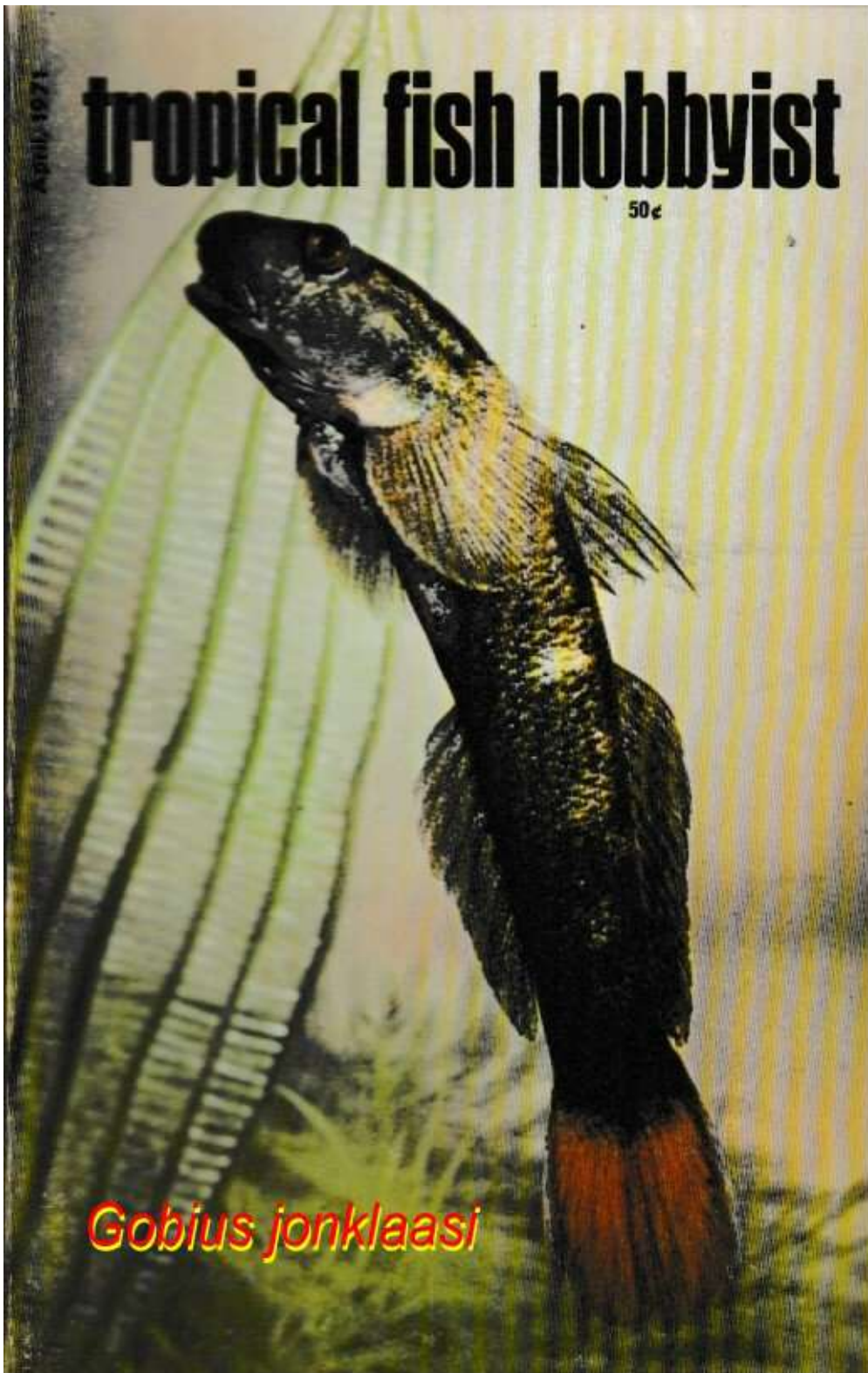


April 1971

# tropical fish hobbyist

50¢



*Gobius jonklaasi*

# tropical fish hobbyist

Vol. XIX, April, 1971 (#182, No. 8)

## CONTENTS

Rarefishing, Ceylonese Style .....	6
Cichlid Notes .....	19
Hybrids and Hybridization .....	23
Salts from the Seven Seas .....	35
African Lungfishes .....	40
My Observations on <i>Leporinus fasciatus</i> .....	60
<i>Gnathanodon speciosus</i> .....	67
<i>Scarus guacamaia</i> .....	69
Mail Call .....	71
Killie Corner .....	84
Your Fishes' Health .....	90
An Easily Spawning Egglayer, the Zebra Danio, <i>Brachydanio rerio</i> .....	94
Photography Contest .....	101

## COVER

Dr. Herbert R. Axelrod  
President, Executive Editor  
Ned Frenck  
Managing Editor, Art Director  
Lincoln Littell  
Editorial Associate  
Dr. Leonard P. Schultz  
Advisory Editor  
Dr. A. Vigor W. Schultz  
Translations Editor  
Margaret Hart  
Advertising Coordinator  
Sam Seidner  
Production Manager

*Gobius jonklaasi* Axelrod. Photo by Dr. Herbert R. Axelrod.

exotic marine fishes supplements  
Pages 67, 68, 69, 70.

## RATES

50¢ per copy in the U. S., 50¢ per copy in Canada or foreign, \$5.00 for 12 issues subscription in U.S. Add \$1.20 per year for foreign subscriptions. Index available in every 12th issue.

In England and the western Sterling area *Tropical Fish Hobbyist* magazine and T.F.H. Books are distributed exclusively through T.F.H. Publications (London) Ltd., 13 Nulley Lane, Reigate, Surrey England. All subscriptions and inquiries should be sent directly to them.  
©1971 T.F.H. Publications  
Special Class Postage Paid at Jersey City, New Jersey. Published monthly by T.F.H. Publications at 245 Concession Avenue, Jersey City, N. J. 07302. Printed in U.S.A.

April, 1971

## EDITORIALY . . .

We usually like to hear from our readers . . . we like to know what they think about our regular column features, our special articles about special fishes, and about the many things which have led to TFH being the most read magazine about fishes in the whole, wide world!

For years we had been getting letters encouraging us to add the supplements to our looseleaf edition of EXOTIC MARINE FISHES to TFH . . . so we did . . . and now we are getting letters from readers condemning us for doing it! "What good is the insert on marine fishes if I just care about freshwater fishes," is the gist of most of these complaints!

I don't have the answer yet, except to promise to try to solve the problem soon, but I'm sure Maury Rackowicz would suggest that you buy his Wonder-Water which is a special salt allowing you to keep both freshwater and marine fishes in the same aquarium!

Now that I can devote my full time to the magazine and books, I know you'll be happy to hear that we are going to expand our line of scientifically-oriented texts to include some of the out-of-print gems which everyone interested in fishes should own. One of the first two in this series will be *MODES OF REPRODUCTION IN FISHES* which is almost 1,000 pages of information about how fishes breed written by Drs. Donn Eric Rosen and Charles M. Breder, Jr. both of the American Museum of Natural History in New York. The second book will be the famous *WAYS OF FISHES* done by Dr. Leonard P. Schultz and Edith M. Stein; this is a junior ichthyologists dream, presenting information about fishes so that anyone could understand it. Look for all of our books at your local petshop. We do not sell our books to 5¢ and 10¢ stores!

Dr. Herbert R. Axelrod



## Tropical Fish Hobbyist

You might have tried spearfishing, icefishing,  
and maybe even some fishing for compliments.  
How about a little

### Rarefishing, Ceylon Style

By RODNEY JONKLAAS, Ceylon

Would you like to find a brand-new freshwater fish and describe it, publish the findings in a journal, and then have your name enshrined forever in the annals of ichthyology? Then come to Ceylon, where there are several of them, quite cheaply collected, that you can choose from.

Ceylon is by no means a big country, nor is it so unexplored as to involve weeks of arduous travel to get to the fishing grounds where



Ventral view of the mountain goby, showing the fin adapted for adhesion, which the fish uses to cling to rocks and logs in the swift streams in which it lives. Photo by Dr. Herbert R. Axelrod.

April, 1971



Right: *Gobius jonklaasi* Axelrod, collected by author Jonklaas during an expedition designed to turn up exciting new Ceylonese aquarium fishes. Below: an adult specimen of the Ceylonese mountain goby, shown in hand for purposes of size comparison. Photo by Dr. Herbert R. Axelrod.





these rare new fishes live. I can take you to most of them within four hours of your arrival here in a jet, in a comfortable car and along scenic roadways where your camera is going to suffer from shutter-fatigue!

And if you don't believe me, ask my favorite publisher, Dr. Herbert R. Axelrod, because he was here some months ago and was agreeably surprised that anyone can drive in fair comfort to a clear jungle stream and collect nice fishes and plants, plus a new unnamed species, less than 15 feet away from the parked automobile. He was also delighted to discover that in Colombo, the capital, you can buy a complete lobster dinner for the equivalent of two bits but that's another story. . . .

The fact remains that since most of us Ceylonese are easy-going, carefree and not over-anxious to spend long hours in tropical jungles or leech-infested stream-banks (much less arduous and boring sessions in the laboratories once the new specimens have been collected), there are still some good attractive and hardy freshwater fishes yet to make the scientific journals, let alone the tanks of aquarists.

But before I tell you about them, one important factor! They are as far as I know numerically few in number with one exception. In other words, it is highly unlikely that they will be collected by the hundreds and thousands like, for instance, the ruby barb (*Puntius nigrofasciatus*).

**Reprint Announcement**

The Smithsonian Institution announces publication of the fourth in its series of TFH Fund ichthyological reprints, *The Philippine Journal of Science*. The new reprint includes all (94) the ichthyological papers (exclusive of some papers concerned with fisheries) that have appeared in the Philippine Journal of Science. The reprint comprises three cloth-bound volumes, over 2400 pages, and includes 55 color plates. Price \$30.00.

All other TFH Fund reprints are also available:  
*Fishes of North and Middle America*, Bulletin 47, U.S. National Museum, 4 volumes, \$25.00.  
*The Freshwater Fishes of Siam or Thailand*, Bulletin 188, U.S. National Museum, \$2.00.  
*The Philippine Bureau of Science Monographs on Fishes*, \$5.50.

These volumes may be purchased from the Smithsonian Institution Press, Washington, D.C. 20560.

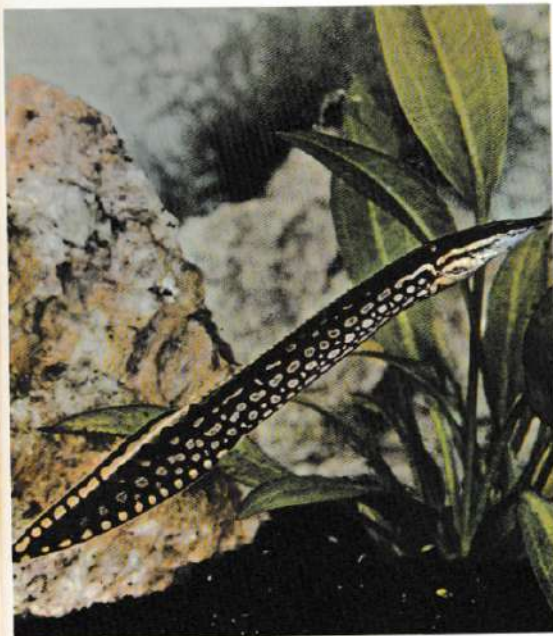
If they become popular and widespread out of Ceylon, credit must go to whoever unlocks the secret of breeding them.

The exception is a new killifish, a still-unnamed species of *Apocheilus* that comes from South Ceylon inland hill-country. When I sent the first specimens alive to Dr. Bruce Turner of the Smithsonian, he was exultant because here was a new one, and a beautiful one at that. *Apocheilus* "X" from South Ceylon is a bigger, brighter counterpart of the familiar *A. dayi*. This new one has a longer, brighter set of fins with a lot of red in the tail, and a brilliant shimmering green body with four or five distinct black oblong blobs, not really stripes. The female resembles the female *A. dayi*, but instead of black spots along her belly, there is one rather blurred oblong black blob. No doubt hundreds of them have been exported as *A. dayi*, and they must occur in many killifish collections outside Ceylon. It remains for a scientific worker to name it. I first found this fish in 1956 in a beautiful jungle area where I also found a new variety of cherry barb (now marketed as the super-cherry) and *Lepidocephalus jonklaasi* Deraniyagala, a rare spotted weatherfish.

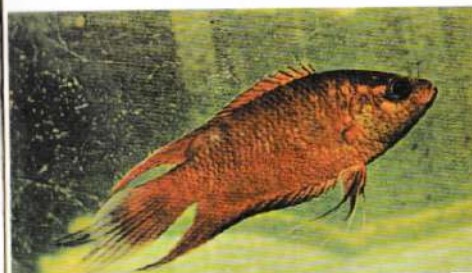
You don't need to organize an expedition with bearers, tents, camping gear, etc., to find the beauty which illustrates this article; the Ceylonese mountain goby, which Axelrod may name *Gobius jonklaasi*, I have known for many years, since 1956 as a matter of fact. But since I am Ceylonese I did little about it, apart from telling people about it and sending a few specimens abroad alive to my tropical fish buyers.

So when along came Dr. Axelrod, alive with enthusiasm and bursting with the desire to find new fishes, I was infected accordingly. I drove the doctor up to one of my favorite collecting spots to find this one and also to show him an exciting new cyprinid, which, for the time being, were calling the Asoka barb in honor of one of Ceylon's most prominent aquarists, Asoka Mivanapalana. On that day it was raining but in spite of some discomfort, a few leeches and lousy underwater visibility, I collected enough to convince Herb that we had an exciting new fish for him. The Asoka barb (which may be a *Labeo*) is a fast-moving elongate silvery fish with a distinct black spot on the tail-base. But every scale is edged with dark brown, giving it a distinguished look. The outer edges of the transparent tail-lobes are vivid red. Asoka barbs have been proved hardy and easy to keep, but catching them is something else again! They frequent very cool, fast-flowing water in mid-stream and are constantly feeding off the bottom around large smooth boulders and water-logged tree-trunks.

Two divers using face-masks and handling large wire-framed hand-nets can collect them, using scaldh, long sticks to frighten them towards



*Mastacembelus armatus*, a Ceylonese spiny eel. Photo by Dr. Herbert R. Axelrod.



Opposite, top to bottom: *Puntius nigrofasciatus*, *Channa orientalis*, *Belontia signata*, all Ceylonese species.



the net, and a heck of a lot of energy! We got two in about two hours, but this was a bad day and we could not even see the mountain gobies.

I had given several specimens of the Asoka barb to scientists from the Smithsonian who were here some months ago on a survey of tropical carangids, or jacks. It is possible that the fish has been named by now, but I have not had any letters or literature on the subject.

Herbert left after giving me the kind of order that tropical fish exporters love but collectors dread. "Send me a box of everything unusual!" he said. Because I am a collector-exporter, I regarded this with mixed feelings. Eventually some of the unusual goodies reached St. Louis, Missouri, and Dr. Axelrod flew there just to photograph them. I was able to send him a few mountain gobies too.

