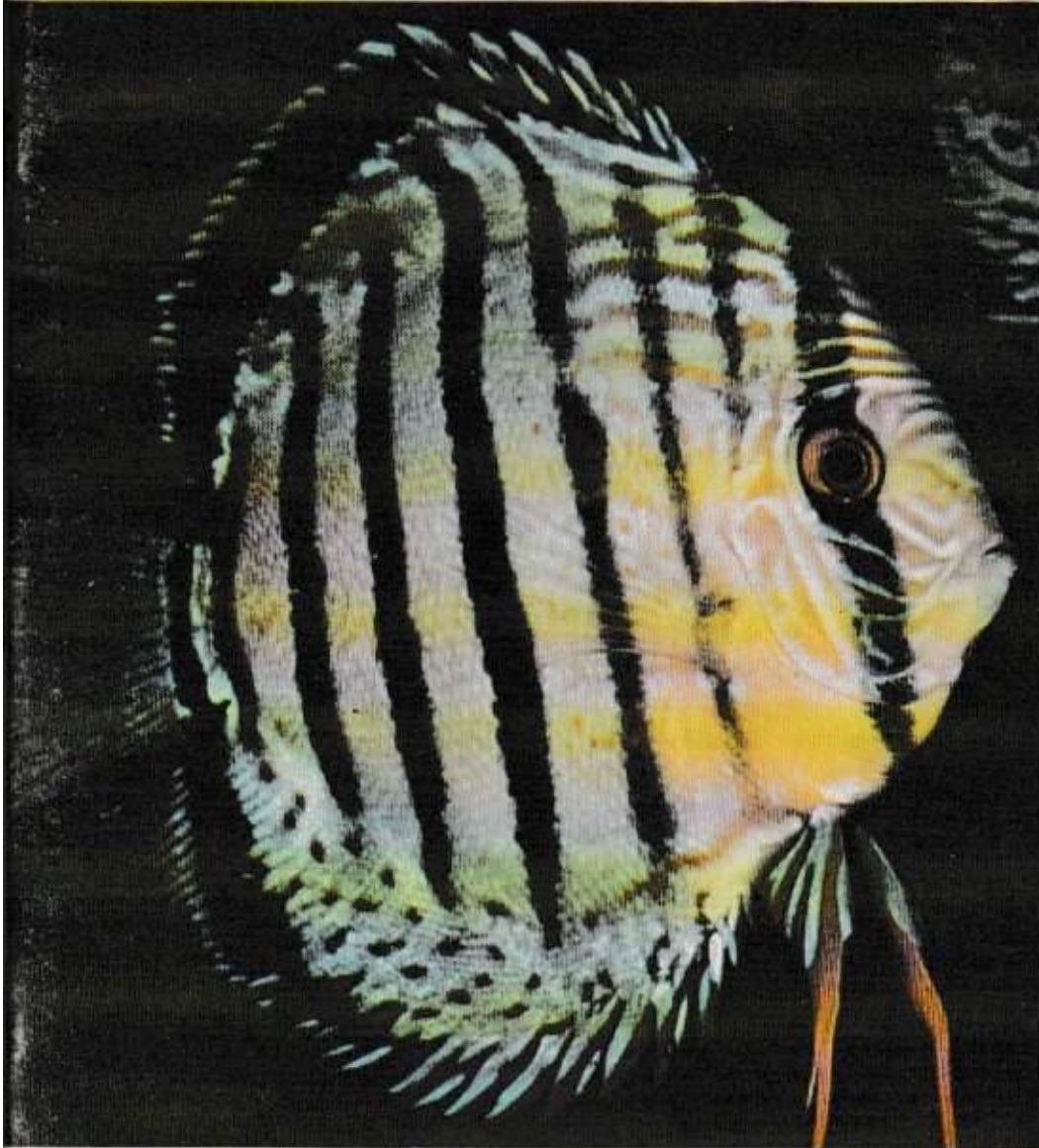


March, 1968

tropical fish hobbyist

DOMESTIC 35¢ / British Isles 2/6



Search...
For The Real Blue Discus

tropical fish hobbyist

Vol. XVI, March, 1968 (r146) No. 7

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features

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cover

Our cover this month is graced with the regal beauty of the Blue Discus, *Symphysodon aequilasciata haraldi*. This species is truly the Mona Lisa of the aquarium world; observe those glorious, subtle, low-key colors so reminiscent of the inspiring Italian Renaissance paintings; watch her enigmatic gaze as she peers out through the aquarium glass. *Symphysodon a. haraldi's* magnificent physical presence combining sweetness with an aura of intriguing mystery, could really have inspired a Da Vinci and has definitely cast a lasting spell over all aquarists who have looked upon her. In fact, our most sophisticated (experienced) aquarists have passionately accepted the challenge of maintaining this Discus within their aquaria. And what a challenge *Symphysodon a. haraldi* does present, for she is most delicate and demanding. But why not! She is more than a painting could ever be . . . she is alive. We are publishing "Search For The Real Blue Discus", a magazine article rich with ecological data, because we hope that possibly within its sentences are clues which will serve as a means to some of our readers in unlocking the secrets of the mysterious life-processes of our mini-Mona Lisa from the lower Amazon region. Photo by Dr. Eduard E. Schmidt.

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

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March, 1968

editorial

It has been many years since I had to write an editorial for this magazine. Almost 12 years ago I gave that job to my great friend and co-worker, Bill Vorderwinkler. As most of you know, Bill suffered a pretty serious stroke last year and has been 50% paralyzed ever since. I saw Bill a few days ago and I can only pray that the fact that he can flinch his right leg means he is on his way back to writing editorials once again. Bill's entire right side is paralyzed, but his left side is great now and I hope to smuggle an electric typewriter into the hospital to see if Bill can type ones again. After Bill became ill, the magazine was turned over to Mike Reed who had been working as Bill's assistant for four years. Mike left on New Year's day for a change in assignment to Chicago, with another publisher (not a pet book publisher). So . . . I have the job once more. In looking through our inventory of articles, I noticed a few that had been gathering dust for one reason or another. Each editor has his favorite authors as well as his favorite subjects. My leaning has always been to stories about fishes in their natural habitat, as well as breeding fishes, with final emphasis on a better understanding of fish diseases. So I dusted off some of our late Harald Schultz' notes and polished them up into a few articles. I don't intend to edit TFH for long; I still prefer going into the jungles, finding new fishes, writing about them and photographing them. You can't do that from a desk that requires 75 hours a week attention.

Herbert R. Axelrod

Search For The Real Blue Discus

Symphysodon aequilasciata haraldi

BY HARALD SCHULTZ
Brazil



March, 1968



Neither this Discus nor the Discus on the facing page is the new Real Blue Discus. This is the old Discus described by Heckel in 1840 and correctly known as *Symphysodon discus*. Photo by Dr. Herbert R. Axelrod.

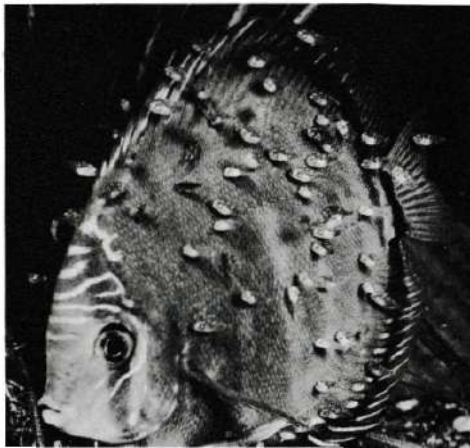
Environment (by Harald Schultz): Discus live in all parts of the lower Amazon region. As far as I could observe, they occur in any kind of waters, from the muddy 'white' neutral waters of the mainstream and its tributaries to the coffee-dark, soft and extremely acid waters of other tributaries. Acidity of some of these rivers, rivulets and lakes goes as far down as 5.6 or 5.8; hardness is less than 1. These soft acid waters seem to have little growth of infusoria or other micro-organisms. This, of course, must be checked out by hydrobiologists, and, as I believe, this had already been done by Dr. Harald Sioli and others.

Strange enough is the well-known procedure of the fry to "graze" on the parent's body, eating the very nutritious slime. But, could it not also be that certain micro-organisms grow on this slimy surface? Natives of the Amazon call this secretion of body-slime 'milk', and it is nothing new to them.

I remember an article about a certain ape-species which in the wild feeds exclusively on vegetables but which when brought into captivity seems to require a diet of animal origin. The author of the article explained that this odd behavior resulted from the fact that the wild apes had in their intestines certain species of large infusoria which provided the apes with necessary animal protein. Upon capture of the apes, however, the infusoria died, thus making it necessary for the apes to be fed animal foods.

