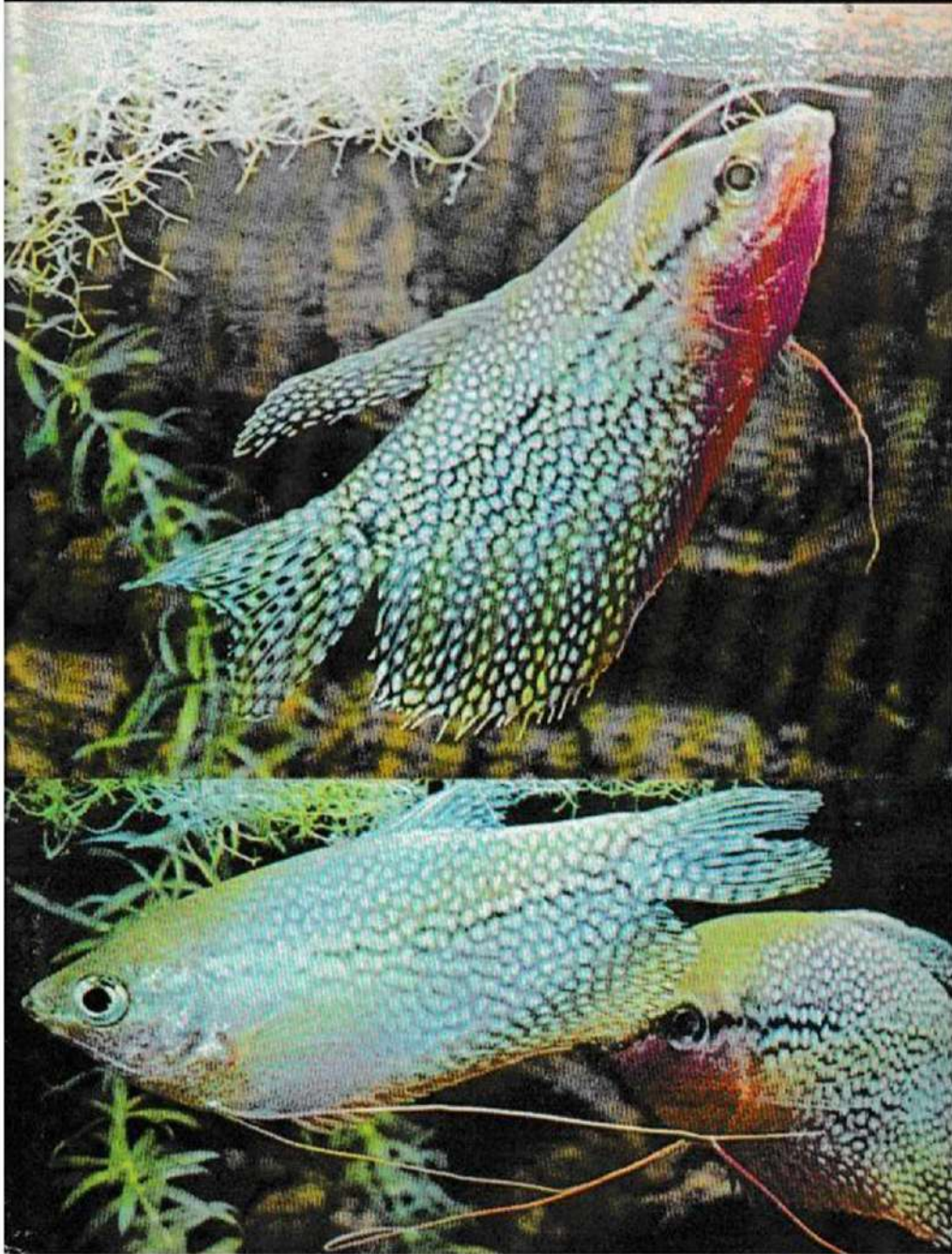


October, 1969

tropical fish hobbyist

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COVER

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The photos on this month's cover are part of a most interesting article, Pearl of Borneo, an editorial feature representing some of Dr. Axelrod's finest writing; we know you will enjoy reading his exciting account of *Trichogaster leeri*. Also in this issue is a documentary story selected by Dr. Axelrod to highlight this October issue of the Hobbyist. "Hunting For Giant Fish" by Dr. Luling, a famous German scientist, is strongly recommended to you by Dr. Axelrod because he believes this text to contain along with pertinent ichthyological information, heroic accounts of thrilling adventure. The spell of the unknown and unexplored elements of jungle-life has inspired many writers.