I have another place to collect mountain gobies, a truly beautiful spot which is also a haven for the largest, brightest ruby barbs you ever saw. Herbert just gasped when he saw some in my display tanks. It is also full of Ceylonese *Garra* which, years ago, were exported by the thousands as glass-cleaners. This stream has also got the blackline barbs (*Puntius pleurotaenia*) and the quite delightful longsnout barbs (*P. dorsalis*). With luck and persistence you can collect the Ceylonese spiny-eels here (*Mastacembelus armatus*), but the real piece de resistance is the mountain goby. I refer to the mountain goby (major). There is also a mountain goby (minor) which lives here, a much smaller fish which I must catch and photograph sometime. . . .

One morning I took my young co-diver Cedric Martenstyn there to help with the collecting. Cedric is 23 and is not only a collector. He water-skis (barefoot), likes to race on a motorbike, is nuts about SCUBA diving and spearfishing, is an avid shell-collector, hunts and fishes, keeps at least two girl-friends busy and happy and works as my assistant. Cedric is a very energetic young man.

Since he does not carry a built-in wet suit of blubber like yours truly, now 45, Cedric has to wear a half-suit of rubber to keep out the cold

**AMERICA'S MOST BEAUTIFUL AQUARIUM**  
Fresh and Salt Water Fish—Famous Breeders of Killifish  
Rt. 4 Aquarium, Inc.

143 Broadway  
East Paterson, N.J.  
201-767-6650



Hours Mon. 11-7 Tues. 11-7  
Closed Wednesday  
Thur. 11-9 Fri. 11-9  
Sat. 11-6 Sun. 11-8

of the water in this stream. "Cold" in this part of the world is about as warm as a Florida backwater in mid-summer—in the low 70s.

You find the mountain goby in mid-stream where the current is compelling and where the sun shines down into the clear water over a boulder-strewn bottom. The gobies cling to the boulders, feeding on algae off them, and as soon as they see you and the net advancing, they dart away to hang onto another boulder. They prefer going up-stream. This means you have to push your way against the strong current, slip and stumble over the slippery boulders, keep your head underwater and the fish in view with a face-mask and also your huge (4 ft. wide) hand-net open and ready in case it darts in. One-hand wields a long stick with which you frighten the goby into your net. Tied around your waist is a perforated plastic canister surrounded by an inflated inner-tube. This is the Jonklaas fish-container, invented in 1960 and now blatantly copied by all the others. When you catch a fish just toss him in the container, where he keeps for as long as you want, water circulating readily through the holes. The sides are high enough to prevent any from jumping out. No need of having a sweating assistant following you in the leech-ridden undergrowth along the banks to take your captures. No need of perilous water-changing from cans and buckets either.

Well, we did get ten mountain gobies that morning, which is very good going indeed. Almost as soon as we caught them I rushed for the Pentax with close-up lens and captured the colors as best I could. The male mountain gobies in full color are quite stunning. They have transparent red tails and shimmering blue-green bodies. The dorsal surface is mottled brown. The females are larger and drab and few in number in relation to males. We got only two females that day. I have never seen a young one yet.

In an aquarium the mountain goby just gets pale and nervous. It takes a long time to get them back into color and happy. It should be easier in U.S.A. where you can control the temperature of the water. There are no thermostats in Ceylon that I know of. If you can give these fish about 70°F., plenty of aeration and filtration, you'll keep them happier than I can. The water in this part of Ceylon is never cooler than 75° and is usually 80° and above.

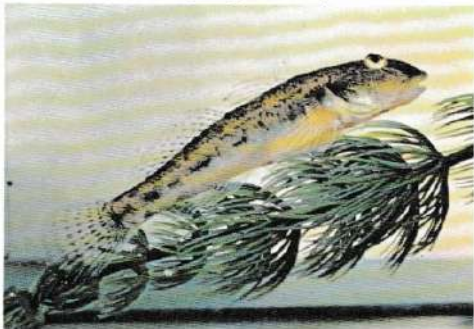
The mountain goby, when unhappy, simply sucks his way up the sides of the tank and goes away. So keep the tank well covered. Of the ten I had, two vanished one night, in spite of these precautions, having oozed out of a space less than  $\frac{1}{2}$ " under the cover-glass. Shades of the octopus!

A very pleased and well-fed pair of red oscars in a fishpond under the aquarium for gobies had obviously dined well that night because



*Eleotris fusca*. Photo by Dr. Herbert R. Axelrod.

*Glossogobius giuris*. Photo by Dr. Herbert R. Axelrod.



*Puntius pleurotaenia*, a pleasing but not often seen Ceylonese cyprinid. Photo by Dr. Herbert R. Axelrod.

*Lepidocephalus jonMaasi*, discovered as a new species by the author in 1956 and later named in his honor. Photo by Dr. Herbert R. Axelrod.





next morning they turned up their noses at some large shrimp offered them.

There is the mountain goby (minor) which is only one inch or so and is therefore insignificant except to lovers of mini-fish. The male has a lot of transparency about him, with several brilliant blood-red dots here and there. The female is slightly larger and drab. The mountain goby (major) averages six inches in length so is indeed a worthwhile show fish.

More new fishes?

How about a freshwater moray-eel, which has been named and recorded but as far as I know never graced a freshwater aquarium in recent years? Or the fast-moving flagtail kuhlia whose nearest relative is in the sea or in freshwater streams of Hawaii? There is at least one tiny goby from brackish-water who has no name. In this same lagoon swims perhaps the only really freshwater clupeid, *Chirova fluviatilis* Deraniyagala, a genuine member of the sardine family that defies all efforts to keep it alive in an aquarium but is caught by the thousands and makes a delicious curry!

Some day soon when I have the time I'll try to find some more new ones and photograph them. Time to relax now. . . .

Please Mention T. F. H. When writing to Advertisers



**RID ALL**

## PROBLEMS

Why use a dozen different remedies when "RID ALL" is used for the positive control and the prevention of Ich, Fin & Tail Rot, Velvet, Body Fungus, Clamped Fins, and other fish diseases. Simple to use. Let "RID ALL" do the work. No need to shut off lights, air, or change the temperature.

**Unwelcome Boarders?**

Approved and Registered, U.S.A.

SNAIL-RID . . . internationally accepted by universities, fish farms, and hobbyists all over the world as the MOST EFFECTIVE method for snail control.

If unable to obtain from your local dealer, send \$1.00 each to: ARJAN RESEARCH, 372 S. Hamilton Westland, Michigan 48185



**use SNAIL-RID**

Look for

 **EUREKA**

# FOIL BACKGROUND

for Aquariums

AVAILABLE IN 12 'SPARKLING' COLORS

RED	FUCHSIA
BLUE	WHITE
PINK	GREEN
BLACK	YELLOW
PURPLE	SKY BLUE
ORANGE	CHARTREUSE



Made in U.S.A.

EUREKA PRODUCTS CO., NEWARK, N. J. 07105  
WORLD'S FINEST AQUARIUM PRODUCTS

## THE NEW BIOZONICS 3 STAGE AQUARIUM POWER FILTER

Makes all other filters obsolete

**STARTER PUMP**  
A few squeezes of the starter bellows start the flow of water — no hands in the tank.

**EXCLUSIVE FILTER BAG**  
Traps all dirt and gross particles coming into the filter. Prevents blocking of other filter elements.

**FINE-GRAIN FOAM BLOCK**  
Screens out minute, barely-visible particles which can cloud tank.

**STARTER BELLOWS**  
Specially designed to simplify filter starting.

**INSPECTION CHAMBER**  
Already filtered clear of visible particles, the water is now ready to enter the final stage of purification.

**UNIQUE CHARCOAL CARTRIDGE**  
Removes toxic wastes. The ultimate in throwaway convenience. Can be replaced in seconds.

**TROUBLE-FREE PUMP**  
Silent motor transmits smooth surge power through the plastic casing in the form of magnetic flux impulsion.

- EASIEST TO START**  
A few squeezes of the starter bellows start the flow — no hands in the tank.
- EASIEST TO CLEAN**  
Unit never needs to be removed from the tank. Filter bag and foam block lift out for easy rinse and squeeze — no need to handle splintery glass wool. Bagged charcoal cartridge can be replaced in seconds — no charcoal mess.
- BEST WATER FILTRATION**  
Exclusive 3-stage filter produces cleaner water. Water passes through largest filter surface area of any filter at the rate of 100 gallons an hour.
- EASIEST FILTER REPLACEMENT**  
Cartridges slide in and out. No need to remove filter unit from tank or to remove motor from filter unit.
- COMES COMPLETE — NO EXTRAS TO BUY**  
All filter cartridges included. Nothing to assemble — starts working soundlessly, efficiently moments after you take it out of its protective carton.
- FOR FRESH & SALT WATER**  
Nothing to corrode.
- FITS ANY TANK**  
With optional adapter it can even fit tanks with frames up to 1 1/2" wide.



\$19.95 Retail

**BIOZONICS CORPORATION,**  
15 Tech Circle, Natick, Massachusetts 01760



## cichlid nOtes

Robert J. Goldstein, Ph.D.

This month I would like to discuss how to get fishes shipped from such far-away places as Africa. I have friends there working in the Peace Corps and other capacities, and perhaps you do also. Several members of the American Cichlid Association are there or plan to be there, and it is good to know some of the basics before committing time and money to the high risks of such long-distance shipping.

First of all, have your contacts. The next step is to determine whether the African fish you can

get are worth getting. For this reason you should insist that your friend first send you color slides of those species he can easily collect in quantity. If the fish looks

### FOOK FISH FARMS CO.

is the most experienced fish farm in Hong Kong specializing in Fancy Livebearers (ablines and hifins), Tank-raised Neons, Penguins, Headstanders, Extra-Fancy Goldfish, etc.

Write for price list (minimum order \$50) to:

**FOOK FISH FARMS CO.**  
11 Fu Hing Street, 1/F,  
Sheung Shui, N.T.  
Hong Kong, BCC

An application for membership in the American Cichlid Association can be obtained from Mr. Guy D. Jordan, 6546 Celia Vista Drive, San Diego, California 92115. When requesting a membership application form, please provide a stamped, self-addressed envelope.



## READ IT IF YOU DARE!

Up until now, you could pick up a book about cichlids and not be in any danger. You'd learn something about cichlids from your reading, but you could still take them or leave them.

Not any more. If you read Dr. Robert J. Goldstein's CICHLIDS you're well on your way to becoming a cichlid expert. So you'll have to start spending money to dress like a cichlid expert, eat like a cichlid expert, entertain like a cichlid expert . . . maybe even buy a cichlid expert's car. Which will of course run you into lots of money, and the book can't help you there.

It can only help you talk like a cichlid expert, think like a cichlid expert, identify and spawn fish like a cichlid expert, treat diseases like a cichlid expert. So be on your guard when someone shows you a copy of the gloriously colorful, brilliantly informative CICHLIDS. Don't get caught in the cichlid trap.



- 256 Pages
- Over 180 Color Photos
- Completely indexed
- Only \$9.95, available at your pet shop.
- \$10.50 from the publisher, postpaid. (\$11.50 outside U.S.)

The world's largest pet book and magazine publisher.



T.F.H. Publications, Inc.  
245 Cornelson Ave.  
Jersey City, N. J. 07302

April, 1971

good, then you can worry about getting it identified later. Often, your friend will require weeks to get his film processed because it must travel to Europe and back. Ask him to simply send you the undeveloped roll by air-mail, together with his log of which fish were shot in which frames. (He can simply log them as "Small cichlid with longitudinal band—Common," etc.) Send back his photos after you have looked them over, and indicate which fishes you want. You will probably have to send him some shipping materials, and I suggest you choose Styrofoam boxes with cardboard outer liners, plenty of bags and rubber bands, and perhaps some tranquilizer. Send him some small nets also, as they wear out quickly in the field. Remember, he can't go to the local drug store or pet shop in his neck of the woods!

Shipping rates are generally high from far-away places, with minimal charges and minimal weights. Usually the minimal weight is 10 pounds, and you have to figure on shipping charges in the neighborhood of \$30 from England, and \$50 from Africa. You want the fish to be sent by Air Freight collect. Call your local Air Freight office and ask for the International Agent. He will give you routing information and the price schedule. If you can swing it, try to get a route that doesn't entail any change of planes. Send this information to your friend. Have him put your phone number on the address label.

In order for the airlines to take on a collect shipment, they will phone you to see if you will accept shipment. This is fine, for when you have the man on the phone, you can find out exactly when the fish will arrive. Be sure to meet the plane, and just before going to the airport, telephone U.S. Customs and inform them of what you are expecting.

The day is here. Should you call Air Freight to see if the fish have

### WATER-RITE

**Agates Water  
Removes Chlorine and  
Other Injurious Chemicals**

**Adjust pH in  
ONE OPERATION**



With Water-Rite, city water can be used at once—no aging for days. For not only does it remove residual chlorine, chloramine and other injurious chemicals, but it adjusts the pH in a matter of minutes, thus making it safe for fish and aquarium life.

Adjusts hard water for desirable fish life. Compatible with Fluorinated Water. Helps stimulate plant growth and maintain a clean balanced aquarium.

**START RIGHT WITH WATER-RITE**

Water-Rite furnished in 5, 8, 15 and 40 tablet vials; also available in 4 oz. and 1 lb. powder containers.

**NATIONAL PET SUPPLY INC.**

3015-3035 Olive St.  
St. Louis, Missouri 63103

21

Tropical Fish Hobbyist

April, 1971

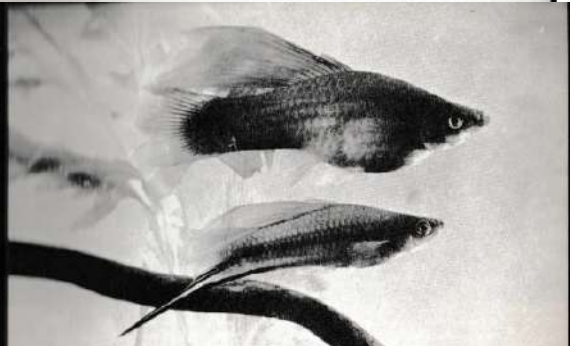
## Q • Ever Have A Plant Problem?



## A • Never Again...

The ENCYCLOPEDIA of WATER PLANTS is the first water plant book to be completely illustrated with full-color drawings, hundreds of them. Its almost 400 fact-filled pages have the answer to any of your questions about culturing techniques, propagation, range, and identification. This book is a must for all aquarists. Buy it at your petshop. **\$9.95**

T.F.H. PUBLICATIONS, INC., 245 CORNELISON AVENUE  
JERSEY CITY, N. J. 07302



Hi-fin swordtails. Photo by R. Zukal.

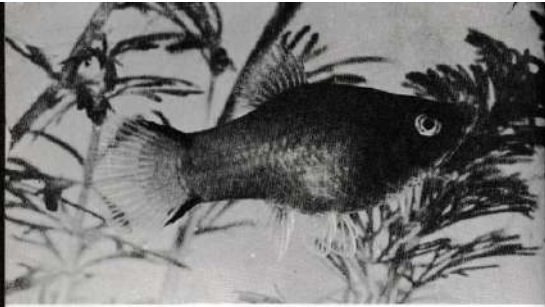
species which have proven themselves to be hardy, interesting, peaceful, and beautiful. The prime reason for crossing two species is to transfer a characteristic of one species to another and to discover characteristics not present in either parent species.

An example of transferring a characteristic can be seen in the case of the hi-fin mutation of swordtails (*Xiphophorus helleri*). This mutation has been transferred to both the platy (*X. maculatus*) and the variatus platy (*X. variatus*).

