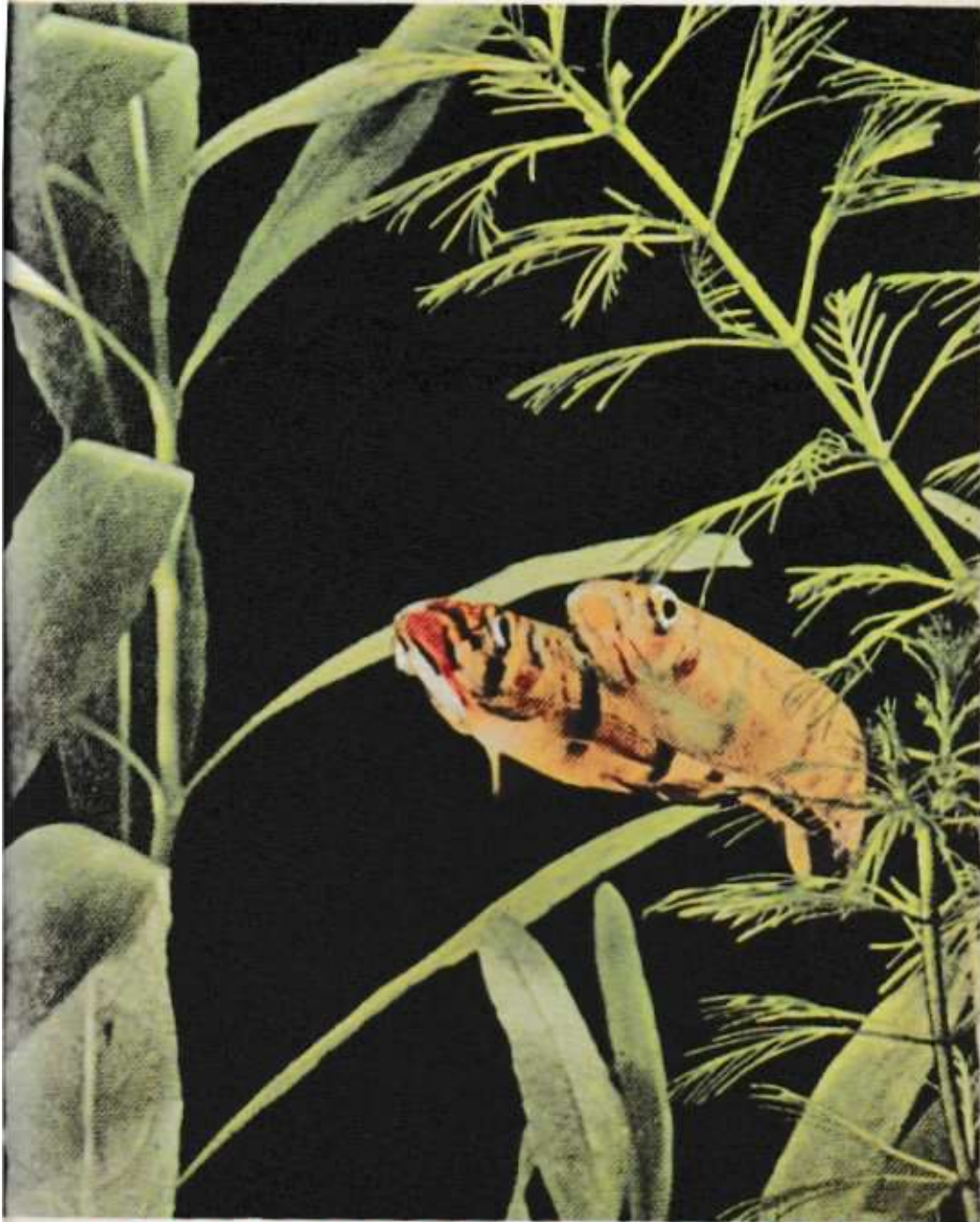


March 1967

tropical fish hobbyist

DOMESTIC 35¢ / British Isles 2/6



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features

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cover

This issue is the first with our new cover format. We hope you like it. And first to be featured on the new cover is the red-chinned panchax, *Epiplatys chaperi*. This species is one of the most attractive and popular of the killies. It's also one of the easiest to spawn, and many hobbyists interested in spawning the group start with *E. chaperi*. They will spawn into spawning mops or leafy plants. The eggs can be picked off by hand, for they are quite hard-shelled. Most breeders hatch the eggs in small shallow containers such as plastic refrigerator containers or jam jars. The parents are usually quite prolific, and the fry are fast growers. Before you know it you've got a population on your hands. For more details on this fish, including some beautiful photos, read the story beginning on page 4. Photo by Rudolf Zukal.

exotic tropical fishes supplements

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

rates

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publisher's note

How do you like our new cover format? And our new size, 100 pages? Notwithstanding our higher operating costs, the constantly rising prices of paper, inks, etc., you are getting a bigger magazine for your money: up to now you got 84 pages and now you have 100 pages, many of the additional ones in color. Now we can give you more to read, and more pictures to illustrate our articles. And how much more does all this cost you? NOTHING!

We've been told for a long time that we have the best magazine in the tropical fish field. This has by no means caused us to sit back and rest on our laurels. We don't just want to be the best, we want to be so much better that no other fish hobbyist magazine can ever hope to catch up to us. We don't just want our readers to be pleased with us; we want everyone who puts down each issue after reading it to say to himself (or herself): "Gee, I can hardly wait until the next one comes out!"

William Vorderwinkler

Tropical Fish Hobbyist

A Photographic Record of the Spawning of the Red-Chinned Panchax, *Epiplatys chaperi*

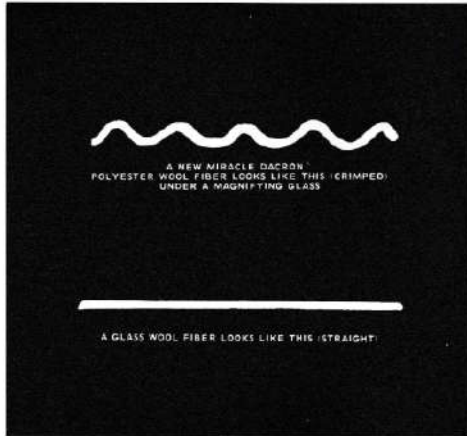
BY RUDOLF ZUKAL
BRNO, CZECHOSLOVAKIA

The red-chinned panchax was imported into Europe in 1908. This wide-mouthed fish with its five to seven vertical bars is native to tropical West Africa, from Sierra Leone to the Gold Coast.

The fish is not only one of the most attractive of the killies, but is also one of the easiest to breed. The male is larger than the female, about 2½ inches long, has a brick-red lower lip and yellow, black-edged fins. The anal fin is pointed behind and the lower edge of the tail is black and comes to a little



Above—A pair of *E. chaperi* spawning. They shake spermatically, side by side among the plants. As the female releases an egg, the male will fertilize it, and the shaking motion of the pair's bodies and fins creates a current that will carry the egg into the plants, where it will adhere by a tiny sticky thread. Photo by Hans Abol. Left—A pair of *E. chaperi* newly introduced into a spawning tank peer suspiciously out of the plants in search of the nest. Photo by Rudolf Zukal.



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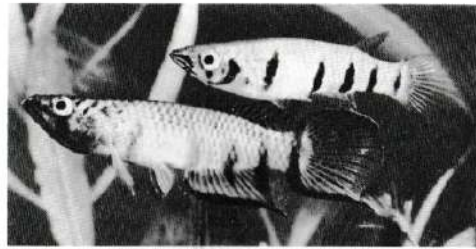
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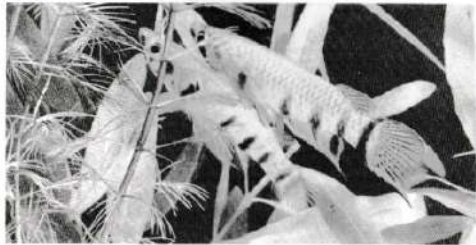
A male, intent on spawning, spreads his fins wide to impress a female. Photo by Rudolf Zekal.

point. The female is a bit smaller, has no red in her chin, and has rounded fins.

To keep them, a medium-sized, normally planted tank is sufficient. A temperature of 68° F. has been found to be sufficient. Medium-hard, slightly acid water is perfect. They should get small living foods, which they will snap up from their favorite haunts among the plants at the top of the aquarium.

For breeding, bring the water temperature to 75° F. A slightly smaller

The male crowds the female into the plants to spawn. Photo by Rudolf Zekal.



In the preliminaries to spawning, the male may lose the female. But he will continue to track her down and drive her about the tank vigorously until she goes with him into the plants. Photo by Rudolf Zekal.



This unusual shot shows the female flipped over during spawning. This is very unusual and is not desirable since it keeps the genital pores of the fish too far apart to assure fertilization of the egg. Photo by Horst Abel.

tank than the one in which they live may be used. Try to mate a robust male to a young, ripe female. The female lays her eggs singly among the roots of floating plants or right among the leaves of fine-leaved plants. Artificial spawning grass may also be used. Spawning can go on for a period of weeks, during which time the plants or artificial spawning grass with the eggs attached should be transferred to another container. The eggs and fry are best kept out of bright light.

Hatching takes about 10 days and the fry gather below the surface. They require tiny living foods. Growth is very rapid and the fry must be sorted frequently for size. In 8 weeks sexes can easily be determined, and in 9 months they are ready to breed.

By regularly removing the plants with the eggs on them and sorting the fry, it is possible to raise several hundred fish from a single pair in a year.

NEW

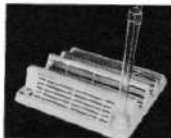
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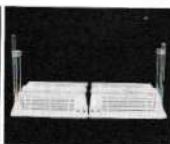
- 4 Snap the filter stem into place; the wider nipple fits into the wider slot. In all cases the narrow air tube goes to the rear as shown.



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- 6 For ultra-high power filtration where your fishes are overcrowded, you can use two filter stems in one filter. (Petshops stock and sell extra stems.)



