

February, 1970

# tropical fish hobbyist

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***PHOTOGRAPHY FOR AQUARISTS***

**SEE PAGE 83**



# tropical fish hobbyist

Vol. XVIII, February, 1970 (#168, No. 6)

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The killies of the genus *Procatopus* lack the brilliant coloration that characterizes many of their relatives within the African cyprinodont population, but in their own subdued way they are every bit as attractive. Read Col. Scheel's interesting, beautifully documented account of the genus, beginning on page 4. Photo by H. Hansen.

## exotic tropical fishes supplements

Pages 33 and 34, 67 and 68. These pages are perforated for easy removal and punched to fit into the Looseleaf Edition of EXOTIC TROPICAL FISHES.

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February, 1970

## editorial

It almost looks as if all the happy predictions made by salt-water specialists years ago are going to come true. For a long time the salt-water species have been heralded as the coming thing . . . but they never came. The situation is different now, and marine species really are beginning to have their day. They're not big yet, but they're on their way.

What caused their sudden upsurge in popularity? Well, first of all, it wasn't a sudden upsurge. It was a gradual build-up of interest, maintained by a hard core of dedicated salt-water specialists and the dealers who catered to their interests. If you want to say that improved methods of capture and transportation have made salt-water species less expensive and therefore more easily salable and therefore more popular, okay; you're at least partly right. If you want to say that the natural beauty of the marine species was itself enough of an attraction to overcome the disadvantages they offered, fine; you've put your finger on a part of it. If you want to mention that manufacturers have been putting out better tanks and equipment and artificial salt mixtures, thereby making the keeping of oceanic fishes less of a gamble and more of a pleasure, you've named some of it. There are many reasons why the marine hobby has grown. But as far as I can see, not enough attention has been paid to one of the biggest reasons, the factor without which very little progress could have been made regardless of the other advantages: more dealers than ever before are setting up and stocking marine aquaria in their shops.

There will be a good bit of a snowball effect here, with more and more dealers taking on marine species, if only to allow themselves to compete with dealers who already handle (or even specialize in) salt-water exotics. Let's hope so, because it can be a good thing for everybody.

*Neal Prosser*



Male *Procatopus nototaenia* from southwest Nigeria. Photo by H. Hansen.

## The Genus *Procatopus*

BY J. J. SCHEEL, DENMARK



*Procatopus aberrans* (*P. roseipinnis*), from Mamfe, western Cameroon. Photo by Col. Jorgen Scheel.

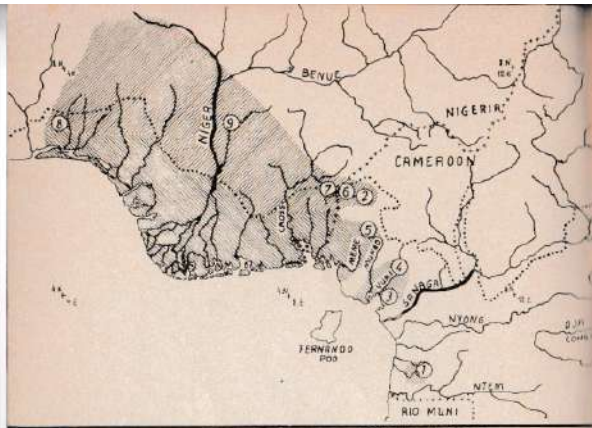
The genus *Procatopus* Boulenger has 10 nominal species in Nigeria and in both parts of Cameroon. The genus was divided into two subgenera, *Procatopus* Boulenger and *Andreaseni* Clausen, by Clausen (1959), who increased the number of nominal species from 4 to 10.

I have kept live individuals of some of these nominal species. *P. nototaenia* Boulenger from Shagamu of southwestern Nigeria and from the Rio Mirupururu of Fernando Po; *P. similis* Ahl, 1927, from the Mboumboula River, near Douala of East Cameroon; *P. roseipinnis* Clausen, 1959, from the type locality near Mamfe of West Cameroon; *P. nigromarginatus* Clausen, 1959, from the type locality near Eyomojok of West Cameroon; and *P. gracilis* Clausen, 1959, from Akure of southwestern Nigeria. During the 1966 expedition to the Cameroons I caught specimens of *P. nototaenia*



*Procatopus cf. aberrans*, aquarium strain. Photo by Col. Jorgen Scheel.





Geographical distribution of *P. nototaenia* (////) and *P. aberrans* (////) in Nigeria, Fernando Po and Cameroon.  
 = Savannah forest border  
 = political border  
 The type localities for the ten nominal species are indicated:  
 1. *P. nototaenia*: Lobe River  
 2. *P. aberrans*: Ossidinge — Mamfe and *P. roseipinnis*: Mamfe  
 3. *P. similis*: Logohaba — Detula  
 4. *P. abbreviatus*: Yabassi  
 5. *P. glaucicaudis*: 58 miles north of Kumba  
 6. *P. nigromarginatus*: Eyomjok  
 7. *P. plumosus*: Ikom  
 8. *P. gracilis*: Iperin  
 9. *P. andreassenius*: Owe River  
 The border separating the two species is tentative for the central part of the distribution of *P. aberrans*.

at the type locality in southern Cameroon and specimens of *P. similis* in many localities within the Dibamba, Wuri, Mungo, and Meme drainages. I also caught specimens of *P. glaucicaudis* Clausen, 1959, in the type locality between Kumba and Mamfe and in the upper reaches of the Mungo River and specimens of *P. aberrans* Ahl, 1927, in many localities near Mamfe (formerly German Ossidinge), the type locality for *P. roseipinnis*. More than 70 preserved specimens from various localities have been studied.

On the basis of these studies I am convinced that only two zoological species should be considered: *P. nototaenia* Boulenger and *P. aberrans* Ahl. I also realized that these two forms are very close, morphologically and by colors, and that future studies of different populations of *Procatopus* may disclose that the two forms above mentioned are subspecies of *P. nototaenia*.

The meristic variation in *Procatopus* is rather limited compared to the average variation in rivuline species from Atlantic Africa. Meristic characters are not suitable for the separation of different species and certainly not for the maintenance of ten different species. It also appears that the descriptions of the recently described species have been based primarily on colors and color patterns.

The variation of colors in different populations of *Procatopus* represents a real problem. At the present time, we do not know whether the observed differences reflect general or ecological differences. This variation was very conspicuous in eastern affluents of the Wuri River of East Cameroon. On our way up to Yabassi (type locality for *P. abbreviatus* Pellegrin, 1929) we crossed a large number of small rivers and large brooks housing populations of *Procatopus*. In some localities the unpaired fins of all males were blood-red; in other localities, however, these fins were orange, or golden, or lemon, or almost colorless. If differences in colors characterize zoological species of *Procatopus*, these affluents of the Wuri River indeed housed a large number of zoological species. In the aquarium, the colors of the individual male do not change. I have raised a large number of juveniles from *P. aberrans* (from Akure) and of *P. nototaenia* (from Fernando Po), and I did not notice any difference in fin colors between them and the wild-caught parent strains.

If the descriptions of *P. roseipinnis* and of *P. nigromarginatus* are compared, rather conspicuous differences in colors and in color-patterns appear to exist. In 1966 I caught many adult males of both forms at the type localities and in other localities of the Mamfe plains. No differences in colors were observed. About 15 individuals of each form were taken alive to Copenhagen and were kept in my tanks for several months. The described colors did not develop, and the two strains were very similar, differing in only one minor trait. In *P. roseipinnis* no anal fin pattern was observed in males, whereas in those of *P. nigromarginatus* small brown spots were present in the upper part of that fin, as in *P. gracilis* and often in *P. nototaenia* (spots are red, not brown). These observations indicate that the colors of the males of a certain population may change from year to year, so fin colors are not useful in the systematics of these fishes.

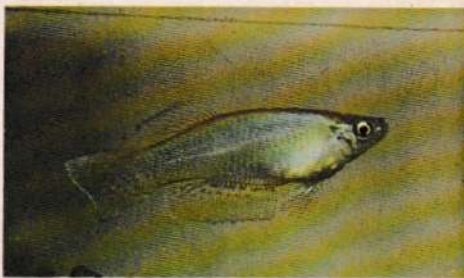
I have studied the chromosomes of males from four populations, i.e., of *P. nototaenia* (from Fernando Po and the Mboumboula River of E. Cameroon) and of *P. aberrans* (type localities of *P. roseipinnis* and of *P. nigromargi-*

Tropical Fish Hobbyist

natus). All these males had 24 haploid chromosomes, and the karyotypes appeared to be similar and of the basic cyprinodont type.

*P. nototaenia* appears to extend from Shagamu of southwestern Nigeria to the Dibamba River of East Cameroon and Fernando Po. In 1966, we searched in vain for populations of *Procatopus* in the western lowlands of East Cameroon within the Sanaga, Nyong, and Lokundje drainages in suitable localities. We found this species in the Kientke River (Kribi River) in southern Cameroon. Thus it seems that the population of this species in the type locality is isolated from other populations by a wide geographical gap. This species is restricted to the coastal part of the lowland forests of Nigeria and of East Cameroon, probably generally on the sediments, being replaced by *P. aberrans* in the northern parts of the forest and in the savannah. In West Cameroon some populations have been able to reach the 400-meter level above the sea (*P. glaucicaudis*) on the plateau between the Manengouba and the Rumpi Mountains and to extend into the upper reaches of the southeastern affluents of the Cross River (according to Clausen 1959: 268 and in agreement with the findings in 1966). The male *P. nototaenia* differs from the male *P. aberrans* by being deeper (up to about 40% of standard length). The red and orange colors are more pure (often brownish in *P. aberrans*) because of the presence of two conspicuous orange lines extending from the upper edge of the eye to the origin of the

*Procatopus* "nototaenia" from Shagamu, southwest Nigeria. Photo by Col. Jorgen Scheel.



*Procatopus aberrans* (*P. gracilis*), from Akure, southwest Nigeria. Photo by Col. Jorgen Scheel.

dorsal fin, sometimes edging the upper edge of the caudal peduncle. I am not sure that this pattern occurs in males of all populations. The metallic brilliance of the sides is more bluish (often greenish in the other species) and more like silk. The number of dorsal and of anal fin rays is a little higher than in *P. aberrans*, and the number of scales in a longitudinal series is a little lower: 9 dorsal fin rays occur in 42% of the material (40 specimens) of *P. nototaenia* and in 35% of the material (31 specimens) of *P. aberrans*. The corresponding figures for 16 anal fin rays were 61% and 21%, respectively, and for 29-30 scales in a longitudinal series I found 59% and 67%, respectively. The position of the ventrals has been considered a good distinguishing character separating the two groups of populations. In *P. nototaenia* these fins are inserted distinctly in advance of those of *P. aberrans*, in most specimens. In some, especially in those from Fernando Po, the ventrals are inserted more posteriorly, reaching the position found in some specimens of *P. aberrans*.