Hi-fin variatus platies. Photo by R. Zukal.







Characters of the comet platy are transferred to the offspring of comet platy-swordtail crosses in the form black markings in the fins; this is one instance of a cross producing hybrids strikingly different in coloration from either parent. Photo by R. Zukal.

Most aquarists would not be surprised to learn that characteristics can be transferred by hybridization, but many would be surprised to find that new characteristics, seen in neither parent species, can occasionally be discovered by hybridization. The classic example of this is found in the wag characteristic of platy-swordtail crosses. When a platy of the comet strain is crossed with a swordtail, a strange thing happens. The dark line found on the upper and lower edges of the tail fin of the platy is extended so that all the fins and the lips of the hybrids become black. Clearly hybridization is a major source of new varieties of aquarium fishes.

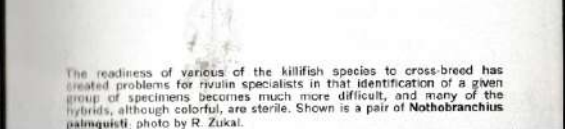
Before we discuss potential hybrids, we need to know just a little about what a species is. For all practical purposes, a species of fish is a population that will interbreed under natural conditions. If two species, with males and females of each, are placed in an aquarium, the two species will not interbreed. If two color varieties of the same species were placed in the same aquarium, however, cross-mating would take place. For example, if six red wag platies and six yellow platies were placed in a aquarium with males and females of each type present, we would soon discover that the two colors will freely interbreed. The two color varieties of platies are therefore of the same species.

A favorite question of beginning aquarists runs something like, "Can a catfish and a betta cross?" To the more experienced aquarist these are amusing questions, but just how can we know when two fishes will cross? A good place to start is to look at the scientific names of the two fishes in question. Each is composed of two parts. The first is called the generic

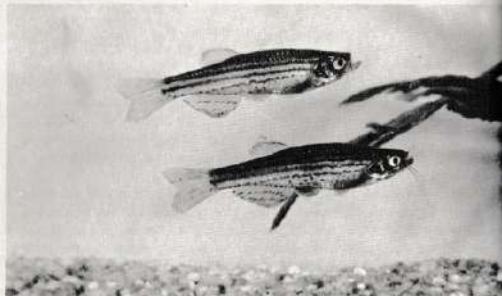
name and the second the specific name. If the two fishes have identical generic names, there is a chance that they can be crossed.

Not all crosses within genera can be expected to be successful. When breeding habits are vastly different, the chances of getting hybrids are small. The Siamese fighting fish (*Betta splendens*), for example, would probably not cross with its relative *Betta pugnax*, because the former is a bubblebreeder and the latter a mouthbreeder.

A second choice for hybridization is between related genera. It is difficult for the aquarist to know precisely how closely related two genera are, but if the two fishes are not in the same family, the chances for a successful cross-breeding approach impossibility. In general, genera in the same family which look similar and which occur in the same general locality are better bets than genera which are dissimilar and occur in widely separated localities. A cross between two African tetras or two South American tetras is more likely than a cross between a South American tetra and an African tetra.

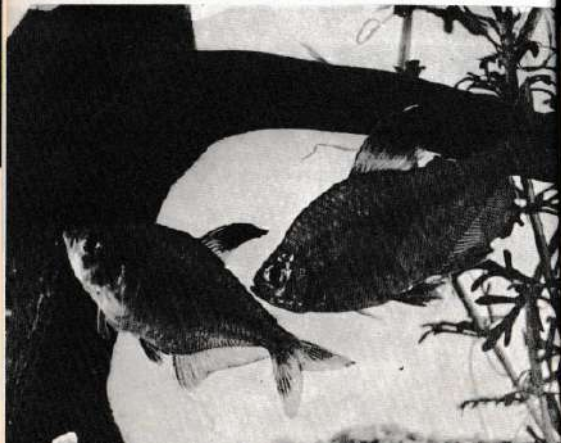


The readiness of various of the killifish species to cross-breed has created problems for taxon specialists in that identification of a given group of specimens becomes much more difficult, and many of the hybrids, although colorful, are sterile. Shown is a pair of *Nothobranchius palmeri*, photo by R. Zukal.



Hybrid between *Brachydanio rerio* and *Brachydanio albolineatus*. Photo by Dr. Herbert R. Axelrod.

Although the tetras have as a group been less subject to hybridizing experiments than the killifishes and livebearers, mainly because the tetras are more difficult to breed, some work has been done; no truly worthwhile hybrids have resulted, however. Shown is a pair of *Hypheosobrycon rosaceus*, one of the favorite characids for hybridization experiments. Photo by R. Zukal.



stripping goldfish; the stripping technique can be used for crossbreeding of various egg-laying species but is of course most successful when used with large fishes. Photo by Dr. Herbert R. Axelrod.

Intergeneric hybrids are much less common than intrageneric hybrids.

But the only way to know for sure if two species will cross is to try it. There are two ways of creating hybrids. One is to let nature take its course and the other is to make the crosses artificially. When using the first method, the aquarist has only to provide the proper breeding conditions and introduce the two fishes to be crossed. In the second method, the eggs and sperm are brought together without the consent of the parents.

Livebearers are the best group for the beginner to work with because they are more likely to give success than are egg-layers. Male livebearers, when deprived of females of their own species, will try to mate with anything that moves. It should be understood that the fact that mating has taken place does not assure that young will result. If the genes of the two fishes are not compatible, the mating will not be productive.

The biggest drawback to using livebearers in hybridization experiments is the fact that females can and do carry sperm from a single male for 6 to 8 months, fertilizing successive broods while a male is not present. This





Certified **KODEL** FILTER FLUFF\*

**THE BEST FILTER MEDIA YOU CAN BUY AT ANY PRICE! AVAILABLE NOW AT LOW DISCOUNT MAIL ORDER PRICES!!**

- 100% synthetic . . . no glass fibers to splinter and cause irritation—to you or your fish
- For maximum efficiency each fiber is mechanically crimped in a continuous "multi-sawtooth" pattern with 9-10 primary and 3-4 secondary crimps per inch
- Hydrophobic—unaffected by water; cannot contaminate aquarium water
- High resiliency fibers resist matting; assured fluffiness
- Chemically inert to all organic compounds found in fresh or salt water aquariums
- Non-toxic; non-allergenic; resistant to bacterial attack
- Each ounce contains the equivalent of 25 miles of a single filament fiber
- Packaged in polyethylene to protect its purity
- Lightweight; 1.38 specific gravity

**AVAILABLE ONLY BY MAIL ORDER FROM AQUARIUM MAIL ORDER COMPANY**

• • • Check our food prices too!

Certified Kodel® Polyester Fiberfill Filter Fluff	
<input type="checkbox"/> 7 oz. size . . . . . \$1.79	<input type="checkbox"/> 14 oz. size (two 7 oz. bags) . . . \$2.99
<input type="checkbox"/> 11 oz. size . . . . . \$2.39	<input type="checkbox"/> 22 oz. size (two 11 oz. bags) . . \$3.99
Also available, Polyester Filter Puffs (Puff material is not Kodel)	
<input type="checkbox"/> 85 Puffs . . . . . \$1.49	<input type="checkbox"/> 170 Puffs (two 85 Puff bags) . . \$2.49
"House Brand" Food	
<input type="checkbox"/> Freeze Dried; 226 grams . \$7.19	<input type="checkbox"/> Tubifex Worms, 110 grams . \$7.29
<input type="checkbox"/> Basic Diet Flake; 8 oz. . . \$3.36	<input type="checkbox"/> Brine Shrimp, 86 grams . . . \$7.79
TetraMarrin	
<input type="checkbox"/> 8 oz. TetraMarrin Staple Food . . \$4.69	<input type="checkbox"/> Six 3/4 oz. cans . . . . . \$4.89

PRICES INCLUDE U.S. POSTAGE AND HANDLING. New Jersey residents add 5% sales tax. Send your check, money order, or postage stamps (no COD's, please) to:  
**Aquarium Mail Order Company, 159 Cedar Avenue, Hackensack, N. J. 07601**

NAME: ..... Total Enclosed \$: .....

STREET: .....

CITY: ..... STATE: ..... ZIP: .....

Prices and specifications subject to change without notice.  Please send catalog  
 \*KODEL is a registered trademark of the Eastman Kodak Company  
 \*Aquarium Mail Order Company certifies that their Filter Fluff is 100% Virgin Kodel  
 Polyester Fiberfill and meets Eastman Fiberfill weight specs.  
 © Copyright, 1971 Aquarium Mail Order Company TFH-2

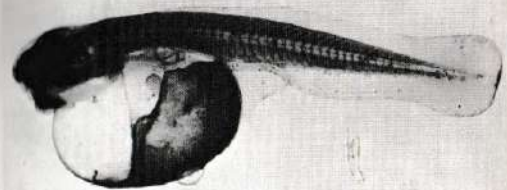
results in a very unsatisfactory situation for the breeder. In order to be sure that any given brood is really the result of a planned mating, he must be sure that the female is a virgin, or at least not carrying sperm before she is used in a hybridization experiment. This is usually accomplished by carefully observing the development of young fish and removing males as their gonopodia start to develop. Another way to secure a "virgin" female livebearer is to isolate her from males for several months until she has used all of the stored sperm.

Once a virgin female is secured, it is very easy to make the cross. It is only necessary to put the male and the female in the same aquarium, preferably by themselves. A successful mating may not take place for several weeks, especially if the cross is between two genera.

Livebearers can be crossed artificially, but it requires specialized equipment and knowledge beyond the scope of most aquarists.

Crossing egglayers is more difficult than crossing livebearers. If a male of one species is placed with a female of another species, there is no guarantee

One of the fry from *Mylossoma* x *Metynnis* cross. Photo by Hiroshi Azuma.



that a mating will take place even if they are from closely related species. Sometimes the reluctance of the breeders can be reduced by special handling.

Some hybridizers have reported success by isolating one fish from each of the two species to be crossed when they are a few days old. Naturally, because the fishes are so young, it is impossible to sex the fishes and there is a good chance of getting two fishes of the same sex in one container. This is overcome by setting up six or more such containers to assure that a pair is obtained. The containers are either shielded so that the fishes cannot see other fishes or the container is placed where no other fishes are visible. Fishes treated in this way seem more inclined to cross-breed than fishes which have been raised with their own kind. As in livebearers, spawning does not necessarily mean that fry will result. This is because of possible genetic conflict.

Egglayers of many species can be artificially bred by a process called stripping. Stripping, especially with small fishes, may cause damage or death to the fishes used. The technique is simple. A ripe female is taken in hand over a saucer of water of the proper temperature. The sides of the fish are gently stroked toward the tail, forcing the eggs out of the female and into the water. The same is done with the male. It is best to allow the vent of both fishes to touch the water to prevent damage to the eggs and sperms. When the stripping is complete, the saucer is swirled to allow the eggs and sperms to mix and the saucer is then allowed to stand for a few minutes. The eggs are then placed in an aquarium for hatching.

**MOVING?**

If you are, you'll want your subscriber's copies of TROPICAL FISH HOBBYIST to be mailed to your new address, so please inform us, as soon as possible, what your new address will be. Letting the Post Office know isn't enough, because they will forward your magazine only upon your payment of extra postage.

When writing to inform us of a change in address, please provide us with your old address, too; the best way is to send along an address label from a recent issue. You won't miss a single copy of your favorite hobbyist magazine if you inform us of your new address at least six weeks prior to your moving date. Write to: Tropical Fish Hobbyist, 245 Cornelison Ave., Jersey City, N.J., 07302.

# The Marine Aquarium . . .

## A New Hobby . . . ?

Not really. We have a book in our company library written in 1693 containing formulas for making synthetic ocean water for aquariums in the home.

They didn't work very well. We know because we tried them and many other formulas too, before we decided on our formula. Ours is fantastic. We knew it would be. We tested it for years before we put it on the market.

One other thing. We also knew that 99% of the marine salts purchased are not used to establish a new tank but are used to change water in a polluted tank. So we added a stable, safe antibiotic to help combat the pollution . . . **NOW THAT IS NEW!**

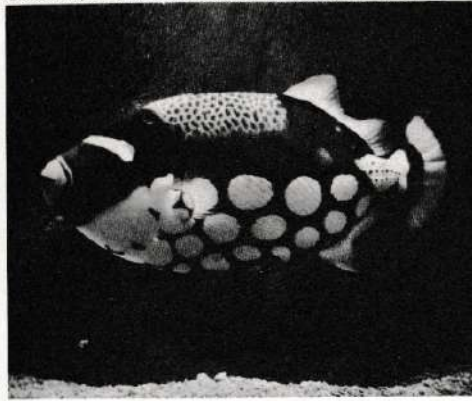


We also make other important and new products like Fresh Water and Marine Purifying Medium, Bulk Polyester Filter Mats, Acidfast Heavy Carbon and a Clarity Cooper Test Kit. If your dealer doesn't have our products tell him about us. He will appreciate it. We have many more products in the works and you'll be hearing from us. Let us hear from you.

**TROPICAL FISH PATTERNS INC.**  
 A subsidiary of **TRONIC** products  
 921 Bergen Ave., Jersey City, N.J. 07309



Bufoleides conspicuum, Clown Triggerfish photographed at Marine World by W. Siegrist



# MARINE WORLD

NATION'S LARGEST IMPORTER OF QUALITY MARINE FISH  
ATLANTIC • PACIFIC • MEDITERRANEAN  
CORAL SEA • INDIAN OCEAN • CHINA SEA  
SEA OF CORTEZ • MICRONESIAN • RED SEA RARITIES

Choose from over 5,000 fat, sleek, healthy, quarantined Marine Fish, Invertebrates, and Live Corals. More than 300 different tank acclimated, and feeding species, in over 400 tanks, with all major brands of accessories, continually in stock! Prompt shipments to major cities in the U.S.A. and Europe. Live Delivery Guaranteed.

Dealers write for free price list.



WHOLESALE DISTRIBUTORS OF:  
"INSTANT OCEAN" MARINE SALT, MARINE FILTER MIX,  
KRACKEN PRODUCTS, AQUA FILTERS, CHEMI-PURE,  
SANDERS OZONIZERS, PROTEIN SKIMMERS,  
LAMOITE WATER TEST KITS,  
"EKTOZOON", CILEX, MARINE CLURE.

3452 W. DEVON AVE. LINCOLNWOOD, ILL. 60645  
PHONE: AC (312) 677-1175 OR AC (312) 774-7921

April, 1971

## Salts FROM THE SEVEN SEAS

BY  
FREDRIC M.  
SCHWARTZ

### Caught in the Net . . .

I recently received a rather long letter from a reader who has a real problem. I decided to condense the letter in the interest of brevity, since this is a problem that often confronts the beginner as well as the advanced hobbyist who is not a chemist.

In his letter, Sergeant Major Maurice C. Hood relates that he set up two marine tanks and a 10-gallon quarantine tank in accordance with the recommendations

found in two well-accepted books on marine fishes. He goes on to list other conditions, such as pH of 8.3, negligible iron and copper, density of 1.025. All four shipments of fishes that he received died in a very short time, fish of the same species dying at about the same time. All fish showed no symptoms before or after death, and none lived more than two weeks.

