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Platies and Moons, by Wilfred L. Whitem, 50c from your dealer or direct from T.F.H.

PLATIES AND MOONS is a new book devoted to a complete coverage of two of the most popular livebearers, *Xiphophorus maculatus* and *Xiphophorus variatus*. Information is given on all phases of the successful keeping of Platies of all varieties, with special emphasis on the differences between varieties.

Intended as a practical guide to raising these colorful and prolific hobby favorites, author Wilfred L. Whitem's book gives concise, easy to understand treatment to such topics of vital importance as foods and feeding, plants and planting, hybridizing, and selective breeding. Under this last category the author discusses a point which has so far presented many problems for the livebearer enthusiast: how to detect and separate the sexes before they are old enough to breed indiscriminately.

The separate section on diseases and medicants lists the major fish ailments encountered and describes the most effective and simple treatments. Moreover, this section is of special benefit in showing not only how to diagnose and treat, but also how to avoid, these diseases. Diseases covered are white spot, fin and tail rot, mouth fungus, velvet, and others.

For hobbyists who have long wanted to develop and raise their own distinctive Platy variety, but who have no desire to wade through the complicated mechanics of the principles of genetics, PLATIES AND MOONS is the answer.

## TROPICAL FISH HOBBYIST

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### Contents

Vol. XIII, June, 1965 (#112) No. 10	
More Top-sail Platies	5
Fishes Among Flowers	14
The Banana Plant and Its Relatives	23
A Trip to the Rio Jacaré	30
Raising and Breeding the Blooding Heart Tern, <i>Phaethon rubricauda</i>	49
Chinese Algae-Eater	77
<b>FEATURES</b>	
Notes from All Over p. 20, Mail Call p. 23, Guest Column p. 24, South from the Seven Seas p. 27.	
<b>COVER</b>	
New developments in the genus <i>Xiphophorus</i> have been the big news in recent months, and some of the best new fishes have been featured on our covers (see April and May). The spectacular blood red topsail platy we saw earlier this month is still another outstanding <i>Xiphophorus</i> . The fish is but one of a number of topsail platies developed by Dr. Joanne Norton whose red hi-fin swordtail was featured in our April cover. For a detailed description of how Dr. Norton developed several different topsail varieties, see her article beginning on page 5. Photo by Dr. Herbert E. Axelrod.	
<b>EXOTIC TROPICAL FISHES SUPPLEMENTS</b>	
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June, 1965

## EDITORIALLY . . .

"If you had your choice, Bill, in what part of the world would you most like to collect fish?" This is a question which I have been asked several times, but which never fails to intrigue me and start me humming about "faraway places with strange-sounding names." How can a fellow make up his mind about such a thing? We hobbyists who get to travel and collect fishes can only judge a collecting place by the fish life we see there or by the accounts we hear or the imported fishes we see.

From what I've read about it, and the few gorgeous fishes I've seen from there, I think that it would be a fascinating experience to collect at Lake Tanganyika, in Africa. Just think, it offers more than 200 cichlid species alone, none of which can be found anywhere else! But the white man is not exactly popular in some parts of Africa, and I have no desire to do anything but catch fish, certainly not to check upon the extent of political unrest anywhere.

Naturally those of you who have read my little accounts of my visit there, know that I have fallen in love with British Guiana, its teeming streams and nice, friendly people who not only welcome a stranger, but give him the feeling that they like him. And the wild life there! Everywhere there are new birds, new trees, new butterflies, new exotic flowers. Alligators splash into the streams as you approach, and at every haul of the seine there are hordes of beautiful fishes, some familiar and many which I had never seen before. Could any fish hobbyist ask for a more pleasant or more interesting trip than that? Just say the word, and I'll pack my bag!

*William Vorderwinkler*



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June, 1965



One of Dr. Norton's red wag topsail platies. Photo by Dr. Joanne Norton.

## More Topsail Platies

BY DR. JOANNE NORTON

Platies have long been one of the most popular aquarium fishes, being available in many different and beautiful colors. However, until recently, their fin size and form did not vary in different strains. This was true until Bill Hearin developed his topsail platy (T.F.H., September, 1963). This new platy, with its amazingly large and full dorsal, resulted when Hearin crossed a variatus platy with a Simpson hi-fin swordtail.

After obtaining a pair of Hearin's blue variatus topsail platies, I decided to develop other colors of platies with large dorsal fins. I wanted to develop strains that would have (1) contrasting body and dorsal colors and (2) full color at an early age. With these two considerations in mind, I began crosses to develop topsail platies in red wag, gold wag, gold crescent, and black variatus.

By crossing a hi-fin swordtail with an ordinary swordtail having no hi-fin parentage, I found that a dominant gene causes this enlarged dorsal, the gene for ordinary dorsal being recessive. Therefore, if a hi-fin swordtail is crossed with an ordinary swordtail, some of the offspring will be hi-fins. Since the same dominant gene for enlarged dorsal is present in topsail platies, a topsail platy crossed with an ordinary platy will produce some topsails in the first generation. Therefore, I expected to get some topsails from each of the crosses that I planned in which only one parent would be a topsail.

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6



Compare these normal-bodied blood red wags with the topsail type developed by Dr. Norton (right). Photo by Kramer.

melanophore-producing gene, and the blood red wag female was homozygous for the recessive allele, "st", of this gene, I expected to get from this backcross 50 percent brick red wags and 50 percent blood red wags. The predicted 1:1 ratio was obtained when the red wag female produced 57 brick red wags and 56 blood red wags. These young fish could be differentiated when they were one day old because the blood red ones were golden at this age and the brick reds were gray. The blood red wags from these were selected and are true breeding in that they will not produce any brick red offspring even in future generations. About half of the fish from the backcross were heterozygous for the dominant wag pattern, since their brick red wag topsail parent was heterozygous for this gene, while the other parent (the blood red wag female) was homozygous for this gene. Therefore, in future generations there should appear some red platics, without the wag pattern. In this way, blood red topsail platics can be obtained. Also, since the brick red wag topsail hybrids were heterozygous for the dominant red color gene, they will produce in future generations some fish without this gene, and these will be gold or gold wag.

Among the offspring of some blue variatus topsails, I found one pair of gold topsails. These were entirely gold, with no additional color in the fins. The recessive gene for gold, "st", must have been present in both of the parents of these golds. Originally, this gene must have come from the hi-fin swordtail parent that Hearin crossed with a variatus platy, since this "st"

8

I wanted to get additional colors of topsails by using Hearin's strain, instead of by crossing a platy of the desired color with a hi-fin swordtail. There were several reasons for deriving the large dorsal from topsail platics instead of from hi-fin swordtails. First, Hearin's topsails have a very large, full dorsal. There was the possibility that I might not get fish with such a large dorsal if I crossed, for example, a red wag platy with a hi-fin swordtail. Second, I wanted to get fish with a platy shape, such as Hearin's topsails have. In contrast, offspring of a swordtail-platy cross are more elongate in body form and the males usually have a stubby sword. Hearin had already done the work of selecting and breeding for platy body and tail characteristics. Third, a high degree of sterility occurs in some swordtail-platy hybrids. I thought that the new color strains that I wanted might be more fertile if derived from a topsail platy crossed with another platy, since Hearin's topsail platics are prolific.

For the red wag topsail strain, I first raised some virgin female red wag platics and then selected the best two of these to breed to a blue variatus topsail male. This mating did not occur even though the red wag females and blue variatus topsail male were kept together for several months. In the meantime, I had crossed an ordinary sunset variatus female with a blue variatus topsail. All of the offspring were sunsets, some of which were topsails. From this I could see that the sunset color is genetically dominant to blue variatus. These sunset topsails were even larger and more robust than the blue variatus topsails. I selected two of the best sunset topsail males to put with ordinary red wag females. These did not cross readily, but after about three months one of the red wag females had young. All of these young had the wag pattern, which is dominant to no wag pattern. Their body color was gray, gradually becoming orange, and finally almost as red as regular red platics. This was a brick red color, because of the presence of a dominant gene, described by Myron Gordon, that results in production of micro-melanophores. This dominant gene had come from the sunset parent. The brick red hybrids that I had obtained were large and had large, very black dorsals. The males had a dark spot resembling a gravid spot, which is also present in blue variatus and sunset males. The males also had a faint dark striping and stippling on the sides of the body as in other variatus platics. Both gold and blood red platics and swordtails have a gene, called "st" by Gordon, that is recessive to the micromelanophore-producing gene. Blood reds, besides being homozygous for the "st" gene, also have a dominant gene, "R," discovered by Gordon. This gene causes red color due to crythrochrome production.

