock.





A largemouth bass (*Micropterus salmoides*) from the fish farm of Szigetszentmiklos, where this species is bred for use in stocking the waters popular with anglers.

for economic reasons, one species to eradicate mosquitos, and four species for aquarists.

From 1897 to 1910, the fertilized roe of the rainbow trout (*Salmo gairdnerii*), a native of western North America, was brought into Hungary. The rainbow trout is now established in the waters of the Danube region and northern Hungary. It is particularly popular as a sports fish, and it is even bred for market in a trout hatchery near Lillafüred.

The roe of another North American trout, the brook trout (*Salvelinus fontinalis*), was imported in 1910. At present, the number of true brook trout, found in Hungary only in the waters of the Garadna, in the Bükk mountains, is slowly decreasing because they are interbreeding with the native brown trout (*Salmo trutta*). The hybrid offspring, known as "tiger trout" are a wonderful ornamental fish for the aquarium, but they are sterile and so are responsible for a reduction in the productivity of both parent species.

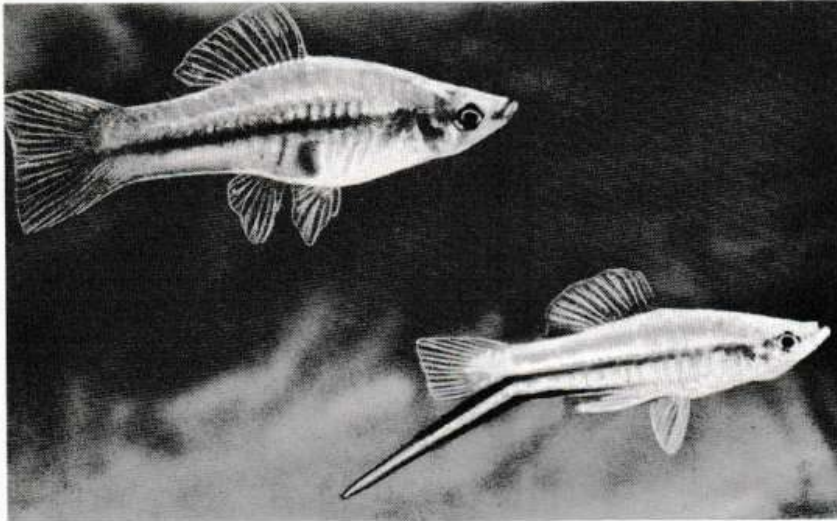
In 1905, brown bullheads (*Ictalurus nebulosus*) from the Mississippi River drainage were introduced into several slow moving, muddy Hungarian

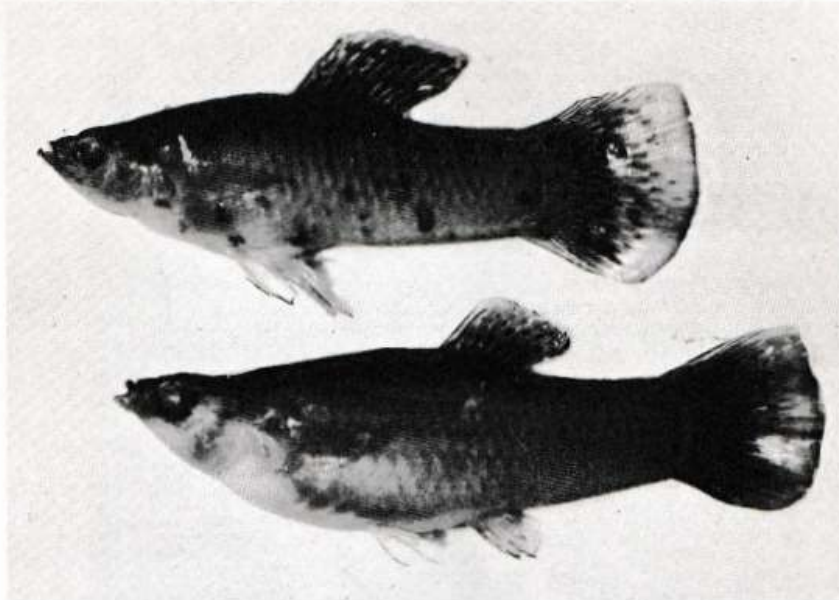
streams. This experiment was not really a success: the brown bullhead does not grow very large in Hungarian waters, but it is a voracious destroyer of the roe and the fry of more desirable fish species. Since it now inhabits nearly all our waters in great numbers, it is very detrimental to the fishing industry. Only aquarists can enjoy these fish, for brown bullheads make handy aquarium fish.

The common sunfish, or pumpkinseed (*Lepomis gibbosus*), was imported in 1905 from North America to serve as a food fish in our fish hatcheries. This importation also proved to be a mistake. Young sunfish escaped through the sluices of the fish farms and into open water where they rapidly multiplied to enormous numbers, invading all adjoining rivers and lakes. The pumpkinseed is worthless commercially and is harmful to many fish that do have commercial value. Though quite beautiful, the pumpkinseed is not highly esteemed by aquarists and is generally kept only in school aquaria.

The largemouth bass (*Micropterus salmoides*) which ranges naturally from the Great Lakes to Mexico and Florida, and has been introduced widely elsewhere, was introduced in 1909 to Lake Balaton in Hungary. This lake, called the "Hungarian Sea," is the largest lake in middle Europe. From here it migrated into the Danube. The species was not as prolific as our other "imports" and, so, recently it has been bred in a hatchery to stock the waters frequented by anglers and to supply other hatcheries. Only a few people know that the 2-to-4-inch young with the irregular black designs on their

A pair of green swordtails (Xiphophorus helleri) from the brook that flows through Eger.





A preserved pair of mollies (*Mollienisia sphenops*) from the brook at Eger.