It's very difficult to diagnose the problem involved here, as many variables are not mentioned, but I'll list some of the things that I think may be responsible for the problem:

1. Some dealers collect their fishes by using a tranquilizer, and a tranquilizer may damage the fish if used improperly. If all fish were from the same dealer, I'd try a new dealer.

2. The tap water used for mixing the synthetic salts may contain undesirable components other than the iron and copper tested for. I'd try an ion exchanger for treating the

Please Mention T. F. H. When Writing to Advertisers

### A MAJOR BREAKTHROUGH IN THE SALT WATER HOBBY RILA NITRITE-NITROGEN TEST KIT

- WILL DETERMINE THE LEVEL OF TOXIC NITROGEN COMPOUNDS IN THE AQUARIUM WATER.
- TESTS ARE ACCURATE, EASY & ECONOMICALLY PERFORMED.
- RESEARCH TESTING WILL ALERT THE HOBBYIST TO ANY CHANGE IN NITRITE LEVELS & THUS AID IN PREVENTING TOXIC CONDITIONS FROM OCCURRING.
- REAGENT CARTRIDGE CARRIES THE MANUFACTURER'S LIFETIME GUARANTEE FOR STABILITY & ACCURACY.
- COMPLETE PLASTIC PACKAGING FOR DURABILITY & EASE OF USE.
- AN ESSENTIAL ITEM FOR EVERY SALT WATER HOBBYIST.



FREE BROCHURE: "BASIC CHEMISTRY OF THE SALT WATER AQUARIUM."  
Ask your dealer today or write for complete Product Information Bulletin and FREE Brochure. Please include ZIP.

RILA PRODUCTS

P. O. Box 114

Teaneck, N. J. 07666

35

Tropical Fish Hobbyist

Just released! Mr. Straughan's latest edition —

SALT WATER AQUARIUM IN THE HOME \$12.50 Per Issue

• X •

Salt water fans shouldn't miss —  
**salt water aquarium** MAGAZINE

Published Bi-Monthly—\$4.50 year  
Beautifully Illustrated!

• X •

REEF CARBON, finest filter medium. Washed, aged, cured. Pound bag just \$2.95 postpaid.

Send for free price list on undrugged fish, corals, books, supplies.

CORAL REEF EXHIBITS  
Box 1005, Randall Br., Miami, Fla. 33158

tap water to remove these before the synthetic mix is added.

3. I assume temperature was maintained between 72 and 78° Fahrenheit and was fairly constant.

4. Some drinking water has fluoride added, which may cause problems if used with a synthetic that has fluoride in it. Some mixes add calcium gluconate, which effectively counters excess fluoride. Dr. Axelrod's Formula is one such mix. I'd try changing mixes if I had such poor results with one mix after time.

5. Use of an ion exchange resin of the type designed for freshwater aquaria will not work in the marine tank and may actually remove necessary trace elements as well as

change the pH value of the water to such an extent as to cause serious problems. A resin for marine tanks only may be used.

6. Improper addition procedures may cause problems. Fish should be floated in their plastic shipping bag until the temperature in the bag is the same as the tank. When the temperatures are the same, tank water should be added gradually over a period of from one to two hours, longer for delicate specimens or if the densities vary by more than 0.002.

Please mention T. F. H. when writing to advertisers

### MARINE and FRESHWATER TROPICALS

Aquatic Plants, Frozen, Dried and Live Foods, Aquarium Accessories, Specializing in Fancy Live Beaters (Clown and Angels)

Experienced Shippers and Keepers of Marine Life

Highest Quality, Lowest Prices

Minimum Order — \$30.00

INDO-PACIFIC IMPORTS

P.O. Box 1912

NORTH BAY, Cal., Canada

(709) 472-9033

April, 1971

change the pH value of the water to such an extent as to cause serious problems. A resin for marine tanks only may be used.

6. Improper addition procedures may cause problems. Fish should be floated in their plastic shipping bag until the temperature in the bag is the same as the tank. When the temperatures are the same, tank water should be added gradually over a period of from one to two hours, longer for delicate specimens or if the densities vary by more than 0.002.

Please mention T. F. H. when writing to advertisers

### MARINE and FRESHWATER TROPICALS

Aquatic Plants, Frozen, Dried and Live Foods, Aquarium Accessories, Specializing in Fancy Live Beaters (Clown and Angels)

Experienced Shippers and Keepers of Marine Life

Highest Quality, Lowest Prices

Minimum Order — \$30.00

INDO-PACIFIC IMPORTS

P.O. Box 1912

NORTH BAY, Cal., Canada

(709) 472-9033

7. I'd start out with hardier specimens, then graduate to more delicate species. Try beau greys, sergeant majors, grunts, Atlantic tangs, porkfish, wrasses.

8. It is hardly likely that all fish had the same (undetectable) disease, especially in four different

WE OVERSHIP EVERY ORDER WHICH MEANS EXTRA DOLLARS FOR YOU

WHOLESALE RETAIL



seven seas Ltd.

Midwest's only importer of fish and invertebrates direct from collectors

ATLANTIC • PACIFIC MEDITERRANEAN RED SEA AND OTHER AREAS OF THE WORLD

All fish tank acclimated when sold

7303 N. Damen, Chicago, Ill. 60626

Phone: 312-338-3853 Cable: Fishnic

## SALT WATER TROPICALS Direct from THE FLORIDA KEYS!

GRAND SEAHORSE . . . . . 1.00	2 GIANT SEAHORSE, 1 SPINY BOX . . . . . \$2.95
ADDITIONAL FISH IN ORDER . . . . . 30	1 COMBIE T. FISH . . . . . \$2.95
GRAND SEAHORSE (1") . . . . . \$7.95	2 SEAHORSE, 1 RED SEAHORSE, 1 BARRACUDA . . . . . \$2.95
ADDITIONAL FISH IN ORDER . . . . . 30	SPINY CRAB 2 KING CRAB SNAILS . . . . . \$2.95
SMALL RED SEAHORSE (1") . . . . . 1.40	1 SEA URCHIN, 1 BUTTE SEAHORSE . . . . . \$2.95
SMALL RED SEAHORSE (2") . . . . . 2.20	1 SEAHORSE, 1 SPINY BOX, 1 COMBIE . . . . . \$3.25
SMALL RED SEAHORSE (3") . . . . . 3.00	SPINY CRAB, 1 BUTTE SEAHORSE . . . . . \$4.50
SMALL RED SEAHORSE (4") . . . . . 3.80	1 SPINY CRAB 1 SPINY CRAB . . . . . \$5.00
SMALL RED SEAHORSE (5") . . . . . 4.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (6") . . . . . 5.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (7") . . . . . 6.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (8") . . . . . 7.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (9") . . . . . 7.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (10") . . . . . 8.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (11") . . . . . 9.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (12") . . . . . 10.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (13") . . . . . 11.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (14") . . . . . 11.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (15") . . . . . 12.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (16") . . . . . 13.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (17") . . . . . 14.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (18") . . . . . 15.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (19") . . . . . 15.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (20") . . . . . 16.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (21") . . . . . 17.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (22") . . . . . 18.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (23") . . . . . 19.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (24") . . . . . 19.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (25") . . . . . 20.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (26") . . . . . 21.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (27") . . . . . 22.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (28") . . . . . 23.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (29") . . . . . 23.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (30") . . . . . 24.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (31") . . . . . 25.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (32") . . . . . 26.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (33") . . . . . 27.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (34") . . . . . 27.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (35") . . . . . 28.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (36") . . . . . 29.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (37") . . . . . 30.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (38") . . . . . 31.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (39") . . . . . 31.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (40") . . . . . 32.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (41") . . . . . 33.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (42") . . . . . 34.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (43") . . . . . 35.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (44") . . . . . 35.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (45") . . . . . 36.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (46") . . . . . 37.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (47") . . . . . 38.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (48") . . . . . 39.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (49") . . . . . 39.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (50") . . . . . 40.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (51") . . . . . 41.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (52") . . . . . 42.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (53") . . . . . 43.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (54") . . . . . 43.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (55") . . . . . 44.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (56") . . . . . 45.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (57") . . . . . 46.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (58") . . . . . 47.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (59") . . . . . 47.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (60") . . . . . 48.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (61") . . . . . 49.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (62") . . . . . 50.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (63") . . . . . 51.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (64") . . . . . 51.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (65") . . . . . 52.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (66") . . . . . 53.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (67") . . . . . 54.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (68") . . . . . 55.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (69") . . . . . 55.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (70") . . . . . 56.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (71") . . . . . 57.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (72") . . . . . 58.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (73") . . . . . 59.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (74") . . . . . 59.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (75") . . . . . 60.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (76") . . . . . 61.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (77") . . . . . 62.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (78") . . . . . 63.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (79") . . . . . 63.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (80") . . . . . 64.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (81") . . . . . 65.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (82") . . . . . 66.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (83") . . . . . 67.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (84") . . . . . 67.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (85") . . . . . 68.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (86") . . . . . 69.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (87") . . . . . 70.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (88") . . . . . 71.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (89") . . . . . 71.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (90") . . . . . 72.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (91") . . . . . 73.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (92") . . . . . 74.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (93") . . . . . 75.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (94") . . . . . 75.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (95") . . . . . 76.60	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (96") . . . . . 77.40	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (97") . . . . . 78.20	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (98") . . . . . 79.00	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (99") . . . . . 79.80	1 SEAHORSE . . . . . \$5.00
SMALL RED SEAHORSE (100") . . . . . 80.60	1 SEAHORSE . . . . . \$5.00

SEND CHECK OR MONEY ORDER TO: KEYS MARINE LIFE UNLIMITED  
P.O. BOX 416, KEY LARGO, FLORIDA 33137

### BUILD THIS ALL-GLASS AQUARIUM YOURSELF

Simple Instructions  
Photos & Purchase List  
Sizes 10 to 30 gal.  
No Special Tools

Send check, cash or M.O. to:

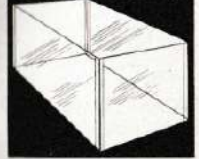
PANORAMA AQUARIUMS INC.

P.O. Box 837

Long Beach, N.Y. 11561

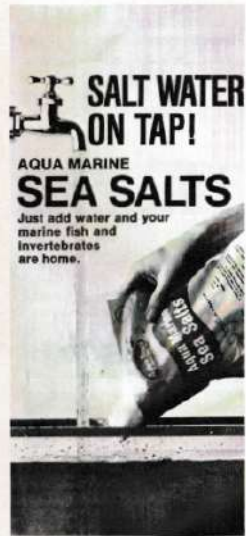
Send 25c for Information

ONLY \$2.95



37





**SALT WATER ON TAP!**

**AQUA MARINE SEA SALTS**

Just add water and your marine fish and invertebrates are home.

- Converts ordinary tap water into ocean water.
- Maintains an ideal salt water condition.
- Contains all the necessary trace elements to sustain even the most delicate forms of marine life.
- Used by collectors and hobbyists everywhere.

1 lb. (for 3 gals.) \$1.25 5 lbs. (for 15 gals.) \$4.75

Distributor Inquiries Invited.

**AQUARIUM STOCK COMPANY, Inc.**  
27 MURRAY STREET, NEW YORK, N.Y. 10007

shipments. However, the fact that none lived more than two weeks is an indicator that this can not be ruled out. They may have contracted a disease with symptoms undetectable by an amateur. Fourteen days is the clue in that most diseases marine hobbyists run into have a gestation period of up to two weeks. Poor addition procedures may cause such a disease.

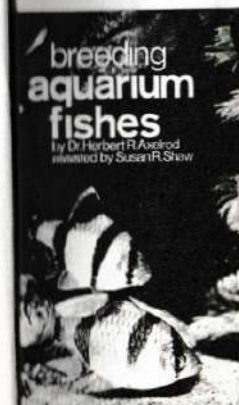
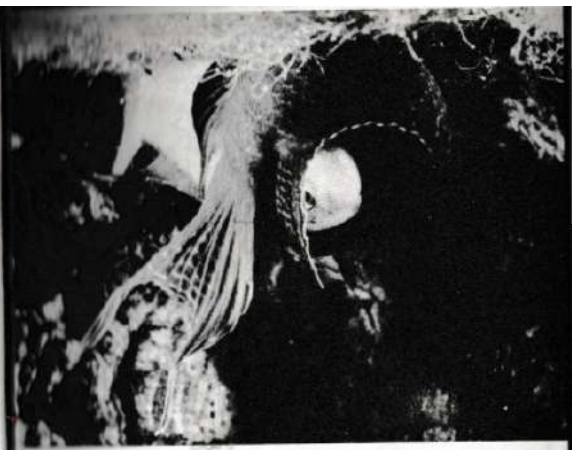
9. An osmotic shock due to concentration of particular water components may be caused by not allowing synthetic mixes to dissolve completely. Mixes should be aerated and/or filtered constantly for at least 24 hours or longer if not all dissolved.

**rent a fish**

Five rental installations return one hundred dollars a month. Aquarium Leasing & Maintenance Corp. of Indianapolis has spent \$40,000 to develop a profitable system of leasing and maintaining aquariums for offices, homes, hospitals etc. Learn of the mistakes and failures as well as the points which brought successful results. Complete report is over 100 pages and explains in detail everything you need to know and especially emphasizes how to be successful in this profitable small business. Complete report with all materials needed to start your own business...\$10.

**Now Only \$3.95**

Send check or money order to  
**AQUARIUM LEASING & MAINTENANCE CORP.**  
P.O. Box 8847, Indianapolis, Ind. 46208



How often have you read an account of how to breed a species of fish and found the account lacking several important details? A vital requirement for breeding fishes successfully is having the right information... all of it. **BREEDING AQUARIUM FISHES** is the first book of its size and completeness to deal exclusively with the breeding phase of the hobby.

If you want to breed your fishes, buy the single major book devoted solely to helping you do so. You won't find yourself looking for any missing clues... There won't even be a mystery!