The feeding of their babies by *Discus* (as well as *Arapaima gigas* and other species) seems to indicate that in nature enough infusoria do not exist to provide food for the fry. It has been difficult for many years to discover the breeding places of the *Discus* species. Now they are known. Unfortunately, I do not know if they are only the soft and acid waters, as I believe they are.

Discus babies feed from the slime generated in the skin of the parents. Photo by Gerhard Buchich.



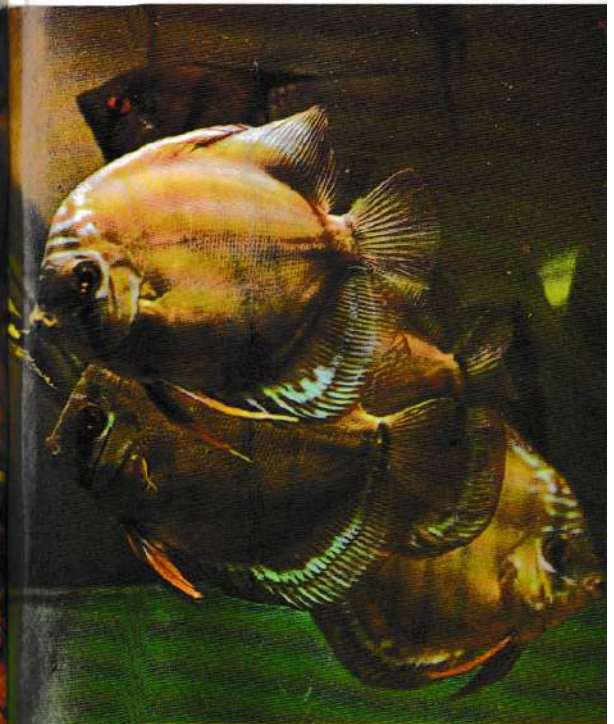
Harald Schultz eating baked Blue Discus with two cocobolos from near Lake Taffe in Brazil. Photo by Dr. Herbert R. Axelrod.

The different color varieties of *Discus* seem to be confined to certain areas. During several decades, when Paramount Aquarium was the sole importer of *Discus* from the Amazon, the whole world of aquarists received only two kinds of *Discus*. From the lower Tocantins came a brown *Discus* and from the Tapajoz, close to Santarem, a grayish variety. These same color varieties seem to live up to Manaus. In the Urubu River, below Manaus, they are dark brown, without any blue or green stripes at all. But in the Rio Negro, not far from the capital of the state of Amazonas, Manaus, exist herds of grayish-brown *Discus* with nice blue stripes . . . and, very rarely, also one or two of the real *Blue Discus*!

Not too long ago, one of the major exporters of this area caught several *Discus* having a yellowish body color. This might also be an unknown color variety, but they are not very beautiful, and possibly of interest to only the scientist!



Symphysodon equifasciata axelrodi show some blue lines when they are in perfect condition. But the blue is nothing like that in the Real Blue *Discus*. Photo by Helmut Pinter.



The normal Brown *Discus*, *Symphysodon equifasciata axelrodi*. Photo by Milanlow Kocar.

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The trees were choking the small streams and travel was extremely difficult, but we had no choice if we wanted Real Blue Discus. Photo by Harald Schultz.

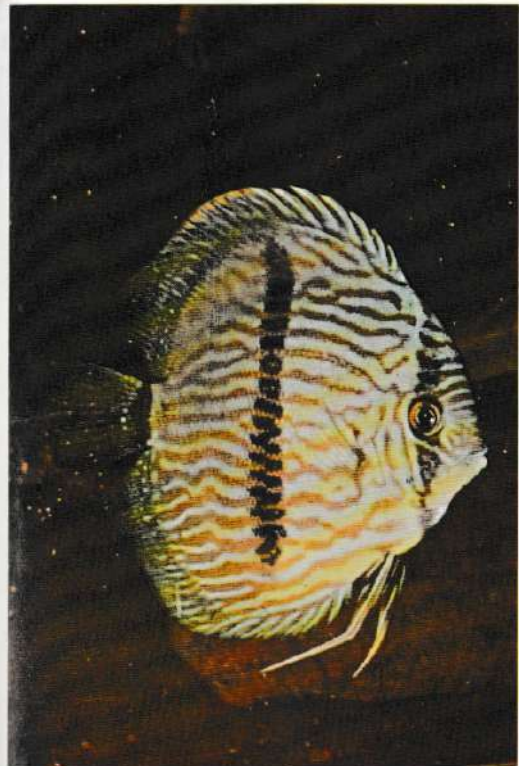
If you, dear reader, are interested in discovering other new, beautiful Discus species, accept this tip: Explore the small blackwater tributaries of the Rio Negro. I am almost sure you will discover still other color varieties. Perhaps you will find the gorgeous red one with green stripes, or a sky-blue one with red waves!

The real Blue Discus, as I caught them, do occur farther up the Amazon. I found them not far from Lake Tefte, not a single one in the lake itself. We had to cross the heavy jungle for many hours, following the narrow paths of Brazilian gatherers or rubber-tappers. It was completely impossible to go upriver by dugout. The small rivulets are completely closed by fallen trunks, huge branches, roots, and other obstacles. The trees which cover the shores are tall; little light falls through the green roof of leaves. The waters are clear and not slow. Some parts are deep, especially after a heavy rainfall—others are extremely shallow. The bottoms of these rivulets are covered with a layer of brown, rotting leaves; the shallows are white, of soft, fine-grained sand. Long roots from the high shores reach into the water, making excellent hiding places, and deep holes reach far into the earth, where many fish live invisible to the human eye.

Tropical Fish Hobbyist



The Real Blue Discus, *Symphysodon aequifasciata haraldi*, named to honor the author. This was an actual specimen collected by myself and Dr. Axelrod. Photo by Dr. Herbert R. Axelrod.



Symphysodon discus. Compare this with *haraldi* on the facing page and you will note that the main difference besides the blue coloration is the two large stripes on *discus* and the seven faint stripes on *haraldi*. Photo by Dr. Eduard Schmidt.

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March, 1968

When my fishermen started chasing the Blue Discus, they waded along the bed, slashing the surface with long poles, pulling the ends of their poles into the holes under the shores, screaming, and beating the waters with their feet. The Discus gathered like herds of cattle. I could not see them, but the fishermen knew where they were. They tried to hide close to roots in the dark, and suddenly started to "run" across the shallow spots to hide immediately in the dark in front of the other shore.

The average temperature of the Amazon mainstream is between 80-82°F, but these shadowed rivulets are only about 76°F. Waterplants were extremely rare and existed only in certain places where the stream flowed slowly. These rivulets did not seem to be very long. Discus occurred only about five miles above the mouth and not further up than fifteen miles, more or less. The fishermen told me that these fish migrate during the beginning of the dry season and again at the end of the rainy season. They said that in summer, when the lakes are shallow, they can easily be caught by torchlight at night in the big lake. I am not sure if the 'lake' Discus are the same colorful fish I have caught in the rivulets!

Continued on page 37.

My fishermen used a net 50 feet long and two yards high in order to trap the discus.
Photo by Harald Schultz.



Tropical Fish Hobbyist



Aphyosemion filamentosum (Meinken) from Ijebu-Ode, in southwest Nigeria. This fish closely resembles the new *Aphyosemion*. Photo by Col. J. J. Scheel.

Still we hear of new Killifishes!

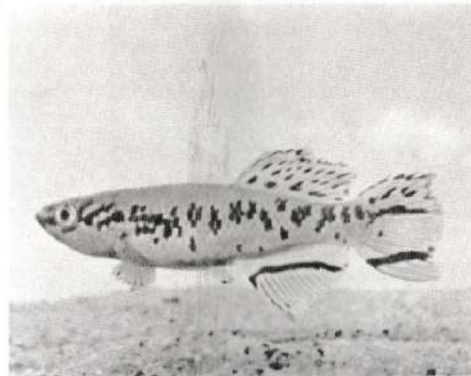
A New *Aphyosemion* (*beauforti*?)

BY HERMANN WILHELM

Aphyosemion gulare (Boulenger) from Ago-Iwoye, also in southwest Nigeria, has some resemblance to the new *Aphyosemion*. Photo by Col. J. J. Scheel.



March, 1968

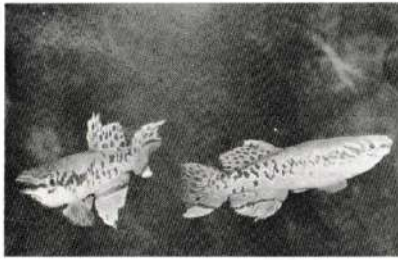


A male of the new *Aphyosemion*. Photo by the author.