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.

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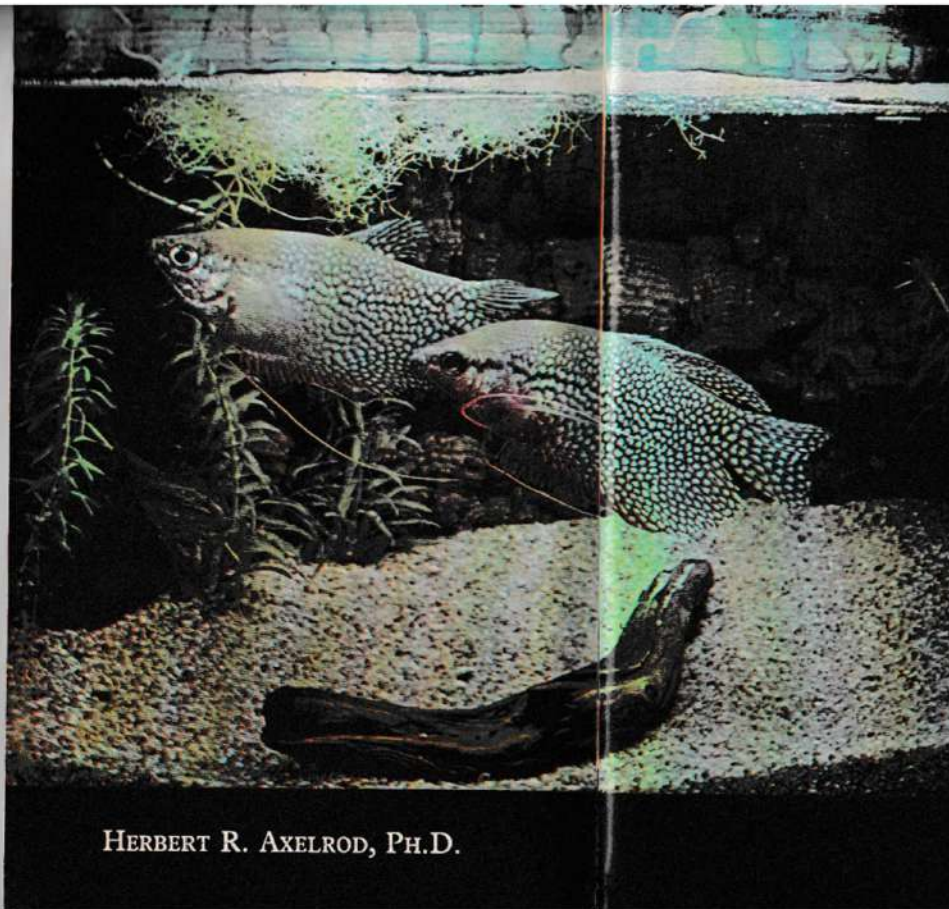
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editorial

Hello, I hope you enjoyed your summer vacation. A little bit of rest does everyone's bones a heap of good. But now that the summer is officially over, you can trade in your beach umbrellas, peanut butter sandwiches and Bach records for some brine shrimp, methylene blue and 20 gallon tanks. It's that invigorating season of the year again when the tropical fish world really comes alive, when we get back into our aquaristic saddles.