**\$9.95**

**BREEDING AQUARIUM FISHES** contains almost 500 pages, complete with detailed and spawning photos.

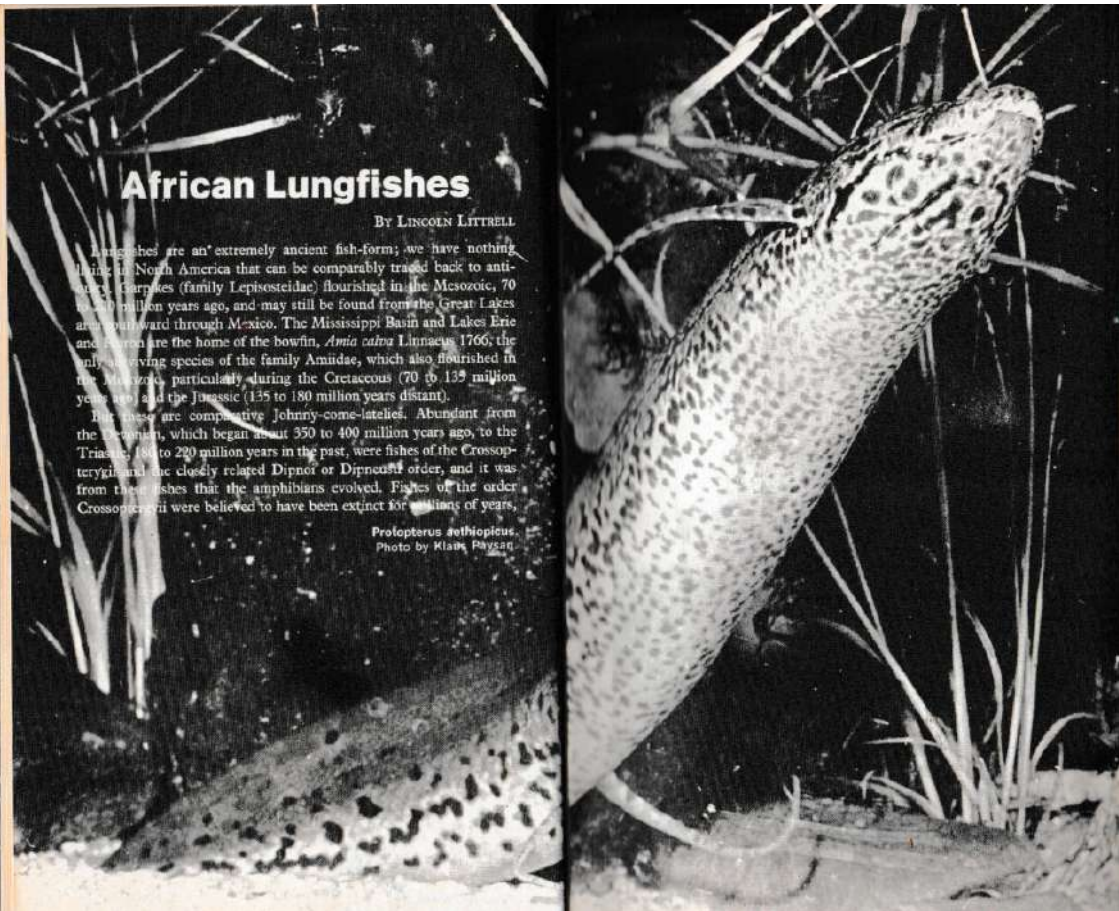
**African Lungfishes**

By LINCOLN LITTELL

Lungfishes are an extremely ancient fish-form; we have nothing like them in North America that can be comparably traced back to antiquity. Garfishes (family Lepisosteidae) flourished in the Mesozoic, 70 million years ago, and may still be found from the Great Lakes and southward through Mexico. The Mississippi Basin and Lakes Erie and Ontario are the home of the bowfin, *Amia calva* Linnaeus 1766, the only surviving species of the family Amiidae, which also flourished in the Mesozoic, particularly during the Cretaceous (70 to 135 million years ago) and the Jurassic (135 to 180 million years distant).

But these are comparative Johnny-come-late-lies. Abundant from the Devonian, which began about 350 to 400 million years ago, to the Triassic, 180 to 220 million years in the past, were fishes of the Crossoptrygidae and the closely related Dipnoi or Dipnoan order, and it was from these fishes that the amphibians evolved. Fishes of the order Crossoptrygidae were believed to have been extinct for millions of years.

*Protopterus aethiopicus*  
Photo by Klaus Pflaig

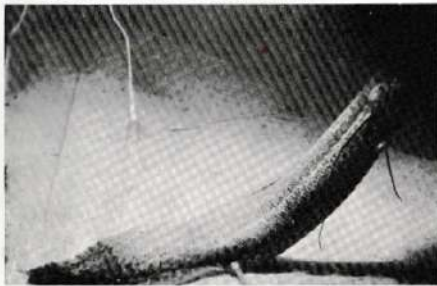






This is a male *P. dolloi* that was forcibly removed from its burrow shortly before the photograph was taken. Photo courtesy African Aquarist.

A lungfish rising to snatch food offered to it; once they begin eating, the lungfishes are voracious. In their native waters, they will try to catch and eat all types of aquatic creatures, preying most heavily on those fishes that are poor swimmers. Photo courtesy African Aquarist.



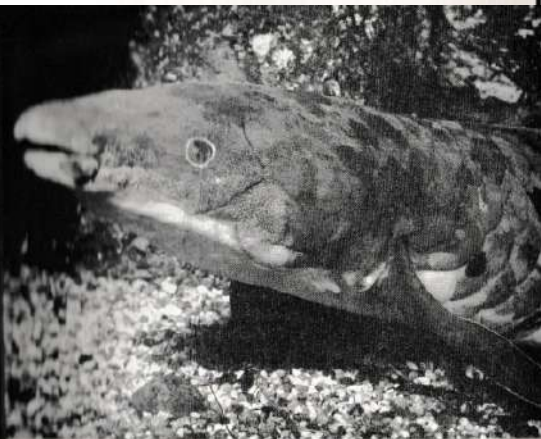
An annectens *P. annectens* curled up in its burrow, head opposite to ventilation shaft; the fish has its caudal fin curled up over its snout. Photo courtesy of African Aquarist.

until 1938 or 1939, when the first of several coelacanths, *Latimeria chalumnae* J. L. B. Smith, was caught in waters near the island of Madagascar.

The Dipneusti too were long known only as fossils. Surviving, however, are six known species, in two families. The surviving member of the family Ceratodontidae is the Australian lungfish, *Neoceratodus forsteri* (Kreff 1870). The only New World species extant is in South America and belongs to the family Lepidostrenidae. This is *Lepidosiren paradoxa* Fitzinger 1836. All other known existing species of this family are in Africa. They are *Protopterus aethiopicus* Heckel 1851, *P. amphibius* (Petrs 1844), *P. annectens* (Owen 1839), and *P. dolloi* Boulenger 1900. *P. annectens* was in 1835 the first of these to be discovered, being found in Gambia by Thomas C. B. Weir. Some classifiers place the African lungfishes into a separate family, Protopteridae, but their affinity with their South American relative seems unmistakable and adds to the evidence supporting the belief of many scientists that a land bridge once connected these continents.

*Protopterus aethiopicus* inhabits the Nile and Congo Rivers and the larger lakes, from eastern Sudan to Lake Tanganyika, but often occupies the shallow waters of the adjacent swampy regions. It reaches lengths up to nearly five feet (140 cm.); one measuring seven feet has been reported as caught in Lake Victoria. Upper surfaces are bluish-gray; lower ones are paler and usually completely marbled or mottled.

*Protopterus amphibius* is much the darkest of the African lungfishes, although it is sometimes confused with *P. annectens*. Dorsally it is blue-gray to very dark gray with isolated or connecting black blotches on the flanks. The belly is sometimes white but is generally pale to very dark gray with white spotting. The underside of the head is characteristically dark, spotted with white. About a foot (up to 30 cm.) is



*Neoceratodus forsteri*, the Australian representative of the Dipneusti. Photo by Gerhard Budich.

usual adult length. The Zambezi Delta and rivers south-east of Lake Basheff are the home of this species.

*Protopterus annectens* occupies waters of the Chad Basin and the Senegal, Niger, and Zambezi Rivers, principally in marshy marginal areas. Length attained is about a foot and a half (70 cm.). The young are very dark, sometimes nearly black; adult coloration is gray-brown to dark brown on the back; flanks are lighter, with irregular rows of dark brown spots. The paler or dirty-yellowish colored belly is usually unspotted behind the throat.

*Protopterus dolloi* is restricted to the Congo Basin and the coastal streams of the Ogooue (Ogooue) River area. Reaching nearly a yard (85 cm.) in length, this species is very dark brown on upper surfaces, lighter on the flanks, and yellowish on the belly. The throat is often light red, usually unmarked but sometimes bearing a few scattered dark spots.

It was once generally accepted that lungs evolved from the swim bladder, but most scientists today are inclined to the opposite view. The Australian lungfish is strictly aquatic; it has only one lung (all others have two), and its gills are fully functional. The protopterids must rely to a great extent upon atmospheric air and will drown if

Please Mention T. F. H. When Writing to Advertisers

**ee lake trading co.**

top quality fish flabobods aquatic plants vivarium accessories

importer-exporter of exotic tropical fishes and

71-73 CHARTWELL DRIVE, SINGAPORE 19. CABLE: 'TELLAKCO' SINGAPORE



prevented from reaching surface air, in fact may do so in water so shallow that they cannot reach the waterline at a proper angle for breathing.

The locomotion of lungfishes is suggestive of eels in swimming, but along the substrate their movement more closely resembles that of newts. The structure of fins indicates closeness to amphibians in the evolutionary chain, and their eggs are much less like those of other fishes than like the eggs of amphibians. They may number 5000, are laid at the beginning of the rainy season, and the larval hatchlings have four pairs of external gills. For about a month the larvae subsist on the yolk-sac while hanging head uppermost on the sides of the spawning chamber and guarded by the male parent. Then they are ready to emerge from the nest and forage, and by that time have lost a pair of the external gills. Two or three pairs may be retained for many months, with *P. amphibius* usually retaining all three until reaching a body length of fifteen inches.

Among the peculiarities of these fishes must be considered their manner of estivation. Upon completion of the burrow in which it will pass the dry season, the fish secretes an enveloping mucous cocoon that hardens to a leathery texture and leaves only a small opening into the mouth. The position assumed is with the body bent double, head

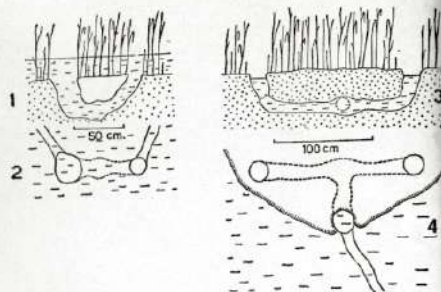
This juvenile *Protopterus annectens* still has its external gills. Photo by J. Herisse.



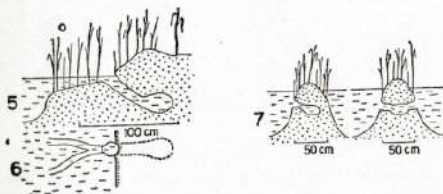
A closeup of the head of *P. aethiopicus*. The tiny eyes make the fish's vision very poor. Photo by Klaus Paysan.

upward, and the tail covering the snout. Unlike other animals, which subsist upon stored fats during similar periods of rest, the lungfish lives upon muscle tissue; the kidneys function in disposal of body wastes and separate urea from body fluids so that the water can be used over and over again.

*P. amphibius* is barely more than mentioned in the literature on fishes; much of the detailed information to follow on other species of the genus has been extracted from the *African Aquarist* reprint of an *African Wild Life* article by Paul Brien on the quite various "living fossils" of Africa.



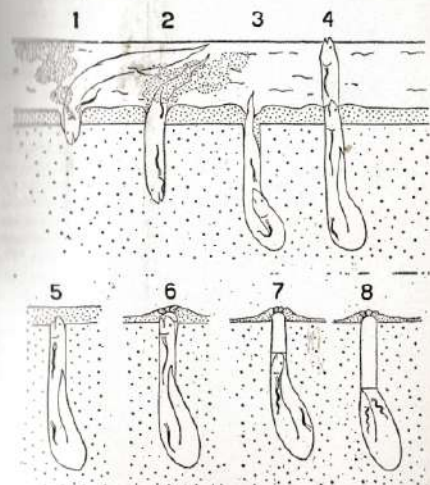
Different forms of the nest of *Protopterus annectens*; odd numbers refer to cross-section views, even numbers refer to views from above of the cross-section shown in the immediately preceding odd number. Drawing courtesy *African Aquarist*.



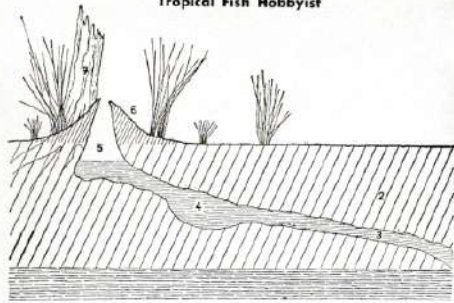
African natives call the lungfishes *sombo* and catch them for food. Methods of "fishing" vary, as Dollo's *Protopterus* does not exactly follow the behavior patterns of its cousins *P. aethiopicus* and *P. annectens*. Waters preferred by the lungfishes are those of marshy areas usually subjected to annual inundations, and these fishes manage to survive the dry seasons that bring death to other aquatic animals of the same regions.

*P. aethiopicus* and *P. annectens* survive by estivation encased in balls of mud, as previously described. As the water subsides day by day, each of these fishes digs a vertical tube extending eight to sixteen inches deep. Propelled by lashing tail, the fish bores into the bottom ooze, gobbling mud and expelling it through the gills. The bottom of the burrow is enlarged so that the fish is enabled to double upon itself to ball up for the period of rest, which may last several months or extend to three or four years depending upon the return of flooding waters. While water remains, the fish rises occasionally to gulp surface air. Later, mud will be pushed up to form a mounded cap over the top of the tube; this becomes porous when dried and permits passage of sufficient air to sustain life in the fish's dormant condition. This air is taken

Stages in the preparation of a nest by *Protopterus*, with ventilation shaft opening onto porous dome. Illustration courtesy of *African Aquarist*.







Cross-section of the nest of *P. dolloi*: (1) underground water; (2) hardened mud of marsh; (3) burrow; (4) egg chamber; (5) ventilation shaft; (6) "molehill"; (7) base of tree trunk. The burrow, egg chamber and part of the ventilation shaft are filled with water. (After A. G. Johnels and G. S. O. Svensson.)

in through the buccal nipple of the cocoon into which the fish has meanwhile sealed itself.

In search of table delicacies, natives go "fishing" with hoes. The molehill-like mounds reveal the locations of the estivating fish and the cocoons are dug out and carried away. The fish are too numerous for culinary extermination and survivors are prolific. Spring rains are usually sufficient to bring flooding waters into these areas and the fish emerge from their burrows and are soon digging others for spawning. These are various in form and differ in regard to the number of passageways leading to the terminal egg chamber but are nearly horizontal, downward-slanted tubular shafts literally eaten into river banks. The initial shaft is bored into the bank at the bottom level of the stream and this open-water entrance is often hidden among aquatic plants. One or more other shafts are frequently excavated, and some of these have been discovered leading to open air among bog plants when the marsh is not totally immersed.

Available evidence indicates that the nests are dug by the males and that one or more females are then induced to enter for spawning. During embryonic development of the spawn the male guards the hundreds of eggs, which have been found in various stages of development within a clutch, indicative of variously spaced spawnings with the same female or a succession of mates. He continues his guardianship until the batrachian-like young leave the nest, swimming back and

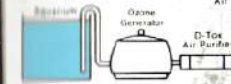
DISEASES KILL AQUARIUM FISH!

KEEP YOUR FISH HEALTHY!

with the new BIOZONICS

OZONE GENERATOR

The Biozonics Ozone Generator and D-Tox Air Purifier connect easily to your air pump.



Helps prevent fish diseases by establishing a natural environment in your aquarium

At last! A scientific way to protect your tropical and marine fish from infectious diseases! The Biozonics OZONE GENERATOR prevents over 90% of the known diseases by destroying bacteria, fungi and viruses. Perfectly safe for even the most delicate fish. Weighing only 3 pounds, the ozone generator keeps up to 100 gallons of fresh or salt water pure. No maintenance problems. When used in combination with the Biozonics D-Tox Air Purifier, it gives the hobbyist a complete aquarium "health center."

MODEL 3 \$39.95 (up to 100 gal.) MODEL 2 \$35.95 (up to 50 gal.)

