

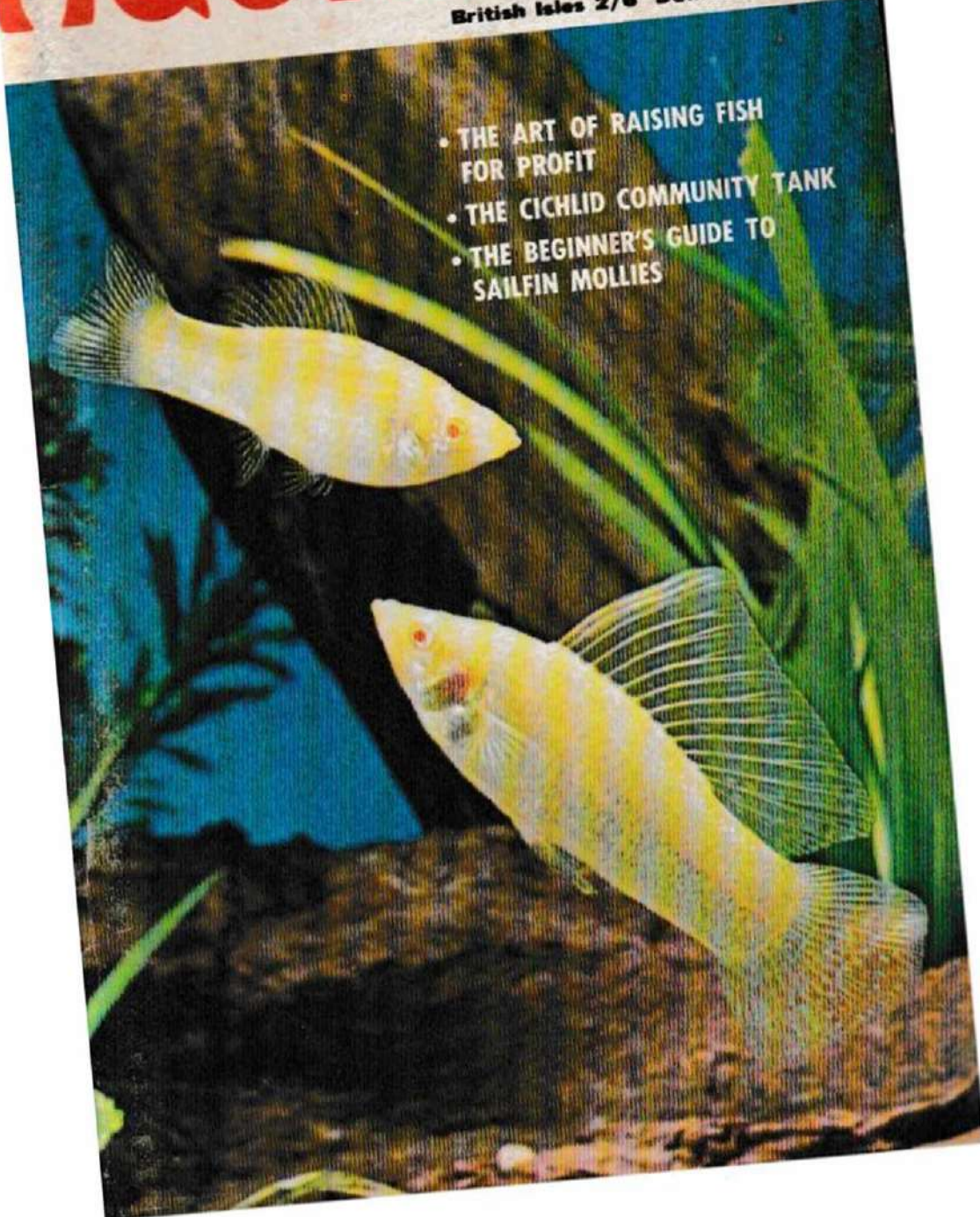
THE

# AQUARIUM

APRIL 1966  
VOL. II NO. 6

British Isles 2/6 DOMESTIC 35¢

- THE ART OF RAISING FISH FOR PROFIT
- THE CICHLID COMMUNITY TANK
- THE BEGINNER'S GUIDE TO SAILFIN MOLLIES





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# THE AQUARIUM

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## contents

<b>EDITOR:</b> Albert J. Klee	<b>THE BEGINNER'S GUIDE TO SAILFIN MOLLIES</b> ..... 4
<b>MANAGING EDITOR:</b> John E. Hayes	<b>THE CICHLID COMMUNITY TANK</b> ... K. Sprenger..... 6
<b>ASSOCIATE EDITOR:</b> Helen Simkatis	<b>ALBINO GUPPIES—YES &amp; NO</b> ... J. Bolsius..... 8
<b>PHOTOGRAPHY EDITOR:</b> Andrey Roth	<b>THE ART OF RAISING FISH FOR PROFIT</b> ... J. Cutler & M. Smith..... 10
<b>ART &amp; DESIGN:</b> John E. Hayes	<b>A CHANGE OF WATER</b> ... W. L. Hanford..... 12
<b>SUBSCRIPTION MANAGER:</b> Maureen E. Steakin	<b>AN AQUARIUM CABINET</b> ... H. J. Mayland..... 14
<b>SENIOR CONTRIBUTING EDITOR:</b> Braz Walker	<b>ADVERSARIA</b> ..... 18
<b>CONTRIBUTING EDITORS:</b> Jim Kelly Paul V. Laiselle E. F. Chappiger Richard F. Stratton William A. Toney Arend v.d. Nieuwenhuizen Gerald F. Currier Cleveland M. Smith Koppy Sprenger Klaus Woltmann	<b>PLECOPTERIDMUS</b> ... R. C. Harrison..... 22
<b>CONSULTING EDITOR:</b> Gene Wolfheimer	<b>THIS IS MY PROBLEM</b> ..... 24
<b>CONSULTING ICHTHYOLOGISTS:</b> Robert R. Miller, Ph.D. Jim Thomerson, Ph.D. Hermann Meinken	<b>VIEW'S AND REVIEWS</b> ..... 28
<b>CONSULTING PARASITOLOGISTS:</b> Sylvan Cohen, M.D. Robert J. Goldstein, Ph.D.	<b>SOCIETIES AT WORK</b> ..... 30
<b>SALT WATER CONSULTANT:</b> Robert Strougon	<b>A HISTORY OF THE AQUARIUM HOBBY IN AMERICA</b> ... A. Klee..... 32
<b>TRANSLATION EDITOR:</b> Paul J. Hoppe	<b>THE TIRE-TRACK SPINY EEL</b> ... B. Walker..... 34
	<b>THE AQUARIUM INDEX</b> ... Vol. I - No. 1 through Vol. I - No. 12 — Series II..... 49



The Aquarium photographer, Andrey Roth, captured this beautiful pair of Albino Sailfin Mollies using a motorized Nikon F on Kodachrome film with artificial lighting.

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## THE BEGINNER'S GUIDE TO SAILFIN MOLLIES

*Mollinisia latipinna*

THERE ARE JUST A FEW KINDS of aquarium fishes that have been able to successfully ride out a wave of popularity. Among them are such as guppies, swordtails, platys, anemfish, and mollies of the sailfin type. These have

spirited style, a kindly disposition, and when it also is hardy and a good breeder, it has a lot of "stuff on the ball". Such a fish is the black sailfin molly.

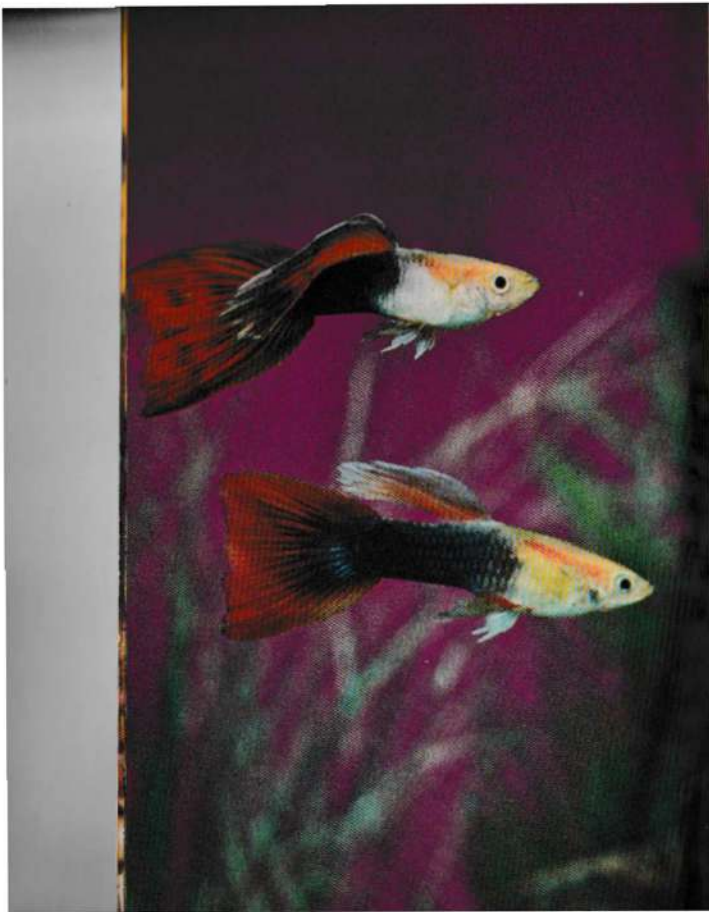
Solid blacks among ordinary aquarium fishes have been produced by selective breeding. This applies to such fishes as platys, guppies and the subjects to this article, the sailfin mollies. In the case of the platys, the work was begun with speckled or partially black stock. Nature furnished plenty of such material, but the case with mollies was different. There seem to have been no partial blacks, but an extremely small number of solid ones, probably less than one in several millions.

continued on page 37

all been "the rage", but never dropped back to a place of unimportance after the excitement died down. Each has its own merits, making it a fish to remember and to like.

Black fishes, in addition to their own distinctive beauty, help set off the brilliant colors of other sorts, or even the green of the plants. When a black fish has a grand sail fin, a





## ALBINO GUPPIES YES & NO

by J. BOLSIUS, JR.

FOR THE PAST TWO YEARS I have been working on a halfblack or "tuxedo" guppy strain. Last year, on one of my trips to the tropical fish stores of the New York City area, I was taken with the sight of a tank of white-and-red guppies. They were so beautiful that I could not bring myself to leave the tank in which they were swimming and playing. I, of course, was ready to buy a pair but my wife reminded me that we had tickets for a show so I made an appointment (a mental one with myself!) to go back the following week and buy them.

The next day, however, as I was sorting out some of my own stock I noticed a few light-colored fry. I isolated about two dozen of them and after a week, I determined that there were three males and nine females. As they got older, the females became gold-white with a little yellow in their tails along with a hint of blue. However, their eyes were black, with a gold to light-green circle around them.

The males were also very colorful, with good-sized bodies and veiltails. Their heads were light-gold to white turning then to dark-blue at the rear; their tails were of a beautiful brown-red color.

These fish were inbred and produced offspring colored similarly. Other than their black eyes, one would think that this was an albino strain. Perhaps it is. After all, Snowflake, the white gorilla found last year, amazed the world with its albino appearance with the exception of its eyes. Well, even if my guppies aren't albinos, I am just as proud of them! EDITOR'S NOTE: The Bolsius' guppy is not, of course, an albino. However, it does represent a localization of melanin (black pigment) which has resulted in an appealing new strain. ●

9

## The Art Of Raising Fish For Profit

by JERRY CURIER & MARTY SMITH

INTERESTED IN MONEY? In a way to make a "killing"? Figure you've got the answer? That you've got a sure way to glom onto the "almighty dollar" with fishes? Well, good luck fella!

Practically every day we meet someone who is going to "make it" with fish. He may have a breeding pair of zebra danios or a breeding pair of discus. Whichever it is, he's got the ticket to instant success! Don't believe him? Just ask him! After you hear his story, listen to ours. Ours may not be as glorious but it's real. Sure, you can make money with fishes—a lot of people do—but let's be realistic. It takes a whole of a lot of work, time and (as is usual in money-making endeavors) sacrifice.

What's that? You've heard all this before? Well don't quit reading now. We're going to tell you how to make money with your fishes. How much is up to you.

The first thing you need is some experience with fishes. You should be reasonably successful with one or more of several basic groups of freshwater fishes, i.e., livebearers (e.g., guppies, mollies, swordtails); Cyprinidae (e.g., the various danios, barbs, etc); characins (e.g., black tetras, flame tetras, etc); cichlids (Egyptian mouthbreeders are good starters. Angelfish require more advanced experience); anabantids (the various gouramies, particularly the blue, and, of course, the betta); killifishes (*Cynolebias whitei* and *Nothobranchius guentheri* are good fish of this group to gain experience with).

It isn't necessary to be an "expert" on all of these groups but you should have good, practical experience with the group (or groups) with which you decide you want to make money. The reason for this statement is obvious if it is studied for a moment. The various *Brachydanio* species can be successfully spawned in a 5-gallon aquarium with one, and no more than two, 10 or 15-gallon aquariums for raising the fry to adults. Another aquarium (10 to 15-gallon) for holding and conditioning the parents completes the primary set-up for these fishes. This, taken together with the fact that two months should be sufficient time to raise *Brachydanio* fry to saleable size, gives a basic idea of space and time requirements. Food and maintenance costs can also be forecast from these data.

10



Angelfish require more advanced experience but are an excellent money fish.

Bettas, however, have a completely different set of requirements. Assuming that breeding for a definite characteristic (color, size, fins, etc) is not to be undertaken, you can probably get by with a 5 or 10-gallon aquarium for holding and conditioning the females, but you will have to have either a divided "betta tank" or separate "drum bowls" for holding and conditioning the males. (Note: While drum bowls are cheaper to purchase, they require more frequent changes, thus consume more of your time.) For spawning, a 5-gallon aquarium will suffice but you will need another 10-gallon tank for raising the females to adults and 50 to 100 "ivy bowls" or drum bowls for raising the males.

It is obvious that the initial investment for breeding bettas will be greater and that more space will be required. As you can see, it is also evident that more time will be needed to tend the fry. (Four months is the minimum raising time in most cases.) These factors are somewhat offset by the return you can expect for your efforts. Whereas 10 cents each is the most that can reasonably be expected for danios, bettas (especially if of good quality) may bring from 50 cents to \$1.00 for males, and from 20 to 50 cents for females. Of course, danios may produce as many as 1,000 saleable fry as compared to an average of 50 to 75 males and generally no more than 100 females of excellent quality in a brood of bettas.

Another factor that enters the picture is that bettas seem to be more susceptible to disease than danios. Consequently, losses from this source are usually of less concern to the danio breeder.

As you can see from the above example, it is necessary to consider a number of factors when undertaking breeding (whether for income or just for fun). Food and water requirements, and all of the other usual

continued on page 77

11

## A Change of Water

by WILBUR L. HANFORD

MORE THAN TWENTY YEARS AGO, when I started in our hobby, most folks expected to buy or eventually have a 10-gallon aquarium. We didn't usually set our sights much higher for most of us started in the hobby in our teen years and had much less money to spend. Typically, we had a 2 or 5-gallon tank. We read a lot, provided we could get a book on tropical fish from our local library! It was advised, and with some justification, that we try to graduate to a 10-gallon tank as soon as possible. It was suggested that we would have fewer problems, the larger the aquarium.

Presently, we now find many apartment dwellers (and others) starting with a 15, 20 or (would you believe?) 50-gallon tank! It is no longer unusual for a pet store to have a novice come in and purchase such a size for his first try at keeping fish. Years ago, we would have envied anyone with the funds to get such an aquarium. However, looking back over my years in the hobby, I am thankful that I "went small" at first. For one thing, some of the lessons learned are applicable to the larger aquaria of today. It is true that the larger tanks provide greater margins for error, but errors have a way of eventually catching up with a hobbyist anyway.