The magical arrival of autumn always finds our homes humming with happy aquaristic activity: new tanks being set up; old ones being sterilized; motors being checked and repaired; heaters cautiously being tested; tank supports being reinforced; water being aged; new fishes being acclimated; books being dusted and read. Yes, there's plenty to keep us aquarists busy. Which reminds me.... a recent letter from a reader who while expressing sentiments we all share about that glorious U.S.A. voyage to the moon stated that since there might be life on other planets, there could also then be a chance of the existence of new species of fishes. Well, I wrote back saying that his conjecture was a very exciting possibility but that in the meantime we're still discovering new fishes right here on good old earth and that there is still so much to explore right here in our own hydrosphere, so many mysteries yet to be unfathomed concerning our wonderful finned-friends, that we should all be kept wonderfully busy for many years to come. We can dream about Mars but do you know where the real action is? It's here in the tropical fish world and the action is for everyone to share right now.

Joseph M. Bellanca



HERBERT R. AXELROD, PH.D.

Borneo The Pearl

Wearing their spawning regalia, this pair of elegant *Trichogaster leeri* transforms this aquarium into an aquascape of unforgettable beauty. The male on the right has many distinguishing features including the larger and more pointed dorsal fin. His colors also exhibit a greater intensity than the female's. Photo by Richter.

Tropical Fish Hobbyist

It's the rainy season in Borneo and the once uncomfortably hot waters in the small pond are now cooling off. The sun, too, seems to know that it's time for a let-up in the heat and hides behind thick, dark clouds. The grass begins to grow faster, reaching higher into the sky to snatch what precious sunlight filters through, for its rate of growth in the first few weeks of the rainy season equals that during the months of fairly dry weather.

The water, too, begins to come to life. More and more, colorful fish break the surface as they snatch insects flying close to the brimming pool. Floating water plants seem to be less dense as the pool fills up again, but here and there we can see tiny masses of foam holding bits of vegetation together. Where did this foam come from? That's what this story is all about. The pearl gourami made the foam as a nest for its eggs.

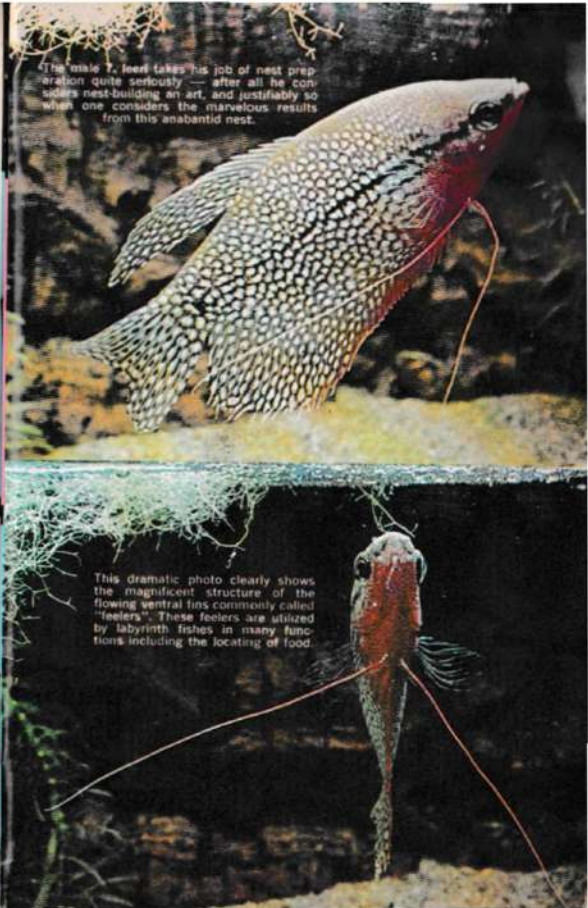
Over many thousands of years, certain fishes have become acclimated to live in waters which almost evaporate during the dry season and which are polluted most of the year. The oxygen available in waters like this is so low that the fishes had to develop accessory breathing organs so they could utilize atmospheric oxygen. By taking gasping breaths of air at the surface of the water every few minutes, the fish fills a labyrinth organ in its head which acts the way our lungs do. The stale gases in the fish's body are slowly exchanged for fresh, pure air. Not only does this benefit the labyrinth fishes, which the natives call "gourami," but it also helps the fish-eating birds that swoop low over the pools and have a fast snack of exotic fish now and then.