Available From Your Local Aquarium Supply Dealer



BIOZONICS CORPORATION  
15 Tech Circle, Natick, Mass. 01750

Please send me your free literature.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Preposterous *Protopterus*

The calumny heaped upon me is colossal—  
Though full of life, I've been called living fossil,  
And scientists in evolutionary classification  
Place me midway between teleost fish and batrachian.

I'm forerunner of newts and the toads and the frogs  
And my youngsters look like polliwogs,  
But unconcerned about looks, I go on my way  
And care not at all what mere persons may say.

To African natives I'm a delicate dish;  
In curator view I'm a blob in a ball of dry mud,  
But a lungfish is a fish is a fish,  
And at home I swish free in the flood.

When considering facts altogether,  
It doesn't seem strange to retire in dry weather;  
If kept underwater I'll drown, it is true;  
So what about that! Wouldn't you?

Lincoln Littrell



Larvae of *Protopterus aethiopicus* at time of leaving their nest. Photo courtesy of African Aquarist.

forth in front of the channel entrance of the burrow to dash within at the slightest alarm and turn about, ready with formidably sharp teeth to repel intruders.

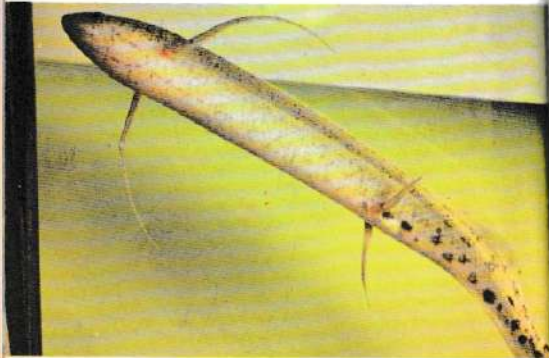
*P. dolloi* frequents grass-grown or bush-covered swamplands of varied appearance but having a common feature in that an underground sheet of oxygen-rich muddy water remains during the dry season. When surface waters begin to recede in summer, *P. dolloi* disappears like his relatives but in descending into the mud he comes to a point at which there is an ooze that becomes more and more liquid and finally reaches the subterranean water table. At about twenty inches below the surface, the slanted shaft opens to a vertical one; a molehill-like cap is formed at the top of the shaft by pushing mud up from below to complete the burrow. Snug in the underground ooze, the fish passes the dry season without forming a cocoon and rises in his shaft from time to time for breathing, or makes new passages to reach fresh air.

An enlargement in the slanted portion of the shaft serves the male in season as an incubation chamber for his young, and native "fishermen" report that such burrows are permanent unless destroyed by spring floods and point out nesting sites reputedly five to ten years old. Burrows not destroyed by spring inundations are prepared for spawning and the clean-out entails ejection of more mud to be piled upon the mound around the entrance and these reach heights of twenty to forty inches at long-occupied diggings.





**Protopterus annectens.** Like the other African lungfishes, *P. annectens* must take in air at the surface of the water, and unless there's sufficient water depth to take the air at a proper angle, the fish will suffocate. Photo by Dr. Herbert R. Axelrod.



## This bottle contains our reputation-



## what's in it for you?

**In this bottle is the most effective treatment for Ich and velvet that has ever been invented. It doesn't color the water, either. Neither you, your fish nor your friends will know that your fishes are being treated.**

*From Miracle, the people with know-how.*

**MIRACLE PET PRODUCTS, INC.,  
Box 386 Jersey City, N.J. 07303**



Eggs of *P. dollotii*, removed from the burrow. Photo courtesy African Aquarist.

These opened mud clumps show two estivating *P. annectens* in their cocoons. Photo courtesy African Aquarist.



*Protopterus amphibius.* Photo by H. Hansen, Aquarium Berlin.

Nest openings are marked by natives at the beginning of the dry season. When a male resting at the bottom of his shaft is desired for food, long, sharp spikes are jabbed haphazardly into the turf around the entrance cap until the squirming movement of an impaled fish indicates a successful thrust. Another spear is used to make certain that the fish is pinned and the natives set to work with pangas or machetes to cut through the mud and tangled roots to make an opening so that the fish can be pulled out with a forked stick. Damage done is carefully repaired, as the burrow may be appropriated later by a maturing male and provide another catch next season.

Propagation likely follows the pattern of other species but the male guards his young while remaining inactive within the burrow and near his brood. Slow movements of his tail while thus watchful against predators probably benefit the young by circulation of the water in the submerged brooding chamber.

The lungfish is not a handsome fellow but he has been around for a long while. Whether the seasons bring him searing heat or flooding rains, he knows what to do about the weather, and appearances indicate that the lungfish may very well still be present in a far distant future.



## My Observations on *Leporinus fasciatus*

BY MICHAEL FORAN

Although there seems to be a shortage of information in current literature regarding the banded headstander, *Leporinus fasciatus*, its availability and that of related *Leporinus* species is rapidly increasing. With this in mind I thought it might be helpful to pass on my knowledge of this fish to current and prospective owners.

The coloration of *Leporinus fasciatus* makes it among the most striking of the genus. The deep yellow background is broken up by nine black bands, the eighth of which divides in half as the fish matures. While young fish may have quite a bit of black coloration in their fins, adult fish's fins are clear, with traces of black at the bases of the dorsal, adipose and anal fins.

For the most part, the banded headstander isn't a choosy eater. The mouth is small and slightly subterminal, indicating that the fish is a bottom feeder. All food should be placed at the bottom of the tank; *L. fasciatus* rarely swims to the surface. My fish receives an abundance of earthworms during the summer and several varieties of freeze-dried food during the winter. Vegetable fare of one type or another is usually recommended for the well-being of the fish, but mine has shown no ill effects caused by a lack of it in the two and a half years since I acquired him.

Any tank of over 20 gallons is sufficient for adult specimens. Subdued lighting, clear, well-aerated water and some plant cover is necessary. While *L. fasciatus* may have a wide temperature tolerance, 72-74° F. is suitable.

Purchased when he was 2 inches long, my banded headstander is now a respectable 8 inches long. He prefers to survey his domain from a thicket of plants in a rear corner of the tank. Usually the other inhabitants, a porthole catfish, a small *Pimelodella* species and a trio of medium-sized tinfoil barbs, are busy scouring the tank for food. When the large *Leporinus* decides to have a look himself, the other fish keep their distance! While posing no real threat to them, he does snap at them occasionally. *L. fasciatus* isn't vicious in the sense that pike cichlids are, but it is a fin-tipper, and this should be considered when selecting tankmates. Fast swimmers, such as the *Prochilodus* species, and surface dwellers, such as the hatchetfishes, are ideal. The only real precaution to be observed is to see that *L. fasciatus* receives enough

NOT NEW  
BUT IMPROVED

## DIATOM FILTER



Retail \$34.95

CYCOLAC CASTINGS NOW USED ON ALL FILTERS

Diatomaceous filtration actually filters out protozoan parasites such as "ick".



- Never needs cleaning.
- No foul odors
- No messy irritating glass wool
- No valuable tank space lost
- Self-contained quiet operation
- Positively does not change water chemistry
- May be moved from tank to tank without spreading disease

Beginning of new water cycle. Diatom Filter "locks out" the "Diatom" tank contains unbroken gravel, cigarette ash and floor coverings. After use, simply empty, producing nearly clean water at once or even the next or several days later.

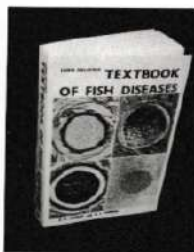
After 20 minutes, even the most stubborn "ick", or four-headed-diamonds, of an inch, have been filtered from the water. All that remains are a few bits of floating debris which did not mix with the water and can be removed easily from the water.

FOR BEST RESULTS - All Filters have Dupont REEMAY Bags. Flows 10 Times Longer - Backflushes Clean.

Ask Your Distributor or Write:



G - 4142 Fonton Rd. • Flint, Michigan 48507



### TEXTBOOK OF FISH DISEASES by Dr. Erwin Amlacher

- 304 pages of explicit, detailed, professional instructions on the recognition, treatment and prevention of diseases and parasites of aquarium and food fishes.
- over 200 illustrations showing the parasites and causative agents of fish diseases and their effects.
- complete discussions of the symptoms, diagnosis and etiology of each disease and the morphology and taxonomy of its causative agents, coupled with specific, practical directions for treatment and prevention.

The most authoritative general fish disease textbook ever published

\$7.95 at all pet shops

### ENCYCLOPEDIA OF TROPICAL FISHES

by Dr. Herbert R. Axelrod and William Vorderwinkler

This book, one of the most popular aquarium books ever printed, contains 800 pages of information and photographs that open the doors to a real enjoyment of the aquarium hobby. All within one master volume can be found chapter after chapter of interesting, informative text dealing with every aspect of tropical fish keeping and hundreds of beautiful photographs . . . more than 350 in full color . . . that make identification of each species pictured simple.

Complete chapters on: water, aquarium gravel and rocks, foods and feeding, aquarium plants, snails and commercial breeding, with fourteen separate chapters discussing the breeding habits of fishes and including even a chapter on breeding the mystery fishes, the ones never bred before. Easy-to-read, easy-to-understand, easy-to-apply practical advice of value to every hobbyist.



\$9.95 at pet shops everywhere

243 CORNELISON AVENUE, JERSEY CITY, NEW JERSEY 07302



*Leporinus fasciatus.*

food. Being shy at times, he will often give up his portion to more voracious species. Also in connection with the fish's shyness: if unduly disturbed, the banded leporinus is likely to jump. Any person unfortunate enough to be leaning over the tank could be struck in the face, so it's best to be extra cautious when working on a tank containing this fish.

With large eyes, deliberate movements, and an impressive appearance, the banded leporinus seems to have some semblance of intelligence. Though I wouldn't recommend *Leporinus fasciatus* to a beginner, given proper conditions this fish makes a real pet of the same caliber as any of the cichlids.







HOME-GROWN TUBIFEX

Q. I always feed my tropical fish live food and I have some of the best fish in my neighborhood. I pay 31c (tax included) weekly for a one ounce cup of the food my fish love--tubifex worms. Don't think I don't feed my fish shrimp and daphnia when I am able to get it. I don't like to spend so much money for so few worms and I've asked alot of people how I can raise my own, and they don't know. I am writing to you for some good information on how to get a healthy culture started and to keep it going.  
LAVEY SKLAR  
LAWRENCE, NEW YORK


A. It's not worth your while to try to raise enough tubifex worms to feed a small...or even a large...fish collection. The production of live worms wouldn't be enough to justify the expense in time and effort and money. Tubifex sold in fish stores are collected, not cultivated; nobody cultivates tubificid worms for resale.

PENCIL FISH

Q. I recently purchased a *Poecilobrycon auratus*, or pencil fish. Could you give me some information on it, such as its feeding habits.  
GLENN KUES  
SAN ANTONIO TEXAS

A. *Poecilobrycon auratus* is a peaceful, fairly timid fish that takes all standard foods that its relatively small mouth can accommodate; when frightened, it's inclined to jump. The species is rarely spawned, mostly because there are not many hobbyists interested in spawning it; it is not a prolific fish.

Please Mention T. F. H. when Writing to Advertisers



**VITA-BRITE Introductory Offer!**  
Three 59c size dispensers for only \$1.00 (\$1.77 value)  
For Canada and areas beyond U.S.A., add 75c postage.  
Shipped prepaid - Send this order together with your money, name and address to:  
**VITA-BRITE Dept. TFH, 67 West 9000 South, Sandy, Utah 84070**

VITA-BRITE is a complete, scientifically balanced all purpose tropical fish food - especially formulated to bring out the best of color and health in your fish. Money refunded if you are not satisfied, promising you return, postpaid, two unused cartons.

Check kind desired:

<input type="checkbox"/> Fine - for fish up to 1"	<input type="checkbox"/> Petlets - larger fish
<input type="checkbox"/> Medium - fish 1" to 2 1/2"	<input type="checkbox"/> Three 2 1/2 oz. ctns. for \$1
<input type="checkbox"/> Coarse - fish 2 1/2" to 4 1/2"	<input type="checkbox"/> 5 lb. ctn. \$4.25
	<input type="checkbox"/> 10 lb. ctn. \$10.00



*Poecilobrycon auratus*.  
Photo by R. Zukal.

**Bulk Tropical Fish Food**

You can save purchase about from Canada's largest and oldest producer of guaranteed over 95% Protein Tropical Fish Food. 100% Organic with no fillers, a product of the sea, composed of small fish, oil, fish scales, fish bones, etc. - nature's natural food ideal for Tropical in Salt Water fish and used by top breeders for years.

**SPECIAL MAIL ORDER OFFER**

1 ONE POUND BAGS FANCY VARIETY PACK \$10.00 POST PAID AND DUTY FREE OR  
1 ONE POUND BAGS GUPPY FOOD \$16.00 POST PAID DUTY FREE OR  
ONE POUND GUPPY FOOD \$1.50 POST PAID DUTY FREE

Aquarium Stores and Nurseries, special price \$9.95. Ship shipped Rate freight only Res. Send for descriptive price list.

**Hart & Howes Ltd.** 540-Stevedore Highway, Richmond, B. C., Canada Tel. (604) 277-4228

**NUMBER 1**  
adds  
**NUMBER 5** \*



**Ed's Tropical Aquariums**

Tropical Aquariums—number one in its field—the largest individually owned chain of tropical fish stores in the U.S.A., has just opened its fifth store... and there are more on the way!

Number five, following in the tradition of the first four, is another of the most modern, attractive, and excitingly interesting tropical fish stores you have ever visited.

**COME SEE US!**

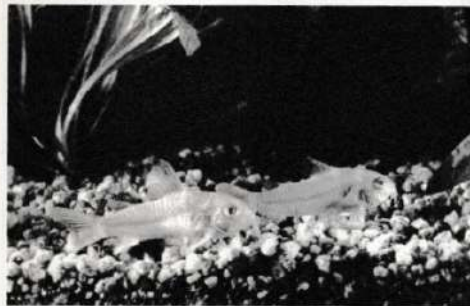
**Ed's Tropical Aquariums**

LYNBBROOK, N. Y., 2 Scooter Ave., 11563  
FOREST HILLS, N. Y., 43-55 - 109th St.  
FARMINGDALE, N. Y., 9 Remondet Trpk.  
ROOSEVELT FIELD, N. Y., Garden City  
BROOKLYN, N. Y., 3733 West Ave. & Ave. K

Main office at Lynbrook address

ALBINO CORYDORAS AENEUS

Q. I have two albino *Corydoras aeneus* catfish and I was wondering if they can be bred in captivity? If so, how can you tell male and female apart? Also, how large do they have to be? Where can I get information on breeding albino *Corydoras aeneus*?  
ANDREW STRISO  
GLEN COVE, NEW YORK



Albino *Corydoras aeneus*.  
Photo by R. Zukal.

A. Yes, they can be bred in captivity, the same way non-albino *Corydoras aeneus* are bred. See the breeding account for that fish in *BREEDING AQUARIUM FISHES*, by Dr. Herbert R. Axelrod and Susan Shaw.

FISH ALWAYS HIDE

Q. My fish are always hiding behind the plants at the back of my aquarium. It is very thickly planted there, but they keep fighting their way back behind the plants. Can you explain this?  
MARK KOKOTAN  
HICKORY HILLS, ILLINOIS

A. Obviously something is bothering them to make them behave the way they do, and our guess is that your tank is too brightly lighted, so they retreat to the relative security of the plants at the back of the tank. Cut down on the brightness of light at the front of the tank and you should be able to eliminate the problem.