In East Cameroon, where *P. aberrans* is not represented, the populations of *P. nototaenia* reach the 200-meter level at least, in the upper reaches of the Keinke River. *Procatopus* is not represented on the inland plateau of East Cameroon or in Rio Muni. South of Rio Muni *Procatopus* is replaced by *Plataplochilus*.

*P. aberrans* appears to be restricted to the drier parts of the forest, expanding into the derived savannah and generally on the basement complex.

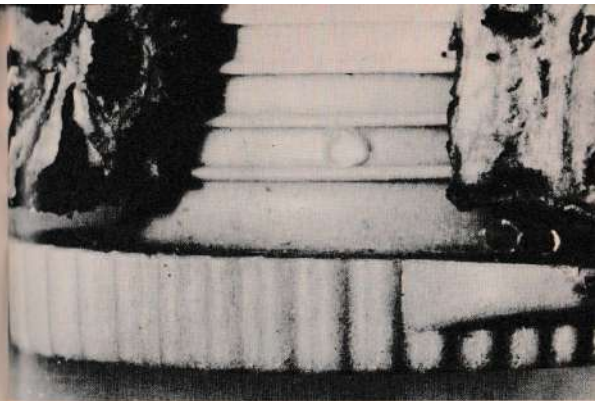
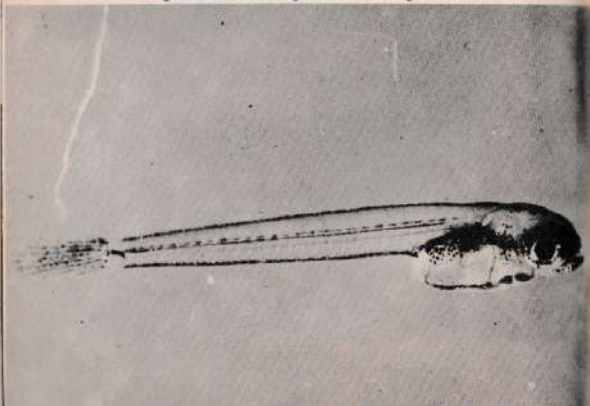


Within the Mamfe plains it occurs, however, on the sediments. Individuals of this species generally are more active than those of *P. nototaenia*. When individuals of the two species are placed together in the aquarium, males of *P. aberrans* dominate similarly sized and larger males of *P. nototaenia*. I was unable to cross individuals from southwestern Nigeria. The upper rays of the caudal fin may extend in males from some populations, and a streamer develops. I never observed such streamers in my own males, but they were described by Clausen and have also been figured in good photos.

Both species are rather easily kept in the aquarium in hard and alkaline water in contact with peat. In soft and acid water, mycobacteria and oodinium represent severe problems; affected individuals often die. I always use dim light during nights for tanks housing individuals of *Procatopus*, because the fish may panic in completely dark tanks. In nature these species are used to rather strong currents, and a slight aeration is useful in producing some movement of the water. They take all sorts of food that they are able to swallow, and individuals may mature sexually within half a year, more or less.

Unlike other cyprinodonts known to me, the species of *Procatopus* place their eggs in holes or in slits, not in roots or in plants. The ripe female uses much time to find suitable places for the eggs. When such a place has been

A newly hatched fry of *Procatopus nototaenia* from southwest Nigeria, exhibiting three thin black longitudinal lines along the sides.



Four *Procatopus* eggs are visible in the photo: two (at right) have been deposited between the cork ring and the plastic stopper, one (center) is on the stopper itself, and one (at left, with large pigmented embryo visible) is in a pore of the cork ring. This improvised egg trap was floating at the top of the tank when the eggs were laid.

discovered, the female turns on her side and the male comes up from below, placing himself alongside the female. The eggs are "shot" into the cavities; when they have expanded, they are difficult to remove.

Juveniles hatch out after two to three weeks. The eggs develop well in hard and alkaline water, but in such water they often do not hatch in due time. When kept in acid and soft water they usually hatch in time. The fry are strictly surface-dwelling and move along in open spaces all day and night (dim light needed). They especially like to shoal if a slight current is produced by aeration. In nature the juveniles live in bays, whereas the adults and semi-adults prefer the current and may be found even in turbulent water. They are extremely good swimmers, very difficult to catch in deep water.

The young ones need much food because they swim so actively. They like newly hatched brine shrimp and grow well on this food. Large and small individuals shoal peacefully together until sexual maturation. Adult males often fight, but the results are not usually serious if the fish are kept in sufficiently large tanks.

Photographs showing adult males of both species correctly identified have been published by Nieuwenhuizen (1964).



*Procatopus* similis from the Wari River, eastern Cameroon. Photo by Col. Jorgen Scheel.

## Literature used:

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 — 1961: Nigerian Lampeye. Aquarium Journ. 32: 411-416. 10 figs.

## Author's note:

In January, 1969 I revisited the western lowlands of both Cameroons to catch more live *Aphyosemon* material for my study of that genus. These investigations of the small watercourses uncovered new evidence concerning the genus *Procatopus*, outdated some of the ideas expressed above.

In one of the northern affluents of the Lobé River, 13 kilometers east of Kribi, towards Ebolowa, I discovered a strange population of *Procatopus* living together with a population of *Aplochelichthys macrophthalmus* Meinken. The latter species had not been reported from Cameroon until my expedition, but I discovered two populations, in brackish water, in western W. Cameroon.



*Procatopus aberrans* (*P. nigromarginatus*) from Eyomojok, western Cameroon. Photo by Col. Jorgen Scheel.

The new Lobé *Procatopus* material differed markedly from all known E. Cameroon material by two features. In the males the upper and sometimes also the lower fin rays of the caudal elongated conspicuous streamers had developed. This character is known in some populations of *P. aberrans*, but not in the other species. The number of dorsal fin rays of the fifteen Lobé specimens also placed this population in *P. aberrans* or very close to that species. Lobé: D. 8-9, mean 8.3. *P. aberrans*: D. 8-10, mean 8.5 (54 specimens), but in other E. Cameroon populations of *Procatopus*, plus the populations from the Moungo drainage of W. Cameroon, I found: D. 11-13, mean 11.7 (56 specimens).

The new Lobé material is important, because the fifteen syntypes for *P. nototaenia* Boulenger also originated from an affluent of the Lobé River,



whereas Boulenger's material from the Kribi (Kienke) River, just north of the Lobé River, are paratypes only. In the original description of *P. nototaenia*, Boulenger had 9-10 dorsal fin rays, indicating that his Lobé material, or part of it, belonged to the same species which I found in 1969. Thus it might be that we have to change our mind concerning the phenotype of *P. nototaenia*, which may be the same as *P. aberrans* or a form very close to the latter. Until the types in London have been intensively studied I think that the best to do is to restrict the name *P. nototaenia* to the population of *Procatopus* of the Lobé River and to use the name *P. similis* Ahl for all further populations of E. Cameroon and the Moungo drainage of W. Cameroon. The populations of western W. Cameroon, of Fernando Po and of southern Nigeria differ a little from the populations here referred to *P. similis* by having fewer dorsal fin rays: D 9-11, mean 9.7 (46 specimens); probably these populations also should be referred to *P. similis*.

The geographical gap separating the Lobé-Kienke populations of *Procatopus* from other populations of the genus has been eliminated. I found a population of *P. similis* in the southern part of the Nyong drainage, 58 kilometers north of Kribi, towards Edca. This population differs markedly from the Lobé population by the number of dorsal fin rays: D. 11-13, mean 11.9 (26 specimens). I also discovered a population of *P. similis* in the Sanaga drainage. Thus *Procatopus* appears to be absent in the Lokundje drainage only.

I took one adult male of *P. similis* from the population near the Yabassi road in which males in 1966 had blood-red fins. In 1969 the fin-color of these males had not changed, but after about four months in the aquarium with my Fernando Po strain I could hardly tell the Mirupuru and the Wuri males apart. The blood-red color has faded considerably and is not far from the yellowish-orange color of unpaired fins in the F-P strain.

#### MOVING?

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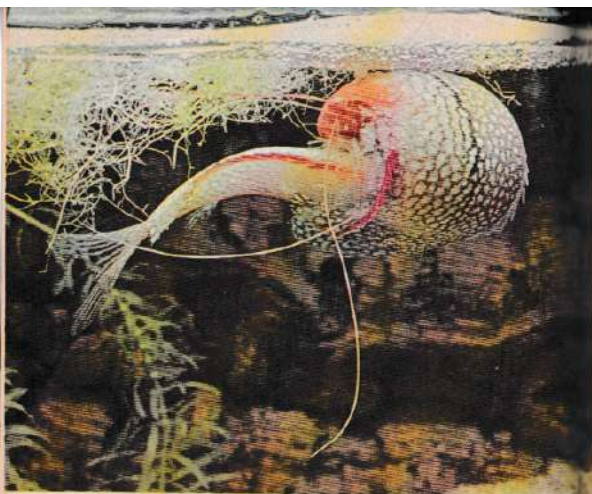
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#### Mugging or Mating?

I thought myself a witness to disaster  
With curving male quite sure to be the master,  
But learned such wrestlings in the dawn  
Soon fill a bubble nest with spawn,  
And squeezing actions make each try go faster.  
Such acts without the benefit of pastor  
Are scandalous enough to flabbergaster,  
But make it very clear why 'tis  
The species known as *leeri* is  
A quite prolific sort of *Trichogaster*.

Lincoln Littrell

## INDEX TO EXOTIC TROPICAL FISHES SUPPLEMENTS

Below is a complete index to the first 141 supplements to *Exotic Tropical Fishes*. The index, arranged alphabetically according to the scientific name of the fish or plant(s) that form the subject matter of each supplement, gives the number of the supplement, the date of issue of *Tropical Fish Hobbyist* magazine in which the supplement appeared (or will appear, since supplements 132 through 141 will be inserted into the *Tropical Fish Hobbyist* issues of January through June, 1970), and the scientific and popular name of the fishes and plants concerned. Additionally, the index provides the number of the supplement book containing any given supplement. (These first 141 supplements to *Exotic Tropical Fishes* are available in ten books of supplements at a price of \$1.00 for each book.) Supplement book #1 contains supplements 1 through 16; supplement book #2 contains supplements 17 through 32; supplement book #3 contains supplements 33 through 41; supplement book #4 contains supplements 42 through 52; supplement book #5 contains supplements 53 through 68; supplement book #6 contains supplements 69 through 84; supplement book #7 contains supplements 85 through 100; supplement book #8 contains supplements 101 through 114; supplement book #9 contains supplements 115 through 128; supplement book #10 contains supplements 129 through 141.

Reading from left to right, the first column gives the supplement number; the second column gives the month and year of issue; the third column gives the scientific name; the fourth column gives the popular name; the fifth column gives the supplement book number.