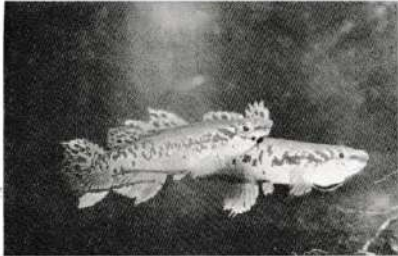
In the strictest sense of the word, this fish cannot be considered a newcomer, for it was a year ago that I received their eggs. The fry hatched successfully and grew very well, and at the present time several aquarist friends have them as well, from my original stock.

These fish are native to Nigeria and I have tentatively identified them as *Aphyosemion beauforti*, but I have already received some letters disputing this. Perhaps when the species becomes more numerous, positive and accurate identification will be made and a different name may be assigned to them.

The body structure is highly reminiscent of *Aphyosemion filamentosum*, but the *beauforti* are considerably larger in size. Mine attained a maximum length of 2 1/2 inches, but I have heard of males which got to be 4 inches long. The dorsal fin of the males is about one-third higher in the forward half, while the tail almost comes to three points. As in *Aphyosemion filamentosum* the first anal fin rays are considerably prolonged, which becomes evident when two males threaten each other. The basic color in the dorsal region may vary from light to dark brown. The ventral region is light blue on the



The beginning of the threatening action between two males.



They beat at each other with their tails.



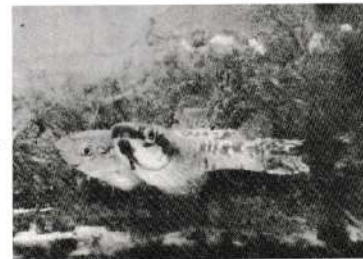
Finally the weaker gives way.



The male dances around the female.



Then he swims above her from behind.

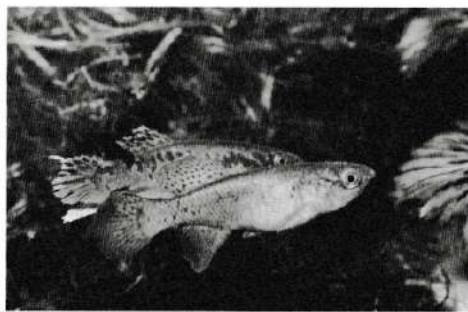


He presses to her side.

Tropical Fish Hobbyist

sides and the entire body is covered with irregular reddish-brown patches. The horizontal lines in the anal and caudal fins are reddish brown as well. The gill-plates are bright violet on the edges, and a throat spot is formed where they almost meet underneath. For this reason German hobbyists have given this fish a name which translates to "Blue-Throated *Aphyosemion*." The females are mostly dirty grayish-brown in color and only a few darker spots are to be found on the body. Their size averages slightly over 2 inches.

They are quite well-behaved if kept with other Cyprinodontes. Only the males seem to forget their good manners at times when they threaten each other, but I must admit that with my fish there were only threats and never any torn fins. These fish are not very fussy about what food is fed them.



The male and female of this new fish are similar in size. Photo by the author.

They have a marked preference for fruit flies and mosquito larvae, but *Daphnia*, *Cyclops* and chopped-up lean beef are also eaten eagerly. Mine have gotten and accepted occasional feedings of dried foods.

Water temperatures are not a critical thing. As with other *Aphyosemion* species, it is well to avoid keeping their water temperatures too high during the winter months. 64 to 68° seems to suffice, and my fish still spawned at these temperatures. I keep them in local tap water which measures 12 German degrees of hardness. However, the pH value should always be acid; 6.5 and less may be considered proper.

March, 1968



I noticed when photographing these fish that the female always placed herself between me and the male as though protecting him.

As part of their spawning behavior I could determine a distinct set of spawning colors. My fish could be observed to spawn only during the morning hours. The males begin by dancing with quick, short motions around the females and in the upper half of their bodies they show a dark horizontal stripe. This is clearly visible only when the female is approached. Then the male swims over the female from behind and when the proper spawning-site is found, he presses his mate into the peat-moss with his folded-over dorsal fin. Both quiver for a short time and a quick swimming apart ends the mating act. These remind us very strongly of the spawning of the *Nothobranchius* species. What was interesting to me was to find out if this *Aphyosemion* species made a funnel of its anal fin. To determine this I let them spawn in fine sand. Here the spawning activity was less lively. The fish put their anal fins together to form a sort of "pocket." Only when they had done so did the egg-laying begin.

The eggs were kept through a dry period, that is to say, in peat-moss. At a room temperature of 64 to 68° F. they remained thus for 8 weeks. Then I could easily see the embryos with the naked eye. I poured water which was only 55° F. in temperature into the glass jar to a depth of only one inch. After 4 hours I could see the first of the fry swimming. In order to imitate the processes of Nature most closely it was best to bring up the water depth very slowly. All spawnings hatched well for me and the fry were free-swimming at once. The youngsters grew very quickly when properly fed and at 4 months were mature.

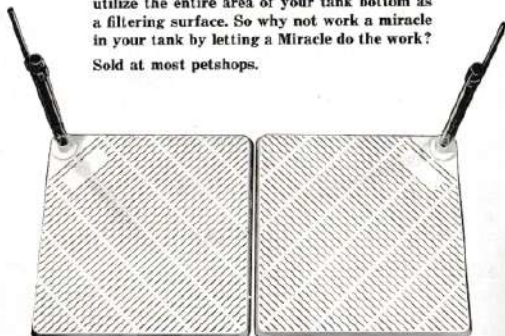
I am happy that hobbyists have another newcomer among the egg-laying tooth-carps in their tanks, and we may be hopeful that this *Aphyosemion* species will not die out.

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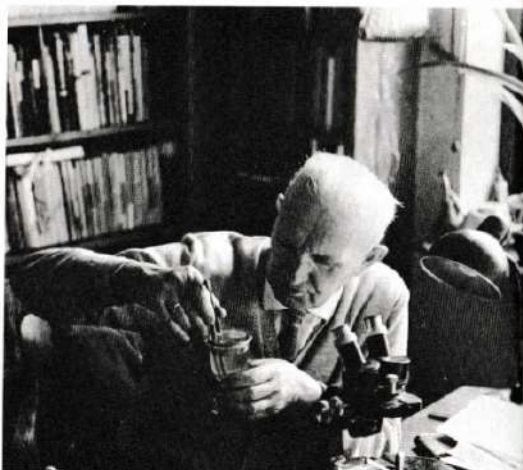
Hermann Meinken observing a group of *Rasbora heteromorpha* in his home aquarium. Photo by Dr. Martin R. Brittan.

Hermann Meinken: A Pioneer

BY MARTIN R. BRITTAN
PROFESSOR OF BIOLOGICAL SCIENCE
SACRAMENTO STATE COLLEGE
EDITOR, ICHTHYOLOGICA, THE AQUARIUM JOURNAL

The name of Hermann Meinken has been well known to European aquarists and ichthyologists for nearly 40 years, and to American ichthyologists and the more advanced American aquarists as well. From Meinken's pen has poured a steady stream of articles about aquarium fishes, some of the articles popular but more often scientific. Most of the latter have been published in aquarium magazines rather than in scientific journals, because, though scientific, they were aimed at clarifying problems for the German aquarist, a more serious individual than the average American hobbyist.

The German hobbyist, and, because of him, the German dealer and importer, has always been a leader in wishing to keep and breed new fishes. He wants to know what they are, see them promptly described as new species if they are new, hear about how they are bred, and, in general, learn *everything* about them. Meinken, through his papers, has been one of the chief means of assisting our German aquarist friends to satisfy their curio-



Hermann Meinken removes a preserved fish to study it. Photo by Dr. Martin R. Brittan.

sity. People who can satisfy the "what is it" and "please give it a name for us" desires of aquarists are rare indeed, and Hermann Meinken has become (he himself opines that he was "forced into it" by circumstances) one of Germany's better known ichthyological systematists or taxonomists.

I had been corresponding with Hermann Meinken for 15 years, since right after World War II. I had done a revision of the genus *Rasbora* as my Ph.D. thesis. As Meinken was doing the rasboras as part of his third of the monumental *Die Aquarienfische in Wort und Bild* (*The Aquariumfishes in Word and Picture*), in collaboration with Arthur Rachow and Maximilian Holly, the publication of which in looseleaf form has stretched over a period of 30 years, I solicited his help on certain difficult and knotty problems. He replied with characteristic speed, friendliness, and helpfulness. So began a long friendship.

Now, in April 1967, after many years of exchanged letters, Christmas cards, and family snapshots, I was in the pulsing north German industrial and commercial city of Bremen, climbing the stairs of the comfortable old house in which Meinken and his wife, Gertrude, live. After an enthusiastic greeting we went to his sunlit, book-lined study on the top floor, overlooking the garden where trees were just beginning to leaf out (and in which a grim concrete air-raid bunker still hulked oppressively). There, while Frau Meinken, a private teacher of English, labored downstairs to pound our language into little German heads, Hermann and I talked far into the night over sausage snacks.