SEXING BLUSHING ANGELS

Q. How are sexes told in the blushing angel or ghost angel fish? Will they grow to breeding size in a ten gallon tank? They are fed tubifex worms and frozen daphnia.  
RAY LIND  
KEARNY, NEW JERSEY

A. The sexes in blushing angels and ghost angels are distinguished the same way they are in normal angels and other angel strains: with difficulty. Really, the best way to determine the sexes is to watch them spawn and see who does what. Yes, they'll grow to spawning size in a 10 gallon tank, but not if you crowd them heavily. Try only four baby angels in one tank.

CYPRINID HYBRIDS

Q. I have some zebra danios and white clouds that are about the same size; have zebra danios and white clouds ever been crossed?  
JAMES LASKY  
ELMHURST, ILLINOIS

A. To our knowledge, no. There have been a number of hybridizations among various of the *Brachydanio* species, however.

**DELTA TAIL—SHOW QUALITY GUPPIES**  
**GLEN L. PARRISH**  
BREEDER OF FANCY GUPPIES  
*Winner of Many Awards in 1970 International Guppy Shows*

Selected top quality guppies from these large bodied, delta tail, trophy winning strains, are now available to the discriminating guppy fancier. Fish shipped are 3 to 5 months old. They breed true.

Guaranteed live delivery.  
Postpaid - Airmail - Special Delivery

**Blue or Green Deltas**  
\$14 pair, \$19 trio, \$24 2 pair

**Green Cobra Deltas**  
\$17 pair, \$23 trio, \$29 2 pair

**Leopard Deltas (Yellow Tail with Black Marks)** \$22 pair, \$30 trio, \$38 2 pair

**High Protein Guppy Food**  
1/2 lb. \$3, 1 lb. \$5 postpaid

Send check or money order to:  
**GLEN L. PARRISH**  
30132 McLENNAN AVENUE  
GRANADA HILLS, CALIF. 91343  
Phone (213) 363-5563

**WATERLILIES**

The loveliest of all flowers that can be grown at home. Exquisite jewel-like colors. Nearly every bloom reaches perfection. Easy to grow in tub, pond or farm pond.

**Exotic Fishes**

Many varieties of tropical fish and goldfish including hard to find Lionheads, Drandas, Celestials, and Pearlscales.

Write today for your free copy of new, colorful 1971 catalog.  
**No price increases for 1971.**

**THREE SPRINGS FISHERIES, INC.**  
Our 54th Year  
721 TROPICAL ROAD, ILLYNDEN, MD. 21717



FIRE EEL

Q. Since acquiring a fire eel several months ago, I've been trying to research it to no avail. It is completely tame and eats from my hand. The eel has grown to about 18 inches, so I must be doing something right. If it is a true eel, it will live to get to be several feet long, but if it is a member of the spiny eel family it is now mature. I would appreciate any information you might have as to its scientific name so that I might research its origin, age, size, family, water, temperature and food requirements.

STEPHANIE FREIDMAN  
SOUTH MERRICK, NEW YORK

A. It's probably a member of the family Mastacembelidae, the spiny eels, and it's not a true eel... but the fact that it's not a true eel doesn't mean that it won't grow larger than its current 18 inch size. Some of the mastacembelids grow considerably larger than that in their home waters, and if they're given proper care they can beat 18 inches in the aquarium, too. Your eel probably is *Mastacembelus erythrotaenia*.

NEED FOR HEATERS

Q. I am not using heaters in any of my seven aquariums. The daytime temperature is about 78 degrees and the nighttime temperature is approximately 74. I have been told that the fish cannot take this drop in temperature. Is this true?

EDDIE HEMPEL

A. No, it's not true. Your fish should easily be able to stand a temperature differential of four degrees between daytime and nighttime, especially since the differential comes about gradually.

**THE CALICO GUPPY**  
(First place winner at 1969 San Gabriel Valley Ca. Show)

A unique addition to the variable Guppy family. Delta males are a patchwork of orange, black and red, against a background of gold females, a solid gold carrying pair of color in tails. They breed true. \$14.00 per pair. \$5.00 extra for trial. Other unusual, true breeding Delta varieties include: Leopard (yellow with dark spots in tail), Ebony Black (black body and tail, white dorsal), Red Cobra, Snakekin (Red Delta), Royal Dark Blue (Solid Dark Blue Tail), First Place winners, 1969 Long Beach Cal. Show. \$9.00 per pair (\$3.50 extra for trial). Guaranteed live delivery, postpaid. Airmail Special. Send Check or Money Order to:

**GUPPY CHAMPIONS INTERNATIONAL**  
P. O. Box 90025, A. F. Unit  
Los Angeles, Calif. 90045  
Phone: (713) 545-4421

Please mention T.F.H. when writing to advertisers

**AQUARIUM PLANTS** as little as 9c ea.

**TROPICAL FISH** from 19c

**AQUARIUM SUPPLIES** 3c to \$85

Find out how you can save money without giving up quality fish, plants and supplies.

Send \$1.00 for catalog or 25c for beginner's list.

**AQUALAN**

P.O. Box 483  
Methuen, Mass. 01844

FRESHWATER TROPICALS IN SALT WATER

Q. I am writing to find out whether freshwater tropical fish will readily adapt to salt water. Also, will the filter in my aquarium filter out the salt in the water?

WILLIAM RICKS  
SAN ANTONIO, TEXAS

A. A few popular freshwater species will adapt to brackish or even distinctly marine water, provided the change is made gradually enough. Mollies are the most common freshwater-to-saltwater changeovers. No, the filter won't remove dissolved salt from the water.


COW MANURE AND POTTING SOIL IN TANK

Q. If I were to take some dried cow manure and potting soil and boil it, would it make a good planting medium for the Amazon swordplant and Madagascar lace plant?

WEBSTER WHEELER  
BATON ROUGE, LOUISIANA

A. The mixture you speak of certainly appears rich enough in nutrients to provide a good medium for the plants, but that's the problem: it might be too rich. Aquatic plants, like terrestrial plants, can be harmed by over-fertilization. Besides, you're better off not using transfusions of

Royal Treatment for the Prince



**ALL ABOUT DISCUS**  
by DR. HERBERT R. AXELROD  
with additional sections by noted Discus experts

Colorful, comprehensive, convenient, concise, compelling... this brilliant new book makes good reading and a good investment in learning how to deal with the prince of aquarium fishes.

128 pages (64 in true-to-life color). \$2.95 at your pet shop or direct from

**T.F.H. PUBLICATIONS, INC.**  
245 Cornelison Ave., Jersey City, N.J. 07302

**MASTER BREEDER PRODUCTS**  
By DALECO

DEPENDABLE LIVE FOOD CULTURES  
SOPHISTICATED AQUARIUM SUPPLIES

DALECO, 416 Grand St., Yonkers, N.Y. 14550  
Rush Free on MONEY-BACK-GUARANTEE

<input type="checkbox"/> Unique Careg-Instruction Manual	\$ 2.25
<input type="checkbox"/> BRISOPHILA (Wings Four Flies)	1.50
<input type="checkbox"/> BRISOPHILA WALTER BREEDER Ph.	3.00
<input type="checkbox"/> (Culture 1 per ASAR Supply)	1.00
<input type="checkbox"/> BRISOPHILA Ph.	1.00
<input type="checkbox"/> MICRO MASTER BREEDER Ph.	3.00
<input type="checkbox"/> (Culture, Breeder Jar & Media)	1.75
<input type="checkbox"/> EUGENIA (Green Insect)	1.50
<input type="checkbox"/> TEREBINTO (Meal Worm)	1.25
<input type="checkbox"/> GAMBARDI Ph. (Crustacean)	3.00
<input type="checkbox"/> OLGOCHEATE Ph. (Aquatic Worm)	3.00
<input type="checkbox"/> GAMBARDI	2.00
<input type="checkbox"/> AIRLIFT WATER SOFTENER (Rockingham)	2.75
<input type="checkbox"/> DIRT MIDGET "Rain" Filter	2.75
<input type="checkbox"/> DR. WATER POLYMER FILTER	4.00
<input type="checkbox"/> (Prevents Fungus on Fertilizer Eggs)	0.00
<input type="checkbox"/> AQUARIUM SIBOBI SUBSTRATE (A)	2.50
<input type="checkbox"/> "SILENT TIGER" AIR PUMP	14.99
<input type="checkbox"/> (Includes 200 ft. Hose Assembly)	23.75
<input type="checkbox"/> 8-GANG AIR VALVE (Basic)	1.00
<input type="checkbox"/> AIRLINE TUBING-Pressure Mount (100 ft.)	1.00

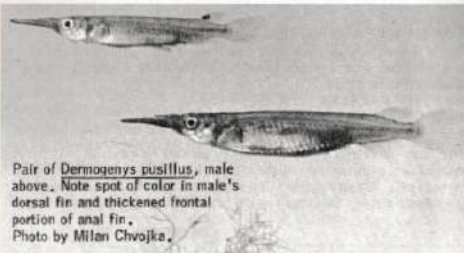
\*Some Cultures

such organic materials in a fish tank (assuming that you intend to plant the plants in an aquarium).

HALF-BEAKS

Q. I suddenly developed this "thing" about half-beaks. Is it true that they are livebearers? If they are, is it easy to breed them? What are their sex differences? From which family do these fish come?

MATT VESELITZA  
RICHMONDVILLE, NEW YORK



Pair of *Dermogenys pusillus*, male above. Note spot of color in male's dorsal fin and thickened frontal portion of anal fin.  
Photo by Milan Chvojka.

A. Half-beaks are livebearers of the family Hemiramphidae, but the fact that they're livebearers doesn't make them easy to breed; they're tough to breed and it's tough to raise the babies. In *Dermogenys pusillus*, the half-beak most often sold in pet shops, adult males have a spot of red on the dorsal fin; the male's anal fin also is thickened and split at the front lower portion, but this difference is not readily visible at all times.

**THE BEST IN BETTAS**  
**BETTAS UNLIMITED**

Solids • Bi-Colors • Butterflies  
• Cambodians •  
• Double Tails •

90-page book about Bettas  
Slides, Photos, Tapes  
Decorative Ceramic Tropicals  
Many More Items

10068 Cavell  
Livonia, Michigan 48150

**THE DEGAULLE GUPPY**  
(Flag of France)

The most unusual breed of this era. A large, firm hybrid with light face, jet black body, burning red tail, and white dorsal fin. Pacific females are olive color with black cast. They breed true. \$12.50 per pair. (\$4.50 extra for trial.)

Other varieties include Albino Yell, Red Peacocks, Lavender Green, Lavender. \$7.50 per pair. (\$2.50 extra for trial.)

Guaranteed Live Delivery, Postpaid, Airmail. Send check or money order to...

**MANHATTAN AQUARIUM SERVICE**  
774 71st St., Manhattan Beach, Calif. 90266  
Phone: 545-4421

BANANA PLANT

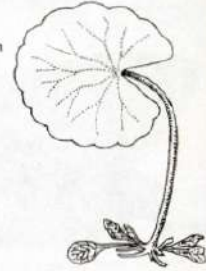
Q. About a week ago I bought a banana plant. I wanted to make it reproduce, so I broke off two of its bananas and placed one under the gravel and one on top of the gravel. That day a new leaf grew taller than the others and finally opened on the surface of the water like a lily pad. I would like to know which way this plant reproduces. Any information will be appreciated.

THOMAS JESZEK  
WAWARING, NEW YORK

A. The banana plant, *Nymphaoides aquatica*, reproduces both from leaf cuttings and from seed; the most usual (and very often accidental)

Young banana plant growing from leaf cutting.  
Drawing by Machlin.

Banana plant, *Nymphaoides aquatica*.  
Drawing by Machlin.



**GREENHOUSE-GROWN**  
**AQUARIUM SHOW PLANTS**

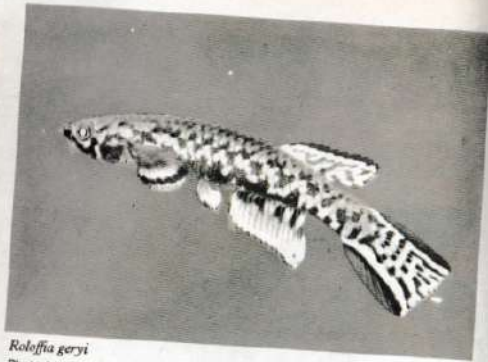
Collection of beautiful broadleaf Amazon sword, 4 cryptocorynes, and ten other varieties of aquatic plants... postpaid to you for only \$6.00. Satisfaction guaranteed. Write for free listing of rare aquatic plants. Retailers: wholesale lists available.

**WESTERLEIGH AQUARIUM**  
Box 11 Station Island, N.Y. 13314









*Roloffia geryi*  
Photo by Col. Jørgen Scheel.

in common with many of the numbered strains, is generally a deep blue-green fish with many red dots, and yellow edging to the tail fin. The latter is generally brownish black, but the males develop more and more deep red pigment as they grow, until the entire fish is heavily reddened. The tail fin also has the yellow edges above and below. *Roloffia* females are often easy to separate by species, as the different ones have different black markings, either blotches, spots or a horizontal line. The pichasants are tougher to propagate successfully, requiring about seven months egg incubation time. So start with the easy ones and work your way up, slowly.

Et Africa unquam oligum esse...

THE LATEST ADDITION TO THE WORLD'S AQUATIC JOURNALS IS THE

**AFRICAN AQUARIST**  
**AFRIKAANSE AKWARIS**

Published on the first of every month to promote the knowledge of tropical fish in general and of African fishes in particular.

Annual subscription in the U.S.A., Canada and dollar areas:  
5.00 dollars (post free — surface mail)  
11.75 dollars (post free — airmail)

Subscription copy 50 cents

Order direct from the publishers:  
**TORPIS PUBLISHING CO.**  
P.O. Box 179, Bloemfontein, Rep. of South Africa



**Dr. Axelrod's Formula**  
**peat moss extract**  
FOR MAKING BLACK WATER

Dr. Axelrod's Formula Peat Moss Extract is an extract from German peat moss which is almost identical in composition to that which was analyzed from the Rio Negro, Brazil and other black-water rivers in the area. It has been found that Cardinal Tetras (*Cheirodon axelrodi*), Neon Tetras (*Hyphessobrycon innesi*) and many other fishes from Brazil and Africa do better in darkened water which is made more acid by the addition of peat moss. Reduces bacterial count and makes fish more colorful. Retards algae.

USE ONE TABLET FOR 5 GALLONS OF WATER. Use less if your water has a pH of under 6.8, and perhaps you might need more if your water has a pH of more than 7.6.

Available at pet shops only.

**YOUR FISHES' HEALTH**

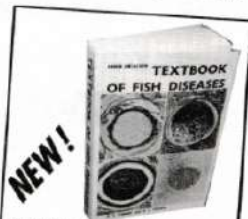
**Coccidiosis**

by Roger Lee Herman, Ph.D.

Coccidiosis is rather common in vertebrate animals. Humans, however, are rarely affected by these parasites. Species belonging to the genus *Eimeria* (subclass Coccidia of the Sporozoa) are the most common. More than thirty species are known to parasitize fish. They may be found in the intestine, testis, liver, and sometimes other organs. Severe infestations of the testis reduce the reproduction ability of the male and may even lead to complete sterility.