#	Date	Scientific Name	Popular Name	Book #
85	11/67	<i>Abramites hypselonotus</i>	High-backed Headstander	7
68	2/67	<i>Acantophthalmus javanicus</i>	Javanese Loach	5
31	1/65	<i>Acetrophthalmus hepsetus</i>	Sharp-Toothed Tetra	2
21	7/64	<i>Acaticrinata macropt</i>	Hook-Nosed Characin	2
114	2/69	<i>Aequidens itanyi</i>	Delphin Cichlid	8
122	6/69	<i>Agencioerus madeirensis</i>	Flathead Catfish	9
123	7/69	<i>Alestes taenurus</i>	African Tetra	9
36	4/65	<i>Ambias</i> species	Water Aspidastra	3
118	4/69	<i>Aphyocharax dentatus</i>	False Bloodfin	9
7	12/63	<i>Aphyocharax erythrinus</i>	Flame-Tail Tetra	1
97	5/68	<i>Aphyosemion bertholdi</i>	Berthold's Killie	7
134	2/70	<i>Aphyosemion christyi</i>	Christy's Lyretail	10



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#	Date	Scientific Name	Popular Name	Book #
100	6/68	<i>Aphyosemion cinnamomeum</i>	Cinnamon Killie	7
96	4/68	<i>Aphyosemion liberianse</i>	Liberian Killie	7
88	12/67	<i>Aphyosemion geryi</i>	Gery's Aphyosemion	7
106	9/68	<i>Apistogramma borellii</i>	Umbrella Dwarf Cichlid	8
87	12/67	<i>Apistogramma trifasciatum trifasciatum</i>	Blue Apistogramma	7
49	3/66	<i>Aponogeton</i> species	Madagascar Aponogetons	4
50	4/66	<i>Aponogeton</i> species	Sinhalese Aponogetons	4
51	5/66	<i>Aponogeton</i> species	Aponogeton plants	4
67	2/67	<i>Austrofundulus neyeri</i>	Myers' Killifish	5
116	3/69	<i>Azelodina riesei</i>	Ruby Tetra	9
27	10/64	<i>Barbodes kerstenii</i>	Kersten's Barb	2
133	1/70	<i>Betta splendens</i>	Split-tailed Betta	10
121	6/69	<i>Botia modesta</i>	Orange-finned Loach	9
13	3/64	<i>Brachydanio frankii</i>	Leopard Danio	1
86	11/67	<i>Brachyraphis terrabensis</i>	Upland Livebearer	7
34	2/65	<i>Cabomba</i> species	Fanworts; Cabomba plants	3
40	7/65	<i>Carassius auratus gibelio</i> × <i>Carassius carassius</i>	Japanese Colored Carp, Koi	3
129	11/69	<i>Carassius</i> species	Koi Varieties	10
38	5/65	<i>Chaetobranchopsis bitaeniatus</i>	Two-Striped Cichlid	3
5	11/63	<i>Cheirodon kribiei</i>	Three-spot Tetra	1
124	7/69	<i>Cichlasoma crassum</i>	F Cichlid	9
81	9/67	<i>Cichlasoma erythraeum</i>	Red Devil	6
61	11/66	<i>Cichlasoma facetum</i>	Gulf's White Convict Fish	5
3	10/63	<i>Colomesus pinnatus</i>	South American Puffer	1
131	12/69	<i>Corydoras aeneus</i>	Albino Corydoras	10
105	9/68	<i>Corydoras multimaaculatus</i>	Soldier Catfish	8
98	5/68	<i>Corydoras schwanzi</i>	Schwartz's Corydoras	7
52	6/66	<i>Cryptocoryne</i> species	Cryptocoryne plants	4
120	5/69	<i>Ctenopoma lujeta</i>	Blunt-nosed Gar	9
15	4/64	<i>Danania urostrata</i>	Striped-Tailed Catfish	1
8	12/63	<i>Danopoma acutirostre</i>	Leopard Ctenopoma	1
90	1/68	<i>Cynolobus wolterstorffi</i>	Wolterstorff's Pearl fish	7
42	9/65	<i>Echinodorus</i> species	Amazon Swordplants	4
43	10/65	<i>Echinodorus</i> species	Amazon Spearplant, Ruffled Swordplant	4
44	11/65	<i>Echinodorus</i> species	Swordplants	4
77	7/67	<i>Epiplatys annulatus</i>	Clown Killie	6
109	11/68	<i>Epiplatys dagemonroviae</i>	Arnold's Killie	8

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## February, 1970

#	Date	Scientific Name	Popular Name	Book #
80	8/67	<i>Epiplatys macrostigma</i>	Spotted Panchax	6
4	10/63	<i>Etroplus debauvi</i>	Three-Striped Glass Catfish	1
119	5/69	<i>Geophagus acuticeps</i>	Cutie	9
101	7/68	<i>Gephyrocharax caucanus</i>	Arrowhead Tetra	8
125	8/69	<i>Gymnocorymbus ternetzi</i>	G.T.O.	9
22	7/64	<i>Gymnohamphichthys hypostomus</i>	Long-Nosed Knife Fish	2
75	6/67	<i>Haplochromis callipterus</i>	Black-Edged Golden Nyasa Cichlid	6
65	1/67	<i>Helogenes narmoratus</i>	Marbled Helogenes	5
135	2/70	<i>Hemigrammocypris lini</i>	Garnet Minnow	10
64	12/66	<i>Hemigrammus coarctatus</i>	Cerulean Tetra	5
74	5/67	<i>Hemigrammus marginatus</i>	Bassam Tetra	6
28	10/64	<i>Hemigrammus nanaus</i>	Silver-Tipped Tetra	2
29	11/64	<i>Hemigrammus proncki</i>	Pronck's Tetra	2
30	11/64	<i>Hemigrammus vorderwinkleri</i>	Vorderwinkler's Tetra	2
136	3/70	<i>Hemihaplochromis phlander</i>	South African Mouthbreeder	10
62	11/66	<i>Hemiodopsis goldii</i>	Gold's Hemiodus	5
63	12/66	<i>Hemiodopsis sterna</i>	Stern's Hemiodopsis	5
91	2/68	<i>Hemiodus gracilis</i>	Slender Hemiodus	7
72	4/67	<i>Heterandria formosa</i>	Mosquito Fish	6
47	2/66	<i>Heteranthera</i> species	Heteranthera plants	4
48	2/66	<i>Hydrocotyle nymphoides</i>	Water Poppy	4
18	5/64	<i>Hyphessobrycon aguila</i>	Red-Tailed Flag Tetra	2
17	5/64	<i>Hyphessobrycon bellottii</i>	Dash-Dot Tetra	2
19	6/64	<i>Hyphessobrycon simulans</i>	Schwartz's Neon	2
137	3/70	<i>Hyphessobrycon takasi</i>	Coffee Bean Tetra	10
103	8/68	<i>Hyphessobrycon vilmae</i>	Vilma's Tetra	8
76	6/67	<i>Ictalurus lacustris</i>	Albino Channel Catfish	6
23	8/64	<i>Iguanodonectes tenuis</i>	Slender Tetra	2
78	7/67	<i>Julidochromis marlieri</i>	Marlier's Julie	6
130	12/69	<i>Kryptopterus macrocephalus</i>	Poor Man's Glass Catfish	10
73	5/67	<i>Labeotropheus fuelleborni</i>	Fuelleborn's Cichlid	6
79	8/67	<i>Labeotropheus trewavasae</i>	Red-Top Cichlid	6
104	8/68	<i>Ladigesia rollofi</i>	Jelly Bean Tetra	8
127	9/69	<i>Lebistes reticulatus</i>	Award Winning Guppies	9
128	10/69	<i>Lebistes reticulatus</i>	Award Winning Guppies	9
60	10/66	<i>Leporinus agassizi</i>	Half-Striped Leporinus	5

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## Tropical Fish Hobbyist

#	Date	Scientific Name	Popular Name	Book #
66	1/67	<i>Leporinus arcus</i>	Lipstick Leporinus	5
58	9/66	<i>Leporinus multifasciatus</i>	Multi-Banded Leporinus	5
59	10/66	<i>Leporinus striatus</i>	Striped Leporinus	5
25	9/64	<i>Luciocephalus pulcher</i>	Pike-Head	2
9	1/64	<i>Macrodon traira</i>	Houri	1
99	6/68	<i>Macropodus opercularis dayi</i>	Day's Paradise Fish	7
26	9/64	<i>Mastocembelus armatus</i>	Spiny Eel	2
24	8/64	<i>Moenkhausia sanctaefilomenae</i>	Yellow-Banded Moenkhausia	2
57	9/66	<i>Molliniesia canama</i>	Cauca Molly	5
56	8/66	<i>Myloplus asterias</i>	Starry Myloplus	5
6	11/63	<i>Myloplus schultzei</i>	Schultze's Myloplus	1
55	8/66	<i>Mylossoma argenteum</i>	Silver Mylossoma	5
45	12/65	<i>Najas</i> species	Nymphworts	4
41	8/65	<i>Nymphaea, Nuphar</i> species	Aquarium Lilies	3
39	6/65	<i>Nymphoides aquatica</i>	Banana plant	3
12	2/64	<i>Pelmatochromis arnoldi</i>	Arnold's Cichlid	1
102	7/68	<i>Pelmatochromis guentheri</i>	Guenther's Mouthbreeder	8
70	3/67	<i>Pelmatochromis hlugei</i>	Kluge's Dwarf Cichlid	6
110	11/68	<i>Pelmatochromis subocellatus</i>	Violet Cichlid	8
141	6/70	<i>Pelmatochromis thomasi</i>	Thomas's Pelmatochromis	10
16	4/64	<i>Petropichthys papilio</i>	Butterfly Mudskipper	1
89	1/68	<i>Petrotilapia trilineatiger</i>	Blue Petrotilapia	7
92	2/68	<i>Phraetocephalus hemipterus</i>	Red-tailed Catfish	7
93	3/68	<i>Phractura aruorgei</i>	African Whiptailed Catfish	7
32	12/64	<i>Piabucus dentatus</i>	Golden-Striped Slender Tetra	2
10	1/64	<i>Pimelodella gracilis</i>	Slender Pimelodella	1
95	4/68	<i>Pimelodella pictus</i>	Spotted Pimelodella	7
138	4/70	<i>Procatopus nototaenia</i>	Blue Lady Minnow	10
108	10/68	<i>Pseudochalceus kyburzi</i>	Kyburz Tetra	8
69	3/67	<i>Pseudotropheus avaratus</i>	Nyasa Golden Cichlid	6
94	3/68	<i>Pseudotropheus elongatus</i>	Slender Pseudotropheus	7
83	10/67	<i>Pseudotropheus zebra</i>	Nyasa Blue Cichlid	6
54	7/66	<i>Pteropichthys dumerilii</i>	Long-Nosed Angelfish	5
140	5/70	<i>Pteropichthys</i> species	New Angelfish Varieties	10
117	4/69	<i>Pygocentrus piraya</i>	Black-tailed Piranha	9
53	7/66	<i>Rasbora bankanensis</i>	Banka Rasbora	5
82	9/67	<i>Rasbora cephalotaenia</i>	Porthole Rasbora	6
20	6/64	<i>Rasbora sarawakensis</i>	Sarawak Rasbora	2
84	10/67	<i>Rasbora sumatrana</i>	Sumatran Rasbora	6