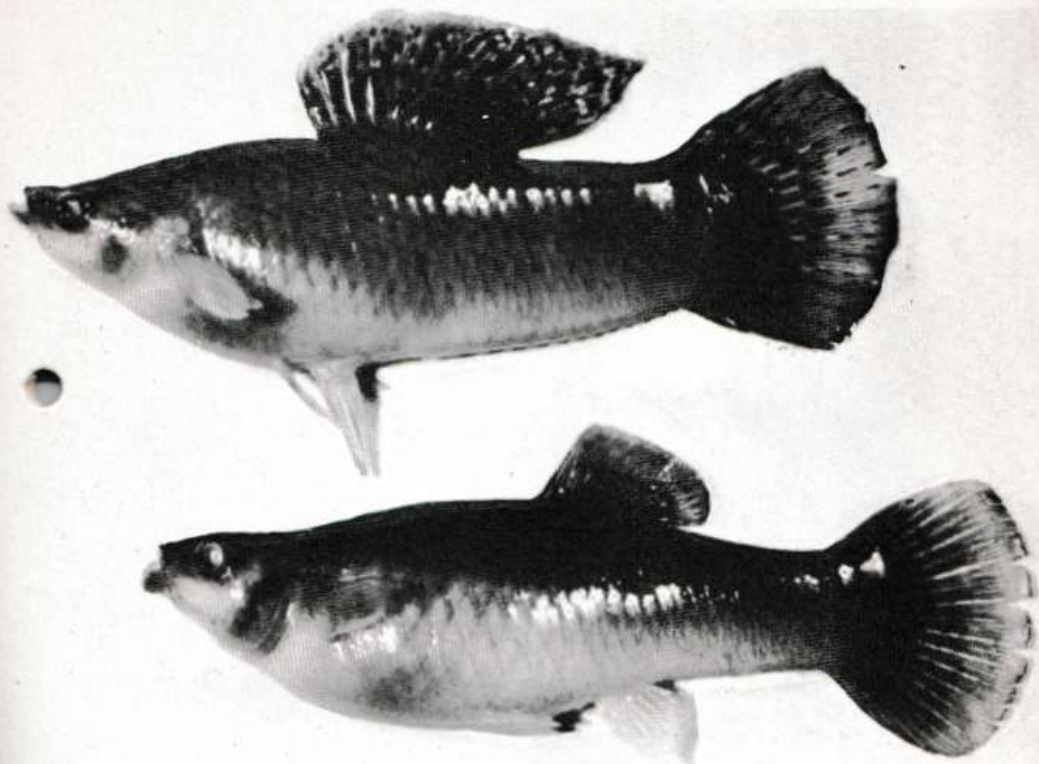
silvery sides, are pretty ornamental fish that are very suitable for the indoor aquarium.

The mosquitofish or spotted gambusia (*Gambusia affinis affinis*), native to the Gulf region of the United States and Mexico, was implanted by the Hungarian Public Health Institute into lakes near Héviz and Tapolca. This measure was adopted to exterminate mosquito larvae and, thereby, control the mosquitos that plagued the resort guests. These fish multiplied to large numbers in both places. From the lake near Héviz, they spread through the canals to Lake Balaton, where they now live throughout the winter. Before the *Gambusia* were introduced, there was a nice guppy stock living in the Tapolca area. There are, however, hardly any of these guppies left now, for their young were devoured even more eagerly by the greedy *Gambusia* than were the mosquito larvae.

There were four tropical fish introduced to Hungary by aquarists in order to satisfy hobbyists' needs. There are large quantities of guppies (*Lebistes reticulatus*) populating the ponds of two thermal bathing sites in Budapest, the Lukács-bath and the Rómaifürdo (Roman baths). Guppies are also found in the warm-water ornamental ponds of the park in the Miskolc-Tapolca area and in the brook that flows through the town of Eger.

**TABLE OF FISHES TRANSPLANTED FROM
THE WESTERN HEMISPHERE TO HUNGARY**

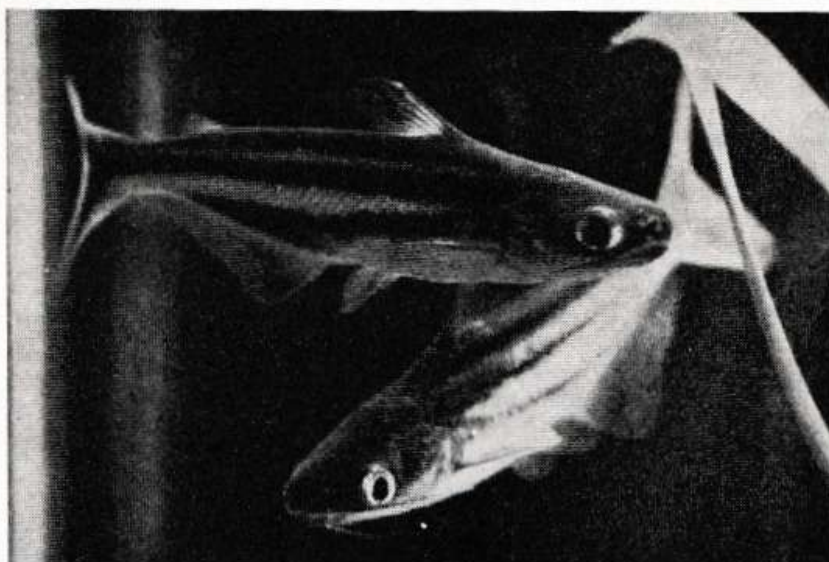
<i>Region</i>	<i>Family</i>	<i>Species</i>	<i>Purpose of Implantation</i>	<i>Occurrence in Hungary</i>
North America	Salmon	Rainbow Trout (<i>Salmo gairdnerii</i>)	Economic	The brooks of Szinva, Garadna, Sed, Gyongyos
		Brook Trout (<i>Salvelinus fontinalis</i>)		Brook of Garadna
	Sun- fish	Common Sunfish (<i>Lepomis gibbosus</i>)		The river systems of the Danube, the Tisza, and Lake Balaton
		Largemouth Bass (<i>Micropterus salmoides</i>)		Danube-branch of Soroksar, Balaton, Drava-river
	Cat- fish	Brown Bullhead (<i>Ictalurus nebulosus</i>)		The river systems of the Danube, the Tisza, Balaton
Central America	Live- bearing toothed carps	Spotted Gambusia or Mosquitofish (<i>Gambusia affinis affinis</i>)	Health	Ponds and canals of the spas Heviz and Miskolc-Tapolca
		Green Swordtail (<i>Xiphophorus helleri</i>) and its red variation	Hobbyist	Brook of Eger
South America		The Molly (<i>Mollienisia sphenops</i>)		Brook of Eger
		Sail-fin Molly (<i>Mollienisia velifera</i>)		Brook of Eger
		Guppy (<i>Lebistes reticulatus</i>)		Thermal bathing sites in Budapest, Lukacs-bath, Romai Furdo, ornamental ponds of Miskole- Tapolca, Eger



A preserved pair of sail-fin mollies (Molliensia velifera) caught in the brook that flows through Eger.

The green swordtail (*Xiphophorus helleri*) and its red variation, the molly (*Molliensia sphenops*), and the sail-fin molly (*Molliensia velifera*) were originally introduced into the canal which borders the lake in Eger. From this canal, the fish spread into the brook that flows through the town, where they can now be found swimming in dense schools. Many visitors are delighted by the sight of these tropical fishes from far away regions of Central and South America living in the crystalline waters of Eger.