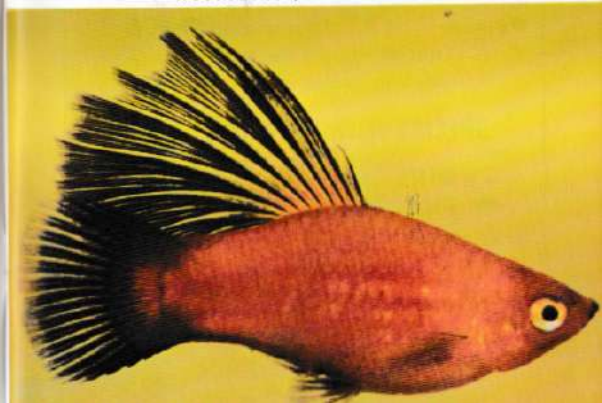
The next step in obtaining blood red wag topsails was to cross one of the best hybrid brick red wag topsail males with a regular blood red wag female. Since the brick red wag male was heterozygous for the dominant micro-

7

gene is not present in pure variatus platics but occurs in all red velvet swordtails. From the pair of gold topsails, I obtained additional gold topsails, which were used in developing both gold crescent and gold wag topsail platics.

To get gold wag topsails, I crossed gold topsail females with an ordinary gold wag male. This cross produced all gold wags. All received the dominant genes for wag pattern from the gold wag parent. Since both parents were homozygous for the recessive gene "st" that causes gold color, all of the progeny were homozygous for this gene and so all were gold. Therefore, all of the F<sub>1</sub> were the desired gold wag color and some of these were topsails. However, all of the F<sub>1</sub> were males. Myron Gordon obtained all males when he crossed a male platy from domesticated stock with a female from Rio Jamapa (Mexico). Gordon found that sex inheritance is different in each of these two strains, the male he used being YY, and the female XX. Therefore, all of the F<sub>1</sub> had XY sex chromosomes and were males. I suspected that the same type of sex inheritance had occurred in my gold wag topsails. That is, the male parent was YY, the gold topsail female being XX. Then all of the progeny would have XY chromosomes and all would be males. If this were true, I would expect to get some females by crossing a regular gold wag female (WY) with a gold wag topsail male (XY). Using Gordon's symbols, this cross would produce both males and females as follows:

The great beauty of Dr. Norton's strain of blood red topsail wags is a tribute to her skill as a breeder. Photo by Dr. Herbert R. Axelrod.



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10

gold wag female x gold wag topsail male  
WY XY


F<sub>1</sub>: WX (females)  
WY (males or females, depending on strain)  
XY (males)  
YY (males)

Gordon could tell which sex chromosomes were present in each of the F<sub>1</sub> because the X and Y chromosomes were each "marked" by a separate dominant gene, each producing a different color pattern. In this way, he found that WX and WY fish were females. The other combinations, XY and YY, produced males. However, Gordon made another cross, again using a female (WY) from domesticated (British Honduras) stock, this time crossed with a male (XY) from Rio Coatzacoalcos. The WY individuals in the F<sub>1</sub> were males, as were those having XY and YY chromosomes. The only females were those having WX chromosomes. Therefore, the sex ratio in the F<sub>1</sub> from a cross of a WY female with an XY male was either 1:1 or 1:3, depending on the strain of the male parent. It can also be seen that other possible chromosome combinations in the F<sub>2</sub> are WW and XX.

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11

From the cross of a regular gold wag female with a gold wag topsail male, I got both male and female gold wag topsails which in future generations would produce mostly gold wags and some golds. Both males and females have a large black dorsal that contrasts sharply with the light body color. Considering the several sex chromosomes involved in this strain, and the numerous possible combinations of these chromosomes, I expect varying sex ratios from different matings within the strain, but the population as a whole will produce both males and females from now on, instead of all males as I got from the first cross.

I wanted to develop a gold crescent topsail platy with a red dorsal. Some gold crescents do not have red color in the dorsal, and none of my topsail gold platies had a red dorsal. Myron Gordon discovered that the red dorsal is due to a dominant gene, which he called "Dr." I crossed a gold topsail platy with an ordinary gold crescent platy having a red dorsal. In this way, I got some gold crescent topsails with red dorsals. Gordon found that the crescent pattern is due to two dominant genes, the gene for no crescent being recessive, and that these three genes are alleles. In the gold crescents, as in the gold wag topsails, I got all males from the first cross. I selected the best male of these, one having both topsail and red dorsal, and crossed him with some ordinary gold crescent females that also had red dorsals. From this cross I obtained both male and female gold crescent topsails with red dorsals. The best of these were selected for breeding stock of this color. These will produce mostly gold crescents and also some all gold, most with a red dorsal and some with a clear dorsal.

A pair of Dr. Norton's gold topsail wags. Photo by Dr. Joanne Norton.



12



A pair of Dr. Norton's black variatus topsail platies. Photo by Dr. Joanne Norton.

To get black variatus topsail platies, I selected two black variatus females and raised virgin females from these. I then selected the best of these females and put them with two of the best sunset topsail males that I had. The dominant black color gene, "N", discovered by Gordon, caused all of the first generation to be black, some of which were topsails. These black topsails can also produce some sunsets. Black variatus topsails become large fish with large, full dorsals, just as in other variatus topsails. At first their fins are clear. Later, in both males and females, the dorsal becomes golden and the tail orange. I selected the best male for both size and color to breed to the best females, and these are now producing the next generation of black variatus topsails.

Just as fancy guppies have not replaced common guppies in the market, topsail platies will probably not replace "common" platies. However, I think that topsail platies will become increasingly popular as they become more readily available. With Heatin's variatus topsail platies and now with the addition of red wag, gold wag, gold crescent, and black variatus topsails, there is a good color selection in topsail platies.



Editor's note: To better understand the basic elements of swordtail and platy genetics, you should read Dr. Myron Gordon's books, *PLATIES AS PETS* and *SWORDTAILS AS PETS*. Both are available at every petshop and they cost only 35c. each.

13

## Fishes Among Flowers

A report on the tropical fish exhibit at the Chicago World Flower and Garden Show.

BY DAVE MINASIAN

Photos by the author

Of the four seasons, spring seems to be the only one which is looked forward to by almost everybody. Even in the depths of winter's chill, our anticipations are aroused by such signs as W-2 forms, Ground Hog Day, and the Lenten season. For those of us who can't wait for nature to reveal itself in its own time, the nation's two largest flower shows provide an opportunity to be suddenly vaulted into the midst of gorgeous gardens of perfect specimens of virtually every type of plant and shrub known to "green thumbs" and professional gardeners. On the concrete floors of the New York Coliseum and Chicago's McCormick Place, are dumped hundreds of tons of rich topsoil. Then as if by magic, the vast emptiness of these mammoth halls are transformed into perfectly landscaped patios and gardens created by some of the world's most gifted landscape architects. The exhibits are complete with waterfalls and 25-foot trees.

To several hundred aquarium society members, Chicago's World Flower and Garden Show, (C.W.F. & G.S.) at McCormick Place has added significance. It is a chance to promote the hobby and compete with over 200 aquariums before the 350 thousand people who visit the show each year. This is, by far, the largest group of people ever to see a competitive aquarium exhibit at one time. Each year, C.W.F. & G.S. has donated 2,000 square feet of space to the larger aquarium societies in the Chicago area and although the flower-show title gives no hint of tropical fish, the fish exhibit continues to be the star attraction of the entire show. It is a tribute to the leadership, spirit of cooperation, and hard work of the participating societies. This year, with Mr. Bruno Bywalec at the helm of the show committee, the Midwest Aquarists Club, the Suburban Aquarist Society and the Midwest Guppy Club put forth a phenomenal effort which resulted in the finest exhibit ever.

Preparation and planning for the fish exhibit was not taken lightly. Even before the winter storms began to lash the Windy City, the show committee was busy at work on the March Spectacular. Even though the space is free, burdening expenses must be met by the societies' treasuries. Lumber for display racks, aquariums, tubing, air pumps, and trophies and ribbons eat away at whatever wealth the societies have been able to accumulate. Heaters are a big item since the entire hall is kept as cool as possible to preserve the flowers over the 9-day

14

## Tropical Fish Hobbyist

period. When the time comes to set up the show, these people know that there is no substitute for the essential ingredients of time and hard work. It means never to bed before 3:00 A.M., and there is always something to do if one cares to stay up all night.