Another thing I learned over the years is that no matter what type of filtration system one uses, it is a beneficial practice to replace  $\frac{1}{4}$  to  $\frac{1}{2}$  of the tank water on a monthly or bimonthly basis. Just filtering and recirculating the same water in your aquarium won't bring out the best colors or action in your fish. It sounds like quite a lot of trouble, but it is worth it.

As a practice, I keep large pickle jars full of treated, aged water on hand. By "treated" is meant that at least a teaspoonful of a germicide and plant rebuilder has been added to each jar of water. By using a quart bottle, about a third of the water is dipped from each of my tanks and replaced with the treated water. I usually try to hold a plastic dish in one hand, using my other hand to pour the water onto it. If you wish to do it another way, try setting the jar of water above the tank on a table or shelf. Place a length of plastic tubing from the bottle to the tank, start the siphoning action and you have a very easy

continued on page 64

12

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## AN AQUARIUM CABINET



by HANS J. MAYLAND

CUPS AND DISHES, linen and clothing may be found in cabinets and dressers—but an aquarium? Perhaps other hobbyists have discussed with you the merits of an Aquarium Cabinet, but how many of us have actually seen one? For one thing, the aquarist can usually not buy one, at least not in the shape and form one desires for the particular spot in the room; in addition, price may be a deterring factor.

14

The advantages of an Aquarium-Cabinet should be obvious, and even a wife should agree to its merits! For one thing it will contain the tank, although probably the least offending thing connected with our hobby, but more important it will hide all the different odds and ends connected with it—air-pump, filter, nets, boxes of medication, food containers, surplus sundry equipment and all the leftovers which seem to accumulate. Let's face it, we are loath to part with anything which appears useful, just in case we may need it one day, and these accumulations certainly give some credence to our dear wife's complaints that our aquarium hobby is not conducive to a living room operation. Well, we certainly can change all this and, depending on our skill with hands and tools and utilizing today's available materials, we should be able to confine and hide everything in a neat package—the Aquarium-Cabinet.

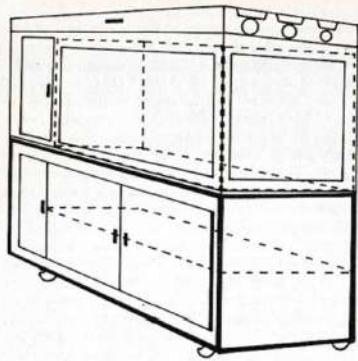
Our first step will be to determine what we want and to make a small sketch (which does not have to be very professional) which will remind us of the details during the building stage. Let's assume that the aquarium, say a 48-inch long tank, is already available; we will require in addition, room for an outside filter, an air-pump and aquarium lights. Since we don't want to set the tank on the floor (after all, it isn't a bathtub!), the cabinet will have to be two shelves high. The lower level will double as storage space for the many things which accumulate around any aquarium; in addition to those mentioned earlier, there will perhaps be some pretty stones (gathered on a Sunday afternoon stroll with the family), some roots from the last vacation, filter-floss, remainders of aquarium gravel and a multitude of other items too good or too sentimental to be confined to the basement or trashcan. The upper level will house the tank setup.

An Aquarium-Cabinet must be rugged and strong. A 48-in. long tank, for example, contains approximately 65 gallons of water. To the water weight of approximately 530 lbs we must add the weight of the tank and of the auxiliary equipment, as well as that of the cabinet. This will exceed a quarter-ton by quite a bit, and the cabinet must be built to take it; otherwise, there may be some dire consequences. Hence, the planning must be for a super-strong frame.

An old but otherwise serviceable tank frame of size equal to that of the tank may be used as the support framework as long as it is hidden behind a suitable decorative enclosure. Most hobbyists, however, will be able to use such frames for better purposes and will prefer to build the cabinet completely of wooden frame members. Since we recommend  $2 \times 3$ 's as framing lumber, even the inexperienced amateur cabinet-maker should have not too much trouble in doweling, gluing and screwing the frame pieces together properly. As indicated before, the framework will be covered later so that errors or defects in its building will not show.

As an alternate, the whole cabinet could be built from plywood.

15



This requires more skill and the tools necessary in order to achieve pleasing and finished results.

The cabinet is built in two parts: the upper and lower part. The upper part is removable by lifting it off the support framework; the obvious advantage here is that we can remove this "cover" when doing extensive work on the tank or its auxiliaries, and thus obtain free access to the equipment.

The base frame, which is the actual support for the aquarium, is enclosed and trimmed as desired to the owner's taste. One may use formica or other plastic surfaced sheets, or thin plywood which may be stained and varnished, painted or covered with overlays. I like wood moulding or trim the best; it can be procured in various types of wood and may be varnished or lacquered after attachment and will then be water resistant.

As is apparent from the enclosed sketch, the cabinet has five openings. On top and extending over the complete width is a lid which carries on its underside three fluorescent lamps. On the right side, next to the tank, is a door which allows access to the mechanical equipment. When using a strong filter with a large container, it may be supported at the lower level where we have the third door. Finally, there are two doors directly under the aquarium, permitting access to the storage space there. This type of Aquarium-Cabinet does not have a low-lying center

continued on page 64

16

## Most filtering floss irritates hands, creates a lot of lint, and doesn't perform at maximum efficiency. Well, Spic & Spun is a new ball game!

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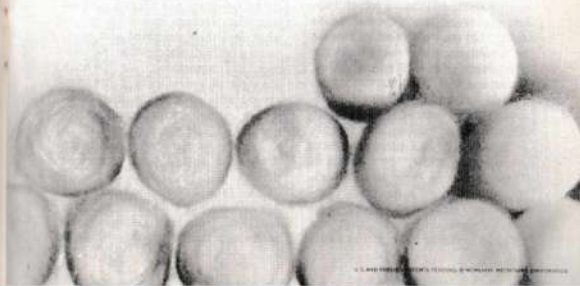
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## adversaria

ADVERSARIA is a column of controversy, dedicated to the uninhibited exchange of relevant opinion. Contributions to ADVERSARIA from readers is encouraged.

"When a thing ceases to be a subject of controversy, it ceases to be a subject of interest." William Hazlitt



SOME OF THE PUBLISHED REMARKS which have appeared in recent months concerning the so-called "walking catfish", seem to border on absurdity. This is true of the overly enthusiastic advocates of both the pro and con, so I'd like to add my own two bits worth.

Like almost every red-blooded American, I am against unnecessary legislation, especially if it interferes with what I'm doing. There is here, perhaps, danger of a confusion of terms and definitions, for to the individual "bad" or "unnecessary" legislation seems almost interchangeable with any legislation which interferes with personal pursuits if the individual involved cannot see any harm in what he is doing. He may also feel that since he would not have committed the act which is now illegal anyhow, there was no need for the law. This is what the "Clarias controversy" is about. State laws have already been passed, and just as in the case of the piranha, others are sure to follow. My own state, Texas, is among them and I am attempting as both a thoroughly enthusiastic aquarist and one who cut his teeth on fishing plugs and shotgun shells to look at the situa-

tion realistically. My comments are for the most part in reference to my own state.

Game dept. officials are in a similar situation to policemen. If your child wanders away, policemen are great, because they are the guys who get the kid located and back home. If you run a red light accidentally and get caught, sometimes they seem less than great. If you get lost in the woods, or if the wind dies while you are sailing smack in the middle of a large lake, there is no more welcome sight than a game warden. On the other hand, if he checks your bag limit and finds a couple of extra ducks or quail and slaps a fine on you, the average hunter is somewhat less than delighted and may, among other unprintable mutterings, say something like "What's a couple of lousy ducks?" Are they comparable to a billion lousy passenger pigeons which used to fly our skies? The point is, policemen and game wardens are great when you need them, but when you don't...

The fact is, they don't make the laws. They just back them up. You can bet Grandpa's antique mustache cup that when the fishing is

bad or the game population goes to nothing, some "sportsman" will blame the local or even federal game department for lack of protective conservation.

I was against Senate Bill (Texas) 512 which passed last year and concerned "certain undesirable fishes". Loose legislation is often used as a catchall, and can be used at times for other than its original purpose. On the other hand, FLEXIBLE legislation can be quite different, and often can fulfill an unforeseen need. I am of the opinion that in the hands of Inland Fisheries Coordinator Marion Toole of The Texas Parks and Wildlife Department, an honest attempt to regulate, but not prohibit, the possession and release of fishes which could conceivably become established to the detriment or even remotest possibility thereof, of our natural fish fauna, has been made. It is not my purpose to evaluate the original list of piranhas, snakeheads, etc., but merely the case of *Clarias*, notably *C. batrachus*.

The Edwards Plateau region of Texas has a system of underground rivers which supply water to countless springs at the surface. These springs feed a year-round 70-72 degree water supply to some of the most beautiful rivers in North America. The water is crystal clear, abundant with *Vallisneria*, *Cabomba*, *Anacharis* and other lush vegetation. In some areas 4-inch sailfin mollies with unbelievable dorsals, Mexican tetras, Texas cichlids and other beautiful tropicals or semi-tropicals abound, and there are even populations of exotics established such as *Tilapia mossambica*, *Astronotus* (oscars) and even *Hypostomus plecostomus*. They became established through accident. Tropicals definitely can

live and breed there. To say arbitrarily that even a few would not or could not establish a "new" species would be silly.

Small *C. batrachus* are as cute as pie. Large ones, and they do reach two feet or more even in very large aquaria, are less cute. They are often quarrelsome, gluttonous and do not enjoy confinement. They uproot and destroy plants and show their dislike for imprisonment by beating their heads on the aquarium cover or coming out of the tank. They do not "walk", but are capable of a fair-to-middling crawling or waddling gait to far away and unusual places such as a shoe in the far end of my own home in which rather amazing perseverance was required to complete the winding journey. Since it is their nature often to leave the water at night, wandering and perhaps even hunting and because of their lust for life and tenacity with which they cling to it even in the baskets of fish mongers of Far Eastern market places, they could conceivably populate even non-connected bodies of water in a hospitable environment.

Extremely similar clarid species are found from the tip of South Africa throughout Southeast Asia from South China to the Sea of Galilee. They range in size from a few inches to *Clarias mossambica* which is said to reach six feet. *Clarias batrachus*, which is the subject of controversy, is established in the Philippines as a result of introduction, and now apparently in Florida.

Each time Senate Bill 512 is amended, an announcement of the impending amendment is made so that interested observers can be

18

19

present in order to state their views at a public hearing. Even should the amendment pass and a fish is added to the list, a person may still obtain or possess this fish through the avenue of a permit which actually amounts to a registration of the fish.

Aquarists and other pet keepers sometimes release fishes or other pets when they tire of them or have had their facilities outgrown. Kindheartedness is not involved here as much as chickenheartedness, for terminal disposition or giving the creature away would in most cases be kinder. Certainly either of these make more horse-sense. Such ignorance demands education. Starlings, English sparrows, carp (*Cyprinus carpio*) and ordinary rats are the result of immigration, accidental or otherwise. Whether they were introduced by the Game Department or through ignorance is of little consequence, for they are at least nuisances, and in some cases carriers of disease, robbers of crops and rollers of the water supply.

I have read criticisms ranging from the fact that the Game Depts. had introduced detrimental wildlife, so why should anyone listen to them, to a foolish comparison between the relatively little harm *Clarias* could do compared to the pollution which we are daily dumping into streams. THIS IS NOT THE POINT. Man is making a mess. The old world is getting crowded and instead of having the sun "sink slowly in the West", like it did in the travelogues of yore, nowadays in most places when it gets past the yardarm it sinks slowly in the smog. It's time to be careful. It's time to educate.

S. B. 512 is probably impossible to enforce. Perhaps, however, the

controversy over this sort of legislation will serve to inform those to whom it might not occur that the local creek is not the place to "free" your fish or your pet alligator when you tire of them.

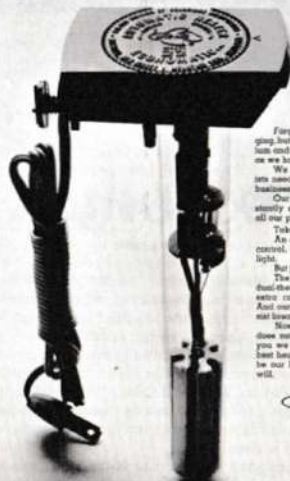
Even the relative merits of *Clarias*, *Cichla ocellaris*, etc. as game fishes in North America have been discussed. Personally, I never had the urge to catch a record trout out of a swimming pool, shoot an Asian antelope on a Texas ranch or catch a snakehead out of the Rio Grande. I would take more pleasure in catching a two-pound channel cat out of his native haunts than a five-pound *Clarias* which didn't belong there. Nature is a system of checks and balances which has required millions of years to work out. To introduce a new predator might or might not upset the balance. A new sport fish is not worth risking a single species of *Notropis*, no matter how remote the chances.

This is not an endorsement of S. B. 512 or any such legislation. It does not need my endorsement; it is the law. As such I will respect it, and if I believe it is wrong, I will try to change it or try to prevent similar happenings.

One closing thought; it would be quite interesting to know what percentage of the outspoken critics which always pop up in the news and in print after any piece of legislation is passed ever sent a letter to a congressman stating an opinion or making suggestions before the voting is over. Come to think of it, maybe a law against Monday Morning Quarterbacks... *Braz Walker, Waco, Texas.*

EDITOR'S NOTE: Those readers interested in reviewing the literature that has appeared in THE *continued on page 67*

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aquarium heaters in the world.  
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**METAFRAME**



## Plecostomus

by RICHARD C. HARRISON

AS MENTIONED IN A PREVIOUS ARTICLE, the San Antonio River has proven to be a fruitful area for placing and propagation of fishes which are not native to the region. In 1961 an attempt was made to introduce a South American sucker catfish of the family Loricariidae. The species chosen agreed with the current descriptions of *Hypostomus plecostomus*, and matched the illustration on page 284 in *Exotic Aquarium Fishes* by William T. Innes, 1956 edition. The nearest part of the range given for the fish in question is northern Nicaragua, and the maximum size given is ten inches. No reference to spawning in captivity is given.

The fish introduced into the San Antonio River were presumed to be mature at five to six inches. Within a couple of years, it was obvious that this dimension was to be exceeded dramatically. At present, the survivors of this first generation approach twenty inches, and there are a number of fish in the outer waters ranging from nine to twelve inches. It is assumed that these latter fish represent a later

generation, since the species has spawned a number of times in the interim.

As indicated, information about the reproduction of this fish and its close relatives is scant. Probably a true aquarium spawning is still ahead of us, for it seems that space and plenty of it is a basic requirement. The conditions present in the waters where spawning did indeed take place would be suitable for many species. First, though, we must assume that this species cannot mature at the average aquarium size since limited space inhibits growth. Not many hobbyists can accommodate two or more active catfish over a a foot long! The presence of gently running water well aerated and constantly refreshed is certainly an important factor.

The available diet in the canals and outer waters is rich and varied, and of all sizes. This is very important to the fry once a spawning has been accomplished. It consists of live food such as worms, insects and animalcules, plus great amounts of nourishment in the form of small fishes and garbage effluent for the adult fish. Since numerous larger fish are now found outside the compound, spawning is not necessarily restricted to the inner canals.

At no time was clinical observation of the spawning process easy because of the relative inaccessibility of the spawning areas and the occasionally poor visibility in the murky water. However, it appears that the eggs are laid in typical loricariid fashion on smooth rocks, and are tended by one or both parents for an incubation period which may extend to two weeks.

The fry were not disturbed at all in the Zoo compound because of the natural desire to conserve the results of whatever spawnings might have taken place there. The area chosen for study was about a mile downstream in a shallow run averaging about ten feet wide. The bottom was about half of rounded stones and half of *Vallisneria* and other quick-water plants.

In less than an hour on the first day of the experiment, nearly two hundred fry were taken by hand net, mostly from the undersides of the flowing plants. The smallest were barely 0.6 inches long, and in this group the length seldom exceeded 1.5 inches. The second group were taken by dragging the nets over the stones, and were larger but obviously quite young.