- 7 The normal approach is a filter stem in each filter at opposite corners so the stems "kiss" in the corners of the aquarium.



- 8 Look for the Miracle Hi-Power Undergravel Filter in the red and black box at your petshop. It is the most powerful undergravel filter in the world!

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March, 1967

A New Tank Design... You be the Judge

BY MIKE REED

I don't think I've ever heard of a company well established in the aquarium equipment field letting hobbyists in on their new product plans in order to get some opinions. However, that's what Bader Industries, Inc. wants to do, and I for one think it's a good idea.

An artist's sketch of the tank in question is shown below. Basically



An artist's sketch of a model of the proposed new style of aquarium. Drawn from one of the several prototypes produced at Bader Industries, Inc.

the tank would resemble a television set with screens on all sides. Of course, the glass would be clear and flat to avoid distortion of the fishes within. The tank would be made by stamping the viewing areas out of a sheet of stainless steel.

This tank would be the first manufactured with such a design and would allow those hobbyists who want to get away from the pure angular design of aquariums currently on the market to do so.

There is no thought over at Bader that this new design would replace conventional aquariums, merely that it would give hobbyists more of a chance to select an aquarium on the basis of something other than capacity.

At any rate, it's up to you, the hobbyist, to let us know what you think. This is a unique chance to have your opinion mean something in this wonderful hobby of ours. Write to me, letting me know how you feel about the proposed new design. I'll be sure to convey your feelings to Bader. I'm sorry that we and Bader won't be able to answer all the letters we get. Rest assured, however, that your effort and your opinions will be appreciated. We'll look forward to hearing from you, and as a reward for your trouble, I'll send you samples of the newest Miracle Freeze-Dried Foods. Write to: Mike Reed, T.F.H. Publications, Inc., Box 33, Jersey City, N. J. 07303.

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Tropical Fish Hobbyist

The Central American Livebearer, *Brachyrhaphis terrabensis* (Regan)

BY DR. MARTIN R. BRITTAN
Professor of Life Sciences
Sacramento State College
Sacramento, California

Two years ago I collected an attractively colored little livebearer in the mountains near the Panamanian border of Costa Rica. A half dozen specimens were netted from among the thick weeds of a tiny stream flowing through the headquarters area of the Gromaco coffee plantation, situated where the Rio Cedro enters the larger Rio Coto Brus, the major tributary of Rio Terraba (Rio Grande de Terraba), which flows into the Pacific Ocean. Preserving three of the specimens in formalin for a subsequent examination under a dissecting microscope, I placed the other three alive into a plastic bag. There were two tiny adult males each about 1/4 of an inch in length and a larger female of about 1 1/4 inches. All were healthy and strong.

With occasional necessary changes of water, I carried the specimens safely back to Sacramento by plane, but one of the males was belly-up several days after arrival. The surviving pair adapted quickly to ordinary dried food. Several times they were placed in a community tank with various small

The author's *Brachyrhaphis terrabensis* male was a small specimen. Note the moderately long gonopodium. Photo by Dr. Martin R. Brittan.



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March, 1967



The *Brachyrhaphis terrabensis* female is as attractively colored as the male. Photo by Dr. Martin R. Brittan.

peaceful fishes (danios, rasboras, platies, and plecostomus catfish), and except for the female's occasional chasing away of a fish which got too close to her, they got along quite well; furthermore, the female was too slow to do any harm.

Later on they were placed in a planted 5-gallon tank in an attempt to breed them. The attempt was unsuccessful, because the female began to drive her partner unmercifully, quickly forcing him to skulk in the corners and behind plants; eventually she killed him. This male was the smallest of the two originally collected, and a mixed group of females and larger males in a more spacious tank would undoubtedly have bred successfully.

This is an attractive species, and one in which the female is just as nicely colored as the male. The body is olive-gray, silvery on the underparts. There is a series of squarish black blotches down the middle of the sides from operculum to tail, elaborated into a zigzag pattern anteriorly in the male. The median fins are margined with yellow. There is a black blotch at the posterior edge of the root of the anal fin (gonopodium in the male). The dorsal fin has a rather interesting checkered pattern. There is a diffuse blackish blotch on the operculum. The eye has a blue-green fleck. This is not a spectacular fish, but one which is colored with quiet elegance.

Brachyrhaphis terrabensis ranges from northwestern Costa Rica to northwestern Panama, occurring mainly in foothill and mountain streams on the Pacific slope. I have found it in Costa Rica to altitudes of over 3,000 ft., where often it is the only fish present in small, clear-water, rapidly flowing mountain streams; they are found in the quieter pools. Some of these streams are quite cool, with temperatures of around 62°F., so this is not a hothouse fish. It does well at temperatures from 60 to 75°F.

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The Red Discus

BY COL. FERNANDO DERVAL DE LACERDA
BRAZIL



Photo by Tetra-Min/James McNeil, W. Germany



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Our story is going to take you, friends, on a trip through the jungle in the central part of Brazil. You will not have to worry about great distances; you will not have to struggle with the mountains or have any other difficulties during the trip. Without thinking of time and space, you will follow the path of the sun and, after but a few moments, you will be in the middle of the jungle, where the white man is almost unknown. And this region, with its luxuriant tropical forests, as wild as it was when the first Portuguese conquerors landed in Brazil, will open up and show you some of its deepest secrets.

This trip really began when I was at the home of Mr. Cresio, the owner of a beautiful fish-breeding establishment. Besides the host, there were some friends of his there; Mr. Fernando Horta, an officer of the Bank of Brazil, and Commander Carlos Mals, a retired pilot of Panair do Brasil. Mr. Horta, for whom fishes had long been a hobby and whose success in breeding and raising tropical fishes had placed him in the ranks of professionals, had been looking for new specimens of different colors and shapes. Mr. Cresio's well-known ability in breeding rare species of fish inspires even the most inexperienced beginners. Eager for success in the rarer species, he has never lost sight of the value of the common varieties, and so he has a good stock of these at his house.

On the day of my visit, Mr. Cresio had received a large number of discus which had come from Central Brazil, deep in the Amazon Jungle, near a Brazilian Air Force base of Cachimbo (Pipe). These specimens were labeled "blue discus." However, the principal reason for the meeting at Mr. Cresio's was the discovery of a new specimen in the lot which was completely different from all the others and which we all admired. It was a most astonishing sight: a red discus! Its fins were red with tones of pink exactly like the blue tones on the blue discus. No discussions or opinions enabled us to arrive at any conclusion about such a rare specimen, though we guessed every possibility. We only hoped we had discovered something new.

As an officer in the Brazilian Air Force, I have traveled all over Brazil, especially in the region from which these fish came. Cachimbo was built as a base for planes on the direct air route from Rio de Janeiro to Manaus. It is situated in an area still completely unknown to civilized man. It is south of the Amazonian rain forest, where the mighty Xingu and Coluene rivers flow along a great sandy (not muddy) river bottom.



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Dr. Axelrod took four years to write this book with the assistance of Mr. Vorderwinkler. He journeyed 135,000 miles from Pakistan to Hawaii to Australia to the Fiji and Hawaiian Islands, through Japan and Ceylon, Singapore and Hong Kong, as well as Europe, the West Indies and South America, not to mention Africa and the Mediterranean, to collect and photograph fishes which have never appeared on a printed page before.

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Only Brazilian Air Force planes of the Military Air Mail fly to Cachimbo. There are no commercial airline planes. The construction of a base, in the heart of the jungle, was a remarkable feat of the Brazilian Air Force (FAB). There is still no overland route to Cachimbo and, even by optimistic calculations, I don't believe there will be one possible in less than 20 years. The construction of the base began when a Piper cub carrying two workmen landed in a previously chosen clearing. The workmen enlarged the clearing so that a Beechcraft, bringing more men, was able to land very shortly. The airport itself was the next step, all the material being brought in by air. Cachimbo is about 2½ hours by C-47 from the nearest airfield (Xingu) and 4½ hours from Manaus, the capital of the state of Amazonas, on the banks of the Negro river, the most important tributary of the Amazon river.

The first trips to Cachimbo were real adventures. There were no navigation charts, so some had to be made using the naked eye, almost by hunches. Later, we improved on these charts. There was no radio beacon to guide us, and those readers who are pilots or navigators will realize how difficult it was to fly, hour after hour, with no landmarks, over dense forests of trees more than 50 feet high. By means of a single precarious limited-range radio station, a message could be sent from the plane to our base when the plane was calculated to be within 10 or 20 minutes of the base. Upon receipt of the message, a large bonfire was prepared on the airfield, with green branches and leaves so as to produce smoke, the pilot's only indication that he was on the right route and near the base. We called this unheard of system of navigation "odromica bonfire". As one of the pioneers on these trips, I began to fall in love with the region. In Amazonia everything is big, only man is small. Many of its multiple secrets are still to be discovered! I know this because I have made the trip more than a dozen times and have come to feel that I am a part of it.

In those first days things happened which reminded us of story books and moving pictures. Near the base, we discovered a plantation of corn and peanuts abandoned by the Indians of that region who had run away when they saw the airplanes coming.

About 15-minutes' flying distance from the base, we discovered an Indian village still unknown, with a population estimated at 5,000. The unusual thing about this village was that its huts were completely different from those of the other Indian villages in Amazonia (spherical roofed). They had housetops (angular roofed) similar to all those where the civilized *caboclos* lived. Another of our interesting discoveries about their customs was the way they appeared when we were flying over their huts. They came out holding bows and arrows in a hostile attitude, their bodies painted with a dark substance. This fact made us wonder about their origin. Were they real Indians or Negroes, descendants of former slaves who had run away

hundreds of years ago? If they were Indians, they might be daubed with *urucum*, a red pigment coming from the plant of the same name (extracted from its pulp), or with a black paint, which comes from the green fruit of the *jempapo*, mixed with *copaiba*, *andiroba* or fish oil. Both men and women cover their bodies with these pigments. The black paint is only used, however, when they are at war, and a declaration of war would certainly not be justified by the flight of an old C-47 over their huts. We took aerial photos to be developed and studied later. The Indians never came into the airport camp, but we could see visible signs of their patrols every day. The movements of the workmen were limited. They could only go about in groups and well armed. An electric-power plant was built at an old waterfall, which gave good light to the camp. Domestic animals were brought by air: hens, horses, goats, cows, pigs, and dogs.