Meinken was now 71 years old. Born in Bremen in 1896, he was educated in the public schools and then went to "seminar," a high school for prospective teachers. In 1915, at the age of 18, he, like most Germans, found himself a soldier, serving on both Russian and Western fronts. From 1920 to 1939 he taught in the public schools in Bremen, only to find himself called up as a reservist at the start of World War II in 1939. He was discharged in 1946 as overage, and began teaching mathematics and biology in a Bremen high school.

During the 1920's, young Meinken, interested from boyhood in nature, began to write about fishes. At the age of 10 he had been given the two volumes of Bader's *The Middle-European Freshwater Fishes* as well as a manual of the plants of Bremen and Oldenburg, by one of his teachers,



Hermann Meinken and the author, Dr. Martin R. Brittan, discussing a new *Rasbora* (?) in Meinken's home in Bremen, Germany.

sparking an interest that was never to flag. Throughout the 1920's and '30's, Meinken gradually rose to the forefront of German aquarists and ichthyologists, much of his work being the required identification or naming of fishes for insistent dealers or hobbyists, as part of the great flood of fishes new to the hobby which poured into Germany, and still do.

Upon retirement in 1958, Meinken became the systematist of the League of German Aquarium Societies, in which post he is still laboring actively.

In Meinken's study (along with a large aquarium containing among others, I noted smugly, *Rasbora heteromorpha*, *R. elegans* and the rarely seen ruby beauty, *R. hallochroma*) are his books (covering the walls), his battered typewriter, a microscope, and other tools of the trade. Meinken's wife of 43 years, Gertrude, was just recovering from bad cuts and bruises suffered in a fall, and she was hobbling about with a cane, which seemed not to slow her down the least bit nor to dampen her infectious sense of humor. Meinken is now working on a large collection of fishes from Pakistan, writing a book on the fishes of the Bremen area (which has never been done before), and continuing to identify new fishes as fast as they come in.

Hermann Meinken is a thoroughly modest man, prouder of his sons, now aged 36 and 40 (the younger an engraver, the elder the manager of a liquor distributing firm), than he is of his own accomplishments. He is "not sure" of the number of papers he has published, but estimates "about 120" (not including the separate species-treatments of *die Aquarienfische*, which would bring the total to several hundred more, perhaps over a thousand). He has described about 20 new species of aquarium fishes (*Rasbora hengeli*, *R. beauforti*, *Aphyosemion cognatum*, *A. filamentosum*, *A. splendopleuris*, and *Micropanchax flavipinnis*, among others), and has had three named in his honor (*Rasbora meinkenii* de Beaufort, *Aphyosemion meinkenii* Myers, and *Chirodon meinkenii* Ahl).

Meinken, at 71, is still going strong after over 60 years of interest in fishes and after nearly 45 years of professional-level effort. Aquarists owe him a great debt.



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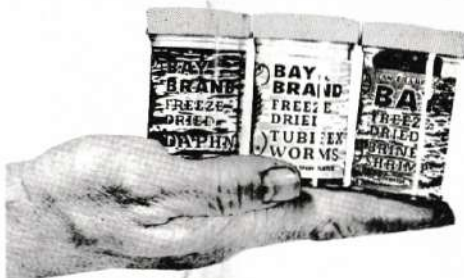
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Search For The Real Blue Discus

Continued from page 15.

When I discovered the first "true" Blue Discus, I did not realize that I had found a valuable jewel. I really was not so much interested in a commercial result as in the fact of having found something beautiful for my own tank. I was just astonished at the fantastic colors of these fish. They did not fade even after carrying them for several days in small fuel-containers. It is rather difficult to describe the real coloration of these Blue Discus... It is a symphony of colors, covering the whole body, not only part of the body, with blue streaks. And among the eighty or more fish we caught first were several with red waves along the entire body and I especially remember one which had deep-red blotches spread over its body. After having returned to São Paulo I could not believe the beauty of these fish, and I could hardly wait to go back to the same spot on the Amazon to get more. But a strange thing happened to me at the same time: When I wrote to my friends Bill Reese and Fred

My fisherman worked hard and tired easily. Every few hours we had to take a 30 minute rest break and sleep on the jungle floor. In the interior of the jungle almost no sun reaches the earth and it is always cool and very comfortable for sleeping.
Photo by Dr. Herbert R. Axelrod.





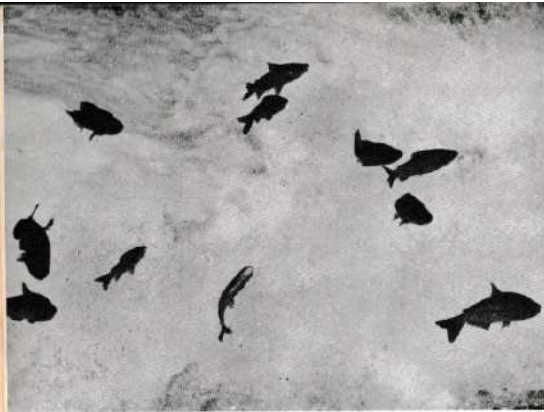
We went into the small igarapés following a clear stream where the water was not black. We found this fish in soft, acid water. We had to follow the stream on foot since it was a mere trickle during the dry season. Photos by Harald Schultz.



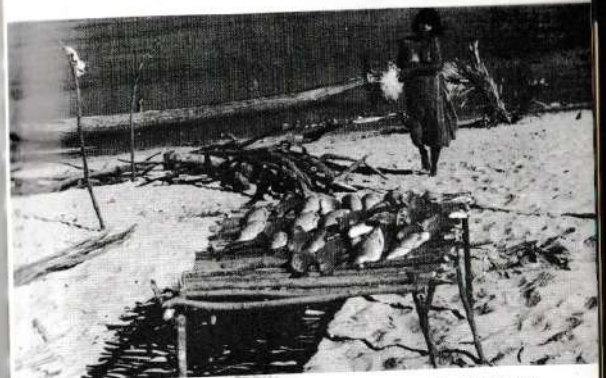
Cochu about these extremely beautiful fish, I felt like a liar; I could not really realize that it was the truth! "Am I a dreamer?" I asked myself. After two years of waiting, I returned to Lake Tefé. We caught only five or six real BLUE DISCUS—heavy rains, flooded rivulets and many other difficulties stopped our work. Two days later Vilma, my good wife and trustful comrade in my jungle travels, arrived. "Come!" I said to her, "please have a look at this fish!" I took one carefully in my hand; it was a fully grown specimen, as big as a breakfast plate. "Have you ever seen such beautiful colors? Am I blind? Or am I dreaming?" . . . She said nothing for a long while, but finally answered: "I cannot find words to say it to you, but these are by far the most beautiful fish you ever showed to me." "Thanks," I said, "now I believe it myself. It is the truth!"

I have not very much to tell about scientific data on the environment of these fantastically beautiful Discus fish. I do not even know their exact distribution. I am almost sure that they represent special races confined to small areas of the upper Amazon, and I believe that they prefer small rivulets, with clear (not black!), acid and soft waters. But in these rivulets we caught only

We finally found the main source of the stream which was a large lake. Photo by Harald Schultz.



In the grand search for many new Discus species, we passed small waterfalls where thousands, if not millions, of *Prochilodus* were jumping the falls. We caught them with our nets so easily that in a few minutes we had one hundred of them. (Below) We asked the local Indians to join our feast and prepared to cook them in local Indian style . . . a huge fish barbecue over an open fire. Photos by Harald Schultz.



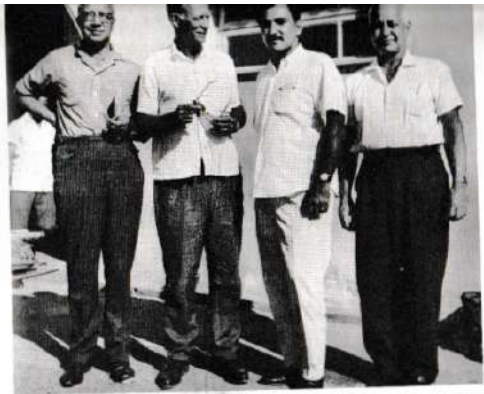
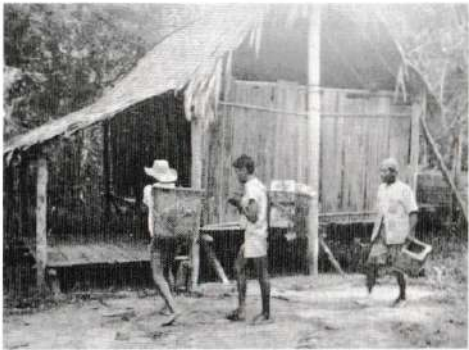
In many Brazilian lakes we found very nice, friendly Indians who were only too happy to cook the fishes we caught. (Below) The author of the article is Harald Schultz who was chief of expeditions for TFH for many years. He died about a year ago. Photo by Dr. Herbert R. Axelrod.