A handful of fish from each group were transferred to bare aquaria and fed copiously for weeks on strained baby spinach. They seemed to prosper and losses were apparently from netting injuries. Most of these fish were moved to display tanks containing a typical selection of aquarium tropicals. Their behavior was perfectly normal for the

*continued on page 65*



## THIS IS MY PROBLEM

by HELEN SIMKATIS

From: Mrs. Emily Wagner,  
Buffalo, New York

Recently my two red sharks have been attacking my black veil angels and also each other. When I purchased them I was told they chase each other but that they do no harm. Yet, when I saw them attack, they left nip marks on the bodies of the angelfish, and others. I have them no longer but I do admire them, and would like to try them again. Why did they become so aggressive?

Answer: We are often asked to explain the behavior of a given species and while it is true that behavior can be accounted for as a characteristic of a particular species, it is also true that individuals within a species take on behavior patterns of their own. The conditions of your aquarium (given in your letter but not repeated here) indicate a very healthy tank and your two-redded sharks probably felt so good, that their general high spirits led them down the primrose path. Their tendency to chase each other and other members of the aquarium community, and leaving their nip marks on your angels, may have been the result of overabundance. This writer offers this as an interpretation of their actions—another writer might come up with something quite different. Any explanation would

have to be conjecture. In that you are attracted to the species, however, is reason enough for you to try the sharks again. The next time, guided by past experience, you might try them with fast-moving tankmates of comparable size.

From: Richard Hermes,  
Yonkers, New York

I have little white worms in my 10-gallon tank about one-tenth of an inch long. I would like to know if they will hurt my fish, how did they get there, and how do I get rid of them.

Answer: These worms are most likely bristleworms, members of the Family *Naididae*, and related both to earthworms and tubifex worms. The members of the *Naididae*, however, are rather tiny compared with their cousins. They usually appear when the aquarium water contains excess debris, especially vegetable matter. The bristleworms are harmless and, being soft, are frequently eaten by small fishes. They usually disappear after awhile, but reappear whenever the aquarium produces excess vegetable matter again. Absolute cleanliness is the only way to get rid of them without removing fish or plants.

From: Daniel Axelrod,  
Brooklyn, New York

Not too long ago I received a female guppy who had a crooked

back. At first I thought it was nothing but when she had babies some of the fry had the same defect. A month later I found that some of the fry had trouble swimming. I would appreciate it if you would tell me what this crooked back is and how I can get rid of it in my fish to come.

Answer: Of course, specimens with a deformity of this type should be destroyed humanely. The cause of the deformity is either genetic in nature, or dietary. In 1950, H. L. Rosenthal and his wife Rose, discovered a mutation in the guppy that produced crooked backs. They named this condition *lordosis*. Investigation showed it to be inherited according to simple Mendelian laws. However, they also found strains of crooked-back guppies in which the problem was not genetic in nature, but was due to dietary deficiency. If a change to a more balanced diet does not eliminate the problem, then the condition is inherited and the strain should be destroyed. If you cannot destroy the fish you have on hand showing this malformation humanely, or do not have the heart to do so, at least do not allow them to reproduce.

From: Ricky Samlin,  
Philadelphia, Pa.

At least once every week I have to scrape a brownish substance off of my aquarium frame and stainless steel reflector. My fish dealer says it is the minerals from the water. If it is, what can I do about it?

Answer: Minerals in the water could be an oxidation peculiar to the metal which your reflector and aquarium frame are composed of, or is a bacterial slime that collects on the areas mentioned in your letter. If it is oxidation, a coating of an acrylic paint will prevent the substance you describe from forming. If, on the other hand, this is a bacterial product, you will have to continue removing it as you have been doing. In that the substance collects on the reflector, we are inclined to believe

this is a process of oxidation.

Question: Occasionally I feed my fish bits of raw ground meat and bits of lettuce. Is this all right?

Answer: Fresh raw lean beef is an excellent food for fish and, of course, lettuce is good, too, if your fish accept it.

From: Jim Wasson,  
Southfield, Michigan

I have both read and heard quite a bit about the proper water conditions for *Apistogramma ramirezi*. Most references say "soft water", with no information regarding a specific hardness. As for pH, I have been advised to use anything from extremely acid to slightly alkaline. I would appreciate it if you could clear up the mystery by telling me the best pH and hardness for this species.

Answer: The reason why hardness or pH are not stressed in aquarium literature is that this species has been spawned in water giving various readings of both hardness and pH. However, a prescribed reading is a pH of 6.5 to 6.8, with a hardness of 80 to 100 ppm.

From: David O'Brien,  
Natchez, Mississippi

Can a pair of *Plecostomus* breed in a community tank?

Answer: We are sure they could breed in a large community tank but it would seem that if one had a willing pair, it would be thoughtful to give them a large tank to themselves. The closely-related fish, *Ancistrus dolichopterus*, has bred in the home aquarium, fastening their eggs to bamboo rods that were in the tank.

From: Jeff Landberg,  
Long Beach, New York

I just have read a very fine article written by H. A. Rogers about the use of formaldehyde in combating infectious parasites. Could you please give me some information and possibly inform me of some recent experimentation of this drug.

continued on page 70



## VIEWS AND REVIEWS

*The Goldfish* by George F. Hervey and Jack Hems.

Second Edition, 1968. Faber and Faber Limited, 24 Russell Square, London WC1. 271 pages; approximately \$5.90.

The first edition (1948) of *The Goldfish* was a classic, and perhaps the most comprehensive book ever written about a single aquarium fish. It contained chapters on: anatomy, history, types of fancy goldfish, environment, selection and transportation of goldfish, foods and feeding, diseases and enemies, breeding, exhibiting, and even the goldfish *vis-à-vis* the arts. Further, considerable scholarship was evidenced in its preparation. Without reservation, it was a book to be recommended to all aquarists interested in the goldfish and its culture. We are speaking, of course, of twenty years ago.

As the dustcover of the new edition tells it: "Now after twenty years the original book has been carefully revised, out-of-date ideas have been removed and new ones incorporated. As a result, it is confidently predicted that *The Goldfish* will remain the standard work for a long time to come." The publishers may very well be right as far as their prediction is concerned for aquarium undertakings of the magnitude of *The Goldfish* are few and far between. As for the re-

mainder, we can scarcely agree. To our great disappointment, the "revisions" to be found could hardly have taken the authors 15 minutes at best. Going over the "revised" edition with the original edition by its side, the following "major" changes were noted: (a) the last two paragraphs of the "Selecting and Transporting" chapter were rewritten; (b) two dozen references, approximately, were added to the bibliography. The latter fact might be redeeming were the additions not but irrelevant in the main.

Be this as it may, the reader cannot take his leave without wishing for a lot more substance and a little less form. After eighteen pages of carefully documented history of the goldfish up to the 16th century, for example, centuries 17, 18 and 19 receive less than one page, clearly indicating that the research of the authors "pooped out" somewhat shortly after the Battle of Waterloo. Reading further, we seriously wonder where they have spent their time these past twenty years. In amazement, we find that the "revision" makes no mention of any of the significant aquarium developments during this time, e.g. Gro-Lux-type lighting, silicone-type tank sealers, frozen or freeze-dried foods, and antibiotics. The "Selecting and Transporting" chapter, for instance, devotes two pages to a quaint-

but-archaic tin "travelling-can", and but one-tenth of a single sentence to plastic bags, leaving the reader to wonder if the authors have not misplaced their sense of proportion.

In the "Diseases, Parasites and Enemies" chapter, we find among the recommended stock for the aquarist's medicine chest, Friar's Balsam and Halibut Oil, but there is no mention of either sulfa drugs or the whole host of penicillin-related antibiotics whose introduction revolutionized the treatment of fish diseases during the past fifteen years. One of the really puzzling aspects of *The Goldfish* is the outdated plant nomenclature used (e.g. "*Ludwigia Mullertii*" for *Ludwigia natans*; "*Echinodorus intermedium*" for *Echinodorus paniculatus*; "*Myriophyllum spicatum*" for *Myriophyllum verticillatum*), in spite of the fact that Roe's "A Manual of Aquarium Plants" was added to the bibliography of this "latest" edition. It would appear that the authors did not read their own references and indeed, provided them merely as "padding" for the book. Other examples could be cited.

Even where the subject material demands that the discussion be topical, *The Goldfish* still is at the Battle of Hastings, e.g. there is no mention or discussion whatsoever of the aberrant net-like transparent goldfishes and the gene modifiers responsible for them. Where scholarship is needed most, we are badly let down. It is almost anticlimactic to note that the book's index itself is a burlesque. We dare anyone to find an entry under "Hardness", "Gravel", or, Heaven help us, even "Granda"!

Finally, one of the most distressing things about *The Goldfish* is that, in this day and age, its attempts at scholarship frequently result in nothing more than pedantry. We are informed, for example, that "aquascape" outrages the laws of philology, at the same time being told how to convert degrees Reaumur into degrees Fahrenheit! We are reminded of

Chert and Sullivan's line in *Patience*: "The meaning doesn't matter if it's only idle chatter of a transcendental kind". We are very sorry to see this scholarship in American aquarium literature is such a rarity that one annually hopes for an example that proves the wisdom of challenging the norm.

At one time or another, most aquarists have kept some items connected with the aquarium hobby in their home refrigerators (mostly "worms"), but Jack Tomlinson of San Francisco sends us the following suggestion which may strain the limits of matrimony: "Most standard refrigerators are set too cold to contain healthy marine organisms. If the refrigerator can be devoted entirely to marine cooling, it can be fairly successful if it is set as 'high' as possible.

If the refrigerator cannot be devoted exclusively to marine aquaria, an aquarium can be included if it also contains an electric thermostatically-controlled heater. The electric cord should trail out between the rubbery seal of the door and the box, and the seal heat will not, cause much trouble for the refrigerator. The heater thermostat can then be set for any temperature above the temperature of the box, and held to close tolerance. An aerating device can be added, either in the refrigerator or beside, with the electric cord or air line passing out between the door and the box. Aeration will help prevent stratification of cold water layers in the tank."

If an old refrigerator can be obtained for this purpose (used ones are relatively inexpensive), the idea would appear to be an excellent one and should find wide application throughout the salt water hobby.

Another interesting letter was received from Mr. Howard P. Christy, of Radioute, Pennsylvania: "The following are my experiences in raising *Gambusia aeneus* catfish. My father, James B. Christy, placed fourteen

continued on page 68



## Societies at Work

By  
HELEN SIMKATIS

A GREAT DEAL OF WRITTEN MATERIAL on the genetics of guppies has appeared in the literature of our hobby and, because the study of genetics is a rather complicated one, the more refined pieces are often too difficult to follow for those unprepared for the intricacies of genetic charts. Norman Blumenthal, apparently aware that many hobbyists have waded through charts and scientific terms for an inkling of what genetics are all about, only to become more confused than ever, has circumvented this problem with his article entitled *The Name of the Game is Fancy Guppies*, appearing in the December issue of *The Fish Fancier* (published by the Houston Aquarium Society). As his title indicates, he has made a game of the guppy fancy, comparing it with a gambling diversion. This is, however, the only sugar-coating device he uses and although his language is simple, it is not condescending. He makes it quite clear that the odds are tremendous against a hobbyist producing the male guppy of his dreams from a single cross even when both the male and female show some of the characteristics for which he is striving. He hastens to encourage the beginner, however, by explaining how he can improve his chances for approaching his goal. Unlike other writers in this area of the hobby, Author Blumenthal's approach is positive and cheerful, and if he has been as successful in creating fancy guppies as he has been in reducing the fine art of selective breeding into clear, readable language, he would have to be an outstanding aquarist. We will not attempt to paraphrase his directions here but we hope this

30

review will encourage editors of society bulletins to reprint his article so that frustrated beginners in the guppy field may benefit from his well-written prescription for a method of procedure which is all they really need in the beginning. *The Fish Fancier*, edited by Mr. and Mrs. Thomas M. Jones, and published by the Houston Aquarium Society, is a well-produced bulletin, containing some original and some carefully selected reprinted material. Write to the society for information regarding it and its publication at P. O. Box 391, Bellaire, Texas, 77401.

Jim Kelly adds his jocular commentary on the green stuff hobbyists avoid accumulating without great success in his *The Green that Makes Aquarists See Red* in the December issue of the *Guppy Roundtable* (published by the San Gabriel Valley Guppy Association). He briefs us on several species and although he admits that algal growth has not been neglected in aquarium literature, he sums up the results as "a candy floss of superstition being woven around a fine web of truth." With this promise of something new in approach to the problem, he proceeds to divide the major methods of algal control under three headings, namely, physical, chemical, and water balance. Physical control, or scraping or removal of algal deposits, he discards as a "treadmill to oblivion." He treats chemical methods more hopefully and passes along Catherine Wolf's remark that she has had excellent results with Microcide but explains he cannot give a first-hand report on this product as it is not available in Great Britain. One drop to two gallons of water is the prescribed dosage of this chlorine type chemical to begin with, but he hastens to warn that 0.5 p.p.m. is the limit that fish such as guppies can stand. The chemical does best in water of a low p.H., and he wonders if this doesn't coincide with his theory that algae do not prosper in slightly acid water. To further this premise is the report that running peat in a filter has been successful in ridding a tank of green water. The Douglass Filter will also trap the tiny plants responsible for water with a green haze. He recommends a pinch of iron filings for the blue-green alga but points out that he isn't sure just how much a "pinch" is. He challenges brown algae with more light and physical removal. He finishes his discussion of chemical control with the warning that too rapid a removal of algal growth is an invitation to a blooming of bacteria. Finally, he tackles water balance and advises planting aquatics that will rob the algae of nutrients. Don't overfeed or overfeed your fish, he tells us and then, as though weary of the whole subject, he ponders what scientists are saying about algae as a supplemental food for humans. We must admit there is nothing here that

continued on page 58

31

# A HISTORY OF THE AQUARIUM HOBBY IN AMERICA PART 17

by ALBERT J. KLEE

THE NINETEEN-TWENTIES SAW the aquarium hobby well-established in this country, and names such as Dorn, Holbein, Brind, Berkitz, Bade, Roth, Innes, Thomner, Schaefer, Bausman, Armbruster, Neidig, Kissel and Schaumberg, among others, were the leaders of the decade. After World War I, the world lapsed into "normalcy" and the influence of German immigrants to the United States and German exporting firms became even greater than before.

In January 1921, an article entitled, "The Labyrinth Fishes", appeared in *Aquatic Life*, authored by George S. Myers of the Hudson County Aquarium Society. He was later to become one of this country's distinguished ichthyologists, and collaborator with Dr. Innes in the latter's publishing efforts. A native of Jersey City, Myers studied under the great ichthyologists, Carl Eigenmann of Indiana University and David Starr Jordan of Stanford University. After completing his formal studies, he was appointed Assistant Curator in Charge of Fishes at the United States National Museum. Ultimately, Dr. Myers settled at Stanford University where he became noted as an outstanding teacher of those aspiring to become professional ichthyologists.

In April 1927, the aquarium hobby achieved another milestone as the concepts of pH, its significance to fishkeeping, and its measurement, were introduced to American aquarists. The man responsible was William G. O'Brien, whose biographical details we shall explore momentarily. O'Brien's investigations showed that: "... in a tank of mixed fish, danios and characins will be the first to show symptoms of distress in alkaline solutions, Helli (i.e., swordtails) next, and barbs last. Conversely, the barbs come to the surface soonest in the presence of acids." Thus, for better or worse, pH had come to the hobby. O'Brien used LaMotte Chemical Co. pH test kits for his own work, but it was not too long before the manufacturers of aquarium supplies came out with versions of their own, somewhat simplified for aquarium use (i.e., with two indicator solutions rather than the

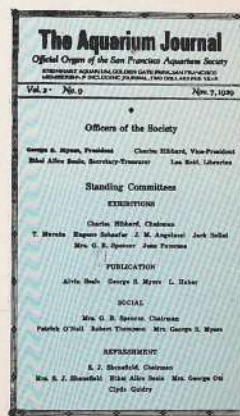
continued on page 55

32



Dr. George Sprague Myers

The publication of the San Francisco Aquarium Society. At first, it was called "The Aquarium" (left), but one year later its name was changed to "The Aquarium Journal".