Yes, we had surprise after surprise in those first days. A non-commissioned officer from the local patrol tried to cross a stream on horseback, and the animal's legs were completely stripped of their flesh by the voracious piranhas. The horse had to be killed. A dead dog thrown into the stream was reduced to a skeleton in a few seconds. Some small rivers in the area are famous for the size and ferocity of their piranhas, which run to 14 inches long and weigh up to 3 pounds plus. In many waters where they occur, the piranhas are perfectly harmless. However, in some rivers, like the Xingu, to fall into the water means almost certain death unless rescuers are immediately at hand. In such rivers these gluttonous fish will swarm over and quickly reduce to a skeleton any animal (human or otherwise). The usual procedure is for one brave piranha to take a bite from the victim. Once the scent of blood is in the water, all the others in the vicinity are driven into a fanatical frenzy of slashing and biting. No one knows why the piranhas in one river are relatively peaceful, while in another, perhaps only a few miles away, they are blood-thirsty killers. (In another small river, there were fish which swam so fast that the natives of the region had to urinate in spurts if they were in the water. If they urinated in a continuous stream this particular species would swim up the jet of urine, into the urinary tract, and penetrate the bladder, causing all kinds of terrible problems.)

But, I am straying far afield, let us return to the red discus, the subject of our story. When I observed that beautiful red specimen, I began (mentally) to plan an expedition to Cachimbo in order to discover where it had come from. I was afraid that the one specimen we had was a hybrid product, a trick that nature plays on us once in a while. In all probability we had a new species of discus, yet we could not be sure or even describe it adequately on the evidence of a single specimen.

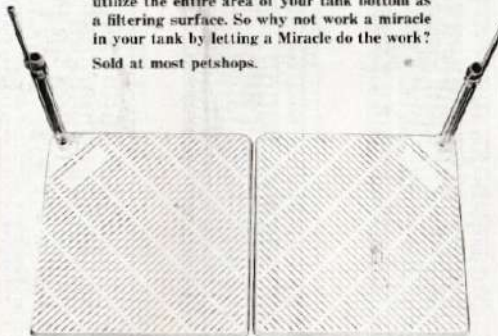
Mr. Cresio told us that the lot of discus had been sent by a friend who had received it from two Indians. Could it really be a new species, this red specimen? It reminded me of the stories I had heard when the blue discus

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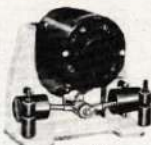
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was discovered. My friend Dr. Herbert Axelrod would be very pleased if he were the first to have a real red discus in his collection. He had already played an important part in the discovery of the blue discus, near the city of Tefe, on the banks of Negro river, right in the middle of Amazonia.

On my annual vacation, I got travel permission for myself, Mr. Horta, and Mr. Cresio at the General Headquarters of the Brazilian Air Force Transport, as well as the necessary passes for our expedition. We took off in an old C-47 from the Galeão Military Base in Rio de Janeiro. After flying for 2 days, we finally reached Cachimbo, stopping first at Belo Horizonte, Brasilia, Aragarças (to sleep) and Xingu. We landed at the base at sunset and, after having dinner, went to bed. I couldn't sleep, I just thought, thought, thought.

How often does it happen that an important plan or a pressing task cannot be carried out because a supposedly insignificant trifle has not been considered or understood? For example, some expeditions undertaken in the last century with the aim of exploring tropical countries never reached their goals because tiny mosquitoes infected the members of the expeditions with malaria. Or remember those pioneers who tried to explore remote and unknown countries by ship. They had food for more than a year on board, and their vessels were strong enough to resist weather and storms, but the lack of vitamin C caused the crew to perish from scurvy. Had we overlooked some small but important detail?

I finally went to sleep, dreaming about sharks, Indian attacks, snakes, crocodiles, and jaguars. But, at last, the first glimmer of dawn appeared on the horizon; the great day had arrived. Mr. Horta was in charge of the fishing material: plastic bags, oxygen tanks, etc. Our guns also were clean and ready for immediate use. We were going to explore an unknown region considered dangerous by the workers at the base. We would paddle, for more than half a day, in a canoe through territory inhabited by hostile tribes, in order to reach our goal. Two semi-civilized Indians, who worked at the base, would be our guides. In that same region, three English explorers were killed, in 1962, by the Cinta-larga, one of the most savage Indian tribes in that area!

Along the way, we saw alligators diving into the water while birds of beautiful plumage, terrified, flew up into the tops of enormous trees. Parrots flew overhead from treetop to treetop, and the highest trees were crowned with blue and white orchids. The blue of the water and the surrounding dense, brilliant green of the jungle against the red sky of a tropical sunset made a beautiful picture.

As we progressed, the scenery kept changing constantly. Water and forest revealed new plants, animals and, occasionally, new Indian tribes. Further on along the beach, the sharp teeth of the wild pigs made a rattling sound. Groups of ariranhas, the Brazilian giant otter, approached our canoes

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Our guide, Darcy. He is from the Cicts large tribe. These very wild Indians wear a fancy headdress made of colored birds' feathers.

curiously, making a choking noise. Multicolored "macacos" (monkeys) of every color flew around us in the trees. From the forest, leaning over the river and blending with it, we heard unaccountable strange noises.

Sometimes canoes are lost, wrecked in the passage of dangerous rapids while the nightingale sings from the banks. In the dense forest, the *inhambu* chirped and the woodpecker called to its mate. In the canoe, rifle at hand, ready for any emergency, was Darcy, one of our Indian guides, while Paraguaçu, the other guide, looked after the engine.

Further on, our passage became more and more blocked, because the river was full of curves and choked with the branches of trees which had fallen into the water. It was hard work, but at noon we reached the place where we were going to fish.

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The wild beauty of this place impressed all of us. We landed on a beach and began to set up camp. Trees were cut down, the sound of the axes interrupting the stillness of the jungle. Monkeys fled in fright. The *pripriá*, sentinel of the wilderness, whistled a warning that intruders had appeared. Toucans, the clowns of the great natural circus, with their large, long beaks and their gorgeous plumage flashing in the sun, appeared on the scene.

We hadn't completely finished the building of our camp, when our guide gave a cry of warning. On the beach, a group of six *Tukumarriés* Indians, armed with spears and arrows, had landed from canoes made of large tree trunks. As a precaution, Darcy went to meet the chief, who greeted him in a friendly way, proving that they didn't think we had hostile intentions. They only wanted to exchange ornaments for gifts. Mr. Horta had foreseen this possibility, so he had brought a large stock of combs, fancy necklaces, fish hooks, pocket knives, mirrors and other trifles of which the Indians are fond. The chief gave me, in exchange for honey candies and a large knife, a jaguar skin which is now on the floor of my apartment in Rio. The chief also

Indians help load the canoes. The canoes are made from large tree trunks split in half and hollowed out in the center.



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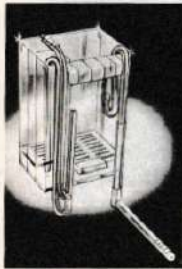


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offered me a strange amulet, a small mummified bird and fragments of its nest. It is said that the bird brings men good luck and happiness, and that its nest placed by the women over their lover's head will make him faithful and passionate.

After the Indians went away, we finished the building of our camp and prepared the fishing material. The camp was set up in a clearing, not far from the river. On the banks, when night was falling, such clouds of mosquitoes flew over our heads that we had to wave them away with our hands to see each other. On such occasions, we proved the efficiency of our insect repellent.

Next morning, we began to explore the region around us. After a night's rest, our zest to collect fish had returned, we were excited by the realization that probably nobody before had ever sampled these rivers for a scientific survey of their fishes. Upstream, well within the river bed, I spotted an isolated pond which seemed large and well suited for the scining type of fish-catching we were prepared for and with which we had plenty of experience. The pond lay near a sharp bend of the river and must have been scooped out by the swirling waters of an eddy during the past rainy season. We prepared the net and began to fish in the deepest part of the pool. The first cast brought us a real potpourri of common fishes and a couple of blue discus whose size impressed all of us (12 inches). I had never seen such big ones. We were not equipped to keep them alive, so we decided to prepare a nylon holding-trap, made with four sticks tied together to form a rectangle, and to leave it in the pool.

I know that fishes coming from typical jungle places, rather than those that are tank- or hatchery-bred, are very difficult to keep in the aquarium. I find that such "wild" discus need the following in the aquarium: high temperature, warm air with high humidity, insect food, tubifex, and soft, acid water rich in humic acids. In keeping this fish, if you do not pay attention to "all" of these factors, you will not be successful. And crowded containers can result in a total loss when you collect discus. It is desirable to bring back a large quantity of the pond water in which the fish can be kept until they can be gradually adjusted to local water.

We went on fishing, but we were unable to catch the fish we were looking for, the red discus. The quantity and quality of fish, however, surprised us more and more. This region is perhaps the most important tropical fish collecting area in the world. In a good spot, 2 hours of scining will result in many more discus than could possibly be kept in even the largest aquarium. There were so many that we chose only the most beautiful ones. We had fried discus for dinner, and I can assure you that this Indian dish is very good. Soon the afternoon began to wane, the shadows to lengthen, and in the

Continued on Page 37

Continued from Page 31

forest that skirts the river, the birds bid a melancholy farewell to the day. Then the frogs and toads tuned up for their evening concert. Night was approaching. Suddenly, to our ears accustomed to the songs of the birds, came absolute silence. The dusk arrives rapidly, like a curtain which closes, and the deep silence of the Brazilian night is broken only by the song of the *curiango*, a night-bird. Soon the jungle emerges from the darkness and is mirrored on the surface of the water, illuminated by the fireflies and the stars. We were now part of the vast stillness of the jungle at night.