Tropical Fish Hobbyist



Harald Schultz could always be recognized by the camera which so pleased the Indians. They called him the "camera man." (Below) This was the "mansion" in which we lived in the lake region near Tefle. Photos by Dr. Herbert R. Axelrod.



Harald Schultz was a famous fish explorer. He guided many famous people into the jungle. The gentlemen above, from left to right, are Harald Schultz, King Leopold of the Belgians, Dr. Herbert R. Axelrod and Bill Riess.

half- and full-grown specimens, not one single young fish. Where do they breed. Who knows?

I can also say that it seems not to be too difficult to transport Discus. I had to cross the jungle, following narrow and slippery paths, during heavy rain-falls, bumping and bouncing the cans on trunks, shaking out the transport waters . . . and the result was dead or dying fish! But, if the fishermen can follow a river and return by boat, they should be able to bring almost every caught Discus home alive . . . even if they have to change from clear or black and acid waters to white and muddy neutral ones. The necessary caution has to be taken during any changes of water qualities. All freshly caught fish, not only Discus, are often hurt; their body-slime or fins are scratched, and microbes and other small disease-carrying organisms find excellent breeding places, finally killing their hosts. The Discus themselves, as I told you before, exist in all different kinds of Amazon waters.

Dr. Eduard Schmidt in Germany, who certainly is the first to breed genuine Blue Discus, wrote me a letter just today, from which I quote: "The Blue Discus which you sent us make us happy every day! They are by far the most beautiful fish we ever saw. There is no other species which could compete either in body shape or in these gorgeous colors, which are matched only in certain Coralreef-fish!"

Tropical Fish Hobbyist



Q. I purchased a pair of bettas to attempt to breed them, and I had what seemed to be successful spawnings. The eggs hatched after 2 days, and fry could be seen hanging from the bubble-nest. But about a day or two after the fry hatched, they mysteriously disappeared. I've had this happen with three spawnings, using a different female each time. In the books I have read, it is stated that the male can be safely left with the young for 9 days. I would appreciate any helpful suggestions you can offer.

Bill Doggett, Birmingham, Ala.
A. After the young become free swimming, the male's paternal duties are over, and he becomes just like any other betta. This means, if it moves, it's food! Too many references about bettas are written by people with too little experience with this species. There is no reason to even attempt to leave the male with the young after they are free swimming.

Q. I am interested in breeding bettas, but, because I work, I seldom get to see the pair spawn. As a result, I never know if the pair has spawned or not. How do you tell if there are eggs in the bubble-nest?

Melvyn E. Wambeke, Clifton, N.J.

A. Eggs are difficult to find in a nest, especially if it is a thick one. Some males build shaggy nests at first, and, in these, the eggs are more easily seen. There are, however, other ways of knowing if the pair has spawned. The female will look slimmer, and the behavior of the male changes. He spends most of his time adding to the nest and retrieving falling eggs. This is a sure sign that egg-laying has taken place.

Q. I have a pair of bettas which I have tried to breed. The male builds a bubble-nest, the eggs are deposited, and for the first day the male cares for the nest. After this he neglects the nest, and it falls apart. This has happened repeatedly. The aquarium is covered and kept at 78° F. Can you suggest what is wrong?

Alice Jelley, Lakeland, Florida

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March, 1968

A. It was once the fashion to attribute such behavior of male bettas to the fact that they are simply unpredictable. This attitude has prevented our finding more out about the betta. Your betta probably neglects the nest for the best possible reason: the eggs are infertile and disintegrate. Not even the most dedicated male will maintain a nest which has no occupants.

Q. I would like to know if it is unusual for a pair of bettas on their first spawn to embrace 112 times and spawn 1,133 eggs. I would also like to know what percentage of betta fry survive under good conditions.

Edward Girard, London, England

A. You do not indicate the size or age of the parent fish, but at any size or age those are believe-it-or-not numbers. It would take at least 4 hours for this spawning, which is much longer than any I have witnessed. As for the percentage of fry surviving to adulthood, it is a direct reflection of the conditions. 80 per cent is a fabulous result. The average is probably less than 25 per cent.

Q. My friend and I have been arguing about the proper temperature at which to keep and breed bettas. He says 75° F. for general purposes and 80° F. for breeding. I say 80° F. most of the time and 85° F. for breeding. Who is right?

Gary L. Johnson, Billings, Montana

A. As usual with such questions, you both are. I tend to prefer the higher tempera-

ture range, because in it bettas are more active, the fry develop faster, and there is a shorter period between spawnings.

Q. I have five young unsexed bettas in a community tank. When they grow bigger will they continue to be so friendly towards one another, or will I have to remove them?

Eva Spencer, Garden Grove, Calif.

A. I have seen a male betta kept in a community tank with several females with no torn fins resulting. The bettas were placed in the tank when they were young, the owner thinking they were all females. As the fish matured, the one male early solidified his claim to being "top dog," and peace and harmony resulted. If your group includes two or more males, this happy situation may not develop.

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them in the infested tank, and don't give them anything to eat for a few days. Before you know it they'll be consuming the hydra in great numbers. Just to be safe, wait a day or two after you see what you think is the last hydra being consumed.

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3. The *fremouth* is ready to breed at the age of about 4 to 6 months. By this time it should be 3 or more inches long.

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Confused beginner

Q. As a tropical fish hobbyist beginner, I am very much interested, yet thoroughly confused, in breeding both livebearers and egglayers. I would greatly appreciate any information you could give me on the subject of breeding tropical fishes, especially the egglayers.

Lorena T. Chin, Silver Springs, Md.

A. Questions of this type, so broad that it would take hundreds of pages to answer fully, make up such a large percentage of the letters we get that I thought I should reply to one of them and thereby answer many hobbyists. Remember that all tropical fish enthusiasts were at one time beginners and had to learn what they know by practical experience and reading. With the reading, T.F.H. can help, for, in addition to this magazine, we publish a large line of books on all aspects of the aquarium hobby. The well informed aquarist is the successful aquarist.

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Blind fish

Q. I have an oscar (*Astronotus ocellatus*) that is about 5 inches long and blind. He has been blind for about a month. He is losing weight fast because he is not getting enough food. How do you feed a blind fish? Is there any possible way of curing him?

Dennis Ieby, Turkey, Texas
 A. Since you do not mention the circumstances under which your oscar became blind, I can only suggest a cure that may or may not be effective. Of course, if the entire eye is missing, no cure is possible. Eye fungus is characterized by the formation of a tuft of white threads hanging out of the eye or a white film over the eye. This is a secondary infection, usually following either mechanical or chemical injury to the eye. The best method of treatment is to paint the eye with a 1 to 2 percent solution of silver nitrate. A progressive salt treatment might also work. Feeding this fish should, indeed, be a problem. Try holding the food in your hand and placing it directly in front of the fish's mouth.

Corydoras crosses.

Q. I have a pair of *Corydoras* Catfish. They are male and female and seem anxious to breed even though they are of different strains. They are similar in appearance and are from the same dealer. Can they cross-breed?

2. If the answer to No. 1 is yes, can they be bred in a large plastic bag in a cardboard box filled with water siphoned from an established aquarium and a layer of mulm on the bottom?

3. Can a plastic turtle raft be hung on the side of the aquarium or box and be used instead of a large upturned leaf?

Patrick N. McDonough, Inglewood, Calif.

A. 1. If you really mean "two different strains" and not two different species, there is no reason why your Catfish will not spawn. With two different species it is quite a different story, and you will probably have no luck.

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2. Leave out that layer of mulm. Catfish like clean water, and a layer of mulm is not conducive to this.

3. If your turtle raft makes contact with the water in the same manner that a floating leaf would, there is no reason why it would not do as well.

Dwarf gouramis

Q. I have recently purchased a pair of dwarf gouramis. I put them in a 5-gallon aquarium with other fishes. The male chases the female about the tank, but he hasn't built a bubble nest. The female doesn't let the male catch her. Why is this? The water temperature is between 70 and 75° F.

2. Sometimes the male goes up to the surface and shoots a stream of water from his mouth. Why does he do this?

Kevin McLaughlin, Swarthmore, Pa.

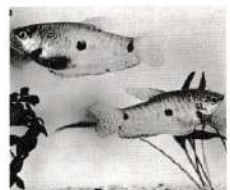
A. 1. Don't expect the male to build a bubble nest and spawn in a small tank with other fishes in it besides. If you want a spawning, give them their own tank and raise the temperature to about 80° F.