33



## THE TIRE-TRACK SPINY EEL

by BRAD WALKER

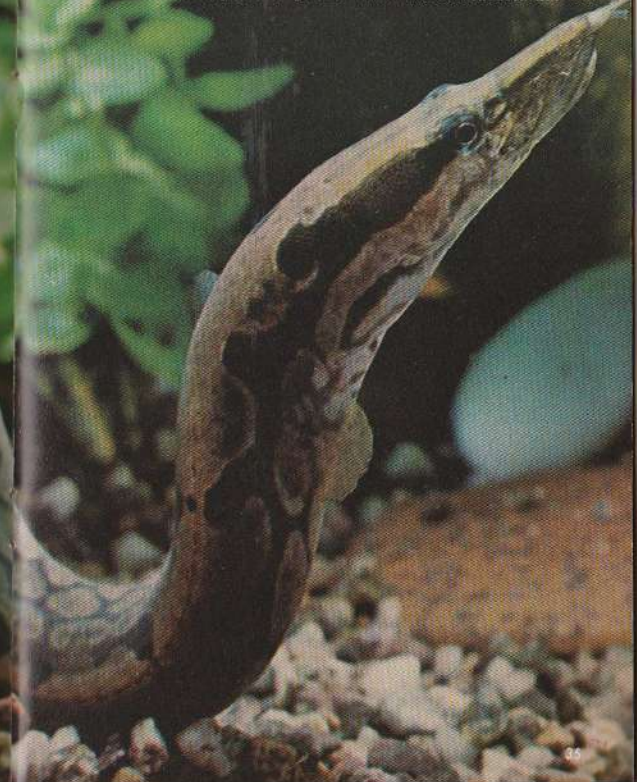
AMONG THE LESS GRACEFUL SWIMMERS which sometime adorn the aquaria of those who seek the less-than-usual occasionally to habitate their tanks, are several members of the serpentine family Mastacembelidae. Their strangeness of appearance and habit have held them in a position of semi-popularity for quite some time, but they could hardly have been considered "bread and butter fish" for the dealers who have handled them until a member of their ranks, *Mastacembelus erythrotaenia*, hit the "rare fish" market under the rather appropriate name, "fire eel", with a seldom-parallelled splash.

A less gaudy cousin, *Mastacembelus armatus*, has been around much longer, is less expensive and in its own way is every inch as attractive as the fire eel. Sold commercially as the "tire track" eel, this is the most widespread member of the spiny eels of Asia and Africa and is found in India, China, Thailand, Borneo, Sumatra, Ceylon and localities inbetween and around. In almost every area of abundance, the tire track eel is an important food fish. Since a length of over two feet is often reached in nature and the fish becomes heavier-bodied at the larger sizes, the length of body and positioning of fins would apparently make the flesh of these and other spiny eels more easily cleaned and eaten than many fishes. Day, in his *FISHES OF INDIA*, notes that the tire track eel is quite delicious, "especially when curried or fried"!

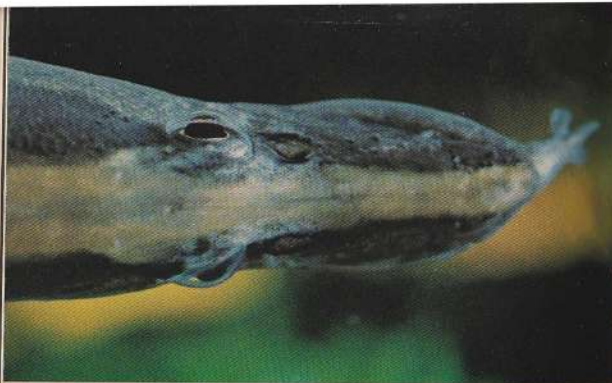
Spiny eels, or mastacembelid eels, are not true eels (Apodes) but there are some physical similarities. Their slithery form and spiny armament certainly make the name "spiny eels" appropriate as far as the aquarist is concerned, and large specimens carelessly handled can leave respectable cuts on the hand of the handler. Local fishermen who seek the spiny eels for food are painfully aware of what happens when a large eel wriggles backward through the hands.

The somewhat lead-bottomed swimming attitude of the tire track and his relatives has no bearing on the ability of the fish to poke around until some tiny hole in the aquarium cover

is found and then to make an exit from the tank. This is a hardy fish, but a few good whacks on the floor from a top aquarium can cause internal damage which can result in the death of large specimens especially. This is assuming that the owner is lucky enough to hear the "plop" when the fish hits the floor. Unfortunately, this usually happens in the wee hours and the respectable gait of which these creatures are cont



34



The eyesight of the tire-track eel is very poor and only food which is contacted by its long nose is taken.

capable, often results in the somewhat desiccated cadaver being discovered quite a distance from where the unfortunate trek started.

*Mastacembelus armatus* is primarily an insect feeder in nature, although crustaceans are important supplements to most of the family members. Aside from crustaceans and aquatic insects, worms of various types are also eaten by most of the mastacembelids; in the aquarium earthworms are ideal. The tire track eel is fortunately one of the mastacembelids which is capable of engulfing proportionately large food items. A five- or six-inch tire track has no problem in "inhaling" fishing-size red wiggler earthworms, while the specimens of fire eels (*Mastacembelus erythrotaenia*) which I have kept seemed to have much greater difficulty. A fire eel twice this size will often have to eject the same size worm and rearrange it several times before swallowing, although this "difficulty" in swallowing seems to be somewhat periodic and may be directly related to the hunger or non-hunger of the fish.

This fish (*M. armatus*) is probably the least persnickety member of the family as far as feeding is concerned. However, those who feed their fishes with an occasional shake of the dry food can and don't wish to put up with even the fuss and bother of frozen brine shrimp, would do well to stick to less cuisine-conscious fishes. The greatest problem encountered in feeding any of the spiny eels when they are kept with other fishes, is their apparent lack of the usual amount of mental activity which one expects to find among most aquarium fishes. In other words, they don't have much horse sense, and it can be rather exasperating to

36



The tire-track eel, *Mastacembelus armatus*, is one of the best show type spiny eels currently on the market.

have the stupid creature treading water, writhing with excitement over the prospective feeding, and have one worm after another hauled away by enthusiastic fishes hardly larger than the worm itself!

*M. armatus* and other mastacembelid eels seem to be capable of surviving periods of fast, either voluntary or accidental, which would certainly doom most other fishes. The fish may give the appearance of feeding every day (by rather quickly learning to recognize the feeder and showing excitement and activity in the midst of the other feeding fishes), while in reality, nothing is being taken. Their eyesight is poor, and apparently only food which is contacted by the strange little rostral appendage or "nose" is usually taken. This is sometimes overcome by training, especially if worms are fed regularly and the fish learns to associate certain sounds and actions with the feeding. There may, however, be periods of weeks when the fish receives nothing suitable, and the unusual ability of some of these creatures to sustain a relatively normal weight under these conditions can convince the aquarist that the fish is somehow finding nourishment.

When food is actually taken there is little doubt for it obviously will be engulfed. My twofold reason for belaboring this point is the fact that dealers sometimes sell emaciated spiny eels which they honestly are convinced have been actively feeding; even if a non-feeding eel has not seemed to have suffered a substantial weight loss, physiological changes may eventually have taken place which cannot be corrected even with the choicest groceries and consequently, the fish can starve in

37



The spiny armament can inflict quite respectable cuts to the hand of a careless owner.

the midst of plenty. This is not frequently encountered but happens occasionally, mostly with species other than *M. armatus*.

Spiny eels instinctively frequent hiding places such as caves, under rocks, stumps or other overhanging objects from which they can peep at the rest of the world with their beady little eyes. They are sometimes found in weedy areas in nature but in North Borneo at least, *M. armatus* seems to occur only in clear running streams with rocky bottoms.

Although one or two species of spiny eels have been reported to have spawned in captivity, for the most part the pleasure of keeping such creatures is in their oddity, their strange grace and even in their beauty. These spawning reports indicate that spawning takes place in some species at least near the surface among floating plants.

Water quality seems not to matter too much, but a teaspoon or so of rock salt to the gallon seems beneficial. When feeding falls off, as with many fishes a water change and gravel stirring may be indicated. The tire track eel will accept most live foods of suitable size—frozen brine shrimp, freeze dried brine shrimp or tubifex, or even ground beef heart, depending on the individual. These are fine community tank fish, providing the aquarist is sure that the fish gets its share of food. If all else fails to get food within reach, worms will be taken from the fingers after the eel catches on.

If you are a victim of Mankind's natural aversion to slithering creatures (which stems from that first unfortunate experience in the Garden!), a period of togetherness with a spiny eel may help you adjust. ●



In nature, the sailfin molly inhabits brackish and salt water. The addition of some salt to their aquarium would be beneficial.

*continued from page 5*

From the extremely rare specimens found among wild stock, several breeders independently brought the strain to its present high degree of development. Those blacks first captured were not even sailfins, so that the feat of both fixing the color and developing sail-like dorsal fins at the same time was a doubly difficult one. It is, however, one of those pleasant-to-think-of outcomes where those who labored did not labor in vain, for the black sailfin is one of the most dramatic fish in the aquarist's world.

These are viviparous, or livebearing fishes. The young are large at birth. A considerable proportion of them are black when born, but in about two weeks this darkness disappears in favor of a sort of fish-gray. Later, perhaps two months, the young begin to speckle. This continues more and more, sometimes slowly and sometimes rapidly, until the entire fish is black. (It should be noted that there are commercial strains, mostly in the non-sailfins, that are black from birth, and which remain black. These are sometimes referred to as "perma-blacks".) The completion of this change takes anywhere from six months to two years. Unlike the black goldfish (moor), a black sailfin in health never loses its color. Sailfins live about three years.

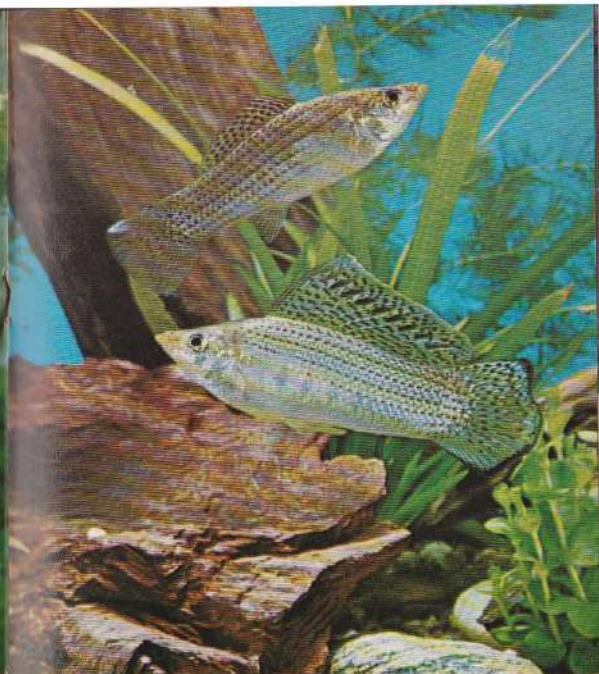
We often receive questions as to whether mollies, especially black sailfins, can do well out of brackish or salt water. The answer is, they can. Millions of them in nature never touch salt water. They are found in the ocean, in coastal streams, and in ponds not connected with the sea. It is a fact, however, that those not found in salt or brackish water (which is



This rare photograph shows a pair of albino sailfin mollies mating.

alkaline) are found in fresh water that is decidedly alkaline in quality. A pH of 7.6 to 8.0 is right for them.

There are numerous difficulties experienced with the managing of black sailfins and other mollies. One of the main things is that, once established in an aquarium, they do not like being moved into another aquarium. It is our opinion that most molly troubles, including the delivery of dead young, are due to wrong feeding. This means principally not feeding often enough. In a state of nature, mollies are constant feeders, and furthermore, they like small food. Repeated experiments have



In the eastern portion of this country the green sailfin molly is found in coastal regions and near the mouths of rivers ranging from North Carolina southward.

proven to our satisfaction that at a temperature of 75 degrees or higher, they should be fed at least three or four times a day when dry food is used. This, of course, does not mean large meals. They like dry food in quite small sizes—small grains a little larger than powder, and preferably a kind that floats for a time before sinking, such as the flake foods. They love to eat from the surface. Their mouths are built for it.

Our larger professional breeders feed them on all sorts of foods, especially live foods such as daphnia and mosquito larvae. There is a well-established belief, however, that they are strongly vegetarians, and



The coloration of the female marbled sailfin molly is considerably duller and the dorsal fin is smaller than the male.

that they ought to have soft algae to eat. They have the extremely long intestines that go with vegetarian animals of all sorts. To take care of this need, we recommend about 10 per cent of dried spinach in making up prepared food for them. Meals of boiled spinach are excellent.

When well-fed, the black sailfin will not eat its young. If the expectant mother is to be removed to a delivery aquarium it should be done well ahead of the date with the stork, but, as said before, it does no particular good handling them at all.

Regarding the question as to the period of carrying the young, the answer is the same for other livebearers—there is no definite period. From one fertilization they are prepared for about four deliveries. When the fish is in good condition and the water is warm (about 80 degrees), these deliveries should be about four weeks apart. A good-sized female should produce in the neighborhood of one hundred in a litter. The young can be raised on prepared foods, but occasional meals of brine shrimp help immensely.

From time to time albino, or white mollies have been put on the market, but another type not to be confused with these are known as "blond" sailfin mollies. Only those fortunate enough to view fish in their natural state, and that undisturbed, ever get the full beauty of their being. With the sun shining down on this special creation of nature, there is a living picture long to be remembered—golden figures of fish, dorsals held high; tails of bright turquoise blue, golden bordered, flirting in

42



A male marbled sailfin molly was developed by cross breeding a green sailfin molly and a black sailfin molly.

the sun.

These blond or golden-blond mollies are a product of much line breeding, bringing to perfection a distinct variety of sailfin molly. They are truly gold; heads of the males running a deep bronze, shading to gold along the entire length of spine, and a paler gold over the entire body. The eyes are a deep, ruby red. Males measure, when fully grown, three inches and over, the females being about the same size.

Blond sailfin mollies are very prolific breeders. There is a noted uniformity in size and coloring in the young—not a black spot or blemish appears on any of them. They run true to breeding.

The blond sailfin molly is a distinctive and valued addition to the aquarium, as is the black sailfin. A great mistake has gained some foothold, in which it is believed that these mollies are *Mollenisia sphenops*. This is not the case, as *M. sphenops* is an entirely different species with a smaller dorsal and with considerably fewer rays in it. *M. sphenops* is extremely variable as to size and color in its broad geographical distribution, and is the molly most often seen in the pet shops, both in black and other varieties.

Finally, it should be mentioned that some very distinguished ichthyologists place all mollies in the genus *Poecilia*. This is, however, a matter still in some dispute and, rather than change names with the possibility that they would only have to be changed back in the future, we shall retain the name, "*Mollenisia*", for the time being. ●

43



*Tilapia mossambica* is a hardy species that is quite peaceful and requires a minimum of care. When in full breeding color a mature male is a deep black with fins which are trimmed with red.

**SPRENGER:** continued from page 7

Carefully placed rocks and caves can greatly increase the selection and number of fish in the tank. There should certainly be caves and crevices of various sizes, providing hidey-holes for fish of dissimilar sizes. As long as the larger cichlids cannot get into all the crevices, cracks and caves, the smaller ones will be able to manage quite well, darting in and out and dashing to safety when threatened by a larger fish.