The following day, we left our pool and set out for another arm of the river, another *igarapé*, those little bays formed when the banks are low or when a small tributary joins the river. What bothered us most was the tree branches that had fallen into the water and made it difficult to cast and draw in our nets. Even so, in the spot we finally chose the discus appeared again, although smaller than those we had found the day before. The spot was a veritable paradise for lovers of tropical fish. It would be almost impossible to enumerate all the species we found there. We were able to identify a tremendous quantity and variety. We examined the whole catch and kept only the best specimens. At noon, we left the fishing grounds and went down-river as far as its juncture with the Xingu, a region which was always flooded, forming a gigantic bay. The *Victoria-regias* (water lilies) were so enormous that three men could easily lie down and fit on one of their leaves at the same time.

On the right bank of the river, just before entering the bay, we came upon a village of *Hialapiti* Indians, a tribe which had already had some contacts with civilization. Once again our Indian guides, Darcy and Paraguaçu, were of great help. They belonged to the same tribe, though they were from different villages. Darcy made immediate contact with the tribe. After we had been introduced to the head men, the exchange of gifts began again. Fishing was over for that afternoon. The chief gave orders for a feast in our honor, and we remained in the village until nightfall. The program consisted of wrestling contests and dances. Brazilian Indian dances are primitive and their musical instruments rudimentary. In the wrestling, one of the contenders had to throw his opponent and place his shoulder on the ground, much the same as in modern wrestling. Mr. Horta, carrying a jar with a discus in formaldehyde, began to question the Indians, with Darcy as interpreter. The chief's son smiled at sight of the fish. Later, we found out that the Indian name for the discus was the same word as one of their words of belittlement. The boy pointed to an *igarapé* where young naked Indian women were bathing, while others on the banks were daubing their bodies with *urucum*, which gave a vivid red coloring to their skins and the waters around them. There were *urucum* trees all around the



"That was your idea, putting a flying fish in the aquarium!"



In honor of the visitors, the Indians put on their best costumes and performed a dance. Only the men dance in this tribe.

igarapé. Mr. Horta asked what the fishes' colors were, and the chief's son answered that it was changeable. When caught, it had one color and, later, the color changed. It was his primitive way of explaining the mimicry of fish. Yes, the implication that some red discus could be found was there.

We returned to our camp at night, lighting our way by torches. We were so excited that we could hardly sleep. I had a feeling that we were close to that which would revolutionize the world of fish-lovers. The discovery of the red discus would be a notable achievement.

Before sunrise the camp was a bedlam. Darcy already had the motor hot and the nets, plastic bags, and collecting boxes were in the bottom of the canoe. We grabbed our guns and departed. An hour and a half later, we reached the *Hialopitis* village, but this time we didn't stop; we just waved to our hosts of the night before and went on to the bay 10 minutes downriver. The women were already taking their customary morning baths. We stopped at a spot free of branches and cast the net.

Everyone was tense. We could hardly wait. Mr. Horta's eyes looked as if they were popping from their sockets. Darcy and I hauled in the first catch. There were 15 discus of various sizes as well as many smaller fishes, but no red discus. We cast the net again and caught *two* discus with red fins! We had found the fish that could create furor among fish-lovers. Mr. Horta, in his eagerness to get them out of the water, jumped into the river, clothes and all. He almost drowned, but saved his precious red discus and his camera. The Indians, who had been watching with interest, howled with laughter at the sight.

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The red discus were carefully placed in the nylon trap, thus remaining in their natural habitat. The other fish were thrown back into the river. The fishing went on the whole afternoon, and we caught four red specimens of various sizes. Mr. Horta looked after them as tenderly as if they had been his own children.

We put the discus in two bags and returned to camp. Mr. Horta took various samples of water in order to examine them later. The color of the water in the *igarapé* in which we had been fishing was different from the water in others because of the great quantity of *urucum*, which came not only from the paint that the Indians used, but also from the large number of *urucum* trees in the area. Later, the discus were put into 7-gallon cardboard boxes with oxygenated plastic bags. We put a dozen blue discus in each box of the same size as those we used for one of the red ones. After closing the boxes, we began the hardest part of the trip: the return, with the great responsibility of bringing the specimens back alive. That afternoon, the old C-47 landed at Cachimbo, returning from Manaus.

We took off at 2 P.M. and landed at 11 P.M. in Goiania, capital of the State of Goiás, where we spent the night. The boxes remained in the airplane. The following day, we took off once again and, after stops at Uberlândia and São Paulo, landed at Galeão Air Base in Rio de Janeiro at sunset.

The discus were immediately taken to Cresio's tanks where they were left with vigorous aeration going. I observed that their color was fading, but I ascribed this to the tiring 2-day trip from the jungle to Rio. The following day, however, the situation hadn't changed, and the fish went on fading. The two smallest ones began showing blue tints in their fins. I called them *urucum* fish in honor of the place from which they had come.

Mr. Horta had a water analysis made, and armed with this knowledge he set about trying to hold the red coloration. We now know that no aquarium expert, even if he is a biologist, can ever exactly duplicate in a tank conditions as they are found in the wilds. There are just too many factors involved.

A week went by, and Mr. Horta had just about moved to Cresio's residence, so often was he working with the fish. Day by day we became more and more anxious. The blue became more fixed and the red, now pink, was growing paler and paler still.

Reality stared us in the face: the fish were red only in their natural habitat. Did the *urucum* affect their color? Only more specimens and meticulous research could answer that question. Yet, we wouldn't give up, we would go on with our experiments with the fish, water, and plants. The mystery would have to be solved.

Some time later, I thought about the almost negative results of the expedition. Was it worth so much effort and sacrifice? Everything I had brought back could be held in one hand: an amulet of green stone, said to

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The author shot this jaguar to help the Indians. Its pelt is now a carpet in his home in Rio de Janeiro.

have been taken from the Amazonas, and the mummy of a bird, gifts from a friendly chief. It seemed to me very little in comparison with the dream I had had.

Yet, I had the keys of success in my hands: the *iraquitan* and the *irapurú* (stone and bird), good luck and love. More than ever, I felt that I had achieved something.

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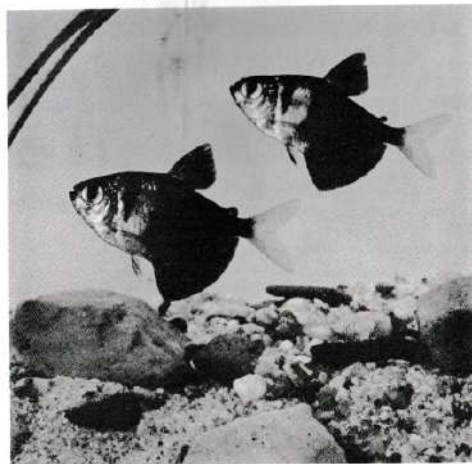
Black on Silver

BY JERRY CURRIER AND MARTY SMITH

Gymnocorymbus ternetzi! Wow! Getting your tongue around that could leave it feeling like a pretzel. If you say it slowly it sounds something like "Jim-no-ko-rim'-bus ter-nets'-eye". Translated it means "Ternetz's Naked Head Tetra". (*Gymnocorymbus* for "naked head" and *ternetzi* for Carl Ternetz the collector.)

You may have never heard the name *Gymnocorymbus ternetzi*, but it's a good bet that you've seen a lot of them. It is even doubtful that you know it had a naked head. In the first place it doesn't really show and in the second place who cares? Getting back to our little wager—the odds have it that you have seen many of them and the chances are good you've kept one or

Up until the fish grow quite large, the dark markings and fins of *G. ternetzi* specimens are pitch black. Photo by Milan Chvojka.



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The female usually starts the spawning action by nipping at the male and luring him into the spawning mop. They then hover side by side and with a quivering motion a few eggs are expelled, and the male fertilizes them. Mild pursuit follows each egg release and the entire spawning may take up to 2 hours. Although most characins are avid spawn robbers, we have found that properly fed black skirts will not pursue this end to any great extent. Still, it is best to remove the parents when spawning is completed, because the temptation might be too great. The eggs hatch in about 2 days at 80° F. and the fry should be fed on infusoria. (Best supplied by one of the commercial tablet compounds found in most fish shops.) If a fungus-retarding drug is added this should be removed by filtering as soon as the fry hatch because such drugs may kill infusoria. The fry become freewimming in about 2 to 3 days, and they should be fed live baby brine shrimp and micro-worms within 5 days after hatching. A little experience will point the way. Growth is very fast and within a month the fry are best moved to a 15-gallon tank if proper development is expected. Within 2 months you should have 200 to 500 quarter-size fish.

In summary we can say that the black skirt is a peaceful fish and shows its best color when not frightened. Quite often the fish are passed by in dealers' tanks because the constant traffic causes them to lose their color, and they appear to be a plain silver characin. But if a few are taken home and placed in a well lighted, moderately planted tank with amiable tank-mates, they will soon acquire deep lustrous black coloration that allows them to compete with many more-popular fishes in beauty.

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Tropical Fish Hobbyist

and calcium nitrate. These salts and the hardness they cause cannot be removed by boiling, hence the name "permanent hardness" is applied. Both permanent and temporary hardness have the same effect on soap, namely, they retard the formation of a soap lather.

The type of hardness of any sample of water will depend upon the kinds of rocks and soils with which it has been in contact. The water will be hard if it has come into contact with limestones or chalk. Igneous rocks such as granite do not impart hardness. Some water departments soften the reservoir water artificially before it reaches the customer. This is done so that soap will be able to lather and work effectively in it. In other areas the water is too soft, and calcium is added because of its importance to children in the formation of sound bones and teeth.

Measurement of Hardness

The original method for the measurement of hardness was to use a soap solution of known strength and mix it with a measured sample of water, noting the amount of soap solution required to produce a lather and determining hardness from this amount. (This is a measure of a sample of water's soap destroying properties and can be related to the calcium content of the water.) Hardness test kits made for aquarists use this method for measuring hardness, and, if used according to directions, do an adequate job.