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## February, 1970

#	Date	Scientific Name	Popular Name	Book #
139	4/70	<i>Rasboraichthys altilis</i>	Green Rasbora	10
46	1/66	<i>Rorippa</i> species	Water Nasturtium	4
115	3/69	<i>Simpsonichthys botoni</i>	Brasilia Lyrefin	9
132	1/70	<i>Symodons davidi</i>	David's Upside-down Catfish	10
11	2/64	<i>Tetraodon lineatus</i>	Congo Puffer	1
1	9/63	<i>Tropheus duboisi</i>	White-Spotted Cichlid	1
2	9/63	<i>Tytocharax madeirae</i>	Bristly-Mouthed Tetra	1
14	3/64	<i>Vandellia cirrhosa</i>	Candiru	1
126	8/69	<i>Xenotodon cancella</i>	Silver Needlefish	9
71	4/67	<i>Xiphophorus helleri</i>	Lyretail Swordtail	6
113	1/69	<i>Xiphophorus helleri</i>	Fiebold Hi-Fin Swordtail	8
107	10/68	<i>Xiphophorus helleri</i>	True Hi-Fin Lyretail Swordtail	8
37	5/65	<i>Xiphophorus helleri</i> × <i>Xiphophorus variatus</i>	Sunset Hi-Fin Variatus	3
35	3/65	<i>Xiphophorus helleri</i> × <i>Xiphophorus variatus</i>	Black Helmet-Hi-Fin Variatus Platy	3
33	1/65	<i>Xiphophorus helleri</i> × <i>Xiphophorus variatus</i>	Delta Topsail Variatus	3
111	12/68	<i>Xiphophorus maculatus</i>	Pearl Albino Platy	8
112	12/68	<i>Xiphophorus maculatus</i>	Bleeding Heart Wug Topsail Platy	8

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### Tropical Fish Hobbyist

Waukesha, Wisconsin? You can find it ten miles west of Milwaukee on a map. For anyone interested in bettas the search would be worthwhile. Waukesha is the home of Dolores and Joe Bialk, and this home is Bettaville, Wisconsin.

Dolores is a bundle of energy who needs Joe's steady hand to hold her enthusiasm in check. Without Joe, Dolores would fill the whole house with water, raise a million bettas and sleep in the garage. As things stand, most of the basement of their house is dedicated to raising bettas.

Why should anyone want to raise hundreds of the same fish with no thought of selling them? Dolores' own words best express the reasons.

"I love bettas. They are a challenge. I like them because they're mean, but each one has its own personality. They won't breed if I don't give them just what they want."

"Sit down, this may take all night. Have a beer," Joe contributed.

As he played host, she went on. "I had a problem with nerves and hyperactivity that I doctored for years. These little fish have settled me down. I just don't have time to be sick anymore."

The hobby started with a vacation to Florida nine years ago. Dolores' dad asked them to pick up some bettas for him on their way home. They talked to the people they got the fish from and were

interested. Dad had other ideas, for he had raised bettas for years. Dolores and her father argued for months about the correct way to raise bettas. Joe finally told her to get some and prove her points. Being Dolores, she jumped to meet a challenge.

When Dolores attacks a problem she goes all out. Where she goes, Joe goes. After getting their fish and equipment they joined the

### Meet the Hobbyists . . .

## Dolores and Joe Bialk

BY ED GRALEWICZ



### Tropical Fish Hobbyist

Milwaukee Aquarium Society and a splinter group, Splendid Beta Fanclub.

All current magazines were subscribed to, and Dolores started corresponding with people interested in bettas. She is a great letter writer. Joe says she spends three hours a night on it and has worn out two typewriters. A need for better communication was in great evidence. The Splendid Beta Fan-

club members initiated action to organize an international group. Dolores headed this committee to start The International Beta Congress. Now in its third year, it is setting beta standards and disseminating information throughout the world. After serving a term as vice-president, Dolores is now editor of *Flare*, the IBC publication, co-chairman of the public relations committee and a board member. At the 1969 IBC con-

vention in Detroit she was honored for her work and devotion to IBC.

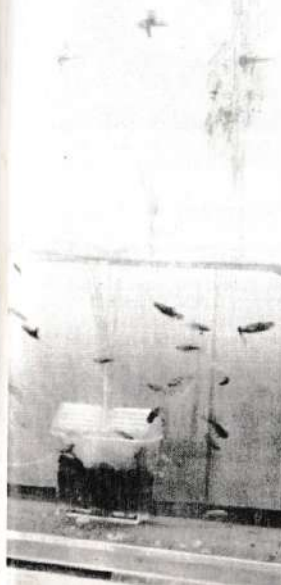
Joe is no sluggard when it comes to honors either. He has been president of the Milwaukee Aquarium Society for the last two years. His tank of albino aeneus catfish won best of show in the 1969 MAS exhibit. In the IBC he is the chairman of the constitution committee.

We walked down to the basement fish room. A large No Smoking

sign on the door of the 10' x 20' room greeted us. It is enforced with the diligence of a gunpowder factory. Jars of male bettas, small breeding tanks and large 30-gallon raising tanks line the walls and a center rack of shelves. A special corner for the raising of live food has parametia cultures, micro-worm jars and white worm boxes. A large 7-gallon plastic pail brine shrimp hatcher bubbles with the hiss of three airstones to circulate the water. An electric heater near the door keeps the insulated room at a controlled 80°. A real breeding factory.

Joe built this room and now is starting on another room the same size. It seems Dolores' bettas chased his angels and albino cats into the cold basement. His new room is going to have an insulated floor and indoor-outdoor carpeting. He says nothing but the best for the "Best of the Show".

The secret of Dolores' success is the energy to do the work. Her bettas all have a family history on a three by five file card. Sixteen generations of a blue strain all repose in a file card case. She has been breeding for a flat black for



A sticker for cleanliness in the betta raising tanks. Dolores also makes sure that each tank is appropriately marked for identification and record-keeping purposes.



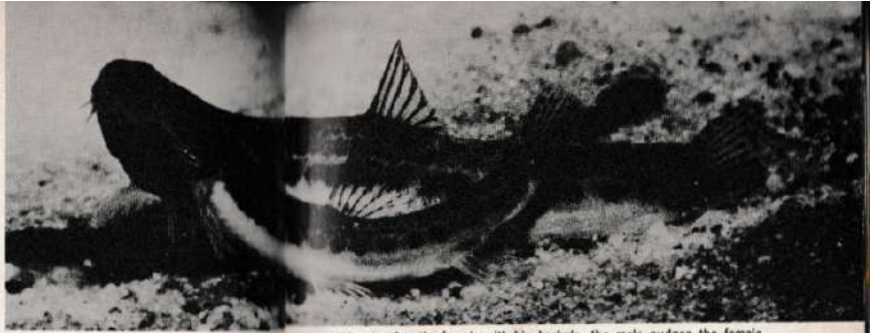




# The Spined Loach, *Cobitis taenia*

BY PROF. VITTORIO MENASSÉ

Photographs by  
Dr. Walter Foersch from  
BREEDING AQUARIUM FISHES



After teasing the female with his barbels, the male nudges the female.

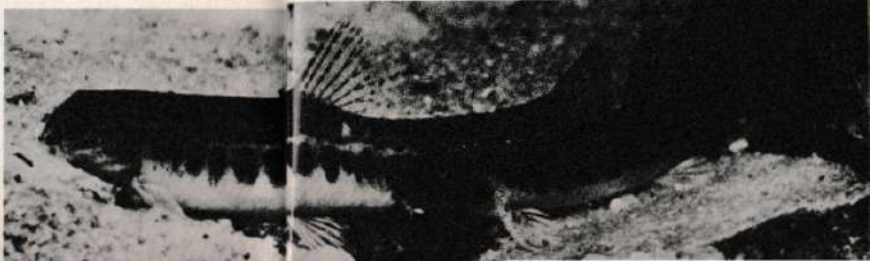
The only scavenger living in Europe that readily adapts itself to life in the aquarium is *Cobitis taenia*. According to some books this fish is known in the United States as "stone-gig" or "suck-stone", but Dr. Axelrod advises me that the more popular name among aquarists is "spined loach". This fish belongs to the family Cobitidae.

Spined loaches subsist on vegetable matter and organic waste they find on the bottom of the aquarium. They are great scavengers for people who overfeed their fishes, for spined loaches can be counted upon to clean up all uneaten food. Hobbyists who discover they have overfed one of their aquariums can usually avert disaster by putting several spined loaches into

the aquarium which was overfed. This must, of course, be done before the water turns foul. Spined loaches also appreciate some live or freeze-dried food if they can find it at the bottom of the aquarium. European fish hobbyists find the spined loach to be a very favorite aquarium fish for scavenger purposes.

*Cobitis taenia* is not difficult to find. Specimens can be bought in many petshops in Europe (I live in Italy). They are also found easily in nature. Almost any body of fresh water found in southern Europe, northern Asia, and north Africa might contain specimens of this fish. The waters can be flowing or still, it doesn't matter, but *Cobitis* doesn't like sunshine, and it

Males are usually smaller than females.

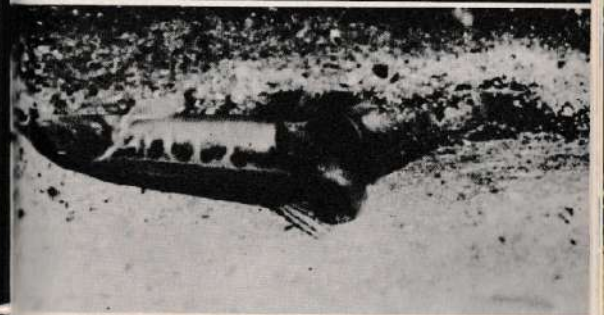


Suddenly the pair begins to thrash about the aquarium and hundreds of eggs are scattered about. The eggs fall to the bottom and hatch in a week to 10 days, depending upon the water temperature. There were 1,000 eggs deposited during this spawning. The eggs are only slightly adhesive.



A closeup showing the developing embryo within the transparent egg.

If the female seems to cooperate, the male will wrap his body completely around her in such a way that their genital pores are close to each other. He seems to exert a great pressure on the female at this time.





**Tropical Fish Hobbyist**

spends most of the day buried in the sand with only its head, and perhaps a bit of its tail, projecting out.

The elongated body of *Cobitis* is compressed laterally and flat on the bottom. It is a light yellow cream color with several rows of irregular dots and dashes. It grows to about 4½ inches long. Its mouth is sub-terminal (That is, it opens under the head) and is provided with three pairs of barbels. The fish has one row of pharyngeal teeth.

All *Cobitis* have small fins. The male fish is much smaller than the female fish. Males have a thickened second ray in their pectoral fins. *Cobitis* is a strange fish in many ways. It is very sensitive to a lack of oxygen, and nature has provided it with a vascular intestinal wall which serves as an accessory breathing organ should the fish find itself in polluted waters which are low in oxygen content.

Keeping *Cobitis* in the aquarium is easy. Provide a bed of fine gravel to facilitate the spined loach's digging into the sand and hiding. The fish is not a "tropical" in the true sense of the word and is, therefore, a perfect scavenger for the coldwater aquarium, too. *Cobitis* do very well at any temperature between 45 and 75°F. In Europe it is commonly used as a tankmate for goldfish.