In aquariums containing digging-type cichlids, rocks and petrified wood should always be placed on the tank bottom. One cannot rely on sand and gravel to support rocks and keep them in place when digging fish will eventually remove the sand. Where rocks are propped against each other, rested atop one another, etc., the slightest settling caused by removal of sand could bring down everything—possibly crushing or bruising fish that could not get out in time.

Another trick to successful and safe rock work is to be sure that passageways along the back of the tank are blocked (especially to the larger fish). If they are not, the "top dogs" (generally the larger fish) may be able to claim two or three caves that were intended for the use of two or three other fish. Many times, if claiming more territory means coming to the front of the tank, around a rock, and into a completely separated cave, the "top dog" will choose to leave that territory alone. Whereas if he can race back and forth along the back of the tank, nipping less aggressive fish who must protect two entrances, he may easily drive these

44



*Crenicichla lepidota*, one of the Pike cichlids, is among the more unusual members of the cichlid family and will make an exciting addition to any cichlid community tank.

fish away entirely and claim this territory too as his own.

Artificial plants certainly can have a place in a digging cichlid aquarium. Their bases can be placed below rocks on the tank bottom, from which few fish will be able to tear them out. Not only do these add to the appearance of the tank, but their slightly stiff leaves afford some protection to those fish unable to claim the more desirable bottom territory.

Live plants also have their place, and I think it is an important one, in tanks with these kinds of fishes. When plants are omitted because the fish uproot them, the aquarist should first stop and think WHY the fish do this. A number of cichlids, those from Africa in particular, sometimes need vegetable matter in their diet. In many instances the plant-destroying fish are merely filling their dietary needs where the aquarist has neglected to do so. In other instances, the plants have not been wisely placed. After some observation, it is not difficult to find places in the tank where plants will not be uprooted or buried. Anacharis and water sprite grow as well at the surface as when rooted, and being partially buried does not seem to hurt them at all! Although this is not an article on care and feeding, healthy well-fed fish have a much better chance of survival than those whose physiological needs have not been met—especially since they may often have to compete in every way with fish whose dietary demands are more easily and frequently fulfilled. Duckweed, too, is avidly eaten by a

45



*Cichlasoma severum*, the banded cichlid, can be considered a "dove" who will not disturb smaller fish or plants.

surprisingly large number of cichlids. Certain mature fish regularly feed upon algae in the wild, and the fry of almost all cichlids spend considerable time nibbling at the infusorians living in it, as well as eating some of the algae itself. The feeding of fry in a community cichlid set-up can be a problem, and I am not suggesting that algae will solve that problem or even begin to do so; however, it can help.

And now the fish of the community tank. The more commonly available species of *Cichlasoma*, *Geophagus*, *Tilapia*, *Hemichromis*, *Pelmatachromis*, *Crenicichla*, and a few of the *Aequidens* are some of the fish in mind as I write this article. In many instances the full-grown specimen of one of the species would make mincemeat (filet?) out of the full-grown specimen of another, but it is somewhat unusual for the aquarist to begin an attempt at a cichlid community tank with fully mature fish. Certain fishes, such as *Cichlasoma dovii*, are practically out of the question regardless of size, but since they are extremely difficult to obtain at best, there is little point in discussing them in this article. Perhaps the best assortment of fish would exclude pairs of any of them. When these fish set up house-keeping, it is not a matter of one-plus-one equalling two. It is more like one-plus-one equalling five or six, and each with a toothache!

If possible, immature fish of similar sizes should begin the cichlid community together. Once settled and with an established "peck order"



*Geophagus jurupary* can usually be found searching the bottom of the tank for a bite to eat. In fact, the generic name *Geophagus* means earth eater.

*Pseudotropheus auratus* is a beautiful addition to the cichlid aquarium.



*Pelmatachromis kribensis* is a colorful and peaceful addition to the cichlid aquarium and to obtain maximum color, they should be kept in pairs. (Pages 6 & 7 features a magnificent close-up view of a pair of these cichlids.)

the addition of another fish can cause chaos. So too can sexual maturity if there are males and females of the same species present. There will be changes in the pecking order as time passes anyway, but they may be accomplished with little difficulty if spawning or a newcomer are not involved. Then again, the competition for status may necessitate the removal of a badly beaten loser. Some fish are comparatively more aggressive as youngsters or juveniles than they are as adults, and vice-versa. Growth rates will vary, as they do even in a group of young fish of the same spawn, and the problem of the weak growing weaker while the strong grow stronger cannot be forgotten. However, with careful feeding the weaker or less aggressive fish need not be handicapped by organic deficiency. Foods like live brine shrimp solve this problem neatly as they will live long enough to scatter themselves about the aquarium where even the smallest and shyest fish can find them. The flake foods now on the market offer an excellent supplement that does not force the weaker fish to compete with the stronger in one relatively small feeding area.

Probably the greatest single factor in the success of a cichlid community set-up is the aquarist who regularly and carefully observes his pets, ponders his problems, experiments, and by himself finds what is best for his particular and individual fish. It is a question of balance, with the aquarist holding the "scales" with both his hand and head. ●

## THE AQUARIUM INDEX

The following index contains all articles and their authors that have appeared in THE AQUARIUM from November, 1967 VOL I — NO. 1 through October, 1968, VOL. I — NO. 12, Series II

Index formulated by Braz Walker.

<b>A-B-C Of Filters</b>	
Vol. 1, #9; July 1968 (Currier, Jerry and Smith, Marty) .....	Pg. 12
<b>About Our Authors</b>	
Vol. 1, #2; Dec. 1967 (Dadey, Quinn) .....	Pg. 28
Vol. 1, #3; Jan. 1968 (Currier, Smith) .....	Pg. 28
Vol. 1, #4; Feb. 1968 (Hanford, Warner) .....	Pg. 30
Vol. 1, #5; March 1968 (Wood) .....	Pg. 30
Vol. 1, #7; May 1968 (Franco, Kaufman, Meyer) .....	Pg. 16
Vol. 1, #8; June 1968 (Stratton, Tohir, Nichols) .....	Pg. 28
Vol. 1, #9; July 1968 (Cox, Symmes) .....	Pg. 28
Vol. 1, #10; Aug. 1968 (Walker, Petty) .....	Pg. 24
Vol. 1, #11; Sept. 1968 (Ahlers, Ahlers, Mighelis) .....	Pg. 26
<b>Adversaria</b>	
Vol. 1, #3; Jan. 1968 .....	Pg. 24
Vol. 1, #4; Feb. 1968 .....	Pg. 19
Vol. 1, #6; June 1968 .....	Pg. 24
Vol. 1, #11; Sept. 1968 .....	Pg. 24
Vol. 1, #12; Oct. 1968 .....	Pg. 32
<b>Agelessus marmoratus, The Smiling One</b>	
Vol. 1, #12; Oct. 1968 (Walker, Braz) .....	Pg. 32
<b>Ahlers, Ron &amp; Tina</b>	
How To Win At Fish Shows — Vol. 1, #11; Sept. 1968 .....	Pg. 4
<b>Amazonian Adventure, An</b>	
Vol. 1, #4; Feb. 1968 (Part I) .....	Pg. 34
Vol. 1, #5; March 1968 (Part II) .....	Pg. 38
Vol. 1, #6; April 1968 (Part III) .....	Pg. 44
Vol. 1, #7; May 1968 (Part IV) .....	Pg. 34
Vol. 1, #8; June 1968 (Part V) .....	Pg. 34
Vol. 1, #9; July 1968 (Part VI) .....	Pg. 36
Vol. 1, #10; Aug. 1968 (Part VII, Conclusion) (Klee, Albert J.) .....	Pg. 34
<b>Anableps, The Four-Eyed Fish</b>	
Vol. 1, #12; Oct. 1968 (Klee, Albert J.) .....	Pg. 7
<b>A New Classification Of Fishes</b>	
Vol. 1, #12; Oct. 1968 (Klee, Albert J.) .....	Pg. 14
<b>A New Mollie</b>	
Vol. 1, #5; March 1968 (Wood, John A.) .....	Pg. 6
<b>Aphyosemion caeruleum</b>	
Blue Gularis, The — Vol. 1, #1; Nov. 1967 (Goldstein, Robert J.) .....	Pg. 42
<b>Aquarium Crossword</b>	
Vol. 1, #9; July 1968 .....	Pg. 64
<b>Aquarium Quiz</b>	
Vol. 1, #12; Oct. 1968 .....	Pg. 40
<b>Aquarium Snail, The</b>	
Vol. 1, #4; Feb. 1968 (Hanford, Wilbur L.) .....	Pg. 6
<b>Balantiocheilus melanopterus</b>	
Tri-Color Or Bala "Shark", The — Vol. 1, #12; Oct. 1968 (Walker, Braz) .....	Pg. 5
<b>Barbs</b>	
Breeding The Smallest Barbs — Vol. 1, #9; July 1968 (Meyer, Herb) .....	Pg. 4
<b>Barclaya longifolia</b>	
Vol. 1, #6; April 1968 (Tomey, William A.) .....	Pg. 32
<b>Basics Of Angel Fish Breeding</b>	
Vol. 1, #4; Feb. 1968 (Warner, Edward L.) .....	Pg. 32
<b>Beautiful Devil, The</b>	
Vol. 1, #3; Jan. 1968 (Currier, Jerry and Smith, Marty) .....	Pg. 6
<b>Beautiful Dorsid, Cat A</b>	
Vol. 1, #6; April 1968 (Walker, Braz) .....	Pg. 4
<b>Bellomy, Mildred</b>	
Biennies In The Aquarium — Vol. 1, #5; March 1968 .....	Pg. 12
<b>Betta splendens</b>	
Birth Of A Betta, The — Vol. 1, #1; Nov. 1967 (Daug, Donald) .....	Pg. 6
Recipe For Betta Spawning, A — Vol. 1, #7; May 1968 (Newman, Barbara) .....	Pg. 7
<b>Big Brother Is Watching</b>	
Vol. 1, #2; Dec. 1967 (Klee, Albert J.) .....	Pg. 30
<b>Birth Of A Betta, The</b>	
Vol. 1, #1; Nov. 1967 (Daug, Donald) .....	Pg. 6
<b>Black Banded Sunfish, The</b>	
Vol. 1, #2; Dec. 1967 (Quinn, John R.) .....	Pg. 4
<b>Biennies In The Aquarium</b>	
Vol. 1, #5; March 1968 (Bellomy, Mildred D.) .....	Pg. 12
<b>Blue Gularis, The</b>	
Vol. 1, #1; Nov. 1967 (Goldstein, Robert J.) .....	Pg. 42
<b>Breeding The Smallest Barbs</b>	
Vol. 1, #9; July 1968 (Meyer, Herb) .....	Pg. 4
<b>Breeding: See Also Basics Of Angelfish Breeding Recipe For Betta Spawning</b>	
<b>Brunner, Gerhard</b>	
Vallisneria, A Popular Aquarium Plant	
Vol. 1, #1; Nov. 1967 .....	Pg. 24

**Cabamba**  
Vol. 1, #3; Jan. 1968 (Tomey, William A.) Pg. 8

**Catfish: See**  
*Ageneiosus marmoratus*  
*Corydoras paleatus*  
*Hypostomus plecostomus*  
*Pseudoplatystoma fasciatum*  
*Pseudoplatystoma fasciatum* ..... Pg. 12  
*Chaetodon macrolepis*  
*Reticulated Characid, The* — Vol. 1, #7; May 1968 (Walker, Braz) ..... Pg. 4  
**Characins (Characoids): See**  
*Chaetodon macrolepis*  
*Hypostomus plecostomus*  
*Mylopius rubripinnis*  
*Nematobrycon palmeri* .....

**Channa (Ophiocephalus) micropilata**  
*Snakehead, the Redstriped* — Vol. 1, #11; Sept. 1968 (Walker, Braz) ..... Pg. 6  
**Checklist For Fish Sitting, A**  
Vol. 1, #10; Aug. 1968 (Petty, George) ..... Pg. 20

**Chhappar, B. F.**  
**Electric Fish Net For Your Aquarium, An** — Vol. 1, #10; Aug. 1968 ..... Pg. 16  
**Treasure Hunting In A Pirate's Lair** — Vol. 1, #11; Nov. 1967 ..... Pg. 44

**Cichlasoma**  
*Red Devil Cichlid, The* — Vol. 1, #1; Nov. 1967 (Stratton, Richard F.) ..... Pg. 34  
**Cichlasoma nigrofasciatum**  
*Think Pink, Congo That Is* — Vol. 1, #10; Aug. 1968 (Symmes, Ed) ..... Pg. 6  
**Cichlids: See**  
*Cichlasoma nigrofasciatum*  
*Cichlasoma nigrofasciatum guentheri*  
*Pseudotropheus auratus*  
*Pterophyllum eimekei*  
*Symphodon discus*  
*Tilapia mossambica*

**Classification: See New Classification Of Fishes, A**

**Cluttergrop, The**  
Vol. 1, #3; Jan. 1968 (Kelly, Jim) Pg. 38  
**Cohen, Sylvan M.D.**  
*Fish Photography Made Easy* — Vol. 1, #8; June 1968 ..... Pg. 32

**Color And Acquaescaping**  
Vol. 1, #9; July 1968 (Cox, Gimmie Lu) ..... Pg. 32

**Conditioning Fish**  
Vol. 1, #3; Jan. 1968 (Vail, Roy) ..... Pg. 30  
**Connelly, Harriet**  
*Bookshelf Aquarium, A* — Vol. 1, #12; Oct. 1968 ..... Pg. 12  
*Malachite Green*  
Vol. 1, #11, Sept. 1968 ..... Pg. 16

**Corned Beef And Cabbage**  
Vol. 1, #9; July 1968 (Symmes, Ed.) Pg. 18

**Corydoras paleatus**  
*First Days In The Life Of Corydoras paleatus, The* — Vol. 1, #11; Sept. 1968 (Tomey, William A.) ..... Pg. 8

**Cox, Gimmie Lu**  
*Color And Acquaescaping* — Vol. 1, #9; July 1968 ..... Pg. 32

**Cryptocoryne lingua**  
Vol. 1, #9; July 1968 (Tomey, William A.) ..... Pg. 10

**Cryptocoryne retrospiralis, Experiences With**  
Vol. 1, #5; March 1968 (Tomey, William A.) ..... Pg. 8  
**Currier, Jerry And Smith, Marty**  
**A-B-C Of Filters** — Vol. 1, #9; July 1968 ..... Pg. 12  
*Beautiful Devil, The* — Vol. 1, #3; Jan. 1968 ..... Pg. 8  
*Everyman's Egglayers* — Vol. 1, #2; Dec. 1967 ..... Pg. 42  
*Happiness Is A Wet Fish* — Vol. 1, #10; Aug. 1968 ..... Pg. 16  
*Pointers On Plants* — Vol. 1, #10; Aug. 1968 (Part I) ..... Pg. 8  
Vol. 1, #11; Sept. 1968 (Part II) ..... Pg. 36

**Cyprinids (Carps): See**  
*Basaniocheilus melanopterus*  
*Breeding The Smallest Barbs*  
*Everyman's Egglayers*  
*Little Known Higo!*

**Dadey, Donald H.**  
*Little Known Higo!, The* — Vol. 1, #2; Dec. 1967 ..... Pg. 8

**Datnioides microlepis**  
*Mouth That Roared, The* — Vol. 1, #5; March 1968 ..... Pg. 4

**Davey, Donald**  
*Birth Of A Betta, The* — Vol. 1, #1; Nov. 1967 ..... Pg. 6

**Davenport, Harold J.**  
*Experiences With The Blue Gouramies* — Vol. 1, #9; June 1968 ..... Pg. 4  
**Dermogenys pusillus**  
*Halfbeak, The* — Vol. 1, #2; Dec. 1967 ..... Pg. 34

**Editor's Letter**  
Vol. 1, #2; Dec. 1967 ..... Pg. 10  
Vol. 1, #3; Jan. 1968 ..... Pg. 10  
Vol. 1, #4; Feb. 1968 ..... Pg. 14