Fish apparently are infested by eating spores, perhaps accidentally, that contain sporozoites, which are the active, infective stage. In the stomach or intestine, the sporozoites leave the spore and penetrate into cells of the intestine or pass through the blood stream to other organs. Within the cells the sporozoites divide to form many merozoites, which invade other cells and begin the division process again. Thus, ingestion of a few spores can result in a heavy infestation of the individual fish. After several such

cycles of division, additional changes occur, and the merozoites become sporoblasts. A membrane forms around the sporoblasts and a spore is formed. Spores are ex-



**NEW!**

Available now, **TEXTBOOK OF FISH DISEASES**, the English-language (and updated) version of Dr. Erwin Amlacher's classic treatise on the recognition, treatment and prevention of fish diseases and parasites.

An excellent detailed, authoritative, completely illustrated encyclopedic reference work. 304 pages, \$7.95

**T. F. H. PUBLICATIONS**  
245 Cornwall Avenue  
Jersey City, N. J. 07302



"... 'AN I'LL TAKE A COPY OF T.F.H. AND THAT SHOULD DO IT FOR NOW, JOE..."





**Maracyn\***  
ANTIBIOTIC TABS

FOR THE PREVENTION AND CURE OF SUSCEPTIBLE BACTERIAL AND FUNGAL DISEASES OF FRESH WATER AND MARINE FISH

**new**

FOR AQUARIUM USE ONLY

CONTENTS: 8 TABLETS NET WEIGHT: 5 GRAMS  
\*Trademark and Patent Applied For

**MARACYN\*** / NEW HEALTH FOR FISH

Save ailing fish, protect thriving ones with MARACYN, the powerful, new, broad spectrum antibiotic proven in public and private aquariums to reduce losses by more than 50%. NON-TOXIC, COLORLESS, completely safe for all fresh and saltwater fish and plants. No need to adjust or change water before, during, or after treatment. Low cost per gallon of water treated.

Formerly only available in bulk quantities to professional aquaria, MARACYN can now be obtained from your local pet shop. Give your fish NEW HEALTH — GIVE THEM MARACYN.

**M** **MARDEL LABORATORIES, INC.**  
P. O. BOX 562 • GLEN ELLYN, ILLINOIS 60137

creted into the water, where they may survive for at least one year.

Fish with *Eimeria* in the intestinal wall pass long, opaque fecal casts. They appear similar to those seen when fish are constipated. If such droppings are seen and the fish are being fed an adequate diet, the sporozoans can be suspected. In addition to the fecal casts, the fish become listless, the intestine is filled with fluid, and the eyes may be sunken.

As with other sporozoans, there is no known cure for the disease once the fish are infested. Infested fish should be disposed of and their aquaria thoroughly disinfected. Quarantine of new arrivals is still the best way to prevent bringing any disease into the community tank. Goldfish and other cyprinids should be watched, especially since they are very susceptible to *Eimeria* infestations. Although it has not been positively identified in discus, the symptoms of *Eimeria* infestation have been reported several times by hobbyists.

FREE  
Aquarium Accessory  
Price List/Catalogue

Send 25c for postage  
and handling to:  
Midland Pet Center, Inc.  
12 Godwin Plaza  
Midland Park, N.J. 07432

**THE EMERALD COBRA**  
(Invasive Guppy)

The ultimate in Green Cobra Guppy males have green iridescent patterns on body with wide tails. Large, prolific females are light colored with green spots. Guaranteed to breed true. \$12.50 per pair (\$4.50 extra for via). Also available in Blue.

Other varieties include Turquoise Green, Mountain Gold Green in body and Delta tails. Blue and Red Delta, Orange Tail. Also \$10.00 per pair (\$3.00 extra for via). Guaranteed Live Delivery, Postpaid, Special Flash, Airmail Service.

Send check or money order to:  
**DELTA AQUARIUM STOCK COMPANY**  
All Paces Dept. P. O. Box 73079  
Los Angeles, Calif. 90043  
Phone (713) 545-6872

**FINS-UP**  
Antibiotic

Protects Healthy Fish . . .  
Improves Sick Fish



Fins-Up aids in the control and treatment of Tail Rot, Fin Rot, Body Fungus, Slime Bacteria, Dicoeum and other infections. Aids in reducing sloughing, itching and colorless fish to normality. Use Fins-Up for Tropical Fish, Gold Fish or Minnows. Will not discolor water, nor harmful to aquatic plants. No prescription needed!

Protects already healthy fish and new arrivals by administering Fins-Up Antibiotic, a Streptomycin and Penicillin G, soluble, Sulfonamide food tonic. (Adds the vital elements in daily fish food.)

USE FINS-UP • START TODAY

Fins-Up sells: 8 tablet vial — 50c. Concentrated (dosage 3 times regular) 16 tablet vial — 95c. Also available in 25, 100, 250, 1,000 tablet bottles.

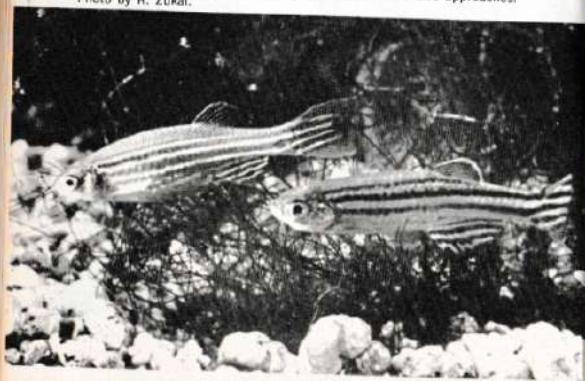
**NATIONAL PET SUPPLY INC.**  
3015-3035 Olive St.  
St. Louis, Missouri 63103  
Phone 314-513-1878

**An Easily Spawning Egglayer . . .**  
**The Zebra Danio,**  
**Brachydanio rerio**

BY RUDOLF ZUKAL

In my years as an aquarist almost countless technical books have passed through my hands, and never once did I notice that in the descriptions of the individual species the zebra danio was missing. And why should it be left out? This is certainly one of the best-known and most popular of aquarium fishes. It was brought into Europe as early as 1905. There is probably no hobbyist who does not have or at some time has not had this fish in his tanks. With its slender, slightly compressed body with seven to nine horizontal stripes, it swims through the aquarium at lightning speed, and it is very hardy by nature. For spawning it makes use of a small to medium-sized tank, planting optional, and normal aged tap water. One thing these fish object to, however, is water that has been aged too long. They enjoy the company of others of their own kind and are very peaceful. They are also not choosy as far as nourishment goes, and take anything offered them.

The male, differentiated from the female in this and succeeding photos by his relative slowness, shows interest in the female and approaches. Photo by R. Zukal.



**Your name should be on the cover of this magazine**



**If it isn't, mail the coupon**

Subscribers receive every issue of TROPICAL FISH HOBBYIST without fail.

Subscribers are kept informed about every important development in the aquarium hobby . . . the new fish, the new people, the new products, the new techniques . . . every month.

They also know that they'll always be up to date with their free supplements to EXOTIC TROPICAL FISHES.

Subscribe NOW to TROPICAL FISH HOBBYIST, the biggest (more pages, more pictures, more information, more readers), most colorful (a minimum of 24 color pages in each issue), most interesting aquarium magazine in the world.

TROPICAL FISH HOBBYIST MAGAZINE  
245 Cornelison Avenue, Jersey City, N.J. 07302

Enclosed please find check, money order or cash for:

- Sample copy—50c
- 12 issues of Tropical Fish Hobbyist, \$5.00
- 24 issues of Tropical Fish Hobbyist, \$9.00
- 60 issues of Tropical Fish Hobbyist, \$20.00

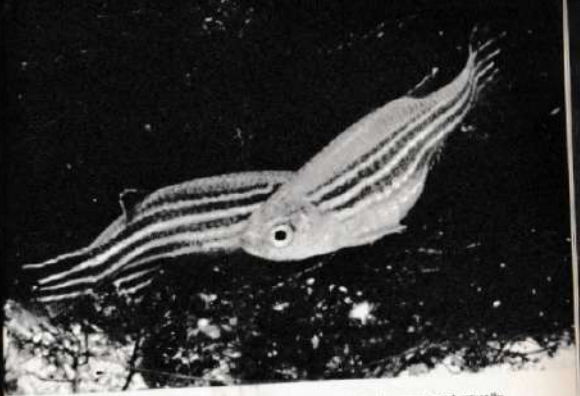
Name \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Foreign: Add 60c per year's subscription.  
Allow 4 to 6 weeks for processing

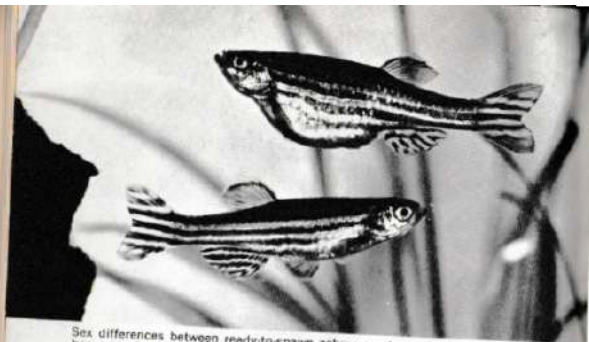




Becoming more insistent, the male begins to chase the female more intently at all levels of the tank, from one area to another. Photo by R. Zukal.



Although zebra danios are scatterers of non-adhesive eggs and usually are set up for spawning in bare or almost bare tanks, they feel more comfortable in a planted tank and will often use clumps of soft vegetation to perform the spawning act. Above, the male has enticed the female to the plants; below, the spawning proper, during which the eggs will be expelled and fertilized. The procedure is repeated until depletion. Photo by R. Zukal.



Sex differences between ready-to-spawn zebras are immediately obvious because of the distended abdominal area of the female, even though the differences are somewhat exaggerated as shown here. Males also are slightly more colorful than the females, with more crisply delineated patterns; the yellowish or tannish tip to the dorsal fin is usually broader and deeper in males than in females. Photo by G. J. M. Timmerman.

I gladly admit, without any cause for embarrassment, that zebra danios were the first fish I ever bred successfully. I always used an all-glass tank 4 to 5 gallons in capacity. The bottom was bare with just a few pebbles and fine-leaved plants weighted down with glass rods to protect the eggs from the greedy appetites of the parents. It was my practice to use two males to one female. Spawning generally took place in the morning hours of the day following introduction of the breeders. The separate eggs were scattered about and fell among the plants and between the pebbles where the parents could not get to them. Usually when I returned home from work, I was able to see the scattered eggs and depleted female, with the fish hunting for whatever few eggs they could find. I took the fish out at once and left the remaining eggs to their "fate". After 36 hours at a temperature of 78° F., the fry could be seen hanging from the glass walls of the aquarium. On the sixth to seventh day they swam about freely and had to be provided with the smallest foods. When I had no time to gather foods from natural sources, the youngsters were happy to accept prepared artificial foods.

Spawning can be repeated by a female every 3 weeks. For spawning it is best to use young, vigorous fish that are about 6 months of age.

Photographing the spawning of a pair of zebra danios is a thing which requires patience and fortitude, as well as a great deal of persistence. As has been said before, the fish move through the water at lightning speed, and it is almost impossible to follow their movements with the naked eye. However, it can be done with a 1/1000 camera exposure.

April, 1971

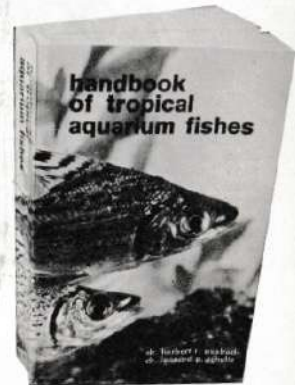
IT'S AVAILABLE NOW!!!!

DON'T WAIT.

More than 720 pages of the most exact scientific material on aquarium fishes ever published.

This new paperback version of the most sought after book on tropical fishes saves you \$10 over the hardcover edition originally published by McGraw-Hill.

ONLY \$4.95



The "Bible" is available once again. The great masterpiece...the work of two great scientists: Dr. Herbert R. Axelrod and Dr. Leonard P. Schultz is once again in stock at every petshop that carries a complete line of aquarium supplies. This paperback edition is slightly modernized and is otherwise identical in content to the \$15.00 edition except for the color plates which are reproduced in monochrome in the cheaper edition.

To order by mail, send \$5.45 (the extra 50¢ is for postage and packaging) in check or money order:

TFH BOOKS, P.O. BOX 33, JERSEY CITY, N.J. 07303



# your bookshelf

*The New York Aquarium Book of the Water World* by William Bridges; American Heritage Press, New York; 287 pages, 267 illustrations (about half of them in color); \$6.95; paperback \$2.95.

When a publisher sends out a new book for review, he hopes that reviewers will write praiseworthy things about it, including some that can be used in advertising the volume.

This is an excellent book, beautiful in format, but I find a major fault in its presentation.

Let's start, in Oriental fashion, at the back of the book. In the index: page numbers are set in boldface type to indicate illustrations and every fish, and bird, and beastie of the text is listed twice. In one listing, the entry is a common name (or a general one such as *marine catfish*) followed by the scientific name, and the other entry is the same in reverse. For the reader checking something just read, there can be no quarrel about this format; but, if later reference is to be made or looking up some animal known by several names is desired, this index is frustrating unless the scientific name is known or the common name of the text is recalled. Compounding this nomenclatural fault is that generic and specific names are very rarely used in the text and constant reference to the index is required to identify precisely each creature pictured or discussed.

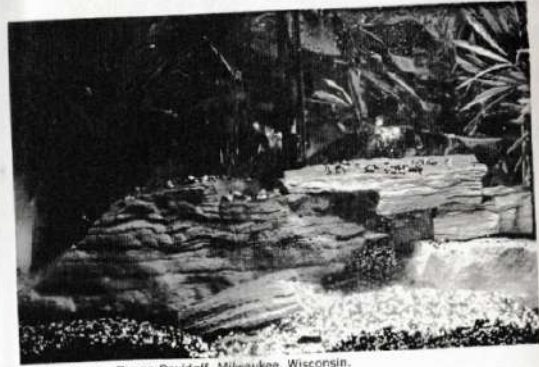
As the title indicates, this book embraces the watery world and the diverse creatures that live within it, from minute one-celled organisms to the mammoth blue whale. The sections are headed: Fishes, Invertebrates, Reptiles, Birds, and Mammals. The home aquarist will be most interested in the first section, which extends over 183 pages and has 198 photographs, 79 of them in color. Profusely illustrated as it is, this is not a book of pictures and captions; equal space is allotted to interesting and informative text.

Subchapter headings are the name of the order and family under consideration. Those whose reading on fishes has been restricted to the literature published strictly for hobbyists will find the order names unfamiliar; they end in *-formes* and are those of the classification introduced by Berg in 1940. With the large number of orders and families of fishes, the coverage on particular groups is understandably limited, but the reader will find odd bits of information not likely to be come upon elsewhere.

This is a book which will be intensely interesting to youthful readers, and will fascinate those of mature years who have retained the inquiring minds and curiosity of earlier days and desire to have an extended view of the world which is the natural habitat of the colorful occupants of their aquariums.

L.L.

## Contest Winners



Landscape: Donna Davidoff, Milwaukee, Wisconsin.

Closeup: Raymond Marquis, Brookfield, Connecticut.