In petshops in Italy, the fish sells for 150 lire, about a quarter. It is a sociable fish and is highly recommended for the community aquarium. Though it rarely breeds in the aquarium, it has done so, as you can see from the accompanying photographs. In America I have seen these fish advertised as "weather fish" because changes in barometric pressure sometimes change their activity.

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By Ed Galewicz

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slate work well for this part. Fill the tank to four inches below the top of the tube. Turn on the air and the water should drip over the top of the tube. Adjust the rocks so water drips in an attractive pattern and does not splash onto the front glass. Place some moss-covered rock on top, with small potted bog plants for natural effect. A jungle river in your very own home.

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*Cephalopholis miniatus* PHOTO BY: Dr. Herbert R. Axelrod

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BY  
FREDRIC M.  
SCHWARTZ

Caught in the net . . .

If you have run into the same problem that I and other marine hobbyists have had in dealing with various of the *Apoogon* species (the problem being that certain of these cardinal fishes seem to fade out and lose their colors, even without showing other symptoms of illness), you might be able to correct the problem by regularly feeding bits of jumbo shrimp, the kind sold for consumption by people. My experience over the past year or so with eight *A. maculatus*



*Apoogon maculatus*



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tus and four *A. orbicularis* in a 30-gallon tank shows that the fishes maintain their normal in-aquarium coloration if they receive the jumbo shrimp as a

major part of their diet. Their colors remain consistently bright and even seem to intensify at feeding time. I use uncooked whole jumbo shrimp, which I keep in my freezer. I thaw out about one inch of shrimp, peel off the shell and cut it into bite-size strips. The cardinals have large mouths and can gulp a fairly big piece of shrimp.

There is a point to be made here other than the obvious suggestion that you try feeding jumbo shrimp to your fish. The

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point is that there is much we do not know about the marine hobby. The freshwater hobby is what it is today because of people who have tried new ideas. Otherwise we might still be limited to breeding guppies and a few other livebearers. Obviously there are feeding requirements we have been unable to meet. If our fish die at an early age, is it not, perhaps, because of a dietary deficiency? We will have to vary their diet and experiment with different foods.

that of communication. Perhaps you have made an interesting observation on the feeding habits of a certain fish. Or, for that matter, perhaps you've made an observation or conducted an experiment on some

*Continued on Page 91*

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BY ROBERT KREBA

Have you ever had a tank so clouded that you've been tempted to dump everything in it down the drain, fish included? Have you come to the conclusion that no filter on earth is capable of cleaning a tank so that you can see the fish in it? Are you so disgusted with your tank's appearance that you're ready to take up stamp collecting?

Well, fear not, my fellow aquarist! Mother Nature has come to your rescue. In fact, it's been here for several million years, it's just that not many aquarists have noticed it. What is it? FWC—the fresh water clam!

Yes, the FWC, or mussel, has been around for about 460 million years! Its ancestors differed little in appearance from its present-day forms. The FWC belongs to the phylum Mollusca, which includes such creatures as squid, octopus, tusk shells, chitons and the snails. The clams, mussels, and oysters comprise the class of bivalves, meaning having two shells.

In North America, just about any permanent body of water will yield one or more species of mussels. For the bigger ones, lakes and rivers should be looked over. Smaller clams will be found almost everywhere. They are found almost exclusively in water under six feet in depth. Only a very few will be found in water of more than fifteen feet and more often none will be found. Silty water is easily tolerated, and perhaps even preferred, as evidenced by the abundance of clams and mussels in the Mississippi and Missouri river valleys—the Big and Little Muddy. They will not tolerate soft or acid water, or water that is polluted by industrial wastes. Except for these two exceptions, they may be found anywhere in the U.S. and Canada. They may be collected by hand, or with an ordinary garden rake, where the water is deep, or clouded. All are bottom dwellers, although some of their saltwater relatives live more active lives; some can swim, some bore through wood, and some are sessile (stationary throughout adult lives).



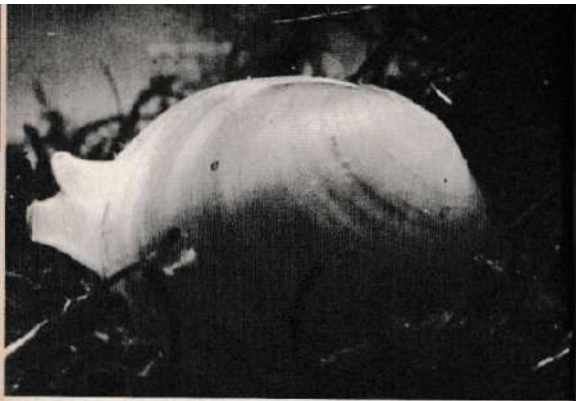
Generally overlooked by hobbyists, freshwater bivalves are nevertheless interesting, even though they present a mixed set of good points and bad points regarding any tropical fish tank that houses them. Photo by Dr. Karl Kraeck.

Some freshwater clams are hermaphroditic; that is, the reproductive organs of both sexes are contained in a single individual. Notable in this regard are the mussels of the genus *Sphaerium*, or finger-nail clams. These seldom reach more than half an inch in length.

Most, however, are sexual. When the breeding season rolls along, which is usually early spring to early summer (although some breed all year round!) the females start to fill with eggs. These eggs, which number from seventy-five thousand to three million, depending on the species, are formed in the gill chambers. Thus, when the males give off the spermatozoa in the water, these are pumped into the gill chambers of females in the area. The eggs are then fertilized, and remain in the gill chambers until they reach the larval, or glochidia stage. Any sperm pumped into the gills of other males are merely expelled.

To get back to our cloudy tanks, a few mussels is the solution. One or two in a cloudy tank will work wonders, seemingly overnight. How do they do it? All fresh water clams have two tube-like extensions known as syphons. The intake syphon is connected with both gills and its mouth. So any suspended matter that is sucked into this syphon is eaten and





A fresh water clam of the genus *Sphaerium*, shown with siphons extended while feeding. The finger-nail clams pose less of a danger in the tropical aquarium than do the mussels. Because they are much smaller, their death and subsequent decomposition in the aquarium creates less of a problem, and they also are much less prolific than the mussels, thereby lessening the amount of spermatozoa released into the aquarium. Photo by Dr. Karl Knack.

disposed of (the other syphon serves to dispel water and body wastes). In addition, they make interesting inhabitants for the cold water aquarium.

By now you must be shaking your head in disbelief. Obviously this is too much of a good thing, there must be a catch somewhere. Unfortunately there is. Remember those glochidia? When finally expelled (and it may happen in the aquarium!) they emerge as tiny fish-eating monsters! Not that bad perhaps, but they immediately seek out a fish, and attach themselves to its gills and fins. They then proceed to live as parasites, dropping off in from two weeks to two months. In the wild the danger is not too bad, as there is usually a vast body of water for them to search through and fish are more plentiful. The same occurrence in an enclosed, limited space like an aquarium, however, is prone to disaster.

Some limnologists contend that these glochidia are highly specialized, and that each type will attack only one species of fish, rejecting all others. If this were so, there would be no problems. However, I'll bet that there are hundreds of aquarists who would be more than happy to discuss the matter with one of these learned men of science.

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### Sounds Produced by *Colisa lalia*

BY ULF MALMGREN

"Dumb like a fish," is the saying, and it usually gives us hobbyists a chance to smile knowingly. That fishes show little respect for this pseudo wisdom is one of the trade secrets we like to disclose to an impressed circle of listeners. Leaving aside the modern theories of a system of communications with electronically measurable sound impulses, we still have a well-attended choir of audible beeps, creaks, groans, and other forms of noise left to us by our fishes. It seems that "sounds" is the correct definition for these phenomena. Vocal cords like those of the human race are not present in fish, and in fact the question of whether a fish has to be considered "mute" in the usual sense of the word must remain open, and so must the introductory decision up to what point the problem is to be faced as a zoological, social, or even metaphysical matter.

Universally regarded as one of the most beautiful and most peaceful of the gouramis, the male dwarf gourami has been discovered to be something of a loudmouth. Photo by Gunter Senft.



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Widely famed, although hardly bothered by aquaristic intervention, the croakers (family *Triglidae*) live in the Atlantic, the Mediterranean, and the Black Sea. Their large swim bladders form the sound box for the noises put forth with the aid of adjacent muscles. The tetraodontids give forth a loud hissing when they suck air into their balloon bellies or when they expel it. From South America come the sometimes very prettily designed spiny catfishes (family *Doradidae*), the best-known species of which, *Doras* (*Acanthodora*) *spinissimus* and *Doras* (*Amblydoras*) *hancocki* were dubbed by aquarists with the significant name of "croaking catfish." Their emission of sound, which is well depicted by the popular name, is audible both while the fishes remain under water or while they are lifted out of it, and is produced by a mechanism similar to that of the croakers.

More than other families of ornamental fishes, the Anabantids have distinguished themselves through *Trichopsis vittatus*, the croaking gourami. With its peculiarities it enjoys a fame that surpasses that of the above mentioned species by far. Its sound, audible during the mating period, especially during fights between males, has been described by several observers, sometimes as a grumbling or croaking, sometimes as reminding

The sea robins, family *Triglidae*, have long been known for their vocal abilities. The sea robin common along the North Atlantic coast of the United States being among the noisiest of the family. Shown here is *Trigla hirundo*, an Eastern Atlantic species. Photo by Gerhard Budich.



one of the nocturnal song exercises of frogs. For some unknown reason it has not yet been recognized that another very popular representative of the Anabantids, *Colisa lalia*, contributes to the standing of the family for the ability to vocalize. It is high time that this fish too receives official recognition for its art.

In *Colisa lalia* it is the male who utters the sounds when he is in a state of the highest excitement, such as at the acme of its typical swift sallies, generally—in case of rivalry—against another male, or—in case of courting—for the benefit of the female of the species. The sound is heard through a 1/2 inch glass at a considerable distance, and could be described as a pronounced, rather abrupt croaking. It is impossible to give a good onomatopoeia of it. Simultaneously with the sound, or immediately after it, a few bubbles of air are released from the gills. The male rarely undertakes more than two or three such sallies with ensuing emissions of sound in quick succession. This seems to be the maximum capacity of its air reservoir which thereafter must immediately be renewed.

There is no anatomical explanation on how the croaking of *Trichopsis* takes place. It is supposed that the labyrinth plays a certain role in it. In the case of *Colisa lalia* the mechanism is probably similar to that of *Trichopsis*. By means of a quick compression of the bag-like enlargement of the gill cavity (the so-called suprabranchial organ or labyrinth), the air that is normally found there puts a source of sound into vibration, possibly the oral cavity of the gill arches.

The ability of *C. lalia* to utter sounds in certain situations serves the double purpose of impressing and scaring off enemies. In the author's tanks the males have used this weapon on each other, for instance in fights over range, or during feeding with especially well-appreciated foods, provided that the preceding period has been one where a less inspiring diet was offered. During the courting period they also use it off and on against the female when she went to the nest too soon or even tried to help in the manufacture of foam bubbles.