Many hobbyists have difficulty in comparing and understanding the various ways of expressing the hardness of water. Some writers refer to German degrees of hardness (DH), while others use parts per million (ppm). The relationship between the two is that a single degree of hardness is equal to 17.9 ppm. The latter figure is close enough to 18 to use 18 in most calculations. Soft water ranges from 0 to 8 DH. Medium hard water ranges from 8 to 12 DH. Hard water ranges from 12 to 18 DH. Any water over 18 DH is very hard, with 30 DH or over being extremely hard.

Causes and Controls of Hardness

Each species of tropical fish we keep has lived in its particular native waters for many thousands of generations and has as a consequence, become adapted to that type of water. The fishes are used to a specific range of pH, hardness, and temperature that occurs year in and year out in these waters. When they are moved to water of totally different characteristics they will not take kindly to it. The worst that can happen is that the change will be drastic and sudden and they will die. The least that can happen is that they will not exhibit their full beauty, and, often, they will fail to breed. (The better color and prolific spawnings of many of the tetras in soft acid water as opposed to hard alkaline water is an outstanding example of this.)

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Water Hardness and the Hobbyist

BY P. F. CAPON
ESSEX, ENGLAND

If ordinary soap is added to water it forms lather. With some water it is extremely easy to form lather. Such water is termed "soft". In other water it is difficult to form lather (i.e. much more soap is needed than in a soft water). This type of water is termed "hard". The terms hard and soft really refer to the suitability of a water for washing purposes, not for fish-keeping. Hardness has been selected as a measurement of suitability of a water for fishes simply because it is easy to determine and is related to the real factor that should be considered. This real factor is *total dissolved solids*, that is, everything of a mineral or organic nature that is dissolved in the water. Luckily, from our point of view, the hardness portion of the total dissolved solids is the major portion. Thus, the hardness tests we use are pretty good indicators of what we want to know.

The minerals dissolved in the water of any body of water depend on the geology of the area, whether the water is from a tropical stream or a domestic supply. The rocks that give rise to hardness in water are primarily those of the limestone (calcium carbonate) and magnesian limestone (magnesium carbonate) types. When rain falls through the air, besides dissolving oxygen, it also dissolves carbon dioxide. The carbon dioxide dissolved in the water causes it to become slightly acidic. If this slightly acidic rain water then falls onto rocks or soils containing calcium carbonate or magnesium carbonate, small quantities of these materials are dissolved forming calcium bicarbonate and magnesium bicarbonate respectively in the water. We will consider only calcium carbonate in this discussion, but it should be kept in mind that magnesium carbonate behaves similarly.

Calcium carbonate is not soluble at all in water that does not contain carbon dioxide. The calcium bicarbonate formed when calcium carbonate dissolves in water can be regarded as calcium carbonate with a portion of carbon dioxide attached to it. When hard water containing calcium bicarbonate is boiled, this carbon dioxide is given off as a gas and the solid calcium carbonate is left as a fine precipitate. In hard water districts, the "fur," or scale, that forms in kettles and boilers is mainly composed of this precipitated calcium carbonate. Sometimes an immersion heater in an aquarium also has such a fur form on the glass tube.

Because the hardness due to calcium carbonate dissolving in water can be removed by boiling the water and removing the carbonate, it is called "temporary hardness." Another name for it is carbonate hardness.

There is another type of hardness, one not due to calcium carbonate but to other salts of calcium dissolved in the water, such as calcium sulfate

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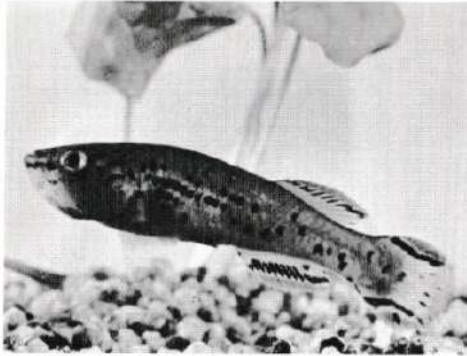


Kits to test and control hardness of aquarium water are available at your petshop. Photo courtesy of Miracle Plastics Corp.

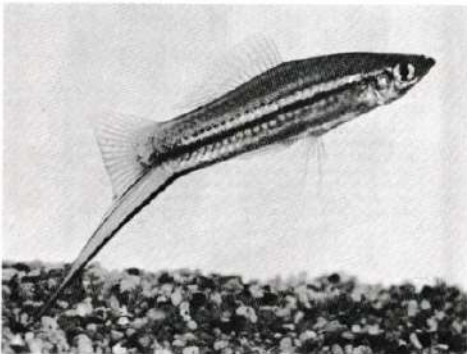
The hardness of aquarium water can change after a month or two if the hobbyist does not take a few simple precautions. Sand or gravel used in the aquarium should not contain more than a trace of limestone or quantities will slowly dissolve in the water (by the reaction with carbon dioxide outlined previously), and the water will become progressively harder. A quick method to check for the presence of lime in gravel is take a small quantity of gravel and just cover it with some dilute hydrochloric acid. If it fizzes like soda water it contains lime. (Always throw the gravel that you used for the test away. Never put it in your aquarium and never let the acid come into contact with your fishes, because it will kill them.)

Another factor that can change the hardness of aquarium water is the types of decorations used. Rocks and pieces of coral may look very nice in your tank, but it should be remembered that coral is composed of limestone and that many rocks are also composed of this material. The author and many other hobbyists have given in to the temptation of adding any piece of rock that catches the eye to the aquarium, often with disastrous results. In his early days in the hobby, the author added several pieces of calcite rock to his tank. For a few days everything went well. Then suddenly

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Like the *Aphyosemion collarium* above, most killifish require fairly soft water to stay in the best of health. Photo by Rudolf Zukal. However, most livebearers, like the swordtail below, prefer fairly hard water. Photo by Louise Van der Meid and Hank Bots.



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many of the fishes started to die and those that were tougher moped about the surface of the tank. A quick change of water and the removal of the much admired rocks ended the trouble. Calcite is a form of limestone, or calcium carbonate, and in the populated aquarium, with the fishes giving off carbon dioxide, it had been dissolved in high quantities.

There are many forms of rock that contain calcium carbonate (lime), for instance marble, chalk, and the various spars. There are also the rocks containing magnesium carbonate to avoid, and it is wise to remember that even some sandstones which are generally regarded as safe for aquaria may have their particles of sand cemented together with limestone. A rough check of the suitability of a rock for use in aquaria can be made by dropping a small piece of the rock into hydrochloric acid. As with gravel, if it fizzes, it contains limestone and should not be used in aquaria. This test, by the way, will not detect the materials that cause permanent hardness, but the hobbyist is hardly likely to encounter rocks containing these materials to any great extent.

Other materials containing calcium carbonate and which therefore create danger by increasing hardness are ornamental shells and cement rocks. Any rocks made of plaster should be avoided, for plaster can cause permanent hardness. Cement rocks can be rendered safe by repeated washings over a period of several weeks to remove all the free lime. The cement is "cured" when water that has been in contact with it for 24 hours has not had its pH altered at all.

Many fishes live reasonably well in hard alkaline water, but hobbyists never seem to be able to get successful spawnings from them. Either the adults never come into breeding condition or, if they do, the eggs that they lay fail to hatch. For instance, neons have been kept in hard water in Essex, England, ever since they were first imported. They live for several years and appear to be in good health, but the only recorded spawnings tell of only half a dozen or so fry being reared to maturity. In the great majority of cases, the eggs just disappear. Tricks such as covering the tank with heavy cloth to keep out the light appear to make little or no difference in the end results. Adding acriflavine or methylene blue to prevent fungus or bacterial attack also does little to improve things. It is not until we keep neons in soft acid water and spawn them in the same type of water that we get good numbers of fry hatching and surviving.

Hardness of water can develop in still another way. There is quite often a considerable amount of evaporation from an aquarium. Normally, all we aquarists do to correct this is add water from the faucet. If your tank was originally filled with moderately hard water, say 200 ppm of calcium carbonate, by the time half the original water has evaporated and you have added fresh water of the same hardness, the hardness in the tank will have risen to at least 300 ppm of calcium carbonate, and probably a great deal

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more. The reason for the increase in hardness is that while the water can evaporate, the materials in water which cause the hardness cannot and are left in the remaining water. As a result, the water in the aquarium becomes progressively harder.

Adding water should be done with care, preferably using soft water, but if this is not available the hobbyist should make it a regular habit to actually remove a portion of the aquarium water and replace it. This periodic changing of the water every so often will not completely halt the rise of hardness but will slow it down sufficiently enough that it will not reach harmful proportions. The periodic changing of a portion of the water will also serve to remove many of the fishes' waste products that are dissolved in the water. Also, remember that covering the aquarium with a glass or plastic top tends to reduce evaporation.

The easiest method of getting soft water for fishes is to collect rainwater. Collecting rainwater from the roof of a house and storage in barrels can be successful, but there are pitfalls to be avoided. If at any time the water comes into contact with galvanized iron (i.e. zinc coated), or copper, or brass, sufficient toxic metal may get into the water to cause fish fatalities. The ideal method is to collect the rainwater in a large sheet of plastic stretched out in a garden or on the patio. The rainwater will collect in the center of the sheet in the depression caused by its own weight. It is preferable that rainwater be collected during heavy falls and only after sufficient rain has fallen to ensure that all the impurities present in the air have been washed out. It is not advisable to collect rainwater in towns or cities where the air is often heavily polluted or in the vicinity of freeways and other roads that carry heavy traffic where the air can contain quite high proportions of diesel and gasoline fumes.

Distilled water is also a form of soft water. It can almost be called "man-made rainwater" because the process of distillation is simply man's attempt to copy nature's method of making rain. Distilled water can be used in aquaria, bearing in mind that freshly prepared water will have little oxygen dissolved in it, but will quite quickly absorb carbon dioxide which will cause it to have a pH in the acid range. Aeration will remove the bulk of the carbon dioxide, lowering the acidity, and will also increase the oxygen content.