Just as the fish itself needs air, so do the eggs and fry, and the way Nature solved this problem is miraculous. Scores of labyrinth fishes are found in southeast Asia and Africa, from the Siamese fighting fish, which weighs less than half an ounce to the giant gourami, which reaches 2 feet in length. All have one thing in common: without breathing air directly from the atmosphere they will suffocate. But they all do not breed the same way. The giant gourami lays its eggs in a nest of algae at the bottom of a large pool; the Siamese fighting fish builds a nest of bubbles and spits its newly laid eggs into the nest after they have been snatched from the bottom. But our pearl gourami's eggs never get far from the top of the water. Never.

It happens like this. Two extremely beautiful fish whose bodies look like they are covered with pearls and whose fins resemble flowing silk meet in a polluted pool. The male, the more beautiful of the two fish, has a much redder breast, and if you look closely you'll see that he also has longer fins, especially the dorsal and the anal. So muddy and dirty are the waters in which he lives that eyes have little value, so he has developed long thread-like ventral fins which act as feelers. He uses these feelers to locate small worms and other moving things at the bottom of the pool.

As the two fish become acquainted, the male may take notice of the

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The male T. leeri takes his job of nest preparation quite seriously — after all he considers nest-building an art, and justifiably so when one considers the marvelous results from this anabantid nest.

This dramatic photo clearly shows the magnificent structure of the flowing ventral fins commonly called "feelers." These feelers are utilized by labyrinth fishes in many functions including the locating of food.



The male Trichogaster leeri at spawning time must also practice the gentle art of persuasion before capturing the female into a spiraling spawning readiness. But actually after the nest is built by the male, the female T. leeri in bottom photo takes the initiative and by means of touch at strategic surfaces convinces the male to curve himself under the nest.

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apparent bulge in the female's sides and he very modestly parades in front of her with his body slightly bent. If the female likes what she sees, she will nudge the male as though picking some black markings from his lateral line. It only takes one peck to start the male into action.

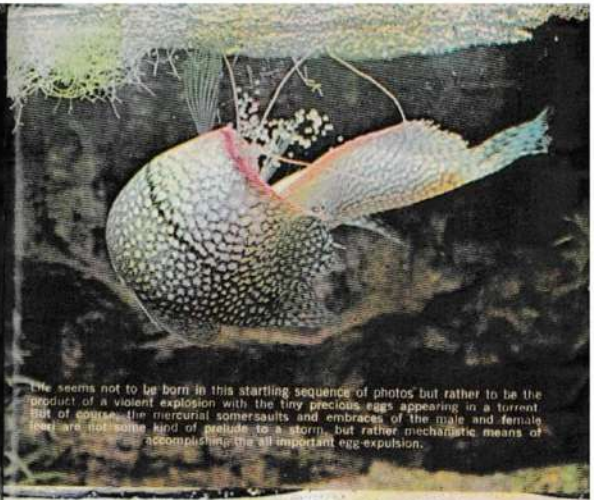
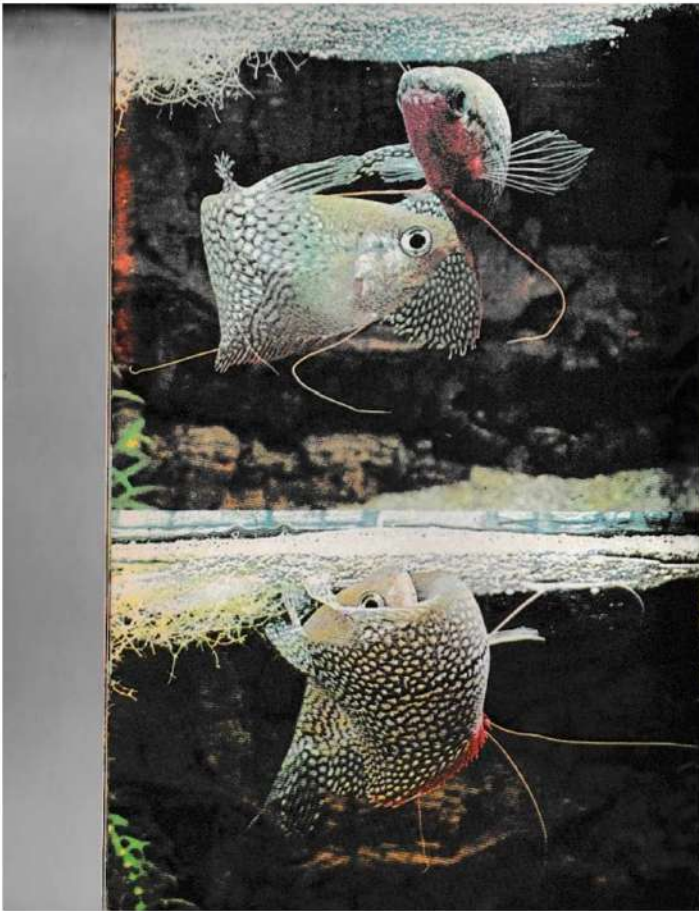
He becomes immediately alert for the smallest bit of floating matter. While a leaf or floating twig will do, he prefers masses of tangled hair grass. Poking about the loose masses of plant life, he gradually fuses them together with streams of sticky mucus bubbles he releases from his mouth. Not satisfied with just holding the plants together, he keeps blowing these bubbles until a huge nest 8 or 10 inches in diameter and perhaps half an inch thick projects from the water. Now he is ready.