2. This bit of behavior has been described to me before. Unlike the archer fish, which shoots a stream of water to knock down an insect above the surface, the dwarf gourami seems incapable of any marksmanship with his stream of water. Probably it's just playfulness.

Sexing Blue Gouramis

Q. I keep several kinds of gouramis. My favorite is the three-spot blue. All the dealers I have asked say that it is impossible to sex these fish. Is this true?

Mrs. Irene Gatcher, Houston, Tex.



A pair of *Tricogaster trichopterus* gouramis. The fish on lower right with more slender and elongated dorsal is the male.

A. It is not at all difficult to sex blue gouramis when they are mature. The male's dorsal fin is longer and more pointed than is the female's. The same is true of the male's anal fin.

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About babies

Q. I would like to know if you can keep baby mollies in the same tank with green swordtails?

2. Will female black wag platies have babies in a 3-gallon bowl without a male and with about seven other fishes that are about 1 inch long?

Jim Novacoski, Powhatan Point, Ohio

A. 1. Always keep livebearer babies by themselves. Even if larger fishes don't attack the youngsters, competition for food will be unfair to them, and they will not get enough to eat.

2. A female platy that is ready to give birth will do so almost anywhere. Unless your female has been in the same tank as a male in the last 6 or 7 months, however, don't expect any young.

Hardness

Q. Your booklet entitled AQUARIUM WATER CHEMISTRY, by Dr. Rolf Gudeh, states, on page 7, in paragraph 1, under the heading "Measuring Total Hardness," the following information:

"There are many available chemical preparations with which one can get good results. It is possible to measure total hardness accurately and very quickly, using test kits made for this purpose."

The gentleman who made this statement undeniably knows whereof he speaks. However the fruits of his knowledge have not been passed on to the petshops, aquarium owners, nor even to the Chemical Analysis Laboratories of either the Philadelphia or Suburban Water Departments.

In fact, sir, to put the matter bluntly, they are abysmally uninformed as to the existence of such kits and seem to be in even deeper water still when questioned as to a starting point in making inquiries.

It would be an understatement to say that I am bewildered by all this. I have all the equipment necessary to measure carbonate hardness, but this is useless to me unless I can also measure total hard-

ness. In the absence of the latter I can only get to the desired carbonate hardness by the method of trial and error. So, if you can inform me where or how this kit can be obtained I would be most appreciative.

Bruce E. Elles, Jr., Merion Station, Pa.

A. For the purpose of the aquarist, the standard hardness test kit sold at petshops is quite adequate. It is simple to use and accurate beyond the degree necessary for aquarium testing.

Fry deaths

Q. I have a problem with the breeding of Jack Dempseys. My pair laid about 500 eggs on the bottom of a 20-gallon tank. The water was 86° F. with a pH of 0.9. The pair took very good care of the eggs and none turned white. In 2 days the eggs hatched. Two weeks after the young were free swimming, most of

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them started spinning around wildly. They made cramped motions and died soon afterward.

I feed babies tiny live daphnia; powdered baby dry food; and frozen baby brine shrimp. The parents eat live, dry, and frozen food and fresh shrimp. What is causing the young to die? This is my second large spawn and both died the same way. The water is clear and filtered. Can you advise me on this so the same thing will not happen in the future?

Judy Foran, West New York, N.J.
A. It sounds like the problem is one of bad genes. In such cases, there is no choice but to get another pair.

Albinos' eyes

Q. First I would like to compliment you on your column "Mail Call." I read it before reading any of the other articles.

There is something that has been bothering me for some time. Does arti-

ficial light, such as a 40-watt fluorescent fixture, bother the eyes of true albinos? It is my opinion that their red eyes are affected by the light. Is this true?

Don Lowry, Winnipeg, Manitoba, Canada

A. It has been known for a long time that albinos' eyes are much more sensitive to light than those of their pigmented brothers. A tank containing albinos of any species should not be lighted intensely, and it should have several dim portions into which the albinos can retreat. I like to keep the top of one corner of my tank densely packed with floating plants which block out much of the light but do not spoil the natural look of the aquarium.

Pelmatochromis

Q. Could you please help me out? I have been trying to find some *Pelmatochromis guthriei*. There is one pair that I know of in this area, but they are not for sale.

I would be very grateful if you could tell me where to get some.

Douglas C. Geldbach, St. Louis, Mo.



Wanted! P. guthriei.

A. There are two approaches you might use. You could let all the big dealers in your area know you are looking for the species, and ask them to call you when the fish are available. You might also write to the Aquarium Stock Company (their address is on our back cover). They will mail the fish to you when they get them if you will send payment.

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Underfeeding

Q. Is there anything wrong with fish who greedily gorge down anything in sight? Their meals include the paint on ornaments, plants, snails, and any bit of debris that may have dropped into their tank. It is a community aquarium, and the fish are reasonably fed. I can imagine tropicals stuffing themselves with food, but this is ridiculous.

Mary Lou Pader, Johnstown, Pa.
A. The most common mistake made in raising tropicals is overfeeding, but you are making the opposite mistake. If your fishes are actually consuming the paint off your ornaments, they are definitely being underfed. Fishes should be kept a little hungry at all times, but not as hungry as yours are. Feed them as much as they will clean up in 10 minutes. If this is what you are now doing, feed them an extra time per day.

Reluctant male

Q. During a visit to an aquarium dealer recently, I noticed three or four female rosy barbets that were very heavy with eggs in one of the tanks. I purchased one of these and then spent a week going around to various dealers before I was able to locate an adult male. I placed the pair in a 10-gallon tank full of bushy plants. Since that time, however, the female is still just as full of eggs

as before, and the male, although seemingly in good health, pays no attention to the female. She has recently begun to chase him around the tank. The temperature is 82°F. What could be wrong?

M. Burns, London, England
A. The male does not want to spawn. Put him in a separate tank and feed him very well for a week or two. Then try again.

Moonlight gouramis

Q. I recently purchased three moonlight gouramis, a male and two females. The male is about 4 1/2 inches long, and the female is a little smaller. I believe

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down on the amount of light entering the pool? The pool would be in the sun most of the time.

Thank you for your help.
Dennis Rothman, Flushing, New York

A. 1. You could use some of the harder cichlids. I would try one of the following: the white cichlid, the oscar, the oscar, the jewel cichlid. Guppies will, of course, do very well and so will tetras or pearl danios.

2. Nylon mesh would be fine for keeping some predators out, but stainless steel mesh would be better. An umbrella-like structure over the pool would keep the rain and pollution out, but I'm not at all convinced that this is necessary if you change about 10 percent of the water every week or two.

3. You had better do something. Floating plants are a good idea.

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Tri-color shark

Q. I am a 12-year-old subscriber to your magazine, and I have been reading it since December of 1966. I find "Mail Call" the most interesting item of all. I do have some questions that I would appreciate your answering.

I have recently seen a picture of a tri-color shark and would like to know the following:

1. What country does it come from?
2. What diet does it do best on?
3. How does one distinguish sex?

Robert Sprackland, Jr., Jackson, N.J.

A. 1. The tri-color, or bala, shark, *Balantiocheilus melanopterus*, is from Thailand, Sumatra, and Borneo.



Harmless "shark."

2. Live foods of all kinds. Some specimens take frozen-dried foods.

3. I don't know of anyone who can without opening the fish up first.

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By Paul Hahnel

Betta companion

Q. I am breeding a beautiful strain of blue veiltails. I use six 20-gallon tanks and one 10-gallon tank. A friend of mine has offered to give me a beautiful male beta that I have always admired in his tank. Can I keep the beta with my guppies. I have the guppies separated by sex in several tanks; does it matter which sex I put the beta with if I do take him?

A. The beta might well damage the tails of your males. However, unless he is overly aggressive, he should be able to get along with a tankful of female guppies fairly well. I would put him in with the females and watch him carefully for a few days to be sure he starts no trouble.

Guppies and snails

Q. I have two tanks. One tank has only guppies in it, while the other is a community tank. The water conditions in both tanks are identical. In the com-

munity tank, there are a number of snails. I have tried to get these snails to live in the guppy tank, but they seem unable to do so. Why is this?

A. Guppies often kill snails by continuously pecking at their heads each time they extend them from their shells. This forces the snails to pull their heads back in, and they cannot get anything to eat. Thus, the guppies kill the snails indirectly by starving them.

Moving a crowd

Q. I had about 115 guppies in a 5-gallon tank and they were quite healthy. Then I moved them to a 10-gallon tank and they died one by one. What happened?

Jeff Perkins, Salem, Oregon

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A. Moving fishes from one tank to another is a tricky business. The fishes are forced to adjust to the water chemistry in the new tank. You should have put the water from your 5-gallon tank into the new tank and then, over a period of days, added fresh water at a rate of about 1/2 gallon at a time. Also, 113 guppies should never be housed in a small tank.