Care should be taken as to the source of the distilled water, as sometimes copper stills are used to prepare it and even small quantities of copper dissolved in the water can be dangerous to fishes. Distilled water obtained from gasoline stations should also be regarded with suspicion, for often it has acid added to it because it is really intended for automobile batteries.

Snow can be melted and used in the same manner as rainwater and distilled

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water, but it is preferable to collect it soon after it has fallen for it gets dirty rapidly. Freshly prepared snow-water will be deficient in oxygen and should be aerated before use. The hobbyist must, of course, be sure that the temperature of the snow-water has been raised to the temperature of the water in his aquarium before using it.

The first attempts at using water from water softeners were with softeners intended for supplying water for domestic washing purposes. In some areas, the results with fish breeding and conditioning were favorable, while in others little or no success was experienced. The author would not recommend the use of water from this type of softener as they only do half the job required of them from the hobbyist's point of view. These domestic softeners produce water that is soft as far as the reaction with soap is concerned. That is, it does not form a scum, but it still contains an appreciable quantity of dissolved solids. This is because domestic softeners act by taking the calcium or magnesium portion of the hardness and replacing it with sodium. For instance, they take calcium sulfate and convert it into sodium sulfate. Waters softened in this way often actually end up with increased total dissolved solids.

Acidification and Hardness

The ideal method of lowering the pH of water (for keeping and breeding fishes that prefer water in the acid range) is through the use of peat moss. The bark of the cork oak is also said to be used in Germany for this purpose. The manner in which the peat is used depends on the tank type. For a breeding tank, the washed peat can be put on the floor of the tank and then used as a spawning media in addition to an acidification material. In the community tank, place the peat in an operating outside filter.

Hard water is not really suitable for acidification with peat for while a slight acidity may be induced for a short time, the pH will return to about its original value in a matter of only a day or two and in some cases in only a few hours. This trouble acidifying with hard water is due to the fact that it contains a large proportion of dissolved calcium bicarbonate which reacts with the acids, such as humic acid, released by the peat in such a way as to remove the acidity. Similarly, a tank with gravel or rocks containing calcium carbonate will neutralize acid from the peat. Such an action, one which tends to maintain a pH in spite of additions of acid, is known to chemists as a "buffer action." Scientifically oriented hobbyists are advised to consult a chemistry textbook should they wish to know more about this.

The only practical way to acidify water permanently with peat is to use soft water, but it should be borne in mind that the softer the water the more effect the peat will have on the pH. Thus, acidity is controlled to a great extent by water hardness.

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MAIL CALL

By William Vorderwinkler
If you have an aquarium question that you would like answered, send it to MAIL CALL. Each month the most interesting questions received and their answers will be published in this column. Letters containing questions cannot be acknowledged or answered personally. Address all questions to: MAIL CALL, T.F.H. Publications, Inc., 245 Cornelison Avenue, Jersey City, N. J. 07302

Mamma wears the pants!

Q. 1. Recently I witnessed a spawning of a pair of my bettas. During the spawning, the female would help collect the fallen eggs and replace them in the nest without eating a single one. After the spawning was completed, the female helped the male in his post-spawning duties, although the male was constantly chasing her away. Since such an event is apparently not normal, what could cause this temporary "maternal" instinct?

A. 2. A few days ago I had a successful spawning of bettas. I experimented by putting them, along with water, into a shallow plastic container, the type used to hold cheese triangles. The container was kept covered, and a fungicide added, but only 3/5 of the spawn hatched. What could have caused the remainder to die?

Ted Sahonyay,
New York City, N.Y.

A. 1. Who knows what goes on in the little brain of a betta? This male was probably a little more gentle than most, and let the female get away with just a little more than is usual.

2. I assume that you kept the plastic

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Tropical Fish Hobbyist

container out of the water. This would give you a very poor place to hold the heat required to hatch the eggs. The small amount of water would also make fouling very easy. What surprises me is that any of the spawn hatched at all.

Paging Thomas Edison!

Q. The fish business has been responsible for many useful inventions in the last couple of years. I will be going away this summer, and I wondered if there was any such invention that could add water to my three tanks.

Larry Fein,
Scarsdale, N.Y.

A. If there is such a gadget, I have not yet heard of it. Unplug your heaters, keep your tanks unrounded, and cover them in such a way that evaporation will be at a minimum, and you do not need to worry that your water level will get too low.

Maintaining pH

Q. Maintaining a pH of 6.8 to 7.0 in my two aquaria seems to be impossible! When I set up my tanks, my tap water was pH 7.6, DH 17. To correct this, I placed a bed of peat moss under the gravel in the large tank, added peat moss to the filter medium in the smaller tank, and used 2/3 rain water and 1/3 tap water in both tanks. For a very short time the pH was excellent, but in a few weeks it has climbed to 7.4 although the

DH has remained stable. What can I do?

R. W. Hoskins,
Chateaugay Terrace, P.Q.

A. Canadian peat moss sometimes has very little acid content. I suggest you take a small amount of water and peat moss and test to see how it affects the pH. If it is not satisfactory, get some German peat moss from your florist. This usually tests strongly acid, so use it with care to guard against shocking your fishes.

Unusual problem

Q. 1. Does your magazine cater to the salt water enthusiast?
2. I have recently moved to a farm, where electric power is available only

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March, 1967

between 5 and 10 P.M. Can you suggest an alternative in the way of getting a continuous power supply for my equipment without too much outlay on my part?

J. B. Ivans,
Zululand, South Africa

A. 1. Of course we cater to the salt water hobbyist; we have a top-notch column SALTS FROM THE SEVEN SEAS every month, besides numerous articles throughout the year which would be of interest to salt water hobbyists.

2. Never had a question of this type thrown at me before. To run an ultrasonic pump, you could naturally get a vibrator pump designed to run in a car and run it off a storage battery. But running a heater is another matter. On average nights you could get away with keeping your tank covered to conserve the heat given by your heater while the current was going, but on chilly nights (even in Africa!) your water might get a bit too cool. The ancient way to keep a tank warm when electricity was not available everywhere was to mount a small alcohol lamp below the tank so that its heat rose and warmed up the water. Then in the daytime, when the weather got warmer, the light could be put out until the next night. Do not mount the lamp too close, or you may overheat the water.

Clogged filter tube

Q. About 4 months ago, I purchased an undergravel filter for one of my 10-gallon tanks. I was amazed at how

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beautifully it kept my tank clean until a few days ago. I noticed that one of the outlets wasn't bubbling, but the other one was working beautifully. I disconnected it from the valve and blow

through it real hard, but only a few bubbles came through. What could be blocking it?

Thomas DiGeronimo, New Hyde Park, N.Y.

A. This just happened in one of my tanks. A snail, for some mysterious reason, crawled into the small hole through which the air enters the airstone tube. Probably the rush of air got him confused, and instead of backing out of the hole he crawled further in, jamming the opening. I had to take out the tube by pushing away the gravel and unscrewing the tube, then inserting a small screwdriver and breaking the snail's shell. Then I cleared the tube by blowing into it. It was a simple matter then to re-insert the tube, push it back into place and screw it in. What makes a snail decide to do this? I'll let you answer that! Sometimes a small amount of grit from your gravel can also block the tube.

Water
Q. My questions are about water chemistry. I have been keeping fish for 2 years now and have had no problems except the usual ones confronted by anyone who is striving for better and healthier fishes. My problems started when I recently purchased a pair of young *Pelmatochromis kribiaensis*. Since I have had no trouble introducing new fish to my aquarium, I went about it in the usual manner, floating them for 3-hour and then turning them loose. I

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kept a watchful eye on them, and in a few hours they died. I called the fellow I purchased them from, and he said the fault was with the water. I have spring water in my tank and was under the impression this was the nearly perfect water. What happened?

William Kurzawa, Bellwood, Ill.

A. Your water is probably very good, but it should roughly match the water in which the fish you are introducing were raised. Floating the container in which the fish came for a half hour is fine; it equalizes the temperature, but that is all it does. If your water, pure as it may be, is considerably different in acidity or alkalinity, your fish may get a shock that they will have trouble overcoming. Test the water you get your fish in, and if it is very different from the water in your tank,

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make the change gradual by transferring your fish in easy stages. Being changed to a tank with different water is a greater ordeal to many fishes than a lot of people realize.

Zebra danios
Q. I have been reading a MAIL CALL question on page 60 of the November '66 issue about spawning zebra danios. We tried the marble method and didn't have any luck with that. Then we decided to try net vinyl material, took a good-sized piece and hung it into the tank letting the material drupe into the water. Then we took snap clothespins and fastened the edges of the material to the tank frame. We then took our loaded females and some males and put them in this trap, and it has proven very successful. The males fertilize the eggs as they leave the female and fall

through the net. We have several hundred zebras to show that it does work, and we thought you might want to pass this information along to others.

Mr. & Mrs. Gilbert Outman Battle Creek, Mich.

A. This is a system which is very similar to the one used by professional breeders. They put a number of breeders in a sieve with a metal mesh bottom and wooden frame and float it in a pool or large tank. It all works on the same principle: let the males and females get at each other to lay eggs and get them fertilized, and then as soon as possible get the eggs where the parents cannot get at them and cut them, because they will do this every chance they get.

Archerfish
Q. I have read an article about archerfish, and found it very interesting. There just wasn't enough to satisfy my curiosity. The following questions come to mind.

1. Why does this fish shoot at anything? Is it out of curiosity, hunger, protection or what?
2. How can the fish compensate to be able to hit anything with such great precision while looking out of the water?
3. At present, have these fish ever been bred in captivity? If so, how?
4. Do these fish accept more of their food above the water or below?

Glenn Raddatz, Chicago, Ill.

A. 1. The waters in which archerfish are found evidently do not harbor enough aquatic life to supply them with their food needs. So they get under a spot that attracts terrestrial insects, such as a flowering bush, and fire away whenever they spot a target.