During set-up time, the entire flower-show area would appear to the casual visitor to be complete bedlam. With heavy earth-moving equipment preparing the garden areas from 10-foot piles of soil, and cranes erecting trees, the scene is not unlike a highway construction site. Scampering in and out of this confusion, are the aquarists with their priceless buckets of aged water and plastic bags filled with the most perfectly bred tropical fish and plants in the Chicago area.

One might wonder what on earth would move these dedicated hobbyists to go to such lengths to put on this show, which is in my opinion the most important public relations event in the hobby. Each person has his own reason, but there can be no doubt that the friendly competitive spirit and the chance of winning a trophy has much to do with it. Then too, society members are, as a rule, a very social minded and friendly group, and they earnestly seek the expansion of the hobby, with an eye toward adding new names to their membership roles.

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19



The "tiger in your tank" theme, using tiger barb along with porreleia tigers and pictures of tigers, was a natural for the novelty tanks.

First prize in the Ideal Aquarium class for the Midwest Aquarium Club went to this display. Note the sparse but attractive planting and the effective use of the driftwood in front.

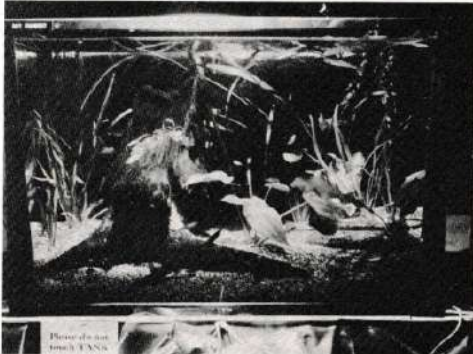
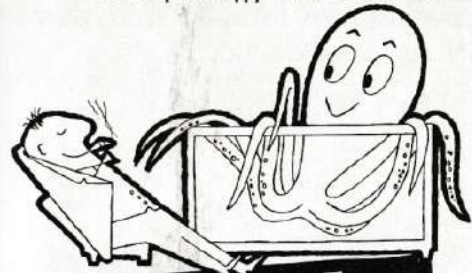


Photo of an "oriental garden" tank by E. S. S. S.

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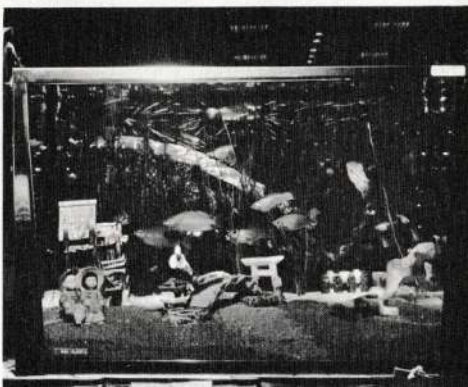
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This "oriental garden" display took one of the Clifford W. Estes Co. colored gravel awards. Particularly striking is the path created in blue gravel on gray green gravel.

My visit on the third day of the show was an interesting study of contrasts. Outside, high winds and 20-degree temperatures whipped up an 11-inch snowfall adding to the unwelcomed near-record accumulated fall of 56 inches already on the ground. Once inside, however, it was easy to get lost in the regenerating spirit of spring.

For the first time, the famous John Shedd Aquarium of Chicago agreed to put in an exhibit. They did a magnificent job, with over 20 aquariums, all of marine life. This display was, of course, non-competitive but nonetheless a superb expression of the perfection which can be obtained in raising and keeping marine tropicals.

Judging was by non-member experts. To maintain maximum public appeal, the major competitive categories comprised only complete aquariums. The entire setup was considered; plants, aquascaping, and fish, rather than fish alone in bare tanks. The only exceptions were the guppies, which, because of their spectacular colors and tails, could be shown alone in bare tanks and still be of great interest to the layman. The Midwest Guppy Club exhibited only guppies and prizes were awarded for Reds, Blacks, Blues, Variegated, A.O.C., ("Any

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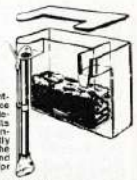
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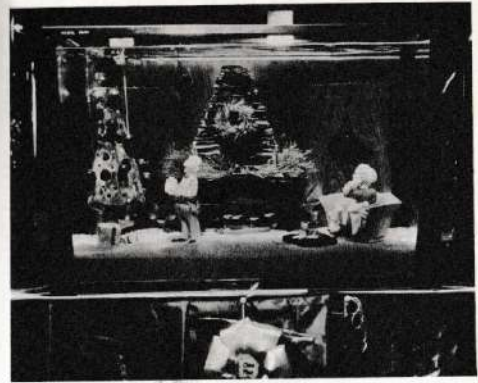
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BY MANFORD RHODES

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### Tropical Fish Hobbyist

#### NOTES FROM ALL OVER

#### THE FRESH-WATER FISHES OF SIAM, OR THAILAND

by Hugh M. Smith  
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As part of the reprint publication program instituted by the Smithsonian Institution and T.F.H. Publications, Inc., *The Fresh-Water Fishes of Siam, or Thailand* has been made available in a hardcover edition. This edition has been reprinted from the original (1945) without change. The book should be of interest to both ichthyologists and aquarists. It is available at the Publications Office, Smithsonian Institution, Washington, D.C. 20560 at a price of \$2.00.

As indicated in a previous issue of this magazine, the proceeds derived from the sale of this and other future reprints will be added to the T.F.H. Fund "for research, collection or purchase of fish specimens, exploration, and publication of scientific reports related to aquarium fishes."



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## A Trip to the Rio Japurá.

BY HARALD SCHULTZ.

Some letters have come into the magazine's office in which it was stated that I often tell about what misfortunes befell me in the capture and transportation of fishes from virgin waters, rather than make a little more effort to be more successful! I also know that I have been criticized by many hobbyists for eating Green or Blue Discus. I should have brought them out instead for the hobby. But if I had tried to do this, I might have starved!

Please believe me when I say that I would like just as well as the others to bring my fishes home alive, like all the millions of hobbyists who would like to leave their work and travel into the jungle, there to discover new species. New species? No, not even that. They would be happy to see their old favorites swimming around in their native waters! I am also sure that after a week of these observations, their views about transporting fishes from virgin territory would change greatly.

Quite a few have tried, and to be sure there have been successful ones among them. The many species in our aquaria today bear witness to this. But there are also people who anticipate a fine business from these things. This is quite logical . . . a fish in its native waters costs nothing. One needs only to catch it. On the other hand, when it gets to the dealer's store it brings an immense price. It follows that the margin of profit must be unusually high. Try it some time, and you will be quickly cured. But it is better to write about fishing expeditions!

For a long time the Japurá attracted me. It is one of the many tributaries of the mighty father of all Brazilian waters, the Amazon. One millimeter measured on a map which is reduced 1:1,000,000 is equal to one kilometer in reality. If I had studied my map a little more closely I would not have been so astonished, after a two-day journey in a straw-covered dugout canoe, to find myself in a "little stream" 2 to 2½ miles wide, which was still just as wide after 10 days of sailing upstream. One would sail for hours among countless islands of varying sizes without knowing if one was still in the Japurá or if one would come out in one of the tributaries or even in a large lake. It is not a sensible thing to travel in such a tiny means of transportation, even if it is powered by a slow (but very dependable) Swedish outboard motor. It takes two hours to cover only a tiny space on the map, but there are no more detailed maps!

The Japurá flows from Colombia. There it is called the Caquetá. It

36

of Brazilian coffee which is brewed so strong that the spoon stands in it!

Here there were numerous Piranhas, *Curimatopsis*, Matríncha and, according to the natives, there were also the big, beautifully-colored Pirarucú, *Arapaima gigas*. Giants, which grew to a length of 8 feet and fed mostly on fish.

After a short trip across the lake we turned into a small stream. At its mouth the water was still and even darker. The entire surface was swarming with little fish. Would this be a wonderful new species? We stepped into the water of the flooded forest, which was not very deep at this point. No, these were only silvery, unattractive little Characins of an evidently unknown species. Nothing for the hobbyist! They remained near the surface, and I had the impression that they found the acid water not unpleasant, water which was saturated with tannic acid, bark extracts, decay by-products of leaves and animal matter.