(According to the research of Dr. Sten Forselius the female possesses the nest building behavior at least latently in her nerve system, even if it is blocked. Dr. Forselius was able to produce it by means of testosterone injections. Notwithstanding this, he reports the aid of the female as a non-normal stage of the courting ritual in his comprehensive graphic description of the mating of *Colisa lalia* [Suhaf 1955: 1, Uppsala 1955]). Other authors, though, have paid more attention to this relationship, for instance J. J. Scheel who observes that "the willing female follows the male to the nest and even starts blowing foam bubbles" (Dansk Akvarieblad 1961, p. 7). My males have always considered this a disturbance of the courting behavior: it always triggered an aggressive reaction and a chasing of the female

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from the vicinity of the nest—with or without sounds according to the degree of excitement.

After courting the paternal instinct found expression in one or the other subduing interpellations of the frightened female. We know *Colisa lalia* as a peaceable pleasant inhabitant of the community aquarium. But there are occasions when the male shows will and nerves of steel and attacks any moving object without regard to his own safety. This happens, for instance, when he is guarding spawn or fry. The sound probably fulfills its most important function in connection with the instinct of preservation of the species. The female, which after the act of spawning tends not to show special signaling actions and color patterns that so far had caused her to be tolerated, is now chased away without compunction. But towards other, more powerfully built species the sound is probably just the psychological means to improve defense in still a better way than fighting. Perhaps our readers have some of their own observations to report.

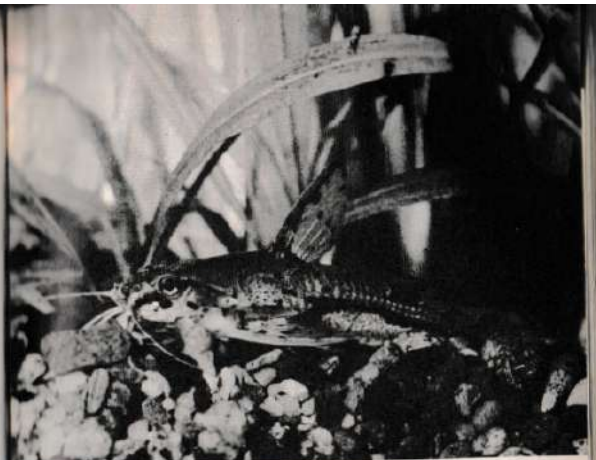
*Colisa lalia*'s vocal ability is of less meaning, but probably still of some value in informing roaming spawn-ripe females of the location of a range and nest.

It is not definitely known exactly how reflexes affect sound production. It is a known fact that key reflexes of the conventional kind trigger the threatening behavior. But with specific regard to the sound there are circumstances which speak for the fact that, without direct influence of a key reflex, it takes place secondarily when the general tension of the body is sufficiently intense. As was stated before, my own observations show that the sound never appears alone, but always in connection with a preceding attack of a certain kind, either in its braking stage, or at the turning point of a parabola formed by approaching and withdrawing again. In both cases it occurs when the object is nearest and the excitement at its highest point. If the attack takes the form of a chase, or if it leads to corporal combat and biting, no sound is heard. In such cases the energy is transformed into a pattern of coordinated motions but of only partly increased muscular stress. Establishing a distinction among the different kinds of attack, we may consider the sound as a component of a larger instinctive action; the other component consists of a threatening attack. An existing key reflex would therefore influence the whole action, but not the sound alone. Thus the accumulated energy (the "action-specific energy") could not be used simultaneously for biting, chasing, and emitting sounds.

Occasionally one kind of attack may change over into another one. Quite frequently, for example, chasing ends in sudden stopping and utterance of sound, turning into renewed chasing, and so forth.

The threatening attack, in which no physical harm is done to its causer, is only natural to the arsenal of *Colisa lalia*, and in fact to that of most fishes.

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*Amblydoras hancocki* is less frequently seen than the talking catfishes of the genus *Acanthodoras* but is just as adept at making sounds. Photo by Gerhard Marcuse.

At the moment when the fish stops and turns around the fins are extended, the volume of the body increases and becomes more frightening, and intense colors are shown. *Colisa lalia* further enhances this moment by the utterance of sounds. Most threatening attacks which end without offensive action, however, are carried out without the production of sound. This has to be clearly established because it enhances the nature of the sound as a by-product still more. Very often only a few bubbles are pressed out off the suprabranchial organ—a median stage of muscular tension.

The male *Colisa lalia* is unable to predetermine behavior that will lead to the utterance of sounds instead of to other actions; that is, the key reflexes lead to threatening and attack, but the sound itself remains under complete dependence on the intensity of the action. Or, in other, better chosen words: the level of activation of the triggering mechanism must be so high that it is able to lead to a value of muscle activity at which the utterance of the sound takes place. To what extent the intensity of triggering the influences plays a role is hard to say. The croaking of *Colisa lalia* is not identical to the rather noisy release of air typical of other anabantids.

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# MAIL CALL

If you have an aquarium question that you would like answered, send it to MAIL CALL. Each month the most interesting questions received and their answers will be published in this column. Letters containing questions cannot be acknowledged or answered personally. Address all questions to MAIL CALL, T.F.H. Publications 345 Comalton Avenue, Jersey City, N. J. 07302.

### Aquascaping

Q. I am doing some aquascaping with stones, slate and cement. I find that cement is really too heavy for my 30-gallon aquarium. Is there any other material that is lighter? I am making cliffs which are five inches high, 1 1/2 inches wide and 20 inches long.

John A. Adams  
Hazel Park, Michigan

A. Try rubberoid aquarium cement. Although it is rather expensive, it is light and perfectly safe. Cement may cause the pH of your aquarium water to become dangerously alkaline if it is not leached in vinegar water for several days.

### Acanthodoras

Q. In the book *Exotic Tropical Fish* is a picture of a catfish which is called *Acanthodoras* U2. In a dealer's show tank I had admired such a fish which was called a "Raphael Cat." I later purchased this catfish and carefully compared it to the pictures in ETF. My

fish looks a great deal like *Acanthodoras* U2, except that his dorsal spine is not as saw-edged. Can you give me an identification for this fish?

Mike Lacey  
Flushing, New York

A. There are many nominal species of *Acanthodoras* and specific identification

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depends on an examination of various characteristics of the armor. From the sketches and photos you have sent, I would say your fish is more similar to *Acanthodoras* U1 than U2.

### Siamese Twins

Q. We are raising albino swordtails, and one of our females had 21 young. Of these 21 there were two sets of Siamese twins. One set died the same day. The other set is still alive and seems to be in good health. Are Siamese twins rare?

Thomas Linz, Sr.  
Lansing, Illinois

A. There is nothing really new under the sun. Siamese twins were very much in the news of the hobby 30 years ago. They are fairly rare, but not valuable. They seldom survive for any length of time, although occasionally a set survives to adulthood. Sometimes the development is equal for each twin; at other times one becomes adult size with the other growing very little.

### Red-tailed Black Shark

Q. I am very much interested in the possibilities of breeding *Labeo bicolor*. I have a four-inch pair that continuously dance around a rock side by side. I assume this is part of the mating procedure. In *Exotic Tropical Fishes* it states that spawnings have been given. Could you give me more details at this time?

Paul R. Kingston, Jr.  
Chesapeake, Virginia

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A. One account of spawning this species was given in the February 1968 issue of T.F.H. Part of the problem with this species as well as some closely related ones is that the females usually do not ovulate under aquarium conditions. It has been suggested that gonatropine added to the water will stimulate ovulation. Some European aquarists claim that a very similar substance is found in peat moss and that adding a peat filter or peat bottom to the aquarium will produce a similar effect.

### Nomenclature

Q. Frequently after the scientific name of a fish there is a word in parentheses which is sometimes followed by a date. What is the significance of this information?

Ty French  
Frostproof, Florida

A. The name and date following the scientific name of a fish is an abbreviated citation to indicate who named the fish in question and in what year the description was published. For example, the lyretail was originally known as *Haplochromis callurus australis* Rachev 1921. The name was subsequently changed to *Aphyoseion australe* (Rachev 1921). The author and date are now placed in parentheses to indicate that although the original description is valid, the name has been changed from that assigned by the original describer.

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**Turtles in Tank?**

Q: Other than the unsightly appearance of having tubifex in the sand, what are the advantages and disadvantages of this situation in a well established aquarium?

I'd like to put a couple of baby turtles in my 55-gallon tank and will supply them with a turtle raft. Will they harm my fish?

Bill Mullin

Alexandria, Virginia

A. The advantage of tubifex living in an established aquarium is that they provide a constant supply of food for your fishes. This advantage, in our opinion, is strongly offset by the fact that when and if they die, they are a source for water pollution and thereby present a hazard to your tank inhabitants.

Small turtles will usually live in harmony with aquarium fishes, since they will eat the same foods as fishes and will tolerate the same aquarium temperature and conditions that tropical fish require. Most baby turtles are too slow to present any danger to tank inhabitants and can be the answer to ridding your aquarium of the tubifex in the sand. They will chop up your plants, however.

**Archer Fish**

Q: I have purchased an archer fish and would like some information concerning him. What water conditions best suit it? Has this fish been bred in the home aquarium? How can I make it shoot for me?

Carl Thummel

Essex Falls, New Jersey

A. *Toxotes jaculator*, the archer fish, likes brackish water, a temperature of 74 to 85 degrees and a lot of water surface (it's a surface dweller). It prefers a diet of live



Archer fish, *Toxotes jaculator*

insects which it can capture for itself, but it will accept many commercial fishfoods (live and frozen). To our knowledge, the archer fish has never been bred in captivity, and nothing is known of its spawning behavior. The archer fish can

sometimes be caught by shooting at pieces of meat suspended within its range of vision. Your best bet is to lower your water level 3 or 4 inches from the top and introduce small insects (such as the common housefly) into the aquarium, covering the tank with a glass top for the insects to adhere to and to keep them inside. With this setup, your archer fish should provide you with quite a display of marksmanship.

**Discus**

Q: What is the best initial food for baby discus and the best conditioning foods for adults? Should rocks or plants be used for a spawning site? Should a light be used on the breeding tank? What is the best size for breeders and what is the optimum pH, DH and temperature for the breeding tank? Is it better

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to buy a breeding pair or a regular pair? Where can I purchase a pair of discus for breeding or a mated breeding pair?