In comparison to specimens bred and raised in the aquarium, the bodies of these fishes are longer and more streamlined. This is particularly true of the mollies. It must be said, however, that pure *Molliensia sphenops* or *Molliensia velifera* are rarely found; there are mostly hybrids of the two species, some looking more like one species, some looking more like the other.



Two of the author's Siamese sharks. Photo by Rossel.

A new catfish genus

The Siamese Shark *Pangasius sutchi*

Fritz Rossel

NEW IMPORTS often produce new and rare catfish species, but unfortunately there are usually only a few specimens. Obviously, catfishes, due to their living habits, are much more elusive to collectors than other fishes. An exception to this rule is a catfish which was recently imported in good numbers from Siam by the Tropicarium in Frankfurt, where until then they were not known to hobbyists. From first sight these fish distinguish themselves by

their elegant swimming motions and gleaming silver sides as an unusual thing among catfishes.

The extended length of the anal fin and the normally built dorsal fin leave no doubt that these belong to the family of Schilbeidae, which is distributed throughout Africa and Asia. Members of this family are rarely imported, and then they are usually limited to African species: *Schilbe mystus*, *Irvinea voltae*, *Parailia pelluci-*

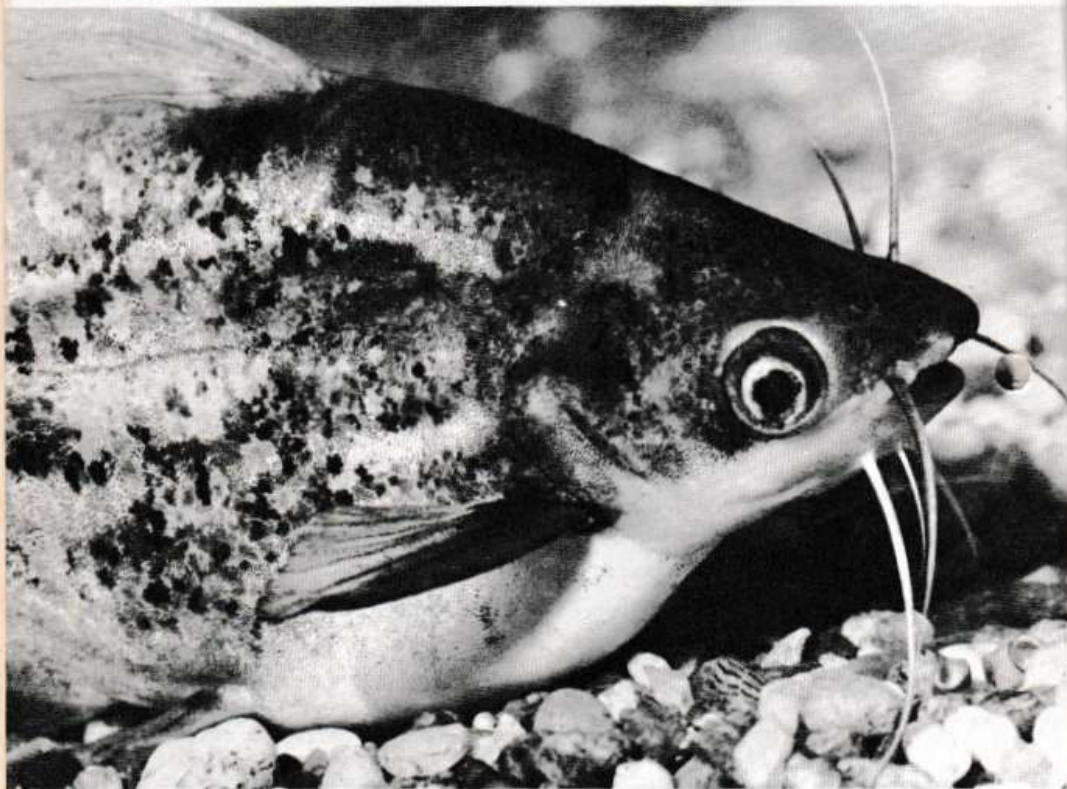
da, *Physalia congica* and the numerous specimens of *Eutropiellus debauei*. The introduction of Asiatic members of Schilbeidae is a very great rarity.

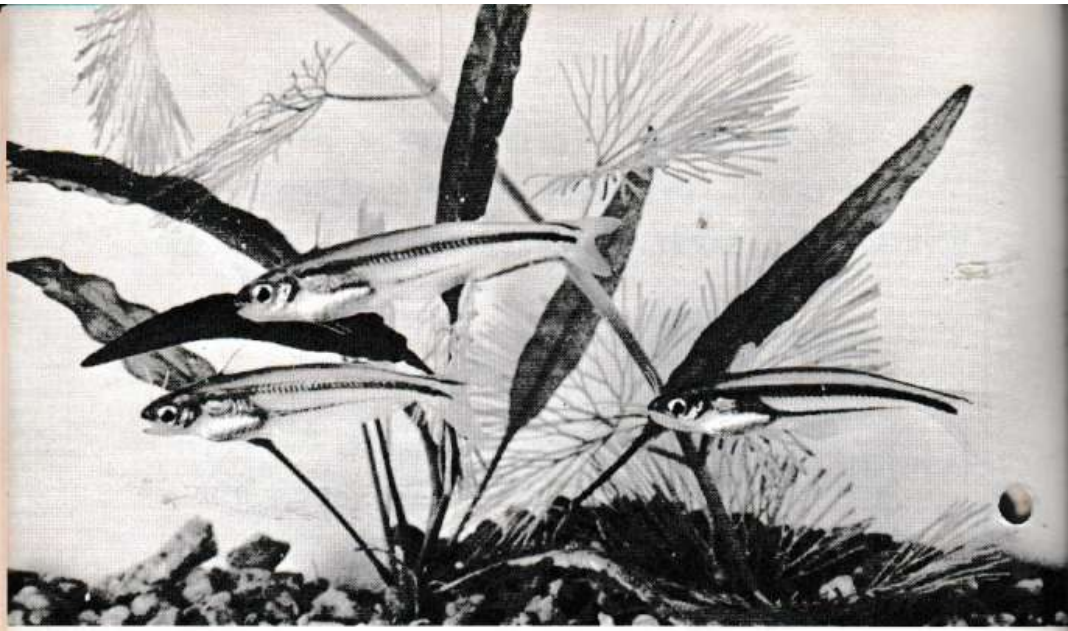
Identification of this new species from Siam was made possible by the distinctive coloration of the living specimens; *Pangasius sutchi*, a species which is known to occur in the vicinity of Bangkok. The form of this fish is marked by the broad head and the long, laterally compressed caudal base. At first sight, when looking at the head, one is impressed by the large mouth and very large eyes. The four short, thick barbels are seldom extended, so these organs, so common to catfishes, are seldom noticed.