2. This question has had many scientists scratching their heads. My personal guess is that archerfish have been doing this for countless generations, and you must remember that this correction must be made equally at all times. They do not shoot at anything under water. Swans as though they hate to indulge in a lot of "target practice" before becoming proficient. A year or two ago Scientific

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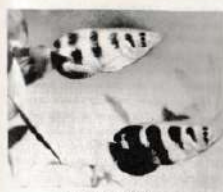
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American did a long article explaining the great accuracy of the archerfish's aim on a scientific basis. If you want to pursue this thing further, write that magazine for a copy of the issue that covered the fish.

3. If they have, nobody has told the world in general. It's not easy to feed fish with such specialized eating habits as these with foods which would have an equal nutrient value not just to terrestrial insects, but to the same insects found in the territories to which these fish are native.

4. They get a "kick" from shooting down an insect from above the water's surface, but very quickly learn to accept living insect food, such as a mealworm floated on the surface. They cannot

"grab" for food, at the bottom.

Red tail sharks

Q. 1. I have three red tail sharks about 1 1/2 inches long. When they are kept together they fight. I have two in my 20-gallon tank and one in a 10. The two in the 20 fight whenever they see each other. The larger one always picks on the smaller one. I would like to know if red tail sharks always fight if kept together and if there is anything I can do to stop this besides separating them. The water temperature is 82° F. Do they fight because the temperature is this high? My other fishes get along fine.

2. How large do you think my sharks will grow?

William Foley, Downers Grove, Ill.



Redtail shark.

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A. I. It could be that your three fish will turn out to be males. Sometimes they will be very scrappy, but only toward each other. Another thing, they seem to follow a "pecking order" such as is found among chickens. The smallest chicken, poor soul, is open to attack from all the others. The second smallest is almost as badly off, but she can pick on the smallest to her heart's content. This goes on up the line until you get to the "boss lady," who is beyond being picked on by any of the rest, but has the right to peck on any chicken she pleases. I'm afraid you'll have to keep your sharks separated for a while at least, until they get to be about the same size, then try again.

2. They got to be about 6 inches long in captivity, but more than 4 inches is rare.

Re-using charcoal

Q. Several members of my family have started in the tropical fish hobby in the past year with my help. Several weeks ago my mother called me and said she had found out how to re-use her charcoal indefinitely. A dealer in her town told her that the charcoal can be washed thoroughly and then "baked" in the oven. He also told her that he had been re-using his charcoal for a month. Recently I took a trip home and asked this particular dealer about this. He told me the same thing that he told my mother. She is thoroughly convinced that he is right, since he has been keeping tropical fish longer than I have. I can't find a thing in any of the books that I own. I learned that the charcoal absorbs harmful gases from the aquarium. I can't understand how baking could clean the charcoal. Is the dealer correct or am I?

David E. Price, Philadelphia, Pa.

A. Charcoal can be re-used, if you are of an economical turn of mind. What happens when you "bake" it is this: gases are absorbed by the charcoal and trapped in the numerous crevices, which also catch a certain amount of muck. Heating serves to partly open these crevices and

release the gases. But each time the charcoal is regenerated in this way it becomes a little less effective, because the crevices become gradually filled up and more and more inactive. For this reason, it is best to use new charcoal each time.

DH

Q. After reading the letter written to your column in the June, 1966 issue by Leslie Ray, of Costa Mesa, California, on the use of synthetically softened water, we felt that our experience on the subject might be of interest. We have been keeping tropical fish for many years, but not until recently, when we moved into the Indiana area, have we been faced with a hard water problem. We investigated all possibilities of overcoming the problem, but finally decided on a commercially prepared water softener for all the water in our home. Upon the installation of the softening unit we gradually converted all our tanks to water from the new system.

We have been operating under this system for almost a year now and to date have had no problem in our tanks. We feel that the success of this change, as with any change in the environment of a tank, is due to the effort of making the change gradually.

H. E. Pletcher, Indiana, Pa.

A. You remind me of a case that once happened to me: A couple of friends of mine were having a lot of success breeding several species of fish, while at the same time my own results were something less than phenomenal. We were using tap water and lived only a short distance apart, but investigation proved that their water and mine came from different sources. Fish adapt to differences in water hardness, but the differences should be given to them in easy stages.

Snails

Q. I have one female snail in my 5-gallon tank. It has laid several colonies of eggs on the glass. I have watched



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Tropical Fish Hobbyist

these carefully and they seem to develop, and just the other day one hatched. Could you explain how they hatched without a male in the tank?

2. When the snail lays her eggs they have a jelly-like appearance with little clear dots with tiny white dots inside them. Do these dots hatch into one snail each, or does the entire mass hatch into one snail?

Jeff Kaufner, Thousand Oaks, Calif.

A. 1. When you call a snail a "female" just because she laid some eggs, you could be wrong in some cases. Some snail species are hermaphrodites, have both male and female reproductive organs in the same body.

2. Each little dot develops into an individual snail.

Tetra von Rio

Q. I have a 23-gallon aquarium with a cave in it. The tank is fairly crowded. In the cave two of my six tetra von Rio have taken possession. They drive the other fishes away.

1. Is this how they are?
2. Are they a pair and breeding?
3. Is it because the tank is crowded?

David Durkee, Rochester, Mich.

A. 1. This is definitely not how they are. Tetra von Rio are among the most peaceful of the tetra species; they are not normally in the habit of taking possession of a cave, but prefer to swim out in the open in a school.



Tetra von Rio.

2. If they are a pair, this is not how they breed.

3. Now you have probably hit the nail on the head. There is nothing aggressive about tetra von Rio, and behavior like this could be attributed to a crowded tank.

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March, 1967

Guppy Corner

By Paul Hahnel

Sulphur-tail guppies

Q. Would you be kind enough to answer the following questions for me?

1. In the past year I've seen very, very few gold guppies available in local petshops and tropical fish stores. Is there a specific reason for this?

2. Are gold guppies less hardy than other varieties? It appears that those I've seen are small, thin, and generally frail in appearance.

3. Have you ever heard of sulphur-tail guppies? They appear to be larger gold guppies, highly colored, with veil tails. Would you care to speculate on the original percentage that produced this variety?

Thank you very much for your response. Our family enjoys your column very much. It is read first.

H. P. Couchot, Hesperia, Calif.

A. 1. Not only in your part of the country, but also on the East Coast and other parts of the United States . . . I have noticed in my travels that there are not many gold guppies in the tanks of hobbyists or in stores. One reason for this could be that a colorful fish is more admired and in greater demand by most hobbyists.

2. Yes, your observation is correct: the gold guppy is not as hardy as other varieties.

3. In many sections of the country, you will run into a number of names for the same variety of fish. These names are given by hobbyists and dealers, to sort of "distinguish" them. It is quite possible that the breeder of this type of fish cross-

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bred the gold guppy back to the gray guppy. Usually this results in 25 or 30% of the offspring having gold guppy characteristics with the colors of the gray GUPPY.

Wild plants in the aquarium

- Q. 1. Why is a pH test necessary?
2. Why do my female guppies give birth to only 4 or 5 babies at a time?
3. Can wild plants taken from a lake be put in a tropical aquarium?
4. Why do you keep your guppies in

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tanks set at 75° F.? I have heard that 78° is ideal.

5. Where can I obtain some of your famous giant guppies, which are pictured in every guppy book I've seen?

Rob Wunderlich,
Lathrup Village, Mich.

A. 1. The test is necessary to determine if the water is acid or alkaline, because fish live best in their proper range. If the water is too acid or too alkaline, it can result in severe damage to the fish.

2. If a female is very young or under-nourished, she may drop only a few babies.

3. There are several reasons why you should never use plants from a local lake: first, you might introduce pests like hydra, dragonfly larvae, unwanted snails, or many

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other things with the plants. Second, wild plants from your area and most others do not usually flourish for any length of time in the high temperatures you would give them in a tropical fish tank. Third, it is poor economy to use wild plants, when for such a small price you can get cultivated plants that will keep on growing well in your tank and are free from all "hitch-hikers."

4. I keep the temperature in my guppy tanks in the 75-80° F. range.

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*Salts From
The Seven Seas*



By Alfred A. Schultz

Caught in the Net... Who says that saltwater fishes are not a hardy breed? The following actually happened to me: Some importers of rare marine fishes recently wrote and offered me an exceptionally large butterfly fish (*Chaetodon* species) which they had received in a shipment. This fish was shipped out of Los Angeles Monday evening, to arrive here at Newark Airport the following morning. Due to some mix-up at the airlines the fish was put on a different flight and arrived here on Tuesday evening. The airline called me on Wednesday morning to tell me that the shipment had come in. They had

tried to reach me on Tuesday evening, but I was not at home. Anyway, this fish had been in a plastic bag from Monday afternoon to Wednesday afternoon, a total of 2 full days. The unheated airline freight terminal was in the low 40's overnight. Before opening the container, I was already certain that the fish had died from the cold. Upon arriving home and opening the box, I was further alarmed. There was this gorgeous 10-inch butterfly fish stretched out in the bag—with only its head immersed in an inch-and-a-half of water. What had happened was that

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the sharp spines of his dorsal fin had punctured the inner plastic bag and the water had all seeped out into the outer bag, except for enough to allow the fish to keep its head under. At this point I just about gave up. I took the fish out and put it into a tank that I had ready for it. I didn't try to match the salinity of the water. I didn't concern myself with the extreme temperature change that would occur for the fish. I went against all the rules. The fish immediately sank to the bottom of the tank, on its side. It lay there with no signs of breathing. It remained in this state of shock for 4 hours. Then, lo and behold! There was a violent shaking by the fish, and, with a surge of

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YOUR FISHES' HEALTH

BY MIKE REED

**Scale Protrusion,
Dropsy,
and
Pop-Eyes**

The reason I am covering the three disorders listed above together is that they so often occur together. The important thing to keep in mind is that when all three disorders are present, only the dropsy need be treated at first. If you cure the dropsy, chances are you'll cure the other two in the process.