Bent backs

Q. I raise blue veiltails, and lately most of my fish have been getting a condition in which their backbones are bent. A half to three quarters of my fry now have this malformation. Other than this, my fish are perfect: they have good size and color. I would like to know if such a high percentage of culls is normal or if inbreeding or heavy feeding could be causing the problem.

**Ricky Gentzel,
Flemington, N.J.**

A. You are getting an extraordinarily high percentage of bad fish. This bent-back condition is usually an inherited characteristic. Choose only perfect fish as breeders from now on. In addition, add a small amount of calcium and phosphorus to your dry food. This will help keep your guppies' bones strong so that they may be able to combat any tendency toward bone deformity.

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*Salts From
The Seven Seas*



By Alfred A. Schultz

Q. Can I use plastic plants in a salt-water aquarium? If so, how about the lead weights?

George Tikijan, South Orange, N.J.
A. Plastic plants can be used. Remove the lead weights and anchor the plants in the sand, or if you use a sand-and-filter, put the stem into one of the slots in the filter.

Q. I recently purchased a copy of the book SALT WATER AQUARIUM FISH by Dr. Herbert R. Axelrod and William Vorderwinkler. Several places in the book mention a synthetic ion exchanger as being good for saltwater aquariums. However it does not say where this product can be obtained. Can you tell me where I might find one?

Larry Osterman, Orlando, Fla.

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Q. Is the sting of the jellyfish, the "Portuguese Man-of-War", deadly?

George Tilton, Hollywood, Calif.

A. There have been cases where humans have died from the stings of the tentacles of the "Man-of-War". In most cases, however, the stings cause only severe pain and cramps. Of course, a person who has been stung by one of these huge jellyfish and subsequently dies does not always die from the sting; being stung might trigger a heart condition which was previously undetected and might have been fatal eventually even if the victim had never even seen a jellyfish.

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A. The synthetic ion exchanger mentioned in the book sea first introduced by Dick Boyd, a hobbyist who lived in California. He and another person marketed this product for a number of years and then gave it up. Since then he has been out of touch with the writer. If he should read this column, I would appreciate his getting in touch with me, and I in turn will contact you.

Q. Can an undergravel filter be used in conjunction with an outside power filter?

Richard Balaban, West Orange, N.J.

A. Either or both combined make a good filtering setup for a saltwater tank.

Q. I have had a clownfish for 7 months, and it has been doing nicely in my tank. Of late I find that my fish shows no interest in food. I have tried various foods to no avail. Its favorite food had been adult live brine shrimp, but it no longer bothers with them. Can you suggest what may be wrong.

**Lawrence Smith,
Warren, Michigan.**

A. In reading the part of your long letter that is not printed here, I notice that you keep your lights on for 10 hours every day. This suggests to me that your fish has been blinded by the light and can no longer see the food that you introduce into your tank.

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You can usually spot this condition by suddenly shinning a bright light at the fish. If there is no response, and the fish is not frightened, you can be sure that it is blind. Sometimes this condition can be remedied by placing the fish in a completely darkened aquarium for 3 days or so. Then, gradually introduce a dim light and brighten it a little each day.

Q. How can you tell the difference between the young French angelfish (*Pomacanthus paru*) and the young black angelfish (*Pomacanthus arcuatus*)? They look identical when young.

**Tommy Sessa,
Orlando, Florida**

A. The best way to tell these fishes apart is by the tail. The French angel's tail is rounded and has a yellow band. The black angel's tail is square and is transparent.

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Osteoglossum, The Arowana

BY H. W. SCHWARTZ
ACQUARIO RIO NEGRO

Brazil
With the Assistance of Daniel Levy

The arowana is a fish that has been known for quite some time. There are two species, *Osteoglossum bicirrhosum* and *O. ferreirai*. Both species are native to South America.

Arowanas are found in the pools and lakes of the Amazon Basin, as well as in *igarapés* (slow-moving river arms) during spawning time, which begins at the outset of the flooding season of the rivers. The fish live near the surface of the water and are excellent jumpers. In the markets of Manaus the arowana is better known as *salapa*, which according to the Portuguese dictionary means "cave under the banks of rivers and *igarapés*, beneath the roots of trees, where the fish hide during the hot hours", or else just simply "hidden".

For food purposes, the arowana's flesh is considered third-rate, but its roe is considered as a delicacy. Since the arowana is a great jumper, catching it turns out to be difficult even for the professional fisherman who makes use of nets. During the low water period of the river the Manaus market is supplied by part-time fishermen who live on the outskirts of the town. Since the fish habitually swim along the surface, the best way to fish for them is with an *azagaia* (three-pronged harpoon). In daylight it is difficult to approach the fish in order to make a throw, therefore fishing is done mostly at night. Fishermen also use an instrument called a *poronga*, which consists of a small coal-oil lamp to which a reflector has been fitted and which is generally carried on the head, leaving one's hands free for throwing the *azagaia* as well as for handling ears in order to stalk the fish. But the *poronga* is a primitive device for providing light for night fishing. Little by

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March, 1968

little it is giving way to battery-powered flashlights.

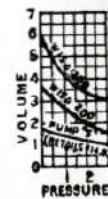
Since I engage in the capture of live fishes for sale to aquariums and in the interest of gaining knowledge in addition to that which is found in aquarium literature, I have done some observation and research on the breeding of the arowana.

By the first month of the flood period of the river, the female arowana shows an average of 200 to 300 eggs which are relatively large considering the size of the fish. They have a diameter of from 1 to 1½ inches. Their color is whitish yellow.

Spawning generally takes place in lakes or dammed-up parts of *igarapés*. Fertilization of the eggs is carried out in a manner that is peculiar to the arowana. During the act of reproduction, the female extrudes the eggs from her ovaries, and these contact the male's sperm outside her body. Then the male picks the fertilized eggs up and keeps them in his mouth, where they are sheltered and kept under conditions necessary for their development.

After fertilization the eggs become jelly-like in consistency and, a few hours later, in the mouth of the male, they develop a small projection from which the baby fish will originate, keeping the yolk sac adhering to its body.

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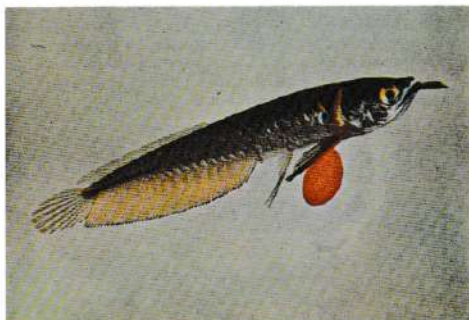
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Before reaching a length of 2 inches, the fry are still unable to swim, for their yolk sacs drag them down. Soon, however, the youngsters start being a little independent. The father opens his mouth, permitting them to come out, and they swim around him hunting for mosquito larvae and microscopic food. As soon as some danger threatens, however, all the young are quickly gathered in by their father. They enjoy the same kind of protection at night time, and this enables the fisherman in search of aquarium fishes to single the species out, for they swim along the surface with their mouths wide open.



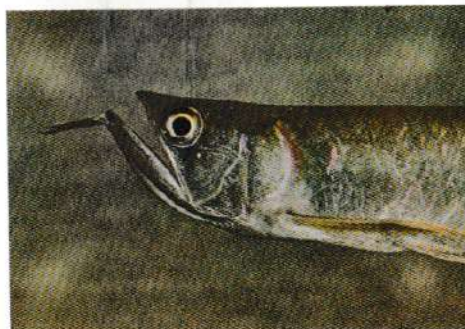
A young arowana, *Osteoglossum bicirrhosum*, about 3 1/2 inches long with its yolk sac. Photo by Dr. Herbert R. Axelrod.

As they grow larger, the young stay ever longer outside the father's mouth. Finally, they become totally independent. At this stage they number 60 to 200, and they venture out in a group on their own in quest of insects and such aquatic foods as small fishes. After reaching a certain size they separate, and they are no longer found in schools. This does not mean, however, that one does not find spots where they abound in large numbers.

If they are intended for the aquarium it is not advisable to catch the grown males with the azagaia, for once harpooned they die in convulsions and spit out the young they carry in their mouths. The young scatter, causing the



Above: The Black Arowana, *Osteoglossum ferrerai* Kanizawa. Below: You can get a good idea of the mouth of the arowana from this photo. Photos by Dr. Herbert R. Axelrod.



fishermen to lose the better part of them.

In order to avoid such losses, fishermen use a capturing method which makes use of a sharp machete. The fishermen hit the fish immediately behind the head with the knife. This causes instant death, and the severed head floats on the surface and is taken and placed in a water-filled container. The fry swim free of the mouth without any losses.