Kevin McMillen

A. The initial food for baby discus after they absorb their yolk sacs is the micon coating on the sides

of their parents, which the fry peck from them for the first two or three weeks of life. After this, generous feedings of baby brine shrimp, commercial fry foods and infusoria should be given several times a day. After three weeks, the fry can be safely separated from their parents, since they will be feeding entirely for themselves. There have been a few accounts in which completely artificial raisings of the young have been reported. This is quite unusual, though, and should not be relied on. Some discus like a live, broad-leaved plant as a spawning site; others prefer a piece of clean slate. Providing both is your best bet, giving the breeders a choice of sites. Once the fry have hatched, providing light for a reasonably long period (18 hours a day) is a good idea. Combined with the relatively high temperature required for breeding (80 to 85 degrees), the fry are kept active and feeding, promoting rapid growth. A pH of 5.3-6.0, not harder than about 6 DH, and preferably a good deal softer than this, is optimal for

breeding. Frequent water changes (be sure your replacement water has the correct pH, DH and temperature) are important, with 1/3 of the total water volume per tank changed weekly considered to be optimal by many. Conditioning foods such as beef heart are usually accepted with relish. The discus is not known for having an interest in dry foods, a variety of the former being grown up to about 1/2 inches in length (excluding the tail fin) they are mature at half this size. Of course, the larger your breeders are, the better, providing they are not too old. A pair that you know have been successfully bred are your best bet, but the price-tag on a mated pair

is usually prohibitive. Your alternative is to purchase several adults and hope that you will witness signs of pairing-off. Advertisements for a pair of breeders can be found in our advertising section, and you can check with dealers and hobbyists in your area.

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## YOUR FISHES' HEALTH

### GOLDFISH

By  
Reger  
Lee Herman

Goldfish, which have been kept as an aquarium fish for over 1000 years, are generally considered to be easy to raise because they are very hardy and require less attention than most other aquarium fishes. But despite their hardy constitution, which allows them to survive in very poor water conditions, goldfish suffer from as many, and perhaps more, diseases than other fishes. This hardiness is why I caution inexperienced aquarists against using goldfish as a community tank fish. Goldfish are able to carry rather large numbers of the common parasites without obvious signs. Thus, when they are placed in a community tank without first having been treated for parasites, the parasites leave the goldfish and attack the less hardy fishes in the aquarium. If goldfish are placed in a community tank, they should be quarantined and treated first as outlined in the April, 1969 issue.

*Ichthyophthirius*, *Costia*, *Chilodonella*, *Gyrodactylus* and *Dactylogyrus* are among the more common parasites which can be carried by goldfish. Anchor worms (*Lernaea*) and the fish louse (*Argulus*) are very common parasites of goldfish in large ponds. These crustaceans, of course, are rather easy to spot because of their large size. If you have only a few fish, they can be removed easily with forceps (a pair of eyebrow tweezers will do). A dab of mercurochrome or iodine should be applied to prevent infection of the wound left from this operation.

Goldfish are frequently seen with swollen stomachs. Such swellings may be caused by the presence of worms such as *Ligula* or by bacteria. Infections by *Mycobacterium piscium* (fish tubercu-

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los) sometimes cause abdominal enlargements. *Aeromonas* and *Paradomonas* bacteria cause a disease which gets its name from accumulation of fluid in the body cavity—dropsy. The tetracycline antibiotics have been reported as successful against all three of these bacteria. They may be dissolved in the water at suggested rates, but better results are usually gained by injecting approximately 1 mg per ounce of fish. Kanamycin is a newer drug which is said to be very effective against these infections, but it must be injected because it is not soluble in water.

In addition to stomach swellings caused by infectious organisms,

goldfish may suffer from conditions equally familiar to other species. Egg binding and constipation caused by improper feeding are good examples. A condition which is rare in most aquarium fishes but rather common in goldfish is polycystic kidneys. The kidneys, which lie between the air bladder and backbone, develop many fluid filled bubbles called cysts. These may become quite large and cause the body wall to bulge. Occasionally, the ovaries of female goldfish will develop a similar condition.

Certain types of tumors are common in goldfish. Lumps on the

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skin may be seen varying from white to black. These may be tumors of nerve tissue (neurofibroma) or of connective tissue (fibroma). These tumors may occur in high numbers on fish in a single pond. It is thought that the genetic makeup of the fish is important in the development of such tumors. Fibromas can be found in the body cavity. Sometimes infections such as dropsy will cause the formation of scar tissue which looks very much like a fibroma. To distinguish between them, it is necessary that a trained fish pathologist look at histological sections of the tissue. This is true for many of the diseases listed in this article. Tumors cannot be cured with drugs. Sometimes it is possible to remove

small tumors from the skin or fins with a razor blade or other very sharp blade.

We see that goldfish with swollen abdomens may be suffering from any of several diseases: bacterial infection, parasitic infection, improper feeding, tumors or other abnormal growths. Because of the variety of causes of this symptom, it is necessary to request the help of someone versed in fish diseases in making a diagnosis.

Genetic diseases such as spinal deformities have not been mentioned, since many of these characteristics are bred into the fish on purpose and therefore cannot really be called a disease. To the fish, however, they are abnormalities.



"I'M SORRY YOUR FISHING TRIP WAS CANCELLED, STU, BUT LISTEN TO REASON!"

## PHOTOGRAPHY FOR AQUARISTS

by DR. HERBERT R. AXELROD

I

### WHY PHOTOGRAPH YOUR FISHES?

People maintain fish tanks in their homes or places of business for many different reasons. One reason is for beauty . . . living beauty . . . and those who appreciate the beauty of an aquarium with its colorful fishes and its green plants (plastic, in most cases) are almost certain to appreciate the beauty of a fish or aquarium photograph. So, many people want to photograph their aquariums and fishes to further decorate walls, scrapbooks or just to remind them of how their aquarium was aquascaped before they changed it.

Since photography is the English-speaking world's number one hobby (stamp collecting is number two) and fishkeeping is number three, there is a great possibility that the home with an aquarium is also the home with a camera. It seems quite natural, then, for the fish lover to want to photograph his fishes . . . and for the camera-bug to want to use the aquarium as a model.

Another important reason for me to share my knowledge of fish photography is simple . . . I have written more than 50 books about fishes and hundreds of articles. Not one of them would have been a success if it were not for the beautiful photographs which adorn the pages and illustrate point after point of what I was trying to get across to the reader. With fishes going through color changes or

This is the first installment in a series of chapters adapted from the forthcoming T.F.H. Publications book *Photography for Aquarists*, by Dr. Herbert R. Axelrod. These articles are intended to be of special use to hobbyists who know something about fishes and their care but almost nothing about photography. The book will be available at pet shops for \$2.00.



spawning antics, it is impossible to record verbally what happens . . . yet a camera records so much with just a single photograph, or a series if that is possible. One of my best-selling books **BREEDING AQUARIUM FISHES** would have been quite impossible without the spawning series of more than 100 species of fishes.

Finally, to identify a fish from its scientific description, even with a drawing or photograph of the dead, preserved specimen, takes a formal education of perhaps six to eight years in a university. Using a good color photograph is nearly all that a fish-lover needs.

II

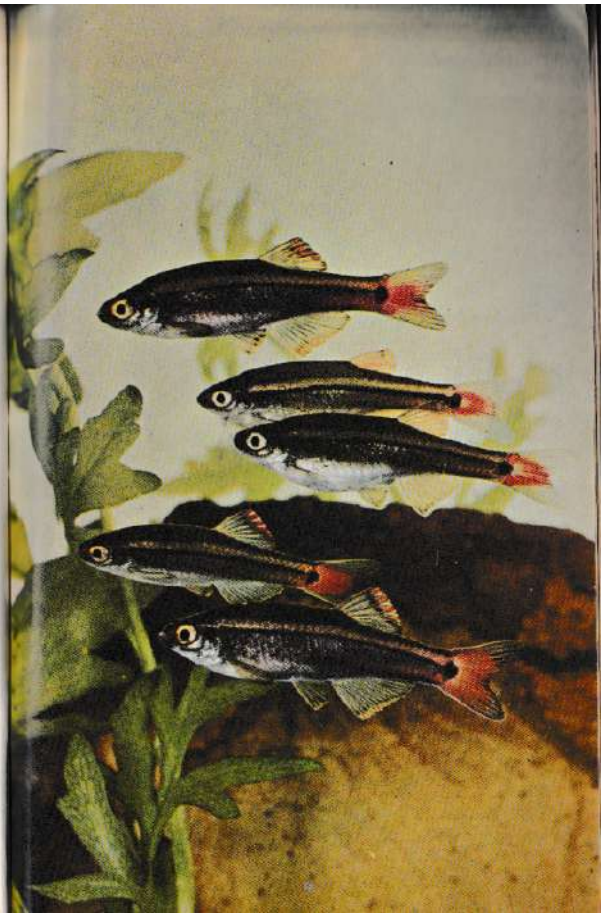
WHAT EQUIPMENT IS NEEDED FOR FISH PHOTOGRAPHY?

Needless to say you need an aquarium and some fishes and plants. The fishes should be as large as possible; the aquarium should have glass which is absolutely clean and not scratched and the water must be crystal clear without debris floating in suspension. A light background of solid color is preferred. If there is no painted background the back can be covered with white paper (light blue is also very good), a white towel or a non-reflective color. By non-reflective I mean that you can't see your own image in it if you try to utilize it for a mirror. Stay away from black backgrounds until you've mastered the art.

The top of the aquarium should be open so you can shoot light into the scene from the top. You will need a minimum of one flash unit, preferably a strobe . . . more preferably three strobes which are synchronized to go off at the same time that the camera shutter opens the lens.

You will also need a camera, preferably a single lens reflex. This means that you can actually look through the lens by a mirror

A group of five white clouds photographed by Dr. Herbert R. Axelrod. A beginner in aquarium photography would have a hard time appreciating the difficulty experienced in trying to obtain group portraits of this quality.



The most common application of the principles of photography is to record an over-all picture of a community aquarium or an aquascaping job prior to change. Above: a beautifully planted aquarium as photographed by G. J. M. Timmerman; below, a marine community aquarium.