Dropsy symptoms include considerable swelling in the belly region, low activity, lack of appetite, and, sometimes, pop-eyes and scale protrusion. The sick fish is actually swollen with an almost watery liquid which is usually colorless, but sometimes light green or pinkish. The disease seems to be caused by the attack of a common bacterium *Pseudomonas punctata* on sites that have previously been attacked by a virus. The bacteria are most often found in the intestines and sometimes in the liver of the affected fishes. Since the causative agents of the disease are probably always present in aquarium water, it seems reasonable to assume that a fish must have a tendency toward dropsy or be in weakened condition to contract the disease. I have found, as have many others, that the dwarf gourami, *Cotisa lalia*, is particularly susceptible to dropsy.

Dropsy should be considered as contagious. Most of the time the disease will not spread, but sometimes, particularly if some of the fluid from a sick fish escapes into the aquarium, it will. At any rate, isolation of the sick fish is wise, if for no other reason than to avoid treating all your fishes for the disease.

Treatment with 50 milligrams of the antibiotic chloromycetin per gallon of water is often effective. This antibiotic has been shown to act against some viruses as well as bacteria. Aureomycin at various concentrations has also been shown to be effective occasionally, but should only be used when chloromycetin fails. With species of fish that can stand lower temperatures (i.e. zebrafish, paradise fish, blood-fins, guppies, many barbs), the temperature of the water should be reduced during treatment, as this inhibits bacterial and viral multiplication.

Scale-protrusion symptoms include the protrusion of some or all of the affected fish's scales, rapid breathing, hanging near the surface, and paralysis of the tail. This is often accompanied by torn fins, loss of scales, and the appearance of red blotches on the fish. Scale protrusion is sometimes contagious, so fishes having it should be isolated and treated. Although I have seen this problem clear up by itself, usually an untreated fish dies.

Two bacteria have been associated with the disease, *Vibrio piscium* and *Bacterium lepidorhthosae*. Treat scale protrusion with from 40 to 60 milligrams (depending on the severity of the disease) of chloromycetin per gallon of water. The disease often will not respond to treatment, and in such cases the fish will probably die.

Pop-eyes symptoms are bulging eyes and sockets. Usually the malady is the result of some other disease, particularly dropsy. Infection of the eyes by trematode worms, and degeneration of the liver due to dietary deficiency also often result in pop-eyes. On rare occasions the disease is caused by very heavy aeration of the aquarium. Such heavy aeration supersaturates the water with atmospheric air, resulting in conditions in which the eye tissues of a fish may take in excessive amounts of nitrogen gas, causing the eye to swell.

To treat pop-eye, check first for symptoms of dropsy. If the fish does have dropsy, treat that disease, and the pop-eye will disappear if you are successful. Also, be sure you are not aerating your tank excessively. Excessive aeration, however, is rare, for before it is dangerous, you must be aerating to such an extent that the tank water is almost churning. Since there is no single treatment specific for pop-eye, I use the standard salt treatment, which is always a good idea when a fish comes down with something unidentifiable or supposedly-untreatable. Merely isolate the fish and add one teaspoonful of non-iodized table salt per gallon of water. The second day, add another teaspoonful per gallon. If there is no improvement, add another teaspoonful per gallon in about 3 more days.

I have seen pop-eye go away by itself with no treatment. I have also seen it result in blindness in and a film over one eye. Such half-blind fishes usually manage quite well in an aquarium where the other fishes are not very aggressive or highly competitive at feeding time.



A *Neolebias unifasciatus* pair. The male is on the left. Photo by E. Roloff.

Neolebias unifasciatus

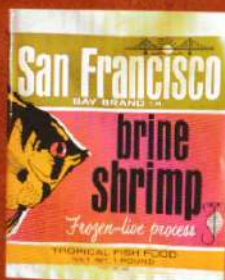
BY E. ROLOFF
KARLSRUHE, GERMANY

In his article published in TFI, Vol. XII, April, 1964, entitled *New African Characini*, Dr. Herbert R. Axelrod mentions *Neolebias unifasciatus*, which was described as early as 1894 by Steindachner and is the type (most typical) species of the genus *Neolebias*.

The fish is known from several West African countries. I found it during my expeditions in the years 1962, 1963, and 1965 in Sierra Leone as well. It is found all over and often occurs in large numbers in small brooks which do not dry out completely in the dry season. It likes the shady spots near the shore and usually occurs in such places in large schools. During the dry season, as a rule there are only youngsters $\frac{1}{2}$ to $\frac{3}{4}$ inches in length. They attain their full size of about 1 $\frac{1}{2}$ inches during the rainy season.

Neolebias unifasciatus is a peaceful little fish which is easy to keep in the aquarium. They can be kept at temperatures between 70 and 80° F. As to water characteristics, this fish makes no great demands. I found it in waters which varied between 1 and 6 DH and pH values between 6.0 and 7.0. It may be fed newly hatched brine shrimp, *Bosmina*, Grindal worms, cyclops, small mosquito larvae, and even prepared foods. Breeding them offers no great problems. The eggs are usually laid in fine-leaved plant thickets and fall to the bottom. The fry hatch after 24 hours and become freewimming on the seventh day. They are very small and must be fed infusoria for the first week. In the second week, they are large enough to take newly hatched brine shrimp. Beyond this point there are no problems.

The coloration of *Neolebias unifasciatus* is shown in the accompanying color plate, which also shows the sexual differences. The males are more slender than the females and, as a rule, are somewhat smaller. There are no differences in fin size and coloration. Because *Neolebias unifasciatus* has little color when compared to the other members of its genus, it will probably find little popularity among aquarium hobbyists.



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March, 1967

Guppy Color Variations

BY DR. EDUARD SCHMIDT
BAD HOMBERG, GERMANY

Methodical guppy breeding is one of the most interesting and tricky phases of the aquarium hobby. Countless colors and fin shapes have evolved from the original wild form since its domestication in our aquaria. Well-known geneticists have spent much time with guppies and have not yet succeeded in clearing up all of the very complicated hereditary processes.

About a decade ago, we in Germany had short-finned but very colorful guppies. The now very popular veiltails, which first showed up as mutations in the United States, were first introduced to us by Paul Hahnel, who sent his lovely red veiltails to the international guppy shows in Germany. Since this time, we have been fortunate enough to receive a constant supply of "auxiliary breeding stock" from American hobbyists. Never to be forgotten are the lovely veiltail guppies sent to our exhibitions year after year by Dr. Rutkowski, Messrs. Kaufman, McAdams, and many others. Unique were

A Paul Hahnel wild veiltail guppy. Photo by M. F. Roberts.





A veiltail guppy with a combination of black, red, and green derived from several strains. Photo by Dr. Edward Schmidt.

The contrast between the black body and the red veiltail make this guppy strain a standout. Photo by Dr. Edward Schmidt.



In Germany this beautiful veiltail guppy is called the "leopard guppy". One look at its tail should tell you why. Photo by Dr. Edward Schmidt.

Crossing a Sternke veiltail guppy with a halfblack strain produced this beauty. Note particularly the heavy body and long flowing dorsal fin. Photo by Dr. Edward Schmidt.



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Bill Sternke's carpet pattern specimens whose orderly, intense colors were like those of butterflies.

In order not to just produce imitations of the colors already developed in the United States, I tried developing new color combinations by crossing European guppies with the American veiltails. The guppies bred in Europe were of small size, but, in contrast to the American veiltails, they were characterized by more gleaming colors and more intense body and tail patterns. I took it upon myself to try to combine the good qualities of the European and American strains.

One of the first of my attempts brought interesting results. In Austria, particularly in Vienna, there have been bred for years emerald-green guppies of the doublesword and bottomsword strains. These swordtailed guppies showed black and red in their tail fins while their small bodies showed a finely-etched green pattern with distinct black dots. The production of an emerald veiltailed guppy seemed a desirable goal. The first crosses with Paul Hahnel's giant veiltails resulted in offspring with ragged fins and pale colors. Some of the males, however, carried the black and red pattern of the Viennese doubleswords in arc markings on their tails. These were the ones used for further breeding. By inbreeding, selection and back crossing for over 5 years, there resulted veiltails which had the arc-shaped patterns in the tail and whose bodies had inherited the fine pattern of the Viennese emerald guppy. This regular arc pattern struck me as so attractive that I also tried to develop it in other strains.

A similar arc pattern came from another crossing. Bill Sternke's carpet pattern showed a pretty spotted marking in the tail fin. When I crossed these with black and blue veiltails, which Mrs. Smith from London had left with me, the result was the same rounded pattern in the tail. By selective breeding this pattern was improved and made to breed true.

Another breeding program was built around European guppies with black bodies. This characteristic is known to be sex-linked (the gene determining it is located on the fish's sex chromosomes). The half- and three-quarter-

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Look at the gorgeous color pattern in the tails of these guppies. They were produced by crossing Sternke and Smith guppies. Photo by Dr. E. Schmidt.

black body pattern first showed up in German guppies as a mutation. These fish were soon exported to the United States as "German blacks". To locate the position of the black gene, one crosses a black male with a normal female. If the result is all females normal and all males black, the black gene lies on the Y chromosome. If, on the other hand, the result is no males black, all females light black or normal but capable of transmitting black to their offspring, the black gene is carried on the X chromosome.

The arc pattern in the tail with the black body was achieved by inbreeding in relatively few generations with the three-quarter-black strain. Naturally, other colors can be combined with this black body color. For instance, a black and red veiltail male resulted from crossing a half-black German guppy with a red Hahnel veiltail. A half-black male was also crossed with Sternke's carpet pattern resulting in a new strain.

Another breeding program came from an English strain. Some years ago Mr. Phillips of London was friendly enough to provide me with gleaming yellow guppies with a fine filigree pattern. They were simple roundtailed guppies, and the males tended toward the formation of swordtails. After many crossings, this very attractive pattern was carried over into veiltailed specimens. In the United States, I understand, a similar pattern has been achieved and named the "King Cobra" while in Germany we call them "Leopard Guppies". An interesting pattern results when these guppies are crossed with dark blue veiltail guppies. In the tails of the resultant hybrids are many gleaming yellow patches which resemble stars in the night sky. Perhaps some American breeder will come along and breed a guppy with stripes and a field of stars!

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