The body color is unusual for a catfish, if you overlook the related genus *Eutropiellus*. Between three black longitudinal stripes there shimmer two light stripes, and the belly is a shiny silver. In the forked tail there is a light black streak which extends to the tips, and in the anal there is a very small black spot.

Pangasius sutchi are the most active catfish I have ever seen. When in good health they swim ceaselessly in a school in the open water. Often they remain in a sparsely planted corner of my tank. Only when this corner is either strongly lighted or darkened can they be driven from there. What factors make this corner so

Schilbe mystus is in the same family as the Siamese shark.





Eutropiellus (or Etropiella) debauwi is also a member of the *Schilbeidae* family.

attractive I cannot rightly say. There they swim up and down the glass in circles. When they leave this spot and are in open water they swim slowly, as if to first orient themselves to their new surroundings. When doing this, they tilt themselves with their heads at a slightly lower level than their tails. With their flat heads in this position, they show a great resemblance to those marauders of the high seas, the sharks.

The picture changes quickly if they are frightened. Then they dash madly about the tank without noticing any obstructions. After a while they sink to the bottom and lie cramped on their sides or on their backs, and the only sign of life is their labored breathing motions. A few minutes later, they recover completely. This fleeing reaction is triggered off very easily, especially if the fish have not yet become fully acquainted with their surroundings: only an abrupt movement near the aquarium is necessary. Possibly the sudden strain causes a lack of oxygen which quickly paralyzes *Pangasius*, because with fishes, fatigue does not come on gradually

as it does with mammals, but hits them suddenly, like a blow.

Another flight reaction of Siamese sharks is worthy of mention. Probably this species carries an alarm substance in its skin, as do many other catfishes, barbs, and tetras. This substance is liberated when the skin is injured even only very slightly. Other similar species nearby can detect the odor and in this way be warned of the fact that one of their kind nearby has been injured or even eaten, and they take flight. I have seen this happen with my *Pangasius*. When I introduced a new one which had been captured by netting it, the others reacted by fleeing. The classic test for this reaction is the addition of skin extract from a freshly killed specimen. I did not want to destroy one of my few fish for this test, however.

Siamese sharks exhibit further extraordinary behavior. We have all seen many catfish come up for a gulp of atmospheric air, from which oxygen is extracted by special breathing organs, as occurs with *Callichthyidae*, *Loricariidae*, *Clariidae*,

and Heteropneustidae, to name a few families. Up to now the *Pangasius* species have not given evidence of such an organ. That the organ exists is a possibility, however, because every 5 minutes or so they dash quickly to the surface, seemingly to gulp air. However, I can never see them expel used-up air, nor does their position in swimming ever change. Perhaps *Pangasius* can store air in its air-bladder and there extract the oxygen from it as we have observed in many other fishes.

The feeding of Siamese sharks is very simple. They eat whatever living foods are in season: tubifex, mosquito larvae, daphnia, etc. Young specimens also take live foods, but are somewhat awkward in capturing them. Adults can also eat baby fishes but are very clumsy when it comes to catching them. The large eyes and short barbels of *Pangasius* lead us to suspect that food is located visually. This is not absolutely the case. They eat only what they have first felt with their barbels. The odor of food excites them and causes them to look about with spread barbels for bits. In the aquarium they learn quickly that food is found only in a certain place, such as under the worm feeder. Once a tubifex worm has succeeded in burying himself in the gravel, he is quite safe from the Siamese sharks, for they are not naturally capable of digging into the bottom.

To date I have never been able to observe that my *Pangasius* would accept foods of a vegetable nature. This is surprising, because we know that large *Pangasius* species in Siam are largely or fully vegetarians. These species are often characterized by a partial or complete loss of their teeth as they get older. This leads to an unusual circumstance. It is believed that one of the *Pangasius* species undergoes such a great change after losing its teeth that the large specimens have been recognized as a different genus: *Pangasionodon gigas*, which grows to be longer than 6 feet. Unfortunately no one can be sure which, if any, of the numerous species of *Pangasius* are the babies of this giant, because none of the intermediate

growth stages have as yet been recognized. Nevertheless, we can be sure that our *Pangasius sutchi* are not the young of the giants, because the two fishes are found in different river systems. The largest *Pangasius sutchi* to be mentioned in literature was about 7 inches long. Imported specimens are usually about 2 inches in length.

With good feeding they grow nicely. They should not be put in a thickly populated community aquarium, because there the danger exists that they would be crowded from any feeding place to which they become accustomed. Singly kept specimens seem to be very sensitive, eating very little and spending most of the time dully on the bottom.

Pangasius may be kept with relatively inactive tankmates such as other catfishes, labyrinth fishes, or the smaller cichlids. They stay in the middle waters, a section which in tanks occupied by such tankmates is frequently bare.

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Beautiful Bigeye

M. D. Bellomy

ALTHOUGH by no means a rare fish, the deepwater bigeye *Pristigenys alta* (Gill), is not usually found in the home marine aquarium. At least, this was true in South Florida until the latter part of 1961. At the present time, however, some of the most experienced marine collectors say more bigeyes are being taken and displayed than at any previous time. The Miami Seaquarium, for example, has twenty specimens exhibited in wall tanks, and four hobbyists known personally, are gleefully showing off one or more bigeyes in their aquaria.

This is fortunate, too, because the uniquely-finned and beautiful deepwater bigeye is one of the most gentle, affectionate wet pets any saltwater enthusiast could hope to acquire. Moreover, it adapts readily to life in captivity, is not difficult to maintain, is brilliantly colored and has interesting anatomical structures seldom seen in other species.

Adult bigeyes, as the common name implies, usually are found only in deep water. Juveniles, one and two inches long are rather common some years in the grassy flats of South Florida bays during September, October, November and early December. The very young may be found floating around in tiny islands of sargassum weed during late July and early August.

Although the marine hobby is not new, some natural history devotees were maintaining small ocean fish in captivity more than a century ago, it has gained

tremendously in popularity and practicality during the past decade. This has been even more pronounced in the three years immediately past. Prior to that time, commercial shrimpers saw and handled many of the specimens so popular with marine hobbyists today but intent on the business at hand—a full catch of saleable shrimp—these men quickly returned anything other than shrimp to the sea and usually, without even a curious glance.

Now, however, the picture is changed. Commercial shrimpers have learned there is money in collecting marine specimens for both private and commercial exhibits, and many are maintaining saltwater setups in their own homes. This comparatively new awareness of the value of small marine fishes trapped along with the shrimp catch is partially responsible for the bigeye's current popularity and availability. This year particularly, dozens of these attractive and lovable little fish have been brought up in commercial nets and ultimately, were distributed to friends or turned over to marine tropical handlers and shippers for sale to the general public.