After two more hours of travel we had to give up using the motorboat. The stream became narrow. Fallen tree-trunks blocked our way. We packed all our necessities into two wobbly, very leaky dugout canoes we had brought along, and left our "ship."

A dozen, no, a hundred times from now on this was our procedure: unload the baskets, camera, bedding onto logs which blocked our way and then lifting the bow and sliding the body of the dugout over the giant log until it splashed on the other side. Then packing and storing

*Arapaima gigas* are numerous in the Japurá. They grow quite large and are a favorite native food. Photo by Harold Schultz.



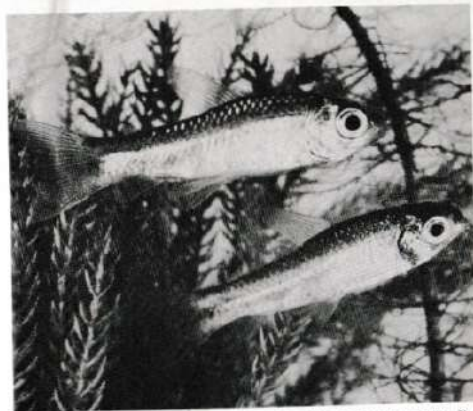
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flows in a north to south direction. Its mouth in the Amazon is a big and much-divided delta with some streams which are hundreds of miles in length. Even after sailing two or three days upstream, there is still real Amazon water under the keel. Deep, long channels, here called *Paraná* are connected even at this height with the Amazon, which sends in its water and colors the Japurá a muddy yellow. And here is something else which is very remarkable: I sailed at the end of December from Tefé, a little, old Amazon city. It was the beginning of the rainy season. Cloudy skies. Rain. Water levels which were constantly rising, already overflowing into the forests along the banks. And of course the Amazon waters which were connected through the mouth of the delta also flooded, forcing the people who lived in the lowlands to move their houses. When we arrived at the real headwaters of the Japurá after several days, the water level sank rapidly. The higher we ascended the river the shallower it became, and soon it was adorned with large sanddrenched sandbanks. Here the water of the Japurá was light green, transparent. Turtles already began to climb out of the water and up the sandbanks to lay their eggs in holes they had dug themselves, afterwards covering them meticulously and smoothing them with their shells, like a housewife irons her clothes. The blue skies were dotted here and there with little puffy white clouds. Here it was summer, the dry season!

It can hardly be expected that the fauna of a large river can be much different from that of the main stream into which it flows, especially in the vicinity of both converging streams, where the waters mix and the stronger ones predominate. Only when other climatic conditions are encountered as in this case, can one figure on finding other species of fishes. But in my own experience I have found that there are "islands" in which some species are found, fishes which inhabit a particular area and are not found in surrounding waters. Such fishes are held naturally to such "islands" because for definite reasons they can only find appropriate and sometimes irreplaceable conditions there.

My actual mission was to try to find the still-wild Makú Indians, who arm themselves with poison darts and swing their blowguns like war clubs. This mission unfortunately prevented me from making a thorough exploration of the Japurá and its tributaries, but sometimes I was able to make a systematic exploration for the hobby of parts of the Japurá. Traveling on the waterways would naturally bring one in contact with the fish fauna living there, but only in the rarest cases can an aquarium fish collector penetrate as deeply as a student of Indian life would travel in the pursuit of his profession.

After twelve more days of upstream travel we turned into a lake where the water was as black as coffee, and when I use this expression I speak



*Curimatopsis* species abound in the Japurá according to the natives of the area. Photo by Dr. Herbert R. Axelrod.

everything, boarding the boat with careful balancing, and then continuing on . . . continuing on? Oh, no, after 20 yards the whole task had to be repeated. Sometimes only 10 yards were gained, and with luck 50 yards.

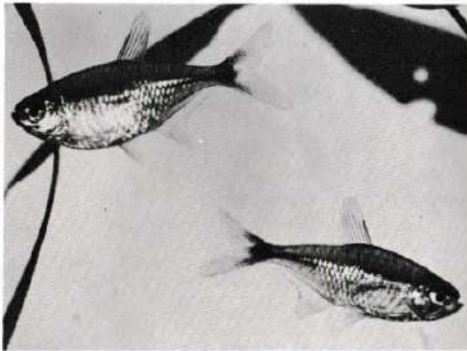
All day long our voyage continued in this manner, up the constantly narrowing stream. We had to get there before dark. Get where? Certainly not to a hotel! A few miles further on the water began to flow. The dark waters of the lake were no longer to be seen. Here the water was clear and transparent. The heavily wooded banks were no longer under water. Suddenly there appeared countless schools of fish: *Poecilia latipinna*, *Moenkhausia oligolepis* and *Hemigrammus ocellifer*, plainly colored smaller Characins and a reddish appearing fish with long waving dorsal fin, *Hyphessobrycon rubrostigma*, in schools. Among these a completely unfamiliar species of Dwarf Cichlid with unusual patched marking. And there, an Electric Eel as long as a man's arm. It glided out from under the shrubbery along the shore, in search of something. I raised my 22-caliber precision

41





Two cosmopolites of the Amazon region, *Moenkhausia silgolepsis*—above—(photo by Günter Seiff) and *Hemigrammus ocellifer*—below—(photo by G. J. M. Timmerman).



44

Large schools of silvery, glittering Matrinchans (*Curimatopsis spec.*) flee at our approach. From time to time we can see yard-long Arowanas, *Osteoglossum bicirrhosum*, just below the surface. One sees their typical, deeply-slit, upturned mouth. The whiskers are turned forward, and the slow, undulating body movements remind one of a snake, even when not swimming. Arowanas are often shot by the Indians. They can also be caught on hook and line, but when seized they leap over the top of the net in a graceful arc at just the right moment.

I reached for the heavy double-barrelled shotgun. We were in need of food. Roasted over an open fire, an Arowana is one of the tastiest morsels which the Amazon provides. The fish however saw my awkward and wobbly actions in the dugout at once. A high leap out of the water, a dive, and he was gone! But fate is sometimes kind, even if at times the unexpected happens. The whole time the shotgun was in the bow, where it lay dry and could not be reached. I told my bow-man, who was pushing the boat upstream with a long pole, to hand me the weapon so that I could shoot the Arowana. Well, the fish was gone but at the same time a fat duck rose from the water at the boat's approach, right in front of my gun and about a hundred feet away. All I had to do was to pull the trigger! We had no salt, but even without it, roasted over the fire it became an unforgettable delicacy . . . for our hungry stomachs!

The deep forest which bordered both sides of the stream became still denser. It was twilight, and at times the sun shone through the fallen branches of the trees which lay across the water, making patterns on the surface.

And here the bottom of the stream became entirely covered with a dense bed of aquatic plants. The leaves looked like those of water-lilies but there were none floating, even in the brighter spots. There are thousands, tens of thousands . . . the roots do not resemble water-lily roots; they are white and grow in bunches in the sandy bottom, without bulbs. The bottom is mostly sandy, in places muddy or covered with a thick layer of rotting leaves. These beautiful bright green plants form thickly matted beds. Most of them are not tall, 4 to 6 inches, but there are others which grow to a height of 16 inches, all of them staying well below the water's surface.

"Here we must collect plants, but later, when we return, Trolo," I said to my hard-working and faithful companion, a native to the Amazon region with mixed European and Indian facial features.

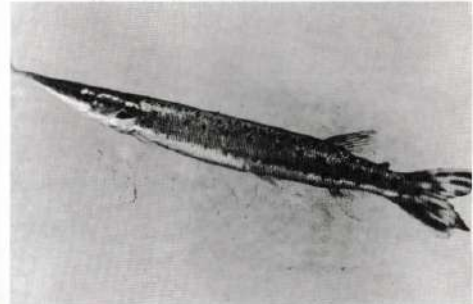
One can only get an idea of the wealth of fish-life, both large and small, after having visited the Amazon and its many tributaries during

48

rifle. Before I could take aim it disappeared with the speed of lightning. I could not even see where. Just under the surface there glided three, then five, and right after that seven tiger-striped fish, long and thin like a Pike with a large mouth and a red upturned nose like so many of those found on the Germans in Saxony: *Boulengeriella maculata*. These beautiful creatures have never to my knowledge been shipped to civilized countries. They fit among twigs rotting in the water, halt, examine anything which might be edible, and then move on. One of them attacked a bit of cracker which I threw into the water. It found out very quickly that it had made a mistake, being a carnivore which preys at night, it eats fish, not biscuits, and then all rushed away, highly indignant.