**Electric Fish Net For Your Aquarium, An**  
Vol. 1, #10; Aug. 1968 (Chhappar, B. F.) ..... Pg. 16

**El Tigre**  
Vol. 1, #4; Feb. 1968 (Walker, Braz) Pg. 4  
**Emperor Tetra, The**  
Vol. 1, #8; June 1968 (Walker, Braz) ..... Pg. 8

**Enneacanthus (Mesogonistius) chaetodon**  
*Black Banded Sunfish, The* — Vol. 1, #2; Dec. 1967 (Quinn, John R.) ..... Pg. 4

**Everyman's Egglayers**  
Vol. 1, #2; Dec. 1967 (Currier, Jerry and Smith, Marty) ..... Pg. 42

**Experiences In Keeping Discus**  
Vol. 1, #6; April 1968 (Mayland, Hans J.) ..... Pg. 8

**Experiences With The Blue Gouramies**  
Vol. 1, #9; June 1968 (Davenport, Harold J.) ..... Pg. 4  
**Experiences With Cryptocoryne retrospiralis**  
Vol. 1, #5; March 1968 (Tomey, William A.) ..... Pg. 8

**Fire Eel**  
Vol. 1, #1; Nov. 1967 ..... Pg. 36

**First Days In The Life Of Corydoras paleatus, The**  
Vol. 1, #11; Sept. 1968 (Tomey, William A.) ..... Pg. 8

**Fish Hatching In Vietnam**  
Vol. 1, #11; Sept. 1968 (Mighells, James S.) ..... Pg. 32

**Fish Photography Made Easy**  
1968 (Cohen, Sylvan M.D.) ..... Pg. 32

**Fishy Little World Of Edward C. Symmes, Jr., The**  
Vol. 1, #9; July 1968 (Symmes, Ed) Pg. 56

**Fish With The Folded Mouth, The**  
Vol. 1, #10; Aug. 1968 (Walker, Braz) Pg. 4

**Floating Fish Can Kill**  
Vol. 1, #8; June 1968 (Nichols, Red) (Pro) ..... Pg. 10  
(Tehr, David And Stratton, Richard) (Con) ..... Pg. 11

**Floating Plants**  
Vol. 1, #4; February 1968 (Tomey, William A.) ..... Pg. 10

**Franco, Philip S.**  
*Mouth Breeding Pelmatochromis, A* — Vol. 1, #7; May 1968 ..... Pg. 12  
*Goldeneer Killy, The*  
Vol. 1, #8; June 1968 (Gossington, Robert F.) ..... Pg. 6  
*Goldstein, Robert J.*  
*Blue Gulans, The* — Vol. 1, #1; Nov. 1967 ..... Pg. 42  
*Good Side Of Flukes, The* — Vol. 1, #5; March 1968 ..... Pg. 32  
*Peruvian Longfin, The* — Vol. 1, #12; Oct. 1968 ..... Pg. 28  
*Rebellid Nothobranchius, The New* — Vol. 1, #9; July 1968 ..... Pg. 6

**Good Side Of Flukes, The**  
Vol. 1, #5; March 1968 (Goldstein, Robert J.) ..... Pg. 32

**Gossington, Robert F.**  
*Goldeneer Killy, The* — Vol. 1, #8; June 1968 ..... Pg. 6

**Halfbeak, The**  
Vol. 1, #2; Dec. 1967 (Tomey, William A.) ..... Pg. 34

**Hanford, Wiibur L.**  
*Aquarium Snail, The* — Vol. 1, #4; Feb. 1968 ..... Pg. 6

**Happiness Is A Wet Fish**  
Vol. 1, #10; Aug. 1968 (Currier, Jerry and Smith, Marty) ..... Pg. 8

**Harrison, Richard C.**  
*Indifferent Explorer, The* — Vol. 1, #3; Jan. 1968 ..... Pg. 42  
*Tilapia mossambica* — Vol. 1, #9; July 1968 ..... Pg. 8

**Higo! Carp (Garraeus sp.)**  
*Little Known Higo!, The* — Vol. 1, #2; Dec. 1967 (Dadey, Donald H.) ..... Pg. 8

**History Of The Aquarium Hobby In America**  
Vol. 1, #2; Dec. 1967 (Part I) ..... Pg. 46  
Vol. 1, #3; Jan. 1968 (Part II) ..... Pg. 44  
Vol. 1, #4; Feb. 1968 (Part III) ..... Pg. 44  
Vol. 1, #5; March 1968 (Part IV) ..... Pg. 34  
Vol. 1, #6; April 1968 (Part V) ..... Pg. 36  
Vol. 1, #7; May 1968 (Part VI) ..... Pg. 34  
Vol. 1, #8; June 1968 (Part VII) ..... Pg. 36  
Vol. 1, #9; July 1968 (Part VIII) ..... Pg. 34  
Vol. 1, #10; Aug. 1968 (Part IX) ..... Pg. 32  
Vol. 1, #11; Sept. 1968 (Part X) ..... Pg. 34

**Hypostomus plecostomus**  
*How To Buy Fish*  
Vol. 1, #7; May 1968 (Kaufman, Les) ..... Pg. 20

**How To Choose Fish**  
Vol. 1, #7; May 1968 (Meyer, Herb) Pg. 28

**How To Win At Fish Shows**  
Vol. 1, #11; Sept. 1968 (Ahlers, Ron & Klee, Albert J.) ..... Pg. 4

**Hydrocotyle leucocephala**  
Vol. 1, #12; Oct. 1968 (Tomey, William A.) ..... Pg. 12

**Hypostomus plecostomus**  
Vol. 1, #1; Nov. 1967 (Reuting, Margarita A.) ..... Pg. 46  
**Hypostomus plecostomus plecostomus**  
*Fish With The Folded Mouth, The* — Vol. 1, #10; Aug. 1968 (Walker, Braz) Pg. 4

**Indifferent Explorer, The**  
Vol. 1, #3; January 1968 (Harrison, Richard C.) ..... Pg. 42

**In Memoriam (William I. Lawrence)**  
Vol. 1, #8; June 1968 ..... Pg. 24

**Is The Male Lyretail Swordtail Really Sterile?**  
Vol. 1, #6; April 1968 (O'Quinn, Dorothy) ..... Pg. 6

**Kaufman, Henry**  
*Guppies* — Vol. 1, #1; Nov. 1967 ..... Pg. 18

**Kaufman, Les**  
*How To Buy Fish* — Vol. 1, #7; May 1968 ..... Pg. 20

**Kelly, Jim**  
*Cluttergrop, The* — Vol. 1, #3; January 1967 ..... Pg. 38

**Killias: See**  
*Aphyosemon caeruleum*  
*Fundulus chrysofasciatus*  
*Killy Catalyst, The*  
*Nothobranchius guentheri*  
*Pterolebias peruanus*

**Killy Catalyst, The**  
Vol. 1, #11; Sept. 1968 (Longworth, Richard M.) ..... Pg. 20

**Klee, Albert J.**  
**Amazonian Adventure, An** — Vol. 1, #4; Feb. 1968 (Part I) ..... Pg. 34  
Vol. 1, #5; March 1968 (Part II) ..... Pg. 38  
Vol. 1, #6; April 1968 (Part III) ..... Pg. 44  
Vol. 1, #7; May 1968 (Part IV) ..... Pg. 34  
Vol. 1, #8; June 1968 (Part V) ..... Pg. 36  
Vol. 1, #9; July 1968 (Part VI) ..... Pg. 34  
Vol. 1, #10; Aug. 1968 (Part VII) ..... Pg. 34  
**Antelope, The Four-Eyed Fish** — Vol. 1, #12; Oct. 1968 ..... Pg. 34  
*History Of The Aquarium Hobby In America* — Vol. 1, #2; Dec. 1967 (Part I) ..... Pg. 46  
Vol. 1, #3; Jan. 1968 (Part II) ..... Pg. 44  
Vol. 1, #4; Feb. 1968 (Part III) ..... Pg. 44  
Vol. 1, #5; March 1968 (Part IV) ..... Pg. 34  
Vol. 1, #6; April 1968 (Part V) ..... Pg. 36  
Vol. 1, #7; May 1968 (Part VI) ..... Pg. 34  
Vol. 1, #8; June 1968 (Part VII) ..... Pg. 36  
Vol. 1, #9; July 1968 (Part VIII) ..... Pg. 34  
Vol. 1, #10; Aug. 1968 (Part IX) ..... Pg. 32  
Vol. 1, #11; Sept. 1968 (Part X) ..... Pg. 34

**Knifeish Regeneration**  
Vol. 1, #2; Dec. 1967 (Walker, Braz) Pg. 6

**LaCorte, Rosario S.**  
*Spawning Pseudotropheus auratus* — Vol. 1, #4; Feb. 1968 ..... Pg. 8  
**Langworth, Richard M.**  
*Killy Catalyst, The* — Vol. 1, #11; Sept. 1968 ..... Pg. 20

**Leprinus frederici**  
*Indifferent Explorer, The* — Vol. 1, #3; Jan. 1968 (Harrison, Richard C.) ..... Pg. 42

**Little Known Higo!, The**  
Vol. 1, #2; Dec. 1967 (Dadey, Donald H.) ..... Pg. 8

**Macropodus opercularis**  
*Beautiful Devil, The* — Vol. 1, #3; Jan. 1968 (Currier, Jerry and Smith, Marty) ..... Pg. 8

**Malachite Green**  
Vol. 1, #11; Sept. 1968 (Connelly, Harriet) ..... Pg. 16

**Marine Fish To Fresh Water**  
Vol. 1, #7; May 1968 (Wheat, William K. S.) ..... Pg. 12

**Mastacembelus eurotaeniata**  
*Fire Eel, The* — Vol. 1, #1; Nov. 1967 ..... Pg. 36

**Mayland, Hans J.**  
*Experiences In Keeping Discus* — Vol. 1, #6; April 1968 ..... Pg. 8

**Meyer, Herb**  
*Breeding The Smallest Barbs* — Vol. 1, #9; July 1968 ..... Pg. 4  
*How To Choose Fish* — Vol. 1, #7; May 1968 ..... Pg. 28

**Mighells, James S.**  
*Fish Hatching In Vietnam* — Vol. 1, #11; Sept. 1968 ..... Pg. 32

**Mouth Breeding Pelmatochromis, A**  
Vol. 1, #7; May 1968 (Franco, Philip S.) ..... Pg. 9

**Mouth That Roared, The**  
Vol. 1, #5; March 1968 (Walker, Braz) ..... Pg. 4

**Mylopius rubripinnis**  
*Silver Dollars* — Vol. 1, #3; Jan. 1968 (Walker, Braz) ..... Pg. 4

**Nematobrycon palmeri**  
*Emperor Tetra, The* — Vol. 1, #8; June 1968 (Walker, Braz) ..... Pg. 8

**Neon Tetra**  
Vol. 1, #1; Nov. 1967 (Reuting, Margarita A.) ..... Pg. 46

**Newman Barbara**  
*Recipe For Betta Spawning, A* — Vol. 1, #7; May 1968 ..... Pg. 7

**Nichols, Red**  
*Floating Fish Can Kill* — Vol. 1, #8; June 1968 ..... Pg. 10

**Nothobranchius guentheri**  
*New Rebellid Nothobranchius, The* — Vol. 1, #9; July 1968 (Goldstein, Robert J.) ..... Pg. 6

**O'Quinn, Dorothy**  
*Is The Male Lyretail Swordtail Really Sterile?* — Vol. 1, #6; April 1968 ..... Pg. 6

Vallisneria, A Popular Aquarium Plant  
Vol. 1, #1, Nov. 1967 (Brunner, Gerhard  
W. E.) ..... Pg. 24

Views And Reviews  
Vol. 1, #2, Dec. 1967 ..... Pg. 24  
Vol. 1, #5, March 1968 ..... Pg. 20  
Vol. 1, #8, June 1968 (Life Of The Pond)  
..... Pg. 20

Walker, Braz  
Ageniosus marmoratus, The Smiling One  
— Vol. 1, #12, Oct. 1968 ..... Pg. 32  
Beautiful Doracid Cat. A — Vol. 1, #6;  
April 1968 ..... Pg. 4  
El Tigre — Vol. 1, #4; Feb. 1968 ..... Pg. 4  
Emperor Tetra, The — Vol. 1, #8; June  
1968 ..... Pg. 8  
Fish With The Folded Mouth, The — Vol.  
1, #10, Aug. 1968 ..... Pg. 4  
Knifefish Regeneration — Vol. 1, #2;  
Dec. 1967 ..... Pg. 6  
Mouth That Roared, The — Vol. 1, #5;  
March 1968 ..... Pg. 4

Red-Striped Snakehead, The — Vol. 1,  
#11; Sept. 1968 ..... Pg. 6  
Red-tailed Characid, The — Vol. 1, #7;  
May 1968 ..... Pg. 4  
Silver Dollars — Vol. 1, #3; Jan. 1968  
..... Pg. 4  
Tri-Color Or Bala "Shark", The — Vol. 1,  
#12; Oct. 1968 ..... Pg. 5

Warner, Edward L.  
Basics Of Angelfish Breeding — Vol. 1,  
#4; Feb. 1968 ..... Pg. 32

Wheat, William K. S/Sgt.  
Marine Fish To Fresh Water — Vol. 1,  
#7; May 1968 ..... Pg. 12

Wood, John A.  
A New Molly — Vol. 1, #5; March 1968  
..... Pg. 6

Xiphophorus helleri  
Is The Male Lyretail Swordtail Really  
Sterile?—Vol. 1, #6; April 1968 (O'Quinn,  
Dorothy) ..... Pg. 6

INDEX OF SCIENTIFIC NAMES  
FISHES

Title	Month	Year	Page
Ageniosus marmoratus	Oct.	'68	32
Anableps anableps	Oct.	'68	34
Aphyoseion caeruleum	Nov.	'67	42
Balantiocheilus melanopterus	Oct.	'68	5
Betta splendens	Nov.	'67	6
	May	'68	7
Carassius sp.	May	'68	4
Chalceus macrolepidotus	Sept.	'68	6
Channa (Ophiocephalus) micropeltes	Nov.	'67	34
Cichlasoma	Aug.	'68	6
Cichlasoma nigrofasciatum	Sept.	'68	8
Corydoras paleatus	Mar.	'68	4
Daniolepis microlepis	Dec.	'67	34
Dermogenys pusillus	Dec.	'67	4
Enneacanthus (Mesogonistius) chaetodon	June	'68	6
Fundulus chrysatus	Nov.	'67	46
Hypessobrycon innesi	Aug.	'68	4
Hypostomus (Plecostomus) plecostomus	Nov.	'67	18
(Lebistes)* reticulatus	Jan.	'68	38
	Jan.	'68	42
Leporinus frederici	Jan.	'68	6
Macropodus opercularis	Nov.	'67	36
Mastacembelus eurotaeniata	Dec.	'67	4
(Mesogonistius)* chaetodon	April	'68	6
(Molliniesia)* sphenops	Jan.	'68	4
Mylopius rubripinnis	June	'68	8
Nematobrycon palmeri	July	'68	6
Nothobranchius guentheri	May	'68	9
Palmatochromis guentheri	Oct.	'68	20
Pimelodus pictus	April	'68	4
Platydoras costatus	Aug.	'68	4
(Plecostomus)*** plecostomus	Nov.	'67	18
Poecilia (Lebistes) reticulatus	Jan.	'68	38
	Mar.	'68	6
Poecilia (Molliniesia) sphenops	Feb.	'68	4
Pseudoplatystoma fasciatum	Feb.	'68	8
Pseudotropheus auratus	Oct.	'68	28
Pterolebias peruanensis	April	'68	8
Symphysodon discus	July	'68	8
Tilapia mossambica	June	'68	4
Trichogaster trichopterus	April	'68	6
Xiphophorus helleri			
*Poecilia			
**Enneacanthus			
***Poecilia			
Barclaya longifolia	April	'68	32
Cryptocoryne lingua	July	'68	10
Cryptocoryne retrospiralis	Mar.	'68	8
Hydrocotyle leucocephala	Oct.	'68	12
Vallisneria spiralis	Nov.	'67	24

PLANTS

KLEE; continued from page 32

six provided by the LaMotte kit).