Previously, the scientific name of this species was *Pseudopriacanthus altus*, Gill. However, a revision of the List of Common and Scientific Names of Fishes from the United States and Canada, second edition, American Fisheries Society Special Publication No. 2, lists the scientific name as *Pristigenys alta* (Gill), and

gives the common name as "short big-eye."

Because no one of whom I have inquired has ever heard this species commonly referred to by any name other than deepwater bigeye, I have refrained from using the unfamiliar "common" name included in the above mentioned list. As the authors of that list so aptly point out, many "species have such firmly established common names that it would be unrealistic to reject them."

The bigeye's body is ovate. Seen overall, however, the fish appears almost as wide as it is long. The head, eyes and mouth are extremely large compared to the rest of the body. The mouth opens like a down-swimming trap-door. When observed head-on, the bigeye resembles (in miniature and without ears) a pugnacious-looking English bulldog. The bigeye always looks "mad" — but how misleading can appearances get?

The bigeye's upper jaw-teeth are villiform; in a narrow band with an outer series of enlarged teeth. The lowers are similar but the inner series here are larger than that of the upper jaw.

The fins are exceptionally attractive. The dorsal, next to the body, is nearly colorless. The entire outer edge is tipped first in black then in a pale flesh color. Nine to fifteen strong spines that are depressible in a groove are found in this fin. The soft dorsal is nearly transparent, splashed with tiny black dots. The anal fin is almost a replica of the dorsal, the soft part being long, transparent and dotted. The ventrals are beautiful. Very large, black and somewhat fan-shaped, they are situated on the thorax. The fish sometimes settles slowly to the bottom and appears to rest lightly on the ventrals. The pectorals are small compared to the other fins and are so transparent they are difficult to define.

Adults, up to thirteen inches long, are frequently found in rather deep West Indies waters. Specimens have been taken by rod-and-reel fishermen as

far up the West Coast of Florida as Pensacola, along the eastern coast to Charleston, and the young are said to stray, in the Gulf Stream, as far north as Rhode Island.

For four months now, I have had the pure pleasure of keeping one of these beautiful little sea babies in my home. My Robin — so-named because, as he grew, his orange-tinted red body reminded me of the breast of a robin — came to me aboard a sea-weed raft.

Every Sunday, weather permitting, my husband and I go fishing — he for fish to eat — I for fish to observe, study and photograph. My particular joy is to reach overboard into the blue waters of or near the Gulf Stream and scoop up sargassum weed as it floats by. The living treasure secluded in such drift weed is almost beyond imagination.

I prefer to bring in babies — the younger and smaller, the better. They seem to mind less the transfer from oceanic to aquarium life, and adapt far more readily than larger, older specimens.

Robin was about the size of a match-head when he was dislodged from his sargassum nursery into my collecting pail. He was so tiny he looked like a jet-black, animated dot about this big ●. There was no single hint of the red beauty he would develop as he passed from "baby days" into "childhood."

I was beside myself with anxiety that I would not be able to keep my tiny black prize alive until I could get home and examine it with the aid of a magnifying glass. I did, however, but even then, I hadn't the remotest idea of what kind of fish I had — I wasn't even sure it was a fish.

I put the tiny baby in a five-gallon aquarium quite alone except for an abundant supply of fresh-hatched brine shrimp. They must have been just "what the doctor ordered." Robin ate and ate and ate. Within a week, the dot had tripled in size. I could see clearly the very large eyes and odd

mouth, and I began to have an inkling of the unusual fin structure. A fair portion of my time that first week was spent, magnifying glass in hand, admiring my prize.

At the end of a month, I began feeding Robin bits of beef on the end of my finger. I haven't yet determined the precise operation involved but bigeyes seem able to slip their snouts under a piece of beef, sort of balance it at the tip end, then take the food into their large mouths a little bit at a time, almost as though it were being rolled in on an invisible conveyor belt. It's a most unusual method of feeding and rather difficult to describe.

A word of caution is a must here. Be careful when hand-feeding a very young bigeye that the fish doesn't "unhinge" its jaw. The lower jaw is attached by an extremely thin, almost transparent, membrane and sometimes, in eagerness to

snatch a tasty tidbit, so much force is exerted that the fish's jaw will become "unhinged." The mouth then locks open.

This happened to Robin twice. The first time was shortly after I began feeding beef on my finger. I was frantic. For a moment, I simply could not think what to do. He began settling side-ways to the bottom, his mouth gaping. I knew I had to get that jaw back in normal position so his mouth would close, but how? I ran to the kitchen, got a toothpick, grabbed a small step-ladder, and returned to the double-tier fish rack on which Robin's tank stands. In far less time than it takes to recount, I placed the ladder so I could reach easily into the aquarium, caught and held Robin in my left hand while I maneuvered the flat side of the toothpick inside his mouth and against the side of the jaw where it seemed to have unhinged. Pressing against it gently, my little pet made a

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movement similar to one's chest movement when the breath is caught sharply, then closed his mouth and wriggled in my hand as much as to say everything was all right again.

The second "unhinging" was nerve wracking but had the same happy result as the first.

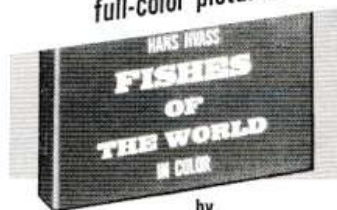
The best way to prevent such "unhinging" probably is to let the food float down free in the water so the fish may take it without assistance of or holding by the feeder. In Robin's case this is not always feasible. Sometimes, he simply does not see the food. This is especially true if he has remained in bright, even semi-bright, light for an hour or more. If the food floats into exactly the right position and the light is not too bright, the bigeye is able to see it. Otherwise, an abundance of food could be in the tank and the fish yet starve to death.

This species will not hunt for food nor pick it from the floor of the tank. The position and shape of the mouth probably has a great deal to do with this. So, whenever pieces of food settle, they should be removed immediately.

Even though steak is appetizing fare whether served on the dinnertable or in the aquarium, if it were served every meal almost anyone would, in time, tire of it and eventually, might even refuse to eat any more. This can happen as easily in the feeding of fish as it does with humans. It is a good idea then, to vary any fish's diet. If beef is fed today, tomorrow try crumbled up or finely chopped shrimp. This could be followed by thin strips or small pieces, depending upon the size of the fish, of raw fish. Many species will eat canned fish roe. This is an extremely nutritious food and should be offered two or three times a week unless the fish shows no interest at all in it. Dry foods—coarse for large fish and medium or fine for small and/or young ones—should be given as a supplement. Marine tropicals



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often do quite well, apparently, on a diet of dry food only. It has not been my experience, however, that such a diet is entirely satisfactory.