There were also Piranhas in these waters. They all prefer the deeper water. Here, as everywhere, nobody is afraid of them when we have to stand knee-deep in the water to push our dugout over fallen logs. When we do this we do not stand on the bottom, the water being about five feet deep here; we must often stand on the limbs of these fallen trees, which are often so slippery that I have to hold on tightly to avoid plunging into the deep water, but my helpers are accustomed to this sort of work. Nobody would exactly want to fall into the deep water. There might be big snakes to which a man's foot might appear edible, not knowing that on the other end there would be a large, unwieldy man.

*Boulengeriella* species are attractive and unusual, but they feed on other fishes and each other! For this reason, they are not imported for use in aquariums. Photo by Harold Schultz.



45

the dry season. A single one of the big lakes in the Amazon could supply all the hobbyists in the world for an unlimited time. We need certainly never worry that any aquarium fishes in the Amazon Basin will ever become extinct by being fished out. Even if all the collectors concentrated their efforts on one single species!

Here too in this remote stream which was visited by few humans, the water swarmed with all sorts of fishes, but we had no time to examine them all. This had to be put off until I returned from our Indians. The first netting showed no sensational novelties, with the exception of an *Apistogramma* species unknown to me.

"When we return from the Makú we want to stop here and photograph fish for a few days, Trolo!"

"Sim, senhor!" was his always-cheerful answer.

But man proposes and God disposes! The Makú Indians accepted us in a very friendly manner. They lived far in the forest. We had to travel for hours on narrow, winding paths far away from "our" stream. The Indians get their water from rain-pools, which at this time held only luke-warm stored water. Here also there were a few fish species, unattractive little Characins and a wonderfully coloured *Rivulus* species.

After twelve days we finally broke off our visit. A young Indian girl had committed suicide by taking strong poison. A thwarted romance! The Makú were still friendly but my friend, being an Amazonian, was wary. "Estou com medo"—"I am afraid!" this usually brave man admitted. In spite of this he carried back all of our things again with the Makú Indians to the boat. But we could not even consider doing anything about catching fish. I could not move him on any pretext on this score.

To be honest, I expected to catch new and beautiful species for the hobby here. But to do this it is best to travel to a point far above the fast-flowing waters. In the lower stretches the fish species take on a sameness.

Our brook had sunk still lower. We required two days of travelling before we had dragged our equipment through all the obstructions made by the fallen trees to get to where we had left our motor-boat.

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# MAIL CALL

By William Vorderwinkler

If you have an aquarium question and cannot find the answer in any of the standard reference texts, send it to MAIL CALL. Each month this column will publish the most interesting questions received and their answers. Letters containing questions cannot be acknowledged or answered personally. Address all questions to: MAIL CALL, T.F.H. Publications, Inc., 245-247 Cornelison Ave., Jersey City 2, N. J.

### Marble gravel

Q. 1. What can I do about a male *Betta* which eats the eggs after they have been put into the bubble nest? I have tried removing him from the tank after spawning was complete and lowering the water level to 1 inch. This doesn't work; now what?

A. 2. I had been using marble gravel until I realized my water was becoming progressively harder even when no new water was added. The water also became more alkaline. I now use granite gravel in my tanks and have had no more of these problems. My only problem is the drabness of the gravel. Is it possible to dye granite?

A. 3. I have a pair of tiger barbs which were sold to me as "golden tiger barbs." They have been with guppies, neons, bettas and dwarf gouramis without ever showing any hostility. Is this a new species or do I have an exceptional pair? They have not bred

as yet even though the female swells with roe and both are at least 2 years old. Any suggestions?

4. What is an inexpensive method of getting soft neutral water?

5. What caused corkscrew *Vallisneria*?

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variety. This variety has proven to be a lot more peaceful than the common variety. To breed them, set a pair out in their own breeding tank under conditions recommended for tiger barbs in any good book on tropical fish.

4. If your tap water is unsatisfactory the best thing to do is to scout around for a source of water which is what you want. Perhaps you can locate a spring, brook or pond which is soft and neutral. You may have a friend who has a water softening unit in his house. Of course, you can always collect rain water or use the water from melted snow.

5. You did not mention how many guppies you had in your 5-gallon tank. Your *Vallisneria* put out more sprouts and grew, and in doing so might have run out of space to grow in. Perhaps if you thin it out somewhat it will commence growing again.

### Strange odor

Q. I have a problem that has completely baffled me for the last few weeks. I own a 20-gallon tank in which I have tiger barbs. It started to give off a very noticeable odor. It has the smell of garlic or, at least, metallic garlic. I feared that this indicated the presence of something that would hurt my fish, so I cleaned out the tank. I washed it out with salt water and did the same to the plastic plants, ornaments, and red gravel; then I put everything back in the tank. After a while the smell returned. I eliminated some ornaments and plastic plants, which didn't change a thing. The smell occurs most strongly on one side of the tank. Since I had been putting in algae control tablets in the last few months, I took a tablet, dissolved it in a small glass, and sniffed the resultant

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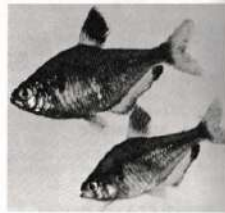
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solution . . . there was no smell. The barbs seem to be in good health but, with that smell, I am afraid it won't last. I will appreciate any information you can give me.

**Gary Milewski, Philadelphia, Pa.**  
**A.** A garlic smell? I am tempted to tell you to stop feeding your fish sakani. Seriously, what I think is happening is this: the smell, you say, occurs strongly on one side of the tank. This is probably where your filter returns come in, or where an airstone causes your tank water to splash against the inside metal lip of the aquarium. A reaction of some kind seems to be taking place when the water comes in contact with the metal. A simple way to overcome this is to coat the lip of the aquarium with aquarium sealer.

**German reds**  
**Q.** I have recently acquired four fish called German reds. I would like to breed them: can this be done? If so, is there any way to tell the sexes?  
**Dan Bowron, Norfolk, Va.**

**A.** I am tempted to say that your German reds came from East Berlin, and recommend building a wall across your tank. Seriously, they may be red serape tetras, Hyphessobrycon serape minor. These



Hyphessobrycon serape minor

spawn in plant thickets like many other tetras. Males have the more slender body and slightly larger fins. Your fish may also be a strain of red platies. These are

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livebearers, and the male's pointed anal fin forms a gonopodium.

**5-gallon tank for 7-inch catfish**  
**Q.** I have several tanks and in one of my 5-gallon tanks I have an albino *Clarias* catfish. He is about 7 inches long and every week or so I have to clean his entire tank because it gets so dirty and the water gets cloudy. I feed him shrimp pellets. I have an inside corner filter and an airstone. What could I do to keep him cleaner without so much maintenance?  
**Bill Goodan, Los Angeles, Calif.**

**A.** The rule of thumb about putting 1 1/2 inches of fish into a gallon of water would not apply to a 7-inch fish in a 5-gallon tank. A 7-inch *Clarias* would require a tank of about 20 gallons in capacity. Give him this and any filter, and you will find

that you will have to do less maintenance work. *Clarias* have a wonderful appetite and their droppings raise havoc in a small tank.

**Freak bettas**  
**Q.** In May '64 my *Betta splendens* spawned. I followed the book instructions as to when to take the female and male from the fry. I fed the fry a liquid formula and then frozen brine shrimp. The fry are grown now and I am still waiting for them to develop their pectoral fins. They were raised in a 10-gallon tank and there were approximately 50 fry. I separated the males at 3 months. Did I do something wrong? Why don't they have their pectoral fins?  
**Donna Bixler, Gettysburg, Pa.**

**A.** It happens sometimes: you have a batch of freaks! Don't use the same pair for spawning again. Use a different male, or a different female.

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**Dwarf gouramis**  
**Q.** I have recently acquired a pair of dwarf gouramis (*Gonia salis*). These I have fed on earthworms, brine shrimp, glass worms, tubifex, daphnia and prepared foods. The only signs of courtship are when they come together head to tail with stretched fins and doing a side to side dance. Their water is at a temperature of about 78° to 82° F., and they get about 12 hours of light daily.

1. Is the temperature too high or too low?
2. Have they too much or too little light?
3. Are the fish really courting? If so when should the breeding commence? This side-to-side movement only started 3 weeks ago and they now seem to have lost interest in each other.