The adult *Osteoglossum bicirrhosum*, which is found in alkaline waters, is usually between 16 and 24 inches long, has silvery coloration, and relatively large scales. While still small and in their premature stage, the fry of this species are silvery in color and, apparently, have no scales.

During one of my fishing trips, in 1961, at a place called Animbá, on the Rio Negro a little above the Jufaris river, for the first time I found young black arowanas. These youngsters have yellow horizontal stripes along their black bodies. These fish are the young of the relatively rare *Osteoglossum ferreirai*, the black arowana.

Reproduction in the black arowana is similar to that in *O. bicirrhosum*. It is a remarkable fact that, although they are found in acid waters with little incidence of microscopic life and foods, the adult black arowanas surpass the common arowanas in size. When adult, the species found at Animbá also differs from *O. bicirrhosum* in having scales with a bluish hue, and orange-brown dorsal and ventral fins. Looking at arowanas from above it is easy to tell the two species apart, for the black arowana presents a darker back than the common arowana. The black arowana, upon growing to a length of 36 to 40 inches, loses its yellow stripes, but keeps its very dark coloring until it starts to develop its blueish gray scales. When seen from the side in a tank, the adults are easily distinguished from the common species due to the difference in coloring of scales and fins.

At Lake Simão, which is connected with both the waters of the Rio Branco (alkaline) and the Rio Xerini (acid) there is a further variety, probably a new species, which shows three black horizontal stripes on the body, from the head nearly to the other extremity, the remainder of the fish being similar to the common arowana.

On the tropical fish market the demand is greater for small and immature specimens of arowanas, preferably still with the yolk sac, for this guarantees self-feeding during the difficult first days of captive life.

When kept in aquaria, in areas where such food is readily available, arowanas' food consists of mosquito larvae, white termite eggs, and small fishes. After having grown to adulthood, arowanas can be fed much more easily, for then they start taking small pieces of fish or meat.

The arowana certainly is an uncommon pet for the aquarist. When it is large, it should be kept in a separate tank due to its great voracity. It should also be kept separated in the stage in which it has its yolk sac, for other fishes will attack the sac.



Photo by TetraMin-Water, Mitsu, W. Germany

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10-Second Quiz

The chemistry of aquarium water is an important factor in the health of aquarium fish. True False

Your success in breeding and caring for delicate species of tropical fish depends as much upon food as it does water. True False



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The spiketailed paradise fish, *Macropodus cupanus dayi*. Photo by Hans Joachim Richter.

The Spiketailed Paradise Fish

BY HANS JOACHIM RICHTER
LEIPZIG, GERMANY

The spiketailed paradise fish, *Macropodus cupanus dayi*, is native to Hindustan and the Malay Archipelago and was first brought into Europe in 1908. In contrast to the original form, *Macropodus cupanus*, this subspecies is much more attractive. In spite of their beautiful colors and graceful form, they are almost never to be found in the tanks of hobbyists. Why? Here for example are my experiences and conclusions:

A friend told me I should make available to hobbyists my hardly-ever-seen fish. I went from petshop to petshop with my half-grown fish, hoping



Above: The normal paradise fish, *Macropodus opercularis*. Photo by William T. Innes. Below: A hybrid between *Macropodus opercularis* and *M. concolor*. Photo by Arend van den Nieuwenhuizen.



that they would gleefully yank them from my hands. The opposite was true: as soon as they heard the generic name *Macropodus*, most of them threw up their hands. Probably they imagined them to be similar to the common paradise fish, *Macropodus opercularis*, and there was never any interest shown. I always got the same answer: "I won't be able to sell these. They are predators!" I could do nothing but shake my head sadly and walk away.

I decided to try a trick, which worked. I took a good picture of a spiketailed paradise fish with me and hurried to a dealer once more. "Would you be interested in these spiketailed gouramis?" I asked. "I have forgotten their scientific name." In most cases I got the same answer: "They look quite pretty; how much do you want?"

I soon had them all sold, just by changing their common name. Even when I delivered them, I neglected to mention their scientific name.

When later on I tried again to get a few specimens of this fish I heard everywhere that they were not being stocked. After frequent failures to find them in Leipzig, I asked a friend in Austria to get me a few, which he did. I received two pairs. They were full-grown, each about 2½ inches in length. A tank of about 8 gallons capacity was prepared for them with tap water (about 18 DH). The bottom was gravel, with grains about 3 mm in size. Plants consisted of *Hygrophila polysperma*, *Nanophila stricta*, and *Synsphaera triflorum*. Water temperature was about 77° F. The *Macropodus cupanus dayi* seemed to do well in this tank, showing their brightest colors after only a few hours. I did not have long to wait until spawning preparations were begun. During these the male showed a blood-red color in the throat and chest regions. He carried and released a small number of fairly large bubbles under a leaf of *Nanophila stricta*. The bubble nest was a little under 1 inch in diameter. The nest was not directly below the surface, but about 2 inches above the bottom, for it had been built under an older leaf which had rolled up a bit. While the bubble nest was being built, the female, her body visibly swollen with eggs, remained nearby but was chased away by the male when she got too close.

Next morning I could observe how both fish circled each other and then swam together to the bubble nest. Here the male embraced the female, but at first these were only false matings. Then there followed a chase about the tank, after which they swam peacefully under the nest, but again there was a false mating. This went on for a while, until finally I observed the first genuine spawning. The eggs were gathered by both the male and the female and put into the nest. This, however, happened only twice, and then the male drove away the female, and she was not permitted under the nest to continue spawning until he had found all the eggs. When the female was depleted, the male drove her away vigorously.

Almost exactly 3 days later I could see the dainty fry under the nest, one occasionally falling out of the bubbles and sinking slowly, to be retrieved

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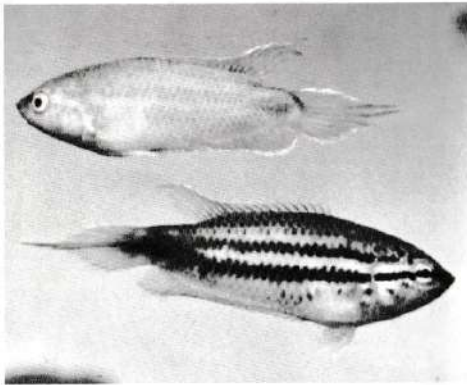
Looking for a complete first aid kit for your fishes? Well that's exactly what INLAND'S BIG 7 represent! Here's what we mean:

- 1—Anti-Chlor is a sodium thiosulfate solution a few drops (not spoonful) of which makes tap water safe for aquarium use. You can use it confidently for any quantity of water from a gallon for topping up, to a tankful when setting up.
- 2—Ichty-Cide is a malachite green solution. This chemical is still the best known treatment for ich. Also useful against velvet and all other external parasitic diseases of aquarium fishes.
- 3—Sileo-Sol contains both cupric sulfate and silver nitrate. This fungicide is effective against most external parasitic diseases. An important addition to any hobbyist's fish cabinet.
- 4—Aqua-Flavine is a solution of the well known acriflavine neutral. It is extremely effective against fungus and fin and tail rot. It is also used by many professional breeders and knowledgeable hobbyists to control fungus on incubating eggs.
- 5—Methylene Blue is the old reliable medication that is preferred by many hobbyists who have been keeping fishes for decades. It is useful against most parasites and bacteria. It has been used particularly effectively to treat ich and velvet and as a fungicide with incubating eggs.
- 6—2-Phenoxyethanol is a good general cure. It is effective for the control of most diseases caused by bacteria and parasites.
- 7—Sommitol is an anesthetic for use in handling and transporting goldfish and tropical fishes. Perfect for treating fishes before they are to be moved.

Inland Aquatic Research, Inc. 5784 Archer Avenue, Chicago, Ill. 60638 - (312) 829-2921



Hobbyists: ask for IAR (Inland Aquatic Research) chemicals at your petshop. Dealers: write on your letterhead for complete price list.



A pair of spiketail paradise fish. Photo by Gunter Senft.

and returned by the male. After 2 days more, the fry became freeswimming. They did not seem to be molested by the parents, because both were generously fed. The fry were given very fine infusoria and after 3 days cyclops nauplii. If one wishes to be very cautious it would make sense to remove the leaf with the bubble nest 3 days after spawning has taken place. This can be placed in a nursery tank with about 2 inches of water from the spawning tank. After a few days more, about 1 to 2 inches of tap water that has been aged 2 to 3 days may be added.

I read in the available literature that *Macropodus chinensis dayi* often spawns in hollows under water. For this purpose I placed a coconut shell in the water, which the male promptly took over for himself. Here all subsequent spawnings took place.

To get a good number of fry from one spawning, the male and female should be kept separated and fed generously, but never overfed, before being placed together. Mosquito larvae and white worms are the best foods for this purpose.

I wish everyone who wants to keep this very attractive fish a great deal of success and pleasure.



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