I have referred to Robin throughout this article as "he." I have no valid reason for doing this. Robin may very well be a "she."

Almost nothing is known of the life history of *Pristigenys alta*. My specimen probably was no more than a day or two old when collected. This is based on an observance of growth during the following four months. Moreover, as pointed out previously, young specimens are plentiful in the fall months of some years, in some areas. Considering these facts, spawning probably occurs in the late spring, depending upon the length of time necessary for incubation. This is conjecture, of course, and must await a great deal of observance in the natural habitat before definite conclusions can be drawn.

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All About the Earthworm

Ted Bear

IT USED TO BE daphnia. Now it's brine shrimp. But in my estimation the true king of fish foods has yet to have his day.

For the richest, most nourishing food of all — the earthworm — is also one of the most available and one of the most easily raised. Why is it not more popular is a real mystery to me.

True, the earthworm is dirty by definition and messy to prepare. It's not neat like the brine shrimp, and it doesn't come packaged, like them, as a frozen "TV" dinner. (But then why doesn't it? Why doesn't a smart somebody do the perfectly feasible thing of marketing clean, frozen worms in a plastic bag, ready to be clipped into bite-size pieces by the customer's nail-scissors? Or perhaps better, frozen fish bite-sized chopped worms?)

Earthworms cannot be equalled for packing meat on the ribs of pale, sickly fishes, and — here's their finest sacrifice and contribution to the fish hobby — they are a sure bet for conditioning both the easy and the difficult breeders to a point where spawning is almost bound to take place if the other conditions necessary in the aquarium are supplied.

"Earthworm" is our word. Actually there are many similar species that we group together under this word. In America and Europe we usually mean *Lumbricus terrestris*. Relatives, though,

usually differ in some minor respect, some by rather major respects, for example, the earthworm of South America which is seven feet long! "Small" wonder this one was worshipped by local Indians. Also there's an Australian worm 12 feet long. You can walk around on top of the ground and locate one below ground because of the audible gurgling sound it makes as it moves.

Small earthworms are found over most of the world except in deserts and cold regions. Since they soak up water through their skin, sand and dry soil are not suitable. They go deep underground in winter, during dry spells, and also on bright days. They are sensitive to light. They have no eyes (nor ears) but their whole body is sensitive to light.

Too much water will suffocate them, and that is why you see them lying around on top of the ground after a hard rain. They usually die in great quantities, for they're already tired from their struggle to get out of their flooded burrows, and as they lie there on top, they often drown and, if not that, rays from the sun destroy them. If you raise worms for your fish, therefore, never let the soil get too wet, and keep them in a cool, dark place.

The earthworm has no true head. No true brain, ears, eyes or obvious separateness in shape from the rest of the body distinguish the front end. It is meaningless to speak of anything but

the "front end." However, the earthworm is organized about the front or oral (mouth) end from the standpoint of its nervous system, locomotion, eating and other aspects of behavior. The earthworm is also sensitive to vibrations. Some people swear the best way to gather them is to jam a long pole into your backyard, take another shorter stick and move it across the pole as if you were playing a cello. This may provide a hilarious sight for your neighbors to contemplate, but in theory the vibrations thus sent through the earth are supposed to tickle the worms so unbearably that they come out of the ground for relief! However, in collecting worms at night, it is sound vibrations from walking feet that send the worms back into their holes.

Anyone who has sat through a high school zoology class has cut open earthworms at some time during the course, mainly to study a nervous system that is very rudimentary. He will also remember that a worm produces both eggs and sperm, and that they get together in couples and practice a type of reciprocal cross-fertilization. In my course I remember learning the word "setae," which means "bristles," a term which I retained because it is useful in crossword puzzles. An earthworm has rings and rings of setae; he uses them to crawl and it is the setae that grip the walls of the burrow when a robin works hard to pull a worm out of the ground.

Worms literally eat their way through the ground, making their burrows at the same time. The earth passes through the length of the body, and the dead plant matter and the organic soil parts remain with the worm as nourishment. In order not to cloud the water in your fish tank with dirt, therefore, when you feed cut-up worms, let them spend a day or two first in a jar of sphagnum moss. They will pass off the dirt inside them. Even a day spent in an empty jar will help.

Its burrowing and eating activities make the earthworm quite possibly the farmer's best friend. They leave holes for air and water to get into the soil. They make the soil finer by grinding it up in a gizzard, thus softer for young plant roots to poke down through. And the worm's waste matter that is left behind is in a richer, more available form as food for those roots than the original piece of rotting leaf that the worm took in with the earth he was eating. Worms in a field will bring 7 to 18 tons of soil to the surface every year per acre. That's one inch added on top every 10 years. And they will cause stones to sink. A worm's working surface, though, can go down as far as 6 or 8 feet. Notice, the next time an earth mover is at work. Darwin was the first man to discover the earthworm's farming role.

These worms help not only farmers but tropical fish fanciers too. It's too bad that more fanciers don't use them, because they're so good and so available. Even if you live in an apartment, they're no farther than the nearest bait store. I know earthworms are good because I ate one. In summer, you know, you don't let them get too hot. Once when I was a teenager, I had a waxed carton of them in the refrigerator (which we then called the "icebox") and my mother found them and vigorously objected. I said they were clean, that it was just the *idea* of them that misled her. She wasn't convinced, so I ate one in front of her.

Earthworms can be raised or gathered easily, depending on how much you like to control things and availability in winter. If you are the adventurous chance-taker and want to meet them on their own ground, watch out for a colorful worm with red rings and which exudes yellow stuff. It is the dung worm and infests manure piles. Most fishes won't touch it.

One of the best ways to collect worms

is to soak your loam just before dark, and then after dark pick them off the surface of the ground—deftly, before the setae dig in. And walk *lightly*. Or, if you have flagstones, lift these from time to time; you'll usually find *Lumbricus* surprises huddled there underneath. Flagstoneless people can leave a board on the grass.

If the dozens you can get in the above ways are not enough, have thousands. You just make a heap in a corner of your garden composed of alternating layers of soil, lawn clippings, potato peels, coffee grounds, or old tea leaves. A few weeks later, the turn of a rake will reveal the writhing founders of a colony soon to number in the thousands. Or, more simply, just lay a spread of gunny-sacking out in the garden and keep it covered with coffee grounds and tea leaves.

In winter, raise them in the basement. Put a large wooden box (preferably waterproofed with paraffin wax) far enough from the furnace that the colony stays cool, fill it with rich moist-but-not-too-wet loam seeded with a few worms, and cover the surface with your leafy garbage or decaying leaves.