**A. Coles, Maidstone, Kent, England.**

**A.** The diet you are giving your dwarf gouramis is satisfactory if you are feeding in the proper quantities. Never give them more than they can clean up in 5 or 10 minutes.

1. The temperature, if anything, is a bit too high. When not breeding, the temperature should be about 76° to 78° F. Breeding generally takes place at 80° F.
2. You do not mention how strong your light is. You also do not say whether

or not they are getting natural light in addition. Twelve hours of even a less than normal intensity of light is a great deal. I recommend that you cut back to about 4 to 5 hours of artificial light plus whatever natural light the tank gets.

3. The movement described is the usual "threatening" posture which is often used by two males. If yours is a genuine pair, you should notice a bulge in the female's abdomen at times. The male signifies his readiness to spawn by constructing a bubble nest. He coaxes her



Spawning dwarf gourami

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under this and wraps his body around hers, fertilizing the eggs as they leave her body and float up into the nest.

**Making tubing behave**

**Q.** Since I became interested in fish (which was only a short while ago) I have been plagued with the problem of placing and keeping an airstone or filter exactly where I want it in the aquarium. The plastic tubing we use comes in rolls and persists in retaining its curved shape, it seems impossible to place it neatly in the aquarium without having it curve in just about every direction except where I want it. To stop this I use an appropriate length of small gauge galvanized wire inside the plastic tubing. It can then be bent to any shape that I want. For example: I ran a tube down the corner of the aquarium and under the gravel and had the airstone at the gravel surface behind a stone. The water doesn't contact the wire and there is no danger of oxidation altering the pH of

the water or affecting the fish in any way. How do you feel about this?


**Ray Shelton, Sonora, Texas**  
**A.** It sounds good, but I'm afraid I'd have to disagree with your statement that the water doesn't contact the wire. If ever you stopped getting air pressure, the water would seep back in through your airstone and fill the tube all the way up to

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the water surface. Then when the pump was turned on again the water that had been in contact with the metal in the wire would be pushed out into the tank before the bubbles started. This might not be a serious thing in the average freshwater aquarium, but in a marine aquarium it could lead to trouble. Even if your air is in constant 24-hour supply, there could be an electrical current interruption over which you have no control.

**Variety of questions.**

**Q. 1.** After the filter carbon has been used is it all right to put it on the bottom of the tank and use it as gravel?

**2.** I have some baby guppies that have some black spots on their tail. Does this mean anything?

**3.** Could you please tell me how to go about feeding live, newly hatched brine shrimp? Do you know where and for how much I could get some brine shrimp eggs?

**4.** Could you tell me where I could obtain a pair of Australian rainbows?



Australian rainbow, *Nematocentrus maculochi*

**5.** Could you tell me, please, how to keep native dace, and some of the habits of a native catfish?

**Paul Colley, Roanoke, Va.**  
**A. 1.** Filter carbon after it has been used for a while becomes clogged with all sorts of detritus. This is the very devil to trash out and if left in could cause the water to become foul.

**2.** Merely that they will have black markings in the tail when they grow up.

**3.** Hatch as directed in the directions which accompany the eggs. Then cause the young shrimp to gather by putting a

light nearby. Siphon the shrimp and water through a very fine net or a piece of linen. Return the water and run fresh water through the shrimp to wash off the salt water. Then you are ready to feed them to the fish. Be careful not to over-feed; if you have gotten out too many shrimp close to the hatching container. Your dealer should have some brine shrimp eggs or be able to get them for you; the price varies, but they are usually available.

**4.** These are usually to be found in the tanks of most fairly well-stocked dealers. If yours does not have them, a little patience is indicated until he gets some in.

**5.** About May, great numbers of young dace are to be found in most lakes. They are easily netted out, and a few may be kept in a planted but unheated aquarium. They eat prepared as well as live food. Native catfish can be kept in the same type of aquarium, also unheated. They have large mouths and can swallow smaller fishes kept with them. They also have large appetites and grow to a considerable size in a short space of time.


**Guppies in the open**  
**Q.** Can guppies be put in a small stream and live there with other small creatures like frogs, snails, minnows, turtles and tadpoles?

**Debra Schefers, Caledonia, N.Y.**  
**A.** Not in Caledonia, N.Y.! A guppy would probably live through the warm months and be able to hold its own, but as soon as the water got cold, goodbye! Some of our tropical species have acclimated themselves to our warm streams: we have heard of Oscars being taken on hook and line in Florida streams and giving a fight comparable to that of a bass. But even an Oscar couldn't survive the winter temperatures in most of our states.

**Plastic lights**

**Q. 1.** I have two tanks on which I have plastic lights. In the back of the light there is a pinkish red color which comes off; what is the cause?

**2.** Will it hurt the fish?  
**Alex Unger, St. Louis, Mo.**



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**A. 1.** Obviously you mean plastic hoods, not lights. The plastic behind the incandescent lights becomes heated, changes color and peels. Discard the old hoods and replace them with some of higher quality plastic or with stainless steel ones.

**2.** Yes, a hungry or inquisitive fish might wonder if it tasted good and sample it, much to his sorrow.

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**Neon colors**

**Q.** I have been re-reading your June 1964 issue, especially the article on the coloration of neon tetras. I was particularly interested in Herr Mayer's view that food had nothing to do with color in neons. Each year from about the end of November until March I raised a certain number of neons. My greatest trouble, after I had found a sound

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method of breeding these fish, was to get a deep red color into them. I tried everything I could think of without result; the red remained a deep pink. One day I visited a friend who had obtained some young neons from me, and I found these fish to have deep red coloration. I asked him what he was feeding these fish and found that they were getting small live cyclops. I had been giving daphnia without results in regard to color, and when I changed over to cyclops the results were really good; it took about 12 to 14 days for the color to change into the deep red I wanted. For this reason, I now breed neons from the end of February until May, when I can get cyclops in abundance from our local sewerage lagoon; after that period I can get only daphnia from this lagoon. The results I get with cyclops as opposed to those I get with daphnia suggest that there must be some

different type of blood or coloring matter in the cyclops which does the trick. I have been breeding neons for about 18 years and can assure you that the cyclops have been a blessing.

**Reginald Mackrell, Yorkshire, England.**

**A.** Wonder what it actually is? In the early days I recall seeing some neons which were bred in Germany, and these were some of the most colorful neons I have ever seen. German breeders at the time were making extensive use of cyclops as well. The strange thing is that what is present in cyclops should be absent in daphnia from the same body of water. After all, both are crustaceans, and both get the same food. Your findings may pave the way to bringing out the red colors in other fish species, a task which has proven to be a problem to many breeders.

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By Paul Hahnel

**Redtailed females**

**Q.** I have had some guppies for about 18 months. During this time they have been breeding with fair regularity but I have not taken any care to separate the "good" from the "not-so-good" specimens. However, lately I have noticed that some of my females have developed some color in their tails. The color is red or at least yellowish-red. The coloring is not intense but is noticeable at a glance. They have also developed some black markings in the tail. Please tell me:

1. Will this coloring increase in succeeding generations?
2. What "breed" of guppies are they?
3. What type of males should be used to obtain the best end results?
4. What books would you recom-

mend for further information about guppies?

**Henry Olwage,**  
Johannesburg,  
Transvaal,  
South Africa.

**A. 1.** I have seen many guppy females with red color in their tails, shown in the different guppy shows. If you want to increase the color, always select the best looking fish for breeders in successive generations. This is the general procedure followed by all guppy breeders. There is a belief that certain chemicals in the water cause hormone reactions which are responsible for this occurrence; I do not

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know whether this is so, for of all the thousands of fish that I have bred there was only one female with red color in her tail.

**2.** The red color of the female's tail does not put them in a separate classification.

**3.** Best results depend on the use of the best parents, but don't forget they must also get the best environments you can give them.

**4.** TFH Publications, 245 Cornwallison Ave., Jersey City 2, N.J., has a number of good booklets on guppies available.

**Albino guppies**

**Q. 1.** Is it possible to develop a strain of albino guppies with a deep red color in the tail?

**2.** Can one inbreed albino guppies and still get a strong strain after several generations?

**3.** To maintain a vigorous strain, would you recommend an occasional crossbreeding of albino guppies with non-albino guppies?

**4.** Would you tell me the names and addresses of some amateur or pro-

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fessional guppy breeders who have first grade guppies?