William G. O'Brian was a chemist with the Goodyear Rubber Co. who, after 12 years at that profession, decided to turn his interest in tropical fishes to a full-time job. Accordingly, in 1924 he joined the Independence Nurseries of Independence, Ohio, a firm formed in 1916 and dealing in water lilies but also interested in expanding into tropical fishes. At the time, although tropicals were extensively imported from Germany, they were not raised in any quantity in this country. O'Brian soon brought the firm to the forefront in the domestic breeding of tropical fishes.

In 1927, O'Brian bought the company and promptly consolidated it with the William Tricker, Inc. firm. The latter was started in 1885 by the firm's namesake, an English immigrant who originated water lily culture in the United States. Tricker died in 1916 but the business was continued by one of his sons, primarily in Saddle River, New Jersey.

O'Brian brought a professional approach to the art of breeding fishes, and a rare sense of humor. He was a frequent, and witty, contributor to *Aquatic Life*. In one of the advertisements he once wrote for Independence Nurseries, he offered "Sewerlines" at \$50 a box! The ad continued as follows: "Wrong again! We are not trying to put over any second hand or worn out goldfish for picnic lunches, nor yet for linotype pi. We just found a nifty handle for the *Scatophagus argus*, which is a mighty nice little fish but too hard to remember. We had to do something because it made our greenhouse cat nervous when customers started to read the label and stalled on the first syllable. Bill Innes says the scatophagi (note the Greek plural 'n everything) hunt up a good sewer when they want to stage a dinner party, which may have started the idea of wearing soup and fish. Anyway you get the idea — Sewer Dine. That's the way Adam had to think up names before Latin was invented. We have now reached the dotted line, and if you don't need a whole box, we sell 'em at \$20.00 a pair. Maybe you haven't a little sewer in your home, but green water, with a diet of algae and white worms will do almost as well." Note the price of seats in the 'twenties — \$20.00 a pair!

William O'Brian died in 1928 at the age of thirty-nine, a victim of a freak accident involving his automobile, while returning from a visit to Bill Sternke and his family in Daytona, Florida. He was a much-liked man, and all who knew him agreed that he died too young. But, as August Roth noted, "Man proposes, God disposes". Aquarists, however, should not forget the man who introduced pH to the aquarium hobby.

The year 1926 saw yet another attempt at publishing by an aquarium society. In that year the *Aquarium Bulletin* of the Aquarium Society

of St. Louis appeared, edited by D. Miller. A year's subscription cost \$1.00, a single issue 10¢. It, however, did not last for very long. One with a far different success story, however, was the appearance of *The Aquarium*, in September 1928. This journal, a printed 4-page pamphlet published by the San Francisco Aquarium Society, was renamed the *Aquarium Journal* in September 1929, a name which is likely to be more familiar to readers whose aquarium experience dates back more than five years.

At this time, the San Francisco Aquarium Society had been re-organized, this taking place in 1923. The society maintained a close relationship with the California Academy of Sciences and with the Steinhart Aquarium, a relationship it enjoys to this day. From the start then, the society attracted many professionals to its ranks. In 1929, for example, George S. Myers became its President. A typical program was that given by Prof. Doanne, of Stanford University, speaking on "The Relations of Aquatic Insects To Fishes".

The first few years of the *Aquarium Journal*, however, were not particularly impressive. The pamphlet included mainly club news and news of the Steinhart Aquarium, with some space allotted to selected Questions & Answers. The \$2.00 yearly membership fee also included a subscription to the magazine. Because of its long history and hobby significance, we shall return to the *Aquarium Journal* during our discussion of the hobby in the 'thirties.

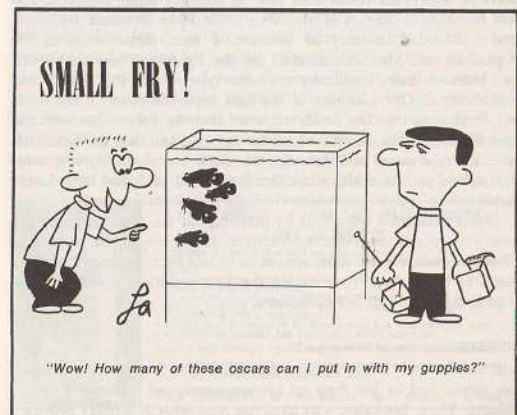
In 1928 there occurred one of the most famous "flaps" in American aquarium history. About this time there appeared on the American scene a type of betta known today in the hobby as the "Cambodian betta". Prior to this time, the hobby knew "two" bettas, i.e., "*Betta rubra*" and "*Betta splendens*". The latter was used to describe fish with a more or less bluish body, the former for reddish strains. In the fall of 1928, Walter Brind attended the annual exhibition of the New York Aquarium Society and saw a number of fish labeled "*Betta cambodia*", exhibited by William Schaumberg of Crescent Fish Farm in New Orleans. In an article in *Aquatic Life* in October 1928, somewhat pretentiously entitled "A Dissertation on the Genus *Betta*", Brind concluded that the Cambodian strain was merely a southern form of "*Betta rubra*" or "*Betta splendens*". The article, however, was a very reasonable one in light of the information available to him. Simultaneously, another article was published, by C. G. Langley, titled "My Favorite Fish — *Betta cambodia*", in which the author gave credit for the introduction to Frank S. Locke of San Francisco.

In December 1928, however, an article authored by W. Beckley took exception with certain of Brind's statements regarding whether the Cambodian betta was a natural form or was developed as a result

of a long series of aquarium breeding (Brind opted for Mother Nature). Also at issue was the matter of priority of naming. Brind responded like a wounded tiger, taking Beckley to task and lecturing him on fish identification. Accompanying Brind's reply, however, were two communications to the editor to the effect that the Cambodian betta was not a product of New Orleans, but San Francisco, giving credit for the introduction and naming to Frank Locke. Since one of these communications was from none other than William Schaumberg himself, one would think that the matter would have ended there.

However, a letter from Joseph Taubles, a prominent New York dealer (owner of the Aquarium Specialty Co.), stated that he had, on July 19, 1927, imported 76 bettas which turned out to be Cambodia. Taubles did not, however, claim that he had applied that name to the fish. They were sold just as a new strain of betta. Locke came into possession of his fish during October 1927; accordingly, Taubles was the first to import them. The record is clear also that it was William Schaumberg who bred some of the fish he obtained from Locke and was the one responsible for its major distribution throughout the American aquarium hobby.

In any event, the next to jump into the controversy was George S. Myers, then a student at Stanford University and a good friend of Mr.



Locke. Myers gave Brind "both barrels", and even reserved a good blast for Mr. Beckley! Recriminations aside, the Myers article is of some historical significance and we reproduce the more important parts of it here: "When I arrived (at Locke's hatchery), he ushered me toward a row of battery jars atop his tanks. There in the jars swam a row of the most remarkable fighting fishes I had ever seen. Both the dark (Siamese) and the light (Cambodian) varieties were represented, though neither Locke nor I then knew what they were. They had come off the ship three days before, and the man who brought them from Singapore said that they came from Bangkok, Siam. I shall not attempt a description of these fishes, others have done that, notably Mr. Locke. Suffice it to say that they were long-finned bettas, much larger and more gorgeous than any of the common kind that we have seen. Both Locke and I were greatly puzzled by the fishes. On general appearances, however, I hazarded the guess to Frank that they were varieties of the common *Betta splendens*."

"The very week that Mr. Locke's fishes arrived, I received word Dr. Smith (Dr. Hugh Smith, the leading authority on Siamese fishes) was returning from Siam and that his ship would dock in San Francisco in a few days. I went to meet the boat, but found it had arrived before schedule and had docked the day before. Dr. Smith had already left for the east, but there was welcome news. He had brought two pairs of high-grade fishes with him all the way from Bangkok, and had left them in the care of Mr. Alvin Seale of the Steinhart Aquarium and California Academy of Sciences. I went immediately to the Aquarium and Mr. Seale showed me the fighters. There they were, two pairs of them, identically the same type of fish that Mr. Locke had received. One pair was of the light type, the other of the dark. Mr. Seale said that Dr. Smith left word that the dark fishes were the true Siamese fishes, carefully bred for fighting, and that the light ones were the type raised in Cambodia. Of course I immediately went over to Locke's and told him what Dr. Smith had said and later Locke published an article christening the light fish *Betta cambodia*."

Myers concluded his article by pointing out the error in giving the new variety species status. In addition, he destroyed the myth that "*Betta rubra*" was a distinct species as it had been assumed for many years in the hobby. Thus ended the first aquarium controversy of note in this country! *To be continued.*

**SOCIETIES:** continued from page 31

will add to the "candy floss of superstition" he mentioned early in his article, and he has done an average amount of homework on his subject. Those hobbyists who have not read what is already provided

in aquarium literature will gain by having read this piece. On the other hand, those of us who have kept fairly current on the subject can't help but feel a bit let down by the lack of fulfillment of what promised to be a new look at an old subject. *Guppy Roundtable* is a lively bulletin, filled with notes and quotes pertinent to the interest of the guppy fancy. A regular feature, *We Get Letters*, touches on many aspects of guppy breeding as well as show ethics, and any buff in this area of the hobby will find it stimulating and rewarding. Write to Midge Hill, 9903 Candia Drive, Whittier, California 90603 for information regarding the society and its publication.

J. K. Langhammer has some kind words for *Apistogramma reitzigi* in the December issue of *Tropic Tank Talk* (published by The Greater Detroit Aquarium Society), entitled *Reitzig's Dwarf Cichlid*. The author believes the species is not common in the shops because it is such a slow grower, and professional breeders dislike waiting a year and a half for tank-raised fish to spawn. This may be true but on the other hand, it may be that the fish is not in demand because it has been neglected in aquarium literature. The accounts of it that do appear in the various texts on tropicals bear out Author Langhammer's description of the fish as being very colorful and, certainly on the plus side for a cichlid, is peaceful, hardy, and easy to spawn. The dusky grey, highlighted with blue becomes vividly blue when the male is in spawning colors. The dorsal, anal, ventral and caudal fins are yellowish. The female is brown and turns a bright yellow when spawning and tending her young, showing off her horizontal dark body stripe which runs through the eye. The author spawned his specimens in a well-planted aquarium furnished with several "cave-like recesses" and a smooth, nearly vertical surface was chosen for the eggs. The male should be removed, he tells us, after the spawning takes place as the female tends the eggs and likes to do it herself. The eggs are red and although this writer describes them as tiny, Sterba says

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they are "very large but not numerous". Both authors agree that the female takes her maternal duties very seriously and Sterba points out that if for some reason the eggs do not hatch, she will herd a group of waterfleas and tend them as though they were her babies. The fry do well on brine shrimp and microworms as first food and brine shrimp serve as a good food for the species even in adulthood. White worms also are relished by these little fish (the female never grows longer than an inch) and they do best kept by themselves as they do not compete well for food in a community situation. This is a thoughtfully written account of a very appealing dwarf cichlid and perhaps because Author Langhammer took time out to tell us about it, its appearance in shops may become more frequent. *Tropic Tank Talk* is published by The Greater Detroit Aquarium Society, P. O. Box C, Royal Oak, Michigan 48068.

*Feed Your Fish Some Gourmet Cooking* by Mary and Dan Carson, appearing in the *Modern Aquarium* (published by The Greater City Aquarium Society) offers a relatively easy way to keep a supply of nutritious food on hand for those hobbyists who have many little mouths to feed. The basic formula is made up of beef liver, egg yolks, one-a-day vitamin capsules, and a portion of Hi-Protein baby cereal. The Carsons add roe, milt, and fish livers, if they have them on hand, or shrimp, spinach, or left-overs of any lean meat or fish. Protein content is most important, they believe, and they are careful to eliminate fats from the mixture. If they do not have these last ingredients mentioned, they make up the liver paste without them. A blender and a Corning Ware bowl plus some room in a freezer seem to be the items that make up their equipment. When all of the skin and tough veins are removed from a pound of beef liver, it is liquefied in the blender and six egg yolks are added, along with the contents of four vitamin capsules. The thoroughly blended liver mixture is poured into a Corning Ware bowl and enough Hi-Protein-baby cereal is added to make a thick paste (thick enough so that the mixture will stand up in peaks). The bowl is then set in a pan of water (double boiler fashion) and brought to a boil. The cooked mixture is allowed to stand overnight and the next morning it is divided into eight portions which are placed in plastic sandwich bags. The bags are rolled out flat with a rolling pin and placed in a freezer. This would seem to be a most nutritious food for tropical fish and the Carsons are delighted with the way it is received by their specimens and how well they thrive on it. Another article in this issue is concerned with the feeding of fish. It is a reprint, originally appearing in the *Trader*, and written by Red Nichols. Here the results are given of a study of diet in relation to

growth, vitality, and disease. It was found that fishes fed five times a day in small quantities grew faster, and were far less prone to disease, than those fishes that were fed a large portion of the same food once a day. The amount of food given to the fishes on the five-times-a-day schedule during each feeding was just enough to feed the more aggressive feeders. While the less aggressive feeders went hungry during one feeding, they became more aggressive during the following one and got their fair share. Here again the value of a high protein diet is stressed. The *Modern Aquarium* has reserved one of its pages as a "Society Bulletin Board" and invites other societies to use it for posting announcements of their coming events. We notice that several New York area clubs have taken advantage of the offer. This would be an excellent feature for all society bulletins, serving to increase entries in shows by non-members and to promote good relationship among clubs. Write to the *Modern Aquarium*, P. O. Box 265, Baldwin, New York 11510 for information regarding The Greater City Aquarium Society and its publication.

James K. Langhammer (President of the Greater Detroit Aquarium Society) writes a thought-provoking letter in the December issue of *Aqua Jewels* (published by the Aquarium Society of Broward County) which should cool the controversy whether to feed or not to feed



## THE FANTASTIC NEW MARBLE ANGEL

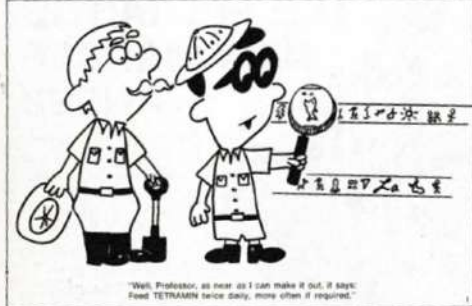
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tubifex to tropical fishes which has been the subject of much debate both in the pages of this magazine and society bulletins for the last several months. Tubifex, according to Mr. Langhammer, should be thoroughly purged in oxygenated water before used as food. He gives five conditions to be avoided when storing the worms, all of which will cause them to be unhealthy and undesirable as fish food. If this letter does not end the controversy, it will at least teach its readers the proper way to handle the worms to best advantage and this alone makes the debate worthwhile. In this same issue Don Talmadge raises another question which may rob the lowly tubifex worm of the spotlight it has been enjoying for so long. Don has concluded, after long consideration, that why some fish in a spawning grow faster than others is a matter of genetics. He points out that even when fry have plenty of room and good food, some grow faster than others. He would like to hear from others who have convictions as to why some youngsters outgrow their siblings. We wonder where this question will take us. *Aqua Jewels* is an exciting bulletin, well written and prepared, and its editor Doris Vilda, invites manuscripts from writers (as well as letters) from hobbyists all over the country and frequently succeeds in getting them. Write to the Aquarium Society of Broward County, P. O. Box 115, Fort Lauderdale, Florida 33302 for information.

### Tetra Tickles

By LARRY ARNOLD



"Well, Professor, so near as I can make it out, it says: Feed TETRAHEM twice daily, more often if required."