Worms can be fed whole to big tough-jawed fishes like cichlids, cut with scissors for medium-sized fish, chopped with a single-edged razor blade for small ones, and shredded to a puree for fry.* Shredding is what you do with "shredders," which are a pair of British manufactured disks with circular ridges and which look like two phonograph records. Chopped or shredded, the results can be held under a faucet in a fine fishnet to be cleansed of dirt and slime. Worms, however, can be allowed to clean themselves out as I noted above, and then quick-frozen in a covered plastic dish. Pieces can then be snipped off, cleanly and neatly, at each feeding directly over the aquarium.

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Conversation Piece

Donald A. Simpson

San Francisco, Calif.

NOW THAT it has been established beyond any reasonable doubt that fishes *do* talk to each other, the burning question remains: what do they talk *about*?

It is with some modesty and considerable pleasure that I announce that I am able to answer that question. The details of how I achieved this ability must, for the time being, remain my secret, for I have it on good authority that the Soviets are pressing hard to catch up or surpass us in this field. And we certainly do not want that to happen, do we?

I can disclose, however, that I crashed this "sound barrier" by a combination of scientific endeavor and some small amount of luck over a considerable period of time in the tropical fish laboratory of a major public aquarium here in the U.S. It was here that I had been tape recording various fish conversations using an apparatus consisting of a hydrophone hooked up to an amplifier.

Eventually, I amassed a considerable amount of fish chatter, but for a long time these sounds were just the usual squeals, grunts, groans, squawks, chirps, whistles, moans, clicks, and various other noises made in the special ways in which fishes communicate. Then, one day—well that's the part that must remain classified for the

time being—but suffice to say that I had acquired the key that allowed me to translate these various sounds into proper understandable language! And wasn't that wonderful? Well, sure.

And I am most happy to be able to bring to you tropical fish hobbyists some of the poop on what your fishes are yakking about. It must be remembered, however, that I have had to use a certain flexibility with the fish idiom, and that I have had to leave out or amend certain words and phrases, for I have found out that fishes are quite uninhibited in their conversation. They are, shall we say, free in their use of the four-letter words. And we must be careful about that, mustn't we? (I guess we must if we don't want to be banned in Boston.)

The fish conversations that are to follow presently are mostly of short duration. This is largely due to mechanical or electronic failure in the delicate and not yet fully perfected apparatus. For my work in these experiments, tanks of different sizes were set up in the laboratory, and various fishes, generally mated pairs, were placed in them. The hydrophone was suspended in the tank at night, hooked up to the amplifier which, in turn, was connected to the tape recorder. A light was left burning over the tank.

Naturally, I couldn't stay there all night so the apparatus was left to function without my help. As a consequence one of the components not infrequently blew a gasket. In spite of this we have enough samples to give you a fair idea of the way your fishes may feel about things, particularly each other—or *you*.

Case recording No. 37
Tank No. X-50 (50 gallons)
Occupants: 1 pair of mated *Symphysodon discus*

"Well, hey, Sweetmomma, where did you come from?"

"That you, Poppie?"

"Well of course. Who'd you expect?"

"Never know *what* to expect in this dump. I've been in a dark tank all by myself ever since we raised that last family."

"How about that? Took all those kids away from us. I've been in solitary, too, but it wasn't too bad. Fine food and lots of it. I suspect it was the usual thing: feed us up so we can raise another batch. You look a little peaked, Sweetmomma, aren't you feeling well?"

"No, I'm not. I'm pretty well shook as a matter of fact. Hate this getting tossed around in a net from one tank to another; gives me a trauma. Look at me. I'm all trembly, too. How's my color?"

"Well you are a little pale. No stripes."

"I should think so. Know what, Poppie?"

"What, Sweetmomma."

"I'm going on a hunger strike. I'll show 'em."

"You *are*? And miss all that good grub?"

"Darn right. And I'm getting a little tired of this raising a family every month or so. What do they think we are, anyway?"

"Aw, now, it isn't as bad as all that."

"Bad enough. Some of it's all right, but I get mighty tired of all those brats nursing on my skin, whole batch of 'em picking away."

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"Well kids gotta eat, and you know well enough they have to start out that way before they can take solid food. I do my share, they munch on *my* skin secretions, too."

"Yeah, *your* share, don't make me laugh. Only time you do is when I shake the kids off on you; you'd never come around and take them if I didn't. You spend most of your time mooning through the glass at that huzzy in the next tank. What you see in that female beats me. Just because she's supposed to be blue? Just a freak if you ask me; probably a methylene blue dye-job."

"Aw, now, honey . . ."

"Don't give me that *honey* stuff. I've got eyes."

"Why, shoot, you know I wouldn't look at anybody but you."

"Pig's eye, you wouldn't. Leave me alone now. I'm going to get in a corner and start my hunger strike. I'll show 'em."

"Shucks, Sweetmomma, Don't do that. Think of all that nice spaghetti you'll miss."

I could go for some right now."

"Spaghetti? What spaghetti?"

"White worms, of course. *Delicious.*"

"I don't care. I won't eat a thing no matter *what* they serve."

"Know what'll happen if you don't?"

"Don't bother me."

"I'll tell you what'll happen. You'll get all thin and crummy looking, and they'll toss you out of here and put that blue gal in, that's what."

"Guess that's what *you'd* like. I bet you'd . . ."

"Cut it out Sweetmomma. Tell you what let's do. Let's clean off a nice leaf of that giant *sagittaria*. Then you lay a big batch of eggs. They'll get all excited when they see that. Then we'll eat 'em! Nice fresh eggs, yummy. How about that?"

"Nothing doing. What do you think I am, a cannibal? That's all you ever think of, food, something to eat. Ought to be ashamed of yourself. I won't do it. I'm going on a hunger strike, and that's final."

"Aw, Sweetmomme, I . . ."

(*Author's notes:* It was the amplifier that broke down at this interesting point, slipped a disk, or a diode, or something.)

A few of the exclamations used above were substitutions made by the author, the originals being a bit gamy for a family magazine.

You might be interested to know that Sweetmomma continued her hunger strike until she eventually kicked the bucket. Which is a pity, but that's the way it is with many of these temperamental types. Poppie is now in a tank with the blue discus, but the outcome of that liaison will have to wait for a future recording. Sorry.)

Case recording No. 62

Tank No. X-20 (20 gallons)

Occupants: 2 male fighting fish, *Betta splendens*

"Hi, Benny, what do you make of this setup?"

"Beats me, Hubert. Looks like a lotta

territory after being cooped up in that little 2 by 4 cell."