**T. C. Huang,**  
Kingston, Ont., Canada.

**A. 1.** I do not breed albinos, but I have seen them with red tails in a New York City pet shop. They had come from a breeder in Brooklyn, N.Y.

**2 & 3.** You can inbreed for generations, but you cannot eliminate the possibility that you will sooner or later have to breed back to the common gray guppies to keep the strain strong. As soon as possible you have to separate the albinos from the gray babies which result from this crossbreeding. Albinos are very difficult to breed because they are very cannibalistic. Many breeders use breeding traps, a step which I would not recommend for types other than albinos.

**4.** Write to Frank Alger, 186 Poor St., Hackettstown, N.J. He might be able to help you.



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By Alfred A. Schultz

**Caught in the Net . . .** Back in 1951, I walked into one of the local aquarium shops. I needed some food, and if the prices were right I would pick up a couple of fish. I bought the food and began looking at the many tanks of fishes. I picked out a nice pair of guppies and a few angelfish. Suddenly I stopped. Swimming about in a 5-gallon tank was a fish which took my breath away. It was an orange-colored fish but it seemed that someone had taken an artist's brush and had painted white stripes around the fish's body. I asked the price and for the second time in a few minutes I lost my breath. It was "only" \$12, which to me at the time was a small fortune. Of course, it was just a clown fish in a salt water tank, but it started my desire to own my own marine aquarium. Times have changed — now with the modern shipping methods and tranquilizers, the prices of such fishes have come way down and we can keep them with us for much longer periods.

The moral of this tale? Next time you go to your favorite aquarium store, take along a friend. Introduce him or her to our wonderful finny friends. You may be starting a new member in one of the world's nicest hobbies.

From time to time U.S. hobbyists write to me asking for names of marine aquarists in other countries with whom they can correspond. This seems to me to be a particularly nice way to get an idea of what's going on in our hobby in other parts of the world. Anyone interested in corresponding with a salt water hobbyist in Sweden, write:

**Mr. Torbjörn Malineström**  
Mardvagen 27  
Karlstad, Sweden.

**Q. 1.** I recently purchased a small fish, 1 1/2 inch, which looks like *Datynia trimaculata*, but the spots on its sides are larger and there is no spot on the forehead. Would you please tell me what fish this is?

**2.** I also have an arrow crab in my tank. Will he in any way harm my fish?

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3. I would like to add a small black angel, a small clownfish and one or two neon gobies. Would I be overstocking my 10-gallon tank?

4. I live near the ocean and during the summer I have found many interesting crabs such as blue crabs and lady crabs. They are very little. Could I put these in my tank?

John Buttery, Hewlett, N.Y.

A. 1. This is the same species; sometimes the spots vary or are lacking altogether in places.

2. It can kill your fish if it can catch it.

3. No.

4. They can be kept, but give them their own tank.

Q. I would appreciate it if you would answer these questions for me, concerning *Scotophagus rubrifrons*:

1. Has any new information been uncovered as to their breeding habits in the last several years?

2. They are said to go through a larval or *Tholichthys* stage. What is meant by this?

3. In view of this larval stage is it in the realm of possibility that they could be bred in an aquarium?

Louis F. Ekam, Schenectady, N.Y.

A. 1. No.

2. This means that the larval form has

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been found and was at first thought to be an entirely different fish, but was later identified.

3. Nobody has ever been able to get them as far as the larval stage, much less beyond that, in captivity.

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A pair of bleeding heart tetras. The blood-red spot over the belly gives the fish its common name. Photo by Kremer.

## Raising and Breeding The Bleeding Heart Tetra, *Hyphessobrycon rubrostigma*

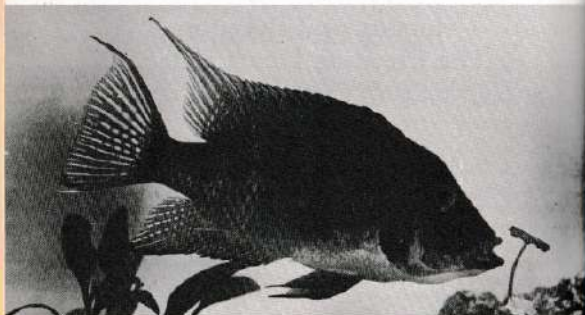
BY MIKE REED

With the exception of the neon and cardinal tetras, which are in a class of their own, I think *H. rubrostigma* is perhaps the most attractive of the aquarium tetras. Its body is a warm pink, more or less tinged with greenish brown. The standout feature is the bright, blood-red spot on the side, right over the belly. The top rim of the eye is also blood-red. The dorsal fin too is unusually colorful. At its base and tip, it is bright pink and white (the proportion of the two colors varying from one specimen to another). Its center is contrasting, jet black. Males of this species are more intensely colored than females and their fins are better developed.

To attain maximum size and fin and color development for *H. rubrostigma*, I have proven to myself a number of times that they must have fairly large and uncrowded tanks. Under these conditions, I have had them grow rapidly from 2 inches at purchase, to about 3½ inches in length on a diet made up exclusively of dry foods! There is an interesting story about the size of this species. When the fish were introduced in the mid 1950's, premature reports, probably on young fish, stated their maximum size to be under 1½ inches. Old reference books still carry this misinformation. As though afraid to dispute this inaccuracy too much, later reports gave 2 inches as maximum size. Finally the new TFH *Exotic Tropical Fishes* gave an accurate size description.

I keep my six adult bleeding hearts in a 50-gallon community tank. The tank is not crowded but contains a number of large fishes including five 6 to 7 inch *Sæmurus* and three 5 inch firemouths. If these aggressive cichlids have ever attempted to molest the comparatively small tetras, I've never seen it or any torn fins as evidence. The bleeding hearts seem to be in vibrant good health. They are all 3 to 3½ inches long and beautifully colored. The water is kept sparklingly clear by a power filter. If the fish have any special water requirements, they have been met through the use of aged New York City tap water, which has a pH slightly above neutral and is relatively soft. Temperature in the tank is normally 78°F., but in summer it occasionally reaches 90° or more for periods of about a week and the bleeding hearts don't seem to mind it.

Fully grown bleeding heart tetras are able to take care of themselves even amongst large cichlids such as firemouths, *Cichlasoma meeki*.



Several months ago I noticed a particularly plump female and decided to attempt a spawning. I used a 20-gallon tank the corners of which I planted heavily with a mixture of *Cabomba* and *Eloidea*. Water conditions were the same as those under which the fish had been thriving since I purchased them. I introduced the plump female and a male into the breeding tank on a Friday evening. Through to Sunday evening the fish showed little interest in one another. On Monday morning the male was chasing the female half-heartedly but not even nearly intensely enough to be construed as spawning behavior. With no result by Thursday, I returned the male to the 50-gallon tank and chose another. This time I waited a full week before I gave up and returned both fish to the large aquarium.

The more I thought about it, the more the failure to spawn the fish bothered me. I was fully aware that I had done just about as little in the way of preparation as was possible. Finally I decided to give it another try and this time to take some pains with the project.

First I separated my pair in two 10-gallon tanks. I fed frozen brine shrimp and provided baby guppies by placing a number of gravid female guppies in slat-bottom breeding traps suspended inside the two tanks. In addition, I raised the temperature to 80°F. in the tanks and lowered the pH gradually (with sodium biphosphate) to slightly below neutral. For the spawning aquarium, I used the same tank and plant arrangement as I had before. The only difference was a change in temperature and pH to correspond to those I had created in the 10-gallon conditioning tanks.

I put the pair into the breeding tank on a Thursday evening. The next morning they were spawning. The male drove the female into the midst of the thickets of plants, where they pressed together and shook spasmodically. This procedure was repeated a number of times and each time 20 or 30 eggs were released. Before I left for work I put a note on the kitchen table asking my wife to remove the breeders when she awakened. Unfortunately the fish finished earlier than I had anticipated and had eaten most of their eggs before they were netted out.

The eggs that were left were lodged amongst the plant fronds and on the gravel at the bases of the plants. I saw no evidence of fungus on any of the eggs in the next two days and by the third morning they had hatched. Late in the fourth day the fry were free swimming. There were only fifty of them, a consequence of the parents' egg-eating spree. I started the fry on infusoria, switching to finely granulated dry food and newly hatched brine shrimp after a week. They grew very quickly at first, but after about a month slowed down to a moderately fast growth rate. If it is characteristic of these fry to spurt in growth in their first weeks, they may consistently show an extremely low mortality rate in this usually-critical period. Of my original fifty fry, for example, forty six have now reached five months of age.