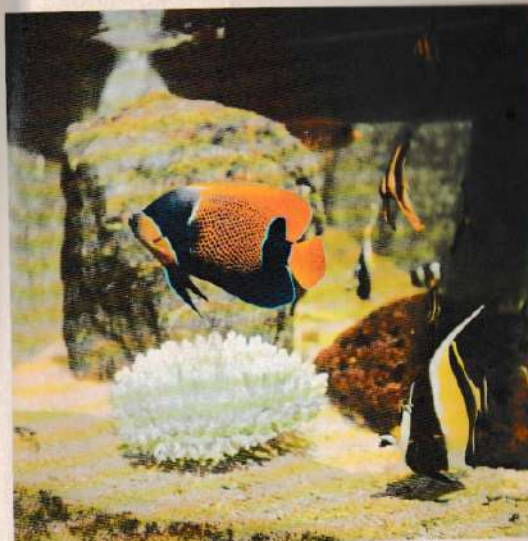
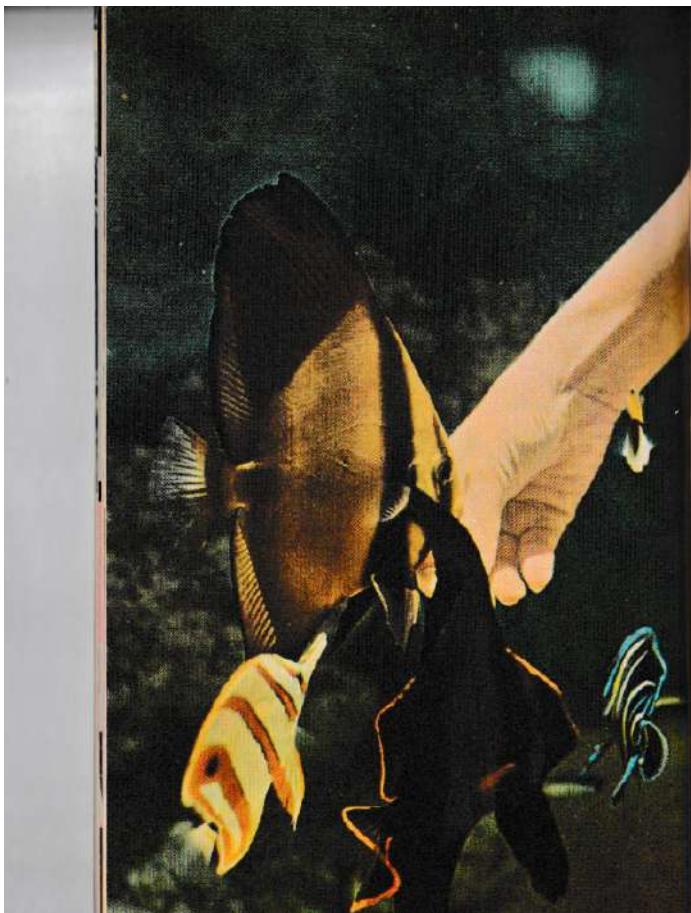
system that folds out of the way when you snap the photo. Almost any camera can take photographs of fish tanks and fishes, but the quality of the photograph and the waste of film and time will more than make up for an investment in the proper equipment.

Since the equipment needed is so very important to your success in picture-taking, we will go into detail about the camera, strobes, spot-lights and model-lights in a separate chapter. Suffice it to say that special equipment is extremely advantageous, but not absolutely necessary. In the jungle I do not use spot-lights, strobe-lights, flash guns, model-lights or a full-sized aquarium. I use an old Exakta camera (or, more recently a Nikkomat) with a Makro lens which can photograph as close as 2 inches from the subject in a 2:1 ratio (the photograph of the fish will be half as large as the fish itself.) I use a small aquarium which is about 2 inches wide by 8 inches square and I drape my handkerchief over the back to act as a background and light reflector. The sun is my light . . . and there is nothing in the world better than strong sunlight for fish photography regardless of what anyone tells you (or sells you.)

Of course, besides a camera, you also need film. I have used almost every kind of color film and black-and-white film made. Unfortunately there is only one manufacturer you can depend upon for consistent quality . . . Kodak . . . and I had to say unfortunately for they are terrible people to deal with if you want any special favors. While I was forced to recommend their film for this book, they refused for years to allow me to use any of their photographs to help people enjoy their hobby more. Often they would buy complete rights to a beautiful photograph and never allow anyone else to buy secondary rights. (I had to get this "blast" in just in case the President of Kodak might change this unwholesome company policy.)

Kodak makes several grades of films, but the best films are Kodachrome for 35 mm color photographs; Ektachrome (daylight type) for 2 1/2 inches square or 4x5 inches color films; and Tri-X for black and white photography (even though it is fast and many people will disagree with me.) The use of faster color films and faster or slower monochrome films is left to the more advanced photographer. To take good photographs of fishes or anything else, stick to one camera, one lens, one color film and one black-and-white film and learn all you can about the combination. Good photographs will be a natural result of experience. But if you keep changing





Sunlight is the best light to bring out the natural colors of fishes. Since the outdoor firms are made in accord with the full spectrum of sunlight, it is hard to achieve comparable results with artificial light. It is best to sun-light whenever possible. Above: photograph taken by Earl Kennedy of one of his marine aquariums in Manila, which he maintains outdoors. Note the natural coloration of the blue-girdled angelfish, *Euxiphippus nevarchus*. Opposite: another Kennedy photo taken outdoors with natural sunlight. Such a pleasant interplay of light and shadow would be hard to achieve with artificial lighting. This photograph illustrates the tameness of Kennedy's fishes as they anticipate being hand-fed.

Tropical Fish Hobbyist

films and changing lenses you'll always be working out new exposures and necessary new techniques with lighting and you'll never get down to learning how to make good photographs. Stick with what I have recommended and you'll be using what most of the successful photographers use (except for those behind the Iron Curtain who cannot get Kodak products.)

There is one more thing to be said in favor of Kodak. Their processing of their own films is superb. If you use Kodak, have Kodak process the films. They do a wonderful job, even if they are usually a bit more expensive than local color processors. Your local camera shop is usually a Kodak representative and he can have the films processed by Kodak for you. If you don't have a shop near you, mail the film to Kodak directly.

Assuming you use Kodak, there is no need to date your photos as Kodak does that automatically for you. All you need now is to store the photos in some proper place. I use an 8 1/2 x 11 inch plastic sheet which has small pockets in which the 35 mm slides can be tucked. They are protected from air, dirt and fingerprints by the plastic sheeting. One side is clear and the other frosted for easy viewing. They are then stored in a looseleaf-type book and alphabetized according to scientific name. I use a card file to identify such things as where the fish came from, where I took the photograph and who identified it for me. In some cases where I have other photographers' works on file, I also have a place on the card for the name of the photographer.

If you are willing to go through with all that is necessary to make good fish photographs, I am willing to divulge all of my "secrets." They are secrets, too. None of these techniques has ever been published before, though I have shown them to several scientists who needed them for their work.

Read it next month in  
TROPICAL FISH HOBBYIST . . .

**PHOTOGRAPHY  
FOR  
AQUARISTS - 2**

**salts**

Continued from Page 49

other aspect of the hobby. I will be glad to publish such information if it is valid and pertinent. It will be the purpose of this column to review such articles for publication or to pass along to our readers points that are relevant. Such letters should be sent to me in care of the magazine along with as much information as possible. We will continue to publish questions and answers as usual and will try to include interesting letters from readers whenever possible.

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Photo by Dr. Herbert R. Axelrod.

# Herr Arnold's Wunderbar Characin

by Frederick J. Kerr

Importations from Africa are erratic, and too few shipments bring the aquarist Arnold's characin, also called the big-scaled characin and the red-eyed characin, *Arnoldichthys spilopterus*. The coloration of this species and its relative *Phenacogrammus interruptus* sends writers to their dictionaries for superlatives to describe them. Such adjectives as "opalescent," "iridescent," and "shimmering" are all true and even fall short of the mark.

The coloration of Arnold's characin changes with movement, and as a result no single photograph can record the multitude of prismatic colors. The background color of this characin is basically an iridescent blue-green, this being much stronger on the sides than on the back. A broad, dark band runs from the back of the bright red eye along the body onto the caudal fin. Above this band is a second bright band. The belly of the male is yellowish



A pair of *Arnoldichthys spilopterus*, male at right. Photo by Dr. Karl Knaack.

with a reddish sheen. All the fins tend to be yellowish, and most have dark markings. In the dorsal fin this takes the form of a very large, conspicuous spot. The caudal is marked with extensions of the lateral markings. The anal fin of the male is variously lined with ivory and black, as are the anterior portions of the ventrals.

The extremely large scales of the upper portion of the body add greatly to the reflective power of these colors. *A. spilopterus* is rather inelegant in shape, being rather dumpy as tetras go. This is a moderate-sized tetra averaging less than 2½ inches in length.

The genus *Arnoldichthys*, with only one species, is closely related to the genera *Alestes*, *Micralestes* and *Phenacogrammus*. The genera *Micralestes* and *Phenacogrammus* differ from *Arnoldichthys* and *Alestes* in having

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laterally flattened teeth, while *Arnoldichthys* and *Alestes* have molar-form teeth. *Arnoldichthys* is separated from *Alestes* on the basis of its large scales. *Phenacogrammus* is separated from *Micralestes* by the same characteristic.

Arnold's characin is quite common in the region of the Niger delta where it is to be found traveling in large schools. Ideal water conditions would include soft water slightly on the acid side or neutral. Since this is a delta region, it might be wise to put a small portion of sea salt in the water. One teaspoon of synthetic sea salts per five gallons of water would be a good starting point. Aquarists too often assume that fishes which come from brackish water will do well in hard, alkaline water. This is not necessarily true, because soft water with sea salts added is not the same as hard water with similar salts added, especially when small amounts are used. The recommended temperature is in the high 70's or low 80's. *Arnoldichthys spilopterus* is a community tank fish if the aquarist considers the relatively large mouth of this fish when selecting companions. *Phenacogrammus interruptus* is an excellent companion fish.

*Arnoldichthys spilopterus* was named after a very important man in the aquarium hobby, Johann Paul Arnold (1868-1952). Living in Hamburg,

The violet overtones exhibited by this *A. spilopterus* are fleeting; at different times the fish's sheen could change to green or blue or pink or other colors, depending on the condition of the fish and lighting conditions in its tank. In general, the species is best maintained in tanks having a dark bottom color, as light-colored gravel tends to wash them out considerably. But it is not necessary to have both a dark bottom and dark background. Photo by S. Frank.

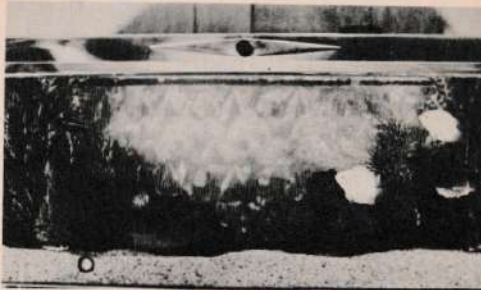


*Phenacogrammus interruptus*, the most sought after of the African tetras and usually the most expensive. The males of the species have the elongated dorsal and feathery caudal filaments. Photo by Krenser.

Germany, Arnold had the opportunity of seeing and studying large numbers of imported fishes. A number of new fishes were thus discovered by Arnold, who sent them to experts for identification. As a result a number of fishes were named for him; a list would include *Aphysionom arnoldi*, *Charodon arnoldi*, *Cichlasoma arnoldi*, *Copeina arnoldi*, *Pelmatochromis arnoldi* as well as our current subject. With Ernst Ahl, Arnold wrote the monumental *Die Fremdländische Süßwasserfische* which appeared in 1936 and served German-reading aquarists for nearly two decades.

There are no reports of Arnold's characin breeding in the aquarium. The aquarist interested in the attempt would do well to provide six to twelve of these fish with an aquarium of about 30 gallons, well planted and receiving occasional sunlight. The closely related *Phenacogrammus interruptus* spawns on bottom plants. Its eggs hatch in six days and the fry are free swimming in about 36 hours. Similar conditions are probably required by *Arnoldichthys spilopterus*.

A complete set of rules governing the photography contest appeared in the January issue; please refer to the rules before submitting photographs.



Landscape: Ellard E. Strassner, Beverly Hills, California.

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Closeup: George Smilow, Brooklyn, New York.



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Foreign: Add 60c per year a subscription  
Allow 4 to 6 weeks for processing