"Yeh, I was getting a little tired of that myself, with *nothing* to look at but you on the other side of the partition."

"Well, that works both ways, Hubert. I can think of things I'd rather look at than you. Girls, for instance."

"Mmm. I see what you mean, but I don't see any girls."

"No, more's the pity."

"Know something, Benny?"

"What?"

"No partition in this tank."

"No par—. By golly, you're right. I hadn't noticed. How about that? Togetherhness!"

"Exactly. Gives me an idea. How about some finicuffs?"

"Fini—*what?*"

"Finicuffs. A scrap. A fight. A battle. We're supposed to be fighting fish, aren't we?"

"Well, heck, Hubert, I dunno. Isn't that kind of old fashioned? Suppose they put some girls in here? I wouldn't want to look all bedraggled, fins and gill covers torn and bloody. Make a crummy impression if any girls . . ."

"Aw, don't be a sissy. That's nothing to worry about, fins regenerate in no time. Let's just have a little beef, huh? A few short rounds with frequent time out to breathe at the surface."

"I don't feel much like it. Let's look this joint over first. Maybe build a bubble nest as a hint. When they see *that*, they might toss in some girls. There's lotsa room here to . . . Hey! Ouch! Cut that out. That's my anal fin! What's the big idea? Why, you big bum, I'll fix *you*. I'll . . ."

(*Author's note:* It was the hydrophone this time. It sprang a leak. I think. If you're interested, the fight was evidently a draw, with both combatants in pretty sorry shape the next morning.)

Case recording No. 28

Tank No. X-15 (15 gallons)

Occupants: 1 pair of African mouthbreeders,
Tilapia mossambica

"Hi there, what's your name?"

"Oh, hello. Name's Gwendolyn. What's yours?"

"Gwendolyn. Quite a mouthfull, that. Call me Joe."

"Well listen, Joe, skip the wisecracks about my mouth. I've raised many a family with this mouth, I can tell you."

"Yeh, looks like it; it's big enough. But it was your *name* I was talking about."

"What's the matter with my name?"

"Nothing much, I guess. A bit highfalutin. Okay if I call you Gwennie?"

"I'll think about it."

"Well, don't strain yourself. Where'd you come from anyway?"

"Been in this dealer's tank for months, raising one family after another. And getting a little tired of it, too, if you want to know. Husband just disappeared one day. Never seen him since. I was hoping to get a little rest, but it looks like that's all over now."

"Well, I wouldn't know much about that, I've never been married."

"Joe, I have a hunch you're about to find out a few things. What did you think they tossed me in here for?"

"Gee. You mean . . .?"

"Hey, you're a little stupid, aren't you? Of course I mean . . . And I can't say I'm exactly crazy about the idea."

"No? What's the matter with me? Don't I stack up with your ex?"

"Oh, you're all right, I guess. Matter of fact you're kinda cute, now that your color is getting real black, and that red-tipped dorsal does things to me, too. It's just that I'm a bit tired of the old routine. Guess I was born into the wrong family. Did you know that with some of our relatives the *male* does all the mouth mumbling part of this family rearing business?"

"No I didn't. Guess you think I'm a dummy?"

"Not necessarily. Inexperienced, maybe."

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"Oh. How'll I know what to do? You gonna tell me?"

"I won't need to, you'll know."

"But *how*?"

"Instinct."

"Instinct?"

"Yep."

"Oh. Well, I hope you're right."

"Just stop worrying, and take Gwennie's word for it."

"So far I just feel sort of useless."

"Well if you want to be doing something, you can get busy and clean a nice spot on the bottom for the eggs. Get all the gravel away, and be sure it's spotless. We don't want any fungus or bacteria to gum up the works."

"Okay. Then what?"

"Just keep it clean until I get ready. I've got to get a good feed or two first, because I won't be able to eat for a week or so."

"You won't? That's tough. Why not?"

"Golly you *are* ignorant. Because I'll have the eggs in my mouth until they

hatch, and then the kids will be in there until I can let them out for short periods."

"Sounds crazy to me."

"You may have a point there, but that's the way it is with oral incubation."

"So *that's* what it's called. Wow. Don't you ever swallow any?"

"No, not unless I get chased or real scared. Then I might swallow the whole batch."

"Well, what do I do while all this is going on?"

"Mmm. I'll tell you, Sonny . . ."

"Name's Joe, not Sonny."

"Oh, pardon *me*. No need to get huffy. You want me to give you the poop or not?"

"Now who's huffy? Go on, get with it."

"Well, there's not much to it. After I lay the eggs in the place you've cleaned for them, you do your little act, and then I pick 'em up. The rest is up to me, I'm sorry to say. It's a pain in the neck as far as I'm concerned."

"It is? Well, what do I do then?"

"Get lost."

"Get . . . Say, how come?"

"Several reasons: one is so's you won't be around to get any ideas when I let the kids out for lunch. Such as trying for a tasty snack of tender baby *Tilapia*."

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"Huh. Doesn't look like any of it would be much fun for me, Gwennie."

"Oh, you'll like it all right. Probably be around pestering me to do it again before I'm half through with the first batch. I know the score, I've been through it enough. I even raised one family in *salt*

water. I'm glad to note this water is a little salty, too; it helps."

"I wouldn't know about that, I . . ."

"You really don't know very much, do you Joe?"

"Well I'm willing to learn, but it seems there isn't much for me to learn; just fertilize the eggs and . . ."

"Yep. Fertilize 'em, and get lost. But take it from me, you'll like it. Wait and see. Matter of fact, they'll probably give you the heave-ho out of here as soon as I pick up the eggs, but I don't think you'll like *that*."

"They will? Why?"

"So you won't get any funny ideas."

"What do I do then?"

"Just grit your teeth, and wait until they put you back here."

"And how long will that be?"

"About a month or so."

"Hardly seems worth while to me."

"Well it works. Now I'm getting a little tired of all this chatter. How's about getting to work cleaning off a spot for those eggs. Come on, and I'll give you a hand."

"Oh all right, but I still think . . ."

(*Author's note:* The tape recorder ran out at this point. The eggs were laid the next day, but it was a small batch, doubtless due to it being Joe's first try.)

Case recording No. 73

Tank No. X-50 (50 gallons)

Occupant: 1 male man-eating piranha,
Serrasalmus nattereri

(*Author's note:* This experiment was carried out in order to determine if fishes talk to themselves as well as to each other. The answer seems to be in the affirmative.)

"Well, what kind of a deal is this? All by my lonesome. Whatever happened to the rest of the gang? Can't say I like this very much. Click—click—click. I'd sure like something nice and bloody to sink my teeth into. I nearly got the man's thumb when he put me in here, but he was a little too quick for me. Click—click—click."