Two Chinese algae-eaters, *Beaufortia pingi* (above) and *Pseudogastromyzon myersi* (below).

## Chinese Algae-Eaters

BY DR. MARTIN R. BRITTON,  
Professor of Life Sciences,  
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Last winter there poured into this country great numbers of strange, limpet-like little fishes dubbed by dealers and hobbyists alike "Chinese algae-eaters." Looking like flattened tadpoles with huge spreading pectoral and pelvic fins forming an adhesive disc, these fishes show a high degree of adaptation to the mountain streams which are their homes. With their ventral sucking mouths they browse the plant and animal scum off stones.

These fishes should prove to be quite hardy, since in their native mountains there may be a considerable range in oxygenation, temperature, and the amount of silt carried in the water. During the rainy season a stream is apt to be an oxygen-saturated, silt-choked, raging torrent; while during the dry season the stream may be broken up into a series of isolated, oxygen-deficient pools in which the temperature climbs and algae builds up. Usually, however, the streams are fast moving, clear, and well-oxygenated. Some of them are at

72

June, 1965

quite high altitudes, and so these fishes should tolerate, for tropicals, some chilling.

Most of the specimens entering the U.S. were apparently collected in Hong Kong and the adjacent mainland for Mr. Harris Teo of the famous Singapore firm of Teo Way Yong & Sons. Two species were identified, *Beaufortia pingi* Fang and *Pseudogastromyzon myersi* Herre. There are five species included in the subfamily *Gastromyzoninae* of the family *Gastromyzonidae*, to which the Chinese algae-eaters belong. The *gastromyzonines* are found only in southern China, Indo-China, and Borneo. There is another subfamily in the family *Gastromyzonidae*, the *Crossostominae*, with about 25 species, which shows nearly the same distribution. A related family, the *Homalopteridae*, with over 50 described species, is found in the same areas, but extends south-eastward to Malaya, Sumatra, and Java, and westward to Thailand, Burma, and India. The *Crossostominae*, though having expanded pectoral and pelvic fins, are more elongate than the *Gastromyzoninae*. This is also true of the great majority of the *Homalopteridae*, but a few of the genera have strongly-depressed, tadpole-shaped bodies, with the paired fins modified into a ventral sucking disc, and will probably be termed "Chinese algae-eaters" if and when they are imported.

Systems of classification improve over the years. Many years ago all the above fishes were considered to be in the carp-minnow family, *Cyprinidae*, along with such fishes as the danios, barb, and rasboras. Then, more recently, the homalopterids (including the *gastromyzonids*) were grouped with the loaches, *Cobitidae* (which themselves had earlier been placed in *Cyprinidae*). Later the homalopterids were given independent family rank through the studies of the great Indian ichthyologist, Sunder Lal Hora, published in 1932; he recognized two subfamilies, the *Gastromyzoninae* and the *Homalopterinae*.

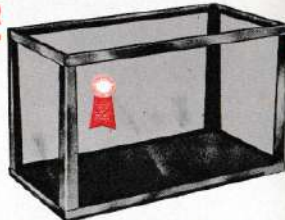
*Gyrinocheilus aymaeri* is probably the fish that is most often sold as the Chinese algae-eater. However, this fish is not from China at all; it is from Siam! Photo by Dr. Herbert Axelrod.



73

Tropical Fish Hobbyist

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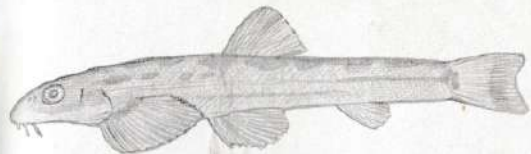


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74

June, 1965



A homalopterid, *Homaloptera montana* Herre, X3. From Silas, 1953, *Rec. Indian Mus.*, Vol. 50, part 2, plate 5, fig. 1 (slightly modified). The family *Homalopteridae* is related to the family *Gastromyzonidae* and some of its members will probably be called Chinese algae-eaters if they are imported.

In 1950 Hora raised the two subfamilies to independent family rank. Hora's excellent student, Eric Godwin Silas, in 1953 recognized the former's two families, *Homalopteridae* and *Gastromyzonidae*, and divided the latter family into two subfamilies, *Gastromyzoninae* and *Crossostominae*.

There are two interesting "mysteries" about these fishes which we call "Chinese algae-eaters." Firstly, there are fishes in two separate families which are so similar that they sometimes have been mistakenly classified in the same genus. Such genera as *Sinogastromyzon* in the family *Homalopteridae* and *Gastromyzon* in the *Gastromyzonidae* are superficially quite similar. Secondly, species of the family *Gastromyzonidae* which are even more similar, for example those of the genera *Gastromyzon* and *Beaufortia*, the latter of which was originally described as *Gastromyzon*, are found in two widely separated areas, southeastern China and the island of Borneo, with salt water in between. Did the Chinese forms migrate to Borneo, or vice versa, at some time when Borneo was joined to the mainland? This was long the most likely theory, for it is known that the islands of Borneo, Sumatra, and Java were once connected with Malaya as part of Sundaland when the sea was lowered through the tying-up of sea-water in the great Pleistocene polar ice caps. However, both Hora and Silas, after an extensive study of the situation, feel that these fishes have evolved no later than the late Pliocene or the Pleistocene. At that time only lowlands existed between the mountains of China and Borneo during the periods when the two lands were connected, and these would have been a barrier to hill-fishes. Consequently, they explain the presence of these fishes in two such widely separated areas as being due to parallel evolution; that is, such Chinese genera as *Pseudogastromyzon* and *Beaufortia* and such Bornean genera as *Protogastromyzon*, *Neogastromyzon*, and *Gastromyzon* have evolved independently from different ancestors (in this case primitive loaches, *Cobitidae*) and have been moulded to look alike by their similar adaptation to the same sort of environment, i.e., torrential streams. Silas puts the

75

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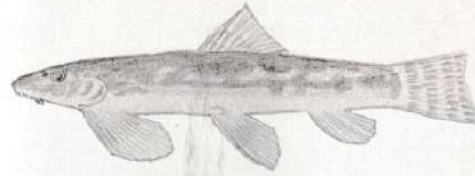
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A crossostomine gastromyzoid, *Crossostoma fuscicauda* Nichols, XI 56. From Nichols, 1943, *Fresh-Water Fishes of China*, p. 227, fig. 121 (slightly modified). There are some 24 other species in the subfamily Crossostominae of the family Gastromyzontidae, a total of about five times as many as are in the subfamily Gastromyzontinae.

Bornean and Chinese Gastromyzontinae into two different tribes, the Gastromyzontini and the Pseudogastromyzontini, respectively. The fishes of the genera mentioned immediately above, however, were originally described as species of *Gastromyzon* for the most part, so alike are they in appearance. Some ichthyologists (de Beaufort, among others) feel that they cannot have evolved independently and that the Bornean forms must have descended from the Chinese or their immediate ancestors, and migrated out to Borneo from China via a very early land connection, perhaps one existing in the Eocene. Silas also considers that parallel evolution explains the resemblance of the homalopterid genera *Sinogastromyzon* and *Hemmyzon* of China to *Metahomaloptera*, *Gastromyzon* and other Gastromyzontinae of the Gastromyzontidae. In fact, Silas considers that the Homalopteridae arose from the Cyprinidae and the Gastromyzontidae from the Cobitidae, and that certain genera in each group have come to resemble each other through parallel evolution. Further, he believes that the Gastromyzontidae are polyphyletic, with the Bornean and mainland Crossostominae and the Bornean and mainland Gastromyzontinae each evolving independently from primitive cobitid ancestors, and then undergoing parallel evolution. So far has parallel evolution been carried that, in both the mainland and Bornean Gastromyzontinae, genera have evolved in which the pelvics and pectorals form a sucking disc, as is the case in several genera of the independently evolved homalopterids and gastromyzontids, but the pelvics are, in addition, fused medially to form a flat, nearly circular "single" fin. Consider the Bornean Gastromyzontinae *Protomyzon* and *Progastromyzon* (with the pelvics not fused medially) and *Gastromyzon* and *Neogastromyzon* (with the pelvics fused) and their "twin" mainland genera *Sesellia*, *Paraprotomyzon*, and *Pseudogastromyzon* (unfused pelvics), and *Beaufortia* (fused pelvics).

So far as is known, none of these fishes have been bred in aquaria.