Betta buffs will be interested to learn that the International Betta Congress has firming its plans for its 1969 convention. It will be held June 27 through 29, 1969, at Stouffer's Northland Inn, Detroit, Michigan. Along with an all betta exhibition and competition, there will be three workshops. One will be devoted to a method for home freeze-drying beef heart, another on photographing bettas, and a seminar on judging. A banquet will be highlighted by a talk to be given by an outstanding betta specialist. Information regarding the International Betta Congress Convention can be had by writing Robert Pavlik, Show Chairman, 30363 Indigo, Roseville, Michigan 48066. Mr. Pavlik is a member of the Betta Bets of Detroit, the host society for this third annual convention of IBC. Hobbyists interested in becoming members of the International Betta Congress should write Sharen Chappell, Secretary-Treasurer, 2373 E. 7th Avenue, North St. Paul, Minnesota 55109. The annual dues are \$5 and junior memberships are invited. Members receive *Flare*, the official publication of IBC (a bi-monthly) which contains material on bettas written by some of the foremost breeders in the country, a swap column, and results of shows held in various parts of the country as well as announcements of coming events in the betta world. A membership also offers the betta fancier to participate in the annual convention show. ●

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HANFORD: continued from page 12

transfer of the water. Those with large aquariums will want to try some form of siphoning setup.

In the days when I had small aquaria, I learned the value of putting some fresh water in my tanks often, and now I make this suggestion to a new, more affluent generation of aquarists. I believe that those who try it will find the procedure worthwhile.

**EDITOR'S NOTE:** We agree with Wilbur Hanford's appraisal of the value of reasonably frequent changes of water. In the confined quarters of the aquarium, certain chemicals (i.e., nitrates, ammonium compounds, etc.) build up in the water with time. Aquarists in the know and with basement fishroom setups, often situate an old refrigerator liner as high in the room as possible, using this as a reservoir for treated, aged water. A bottom opening and a sufficiently long hose provided with a stopcock, permits a very convenient gravity feed to all tanks in the room. ●

MAYLAND: continued from page 16

of gravity; the center (the water-filled tank) is on the second level. The need of a very stable undercarriage then, should be quite apparent.

Available today in supply houses are furniture rollers which are capable of supporting the high loading from our cabinet, and which combine this feature with good appearance. They allow us to make our

tank cabinet movable if this is desired. As visible in the sketch, the rear rollers are fastened under the area where the actual aquarium ends, and not at the edge of the cabinet. This has several advantages: (1) the rollers are under the actual load center, which permits them to function properly; (2) the cabinet cannot sag; (3) one does not have to worry about interference between the base moulding and rollers.

The cabinet may be built with one, two, or three "windows" which permit viewing of the aquarium. We do not recommend three since it is nowhere near as attractive to look through an aquarium as it is to look into it. Otherwise, the choice will depend on the planned arrangement and additional amount of work required. The main thing is that the Aquarium-Cabinet combines all loose and independent pieces of our set-up into one unit which, if properly executed, should add to the overall furnishings of the room. For the breeder or owner of several small tanks, a cabinet based on similar ideas as the one described above for a show-aquarium will achieve the same result. ●

HARRISON: continued from page 23

species. Their actions and appearance were indistinguishable from those of imported specimens.

For six years this fish has maintained itself and prospered in conditions which must approximate those of its native waters. It has

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been of considerable interest to hobbyists in the area and some fish have doubtless been harvested by them. However it seems that mild over-fishing will not diminish the *Plecostomus* population. The fish are protected inside the Zoo, but sufficient numbers escape to replenish the population of the outer waters.

There is only one conclusion worthy of mention at the present and that is a familiar one. To induce a "difficult" species to spawn, simply duplicate the water conditions and diet it prefers and let nature take its course. This seems to be all the encouragement many of the more stubborn species need. ●

**ADVERSARIA: continued from page 20**  
AQUARIUM in the past on this and related subjects, both pro and con, are directed to the following: *Big Brother Is Watching*, Vol. I, No. 2, December 1967, pg. 30; *Adversaria*, Vol. I, No. 4, February 1968, pg. 52; *Editor's Letter*, Vol. I, No. 4, February 1968, pg. 14;

*Views & Reviews*, Vol. I, No. 5, March 1968, pg. 20. Mr. Walker's remarks in this article are mainly directed to the article that appeared in the July-August issue (Vol. 4, No. 7-8, 1968), of the *FTFI TRADER* entitled, *Albino Accused of Upsetting Balance of Nature in South Florida*. ●

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**VIEWS & REVIEWS: continued from page 29**

fairly large "cats" in a tank in 1956. For him, they seemed to spawn only in the spring and late fall, but he raised hundreds of them. The breeders, however, must have been at least three or four years old before he placed them together. Since 1964, I have been operating Tidouste Aquarium Supply, and by count, have raised 5,195 cats. I found that by putting them together in a clean tank and feeding live white worms every day, they would spawn year-round. The pH was always on the alkaline side, never acid. Breeding pairs have had five to six spawnings in as many days, moved from one tank to the next. Then, they might not spawn for about a month, after which they begin again. My fish seem to have bigger spawnings in planted tanks, but they have spawned in bare tanks when I was short on the others. Of the 14 original cats, five died (mostly from jumping out). Three were replaced and now I have 12,

nine of which must be 12 years old and still spawning! I feed the fry nothing but live brine shrimp until they are free-swimming, then dry food. The largest spawning obtained in the planted tanks was 455, the average well over 300 (in bare tanks the average is around 200). Hope this is of interest to others!

An article recently appeared in the German aquarium magazine, *DATZ*, authored by Manfred Neumann, which concerned itself with the question of water quality and the breeding of *Phenacogrammus interruptus*. Mr. Neumann, having tap water of 187 ppm total hardness, 107 ppm temporary hardness and a pH of 7.0, first conducted a test with 40 eggs of the fish in question. Into the tap water mentioned he placed 15 eggs; 25 eggs were placed in a water that had lain over peat for one week. The latter tested 36 ppm total hardness, 9 ppm temporary hardness and a pH of 5.4. To this, 3-3 grams per liter

(g/l) of cooking salt were added. Within 24 hours, 20% of the eggs stored in the tap water showed developed embryos, but 48% of those in the treated water indicated such development. Not many of the latter embryos hatched, however, and it was thought that the salt concentration was too high. Hatching success with the eggs sorted stored in the tap water was nil.

Accordingly, the following hatching percentages were obtained (using the peat water) at the salt concentrations indicated:

Concentration	% Hatch
3-0 g/l	10%
1-5 g/l	31%
1-0 g/l	44%
0-75 g/l	19%
0-5 g/l	0%

The optimum, therefore, lies between 0-75 and 1-5 g/l of salt, indicating that quantitative as well as qualitative factors are present in the breeding of "problem fishes". The aquarium

### CREDITS

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ALBINO SAILFIN MOLLY supplied by Paul's Pet Shop, E. Paterson, N.J.; GREEN SAILFIN MOLLY supplied by Kasimir Pet Shop, Hackensack, N.J.; BLACK & MARBLE SAILFIN MOLLY supplied by Mr. I. Geller, Sebastian, Fla.; TIRE TRACK EEL supplied by S. Lieberman, Saddle Brook, N.J.; PIKE CICHLID, TILAPIA MOSSAMBICA, P. AURATUS supplied by Grassfork Fisheries, Saddle River, N.J.; GEOPHAGUS JURUPARY, C. SEVERUM, P. KRIBENSIS, supplied by Beld's Aquarium, Hazelwood, Mo.

### PHOTOS:

H. J. Mayland, p. 14; All other photos taken by THE AQUARIUM photographer, A. Roth.

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hobby is not as simple as some would have us believe. ● A. J. K.

**PROBLEMS: continued from page 25**

**Answer:** Formaldehyde Solution (Formalin) has been used by hobbyists over a number of years for certain fish parasites such as flukes. You may read *Diseases of Fishes* by C. Van Duijn, Jr., p. 155, for a detailed account of the uses for this medication. Robert E. Gossington, in the December 1966 issue of *THE AQUARIUM*, suggests four drops per gallon of 37 percent Formaldehyde to kill newly-hatched larvae of Anchor Worm, but points out this will not have any effect on adult Anchor Worms. We suspect that recent experimentation on dealing with fish parasites would deal largely with medications that have been recently developed. There is no reason why, however, that you should not write the National Fisheries. ●



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**CURRIER & SMITH: continued from page 11**

things that vary from fish to fish, have to be taken into consideration as well.

Then there is the matter of time—YOUR time! By this we do not mean the time it takes for the eggs or young to become old enough to sell, but rather the amount of time you must spend working with these fish. We want to emphasize that word "must". We are not referring to the amount of time you choose to spend. We mean the amount of time that is absolutely required to feed, clean and otherwise maintain a healthy bunch of fish.

Let's go back to our two examples a moment and consider "time". The danios will need the least expenditure of time. Feeding them twice daily on a combination of good dry and live foods will create maximum growth. At the outset you will have to raise baby brine shrimp but within three weeks the fish should have grown to the point where they can take full-grown shrimp with little difficulty. Therefore, you can safely estimate a required expenditure of no more than half an hour a day for feeding. Since these fish can be kept together in one aquarium, maintenance is relatively simple. Filtering the aquarium will remove most waste products and an occasional water change will complete the program. The time involved here is generally no more than an hour a week. Based on these estimates, the total time you must spend (over a two-month period) amounts to 45 hours. This total will vary up or down dependent upon

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your efficiency at performing these tasks.

Now let's see what the time will be for the bettas.

For the first month or so you will be able to assume the half-hour-per-day feeding schedule as with the danios. This time will be spent, primarily, in feeding and preparing food for the fry. However, by the end of the first month you will have to start separating the individual males from the rest of the brood. At this time they begin sparring among themselves, and fins damaged from this activity can lead to reduced prices when selling time arrives. Here the estimate of time you will have to spend is complicated by a number of factors, i.e., your experience in recognizing the males early, the number of males in the brood, your ability at netting the individual fish, etc. It would be safe to assume that an additional half-hour a day for a week would be required for this activity. Now additional time must be spent in feeding for you no longer have only one aquarium to feed. Instead, you may be confronted with as many as a hundred small bowls with individual fish. By streamlining feeding procedures you should be able to feed and observe the lot, twice daily, for a total expended time of one hour per day. With separation, however, a further time problem sets in. Unless you can afford divided tanks that can be filtered (and most of us can't!) you will find that the individual bowls will have to be cleaned. In our experience this is a weekly necessity. Total time for this activity, including drawing water, netting

74



If you desire to raise these mouthbrooders you will soon recognize the nuptial dance of the *Pelmatochromis guentheri*.

and transferring the fish, etc., amounts to a minimum of six hours. The total of all the time itemized above is rather surprising. It amounts to 173.5 hours! (This is based on a four month, "egg to saleable adult" period.)

Now you might say, "Well, so what? I enjoy working with the fish—I'd spend the time anyway." Well and good. Keep in mind, however, that when you HAVE to do it you may find you'll have a different outlook! However you cost out your time, it is part of the cost of raising the fish and something to consider in the overall cost/profit picture.

Moving on now to the actual sale of the fish, there are a number of ways to go about it. First, you can try to sell to other aquarists from your home. This means you can ask full "retail" price for the fish. Unfortunately, this is not as simple as it sounds. It is obvious that few people will know you have fish for sale. It might take quite a while to dispose of a thousand danios or a couple of hundred male and female bettas. (Not only that, but it may be illegal unless you obtain a seller's license.) Of course, all the while you must continue to feed and maintain the fish. Expenditures in food and time will obviously cut into the profits you can expect to make. Another problem with a "do-it-yourself" program is the possibility of ill-will from local dealers, especially if you attempt to sell at prices lower than they do. This should not be taken lightly!

A more practical approach to disposing of your fish is through

75



The blue gourami, *Trichogaster trichopterus*, is an excellent fish to gain experience with. This is the classical standard blue gourami known as the "three spot".

dealers themselves. Most dealers are on the lookout for quality "home-grown" fish, primarily because these fish are already adapted to local water conditions and losses are generally reduced considerably. You cannot expect, of course, to get the retail price for your fish. After all, the dealer is in business to make a profit too. Usually you cannot expect more than one-quarter to one-half the retail price for a specific fish. If you analyze the situation the reasons for this are readily apparent. The dealer must assume he will have to feed and maintain the fish at his expense until he can sell them. During this time he will also suffer a certain percentage of loss which further cuts into his profit. By the time all of his costs are taken into account, a 5% actual (or "net") profit may be the best he can put in the bank!

With dealers, you can dispose of your fish in quantity. The dealer is not going to buy one or two at a time. If the dealer has a large clientele he may be able to take all of your fish in one lot. (Especially if the fish you are selling are in demand at the time.) On the other hand, he may not need a thousand danios or two hundred bettas. Consequently, you may have to sell to a number of dealers to dispose of your fish.

It is a good idea to take some "sample" fish along when you are ready to talk to the dealer. Be honest about your choice of samples. Take the average fish. Don't just pick out the largest or the most colorful. This misleads the dealer and he will resent it. YOU MIGHT

76



One of the basic and most easily bred fish is the guppy. With a minimum of effort, the beginner can obtain quite good results.

#### EVEN LOSE THE SALE!

You don't have to be a salesman if you have quality fish—they'll sell themselves. You DO have to be courteous. It's best to call and arrange a time if possible. If the dealer is busy with customers you may have to wait. Be patient. **THE DEALER IS YOUR CUSTOMER IN THIS CASE!** You should have decided beforehand on the price you are going to ask for your fish. Touring the fish shops in your area will give you an idea of the current retail price. This should enable you to set a fair price of your own. But be flexible. If the fish is a fast seller, the dealer's mark up may not be as great.

The major factor to take into account when setting a price is your own cost. You should keep accurate records of your costs, based on food, water, time, etc. The total amount spent on a batch of fish, divided by the number of saleable fish will tell you the cost-per-fish. If this exceeds the price the dealer is already paying, you are going to lose money. You must either reduce your costs or change the fish you plan on breeding.

When making a sale it is good customer relations to "guarantee" the fish. That is, you should make it clear that you will stand by the quality of the fish, up to and including replacement, should they be defective. This is a ticklish situation for a number of reasons. First, lack of caution in transferring the fish may cause wholesale losses; unscrupulous dealers may try to take advantage of this guarantee; hidden

77



The rosy barb, *Barbus conchonus*, is an easily bred egglayer.

weakness in the fish may trigger death due to the change in conditions. Generally, guarantees can be given without fear if proper care and good aquarium management has been exercised in rearing of the fish. We always retain a few "control" specimens of a batch of fish in our own tanks. This way if the dealer claims a large loss, we then have the "controls" on which to base a decision.

As your sales increase you may wish to expand your facilities. This should be undertaken cautiously. It is easy to "bite off more than you can chew". Always keep in mind that the amount of time you wish to spend in breeding and raising fish is pertinent. If you do not allow yourself time for other pursuits you may soon find that, instead of fun, your hobby has become just another "job".

You should always be on the lookout for methods of reducing your costs. Items as dry foods, brine shrimp eggs, drugs, charcoal and spun glass for filters, etc., should be purchased in quantity. Cost per unit will drop, saving you money over small purchases.

When buying equipment, purchase only the best. This will reduce equipment breakdowns and consequent repair costs. Never purchase something you don't really need. You may also find that improvising can save time and money. (It can cost, too, if you don't plan carefully!)

As we said in the beginning YOU can make money with your fish. "All" it takes is work, time and sacrifice. ●



**TetraMin CONDITIONING FOOD**

Here is a genuine plant food for fish that live on plants and algae. It is recommended as a valuable addition to TetraMin Staple Food and is highly desirable as a feeding supplement. Although Conditioning Food essentially is a special diet, it may be safely fed to all fish in the tank. Use it simultaneously at feeding time with TetraMin Staple Food, or sprinkle it alone in the tank, one day a week. Species like Barbs, Labyrinth Fish and especially live bearers need the nutritional balance of Conditioning Food. They thrive on it, and develop into really fine, healthy fish.

**SUCCESS SPEAKS FOR**