The female has been watching these antics for almost two hours, and the fact that she hasn't left the scene indicates her approval of what has been going on. Almost as soon as the male has finished, or, perhaps, upon signal from her, he begins to tense himself under the nest. The female pearl gourami reads the message loud and clear and quickly joins the male under the nest, again poking him in the center of his body until he almost folds in half.

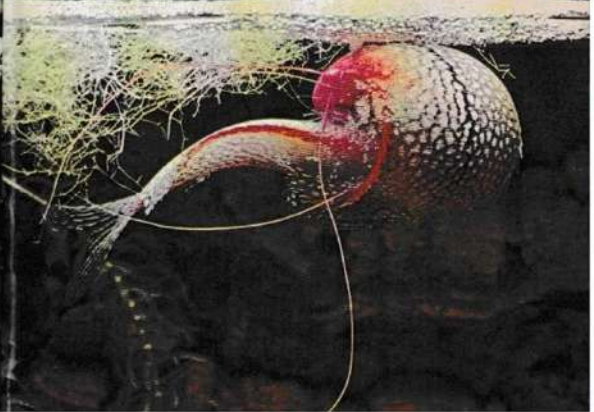
As his body forms the tight U, the female snuggles into the curve in such a way as their genital pores almost line up. In a quivering, tightening spasm, the male squeezes the female so tightly that his head is actually covered by his tail. For almost a minute this nuptial embrace continues under the nest until a huge cloud of eggs appears lazily floating from the now-paralyzed bodies of the breeders. The eggs are lighter than water and slowly float directly up into the mass of bubbles already provided by the male. As the eggs slowly float, the male becomes active once again and mouths the eggs to be sure they are all separated and securely attached to his bubble nest. Only after a few minutes of primping the nest and repairing any damage which may have occurred while he was wooing the female, will he return to the female for another embrace. Normally about 50 eggs are released at each embrace, and the spawning continues for several hours with eggs flowing into the nest every 5 minutes or so.

After spawning is completed, it is usually the male who tends the nest and insures that the bubbles protect the eggs from drying out or falling to the bottom. His nest becomes tattered after a day or so, but luckily the eggs begin to hatch in the high heat. The young begin to appear by the hundreds as tiny black slivers, and the male continuously tries to catch them in his mouth and blow them back into the nest. Now is the critical stage, for the male senses that his offspring have not yet developed their labyrinth and must stay very close to the surface where the dissolved oxygen is more readily available, or they will surely suffocate. He becomes a beehive of activity, snapping the young back into the nest day after day until finally he tires of the activity and leaves the nest once and for all.

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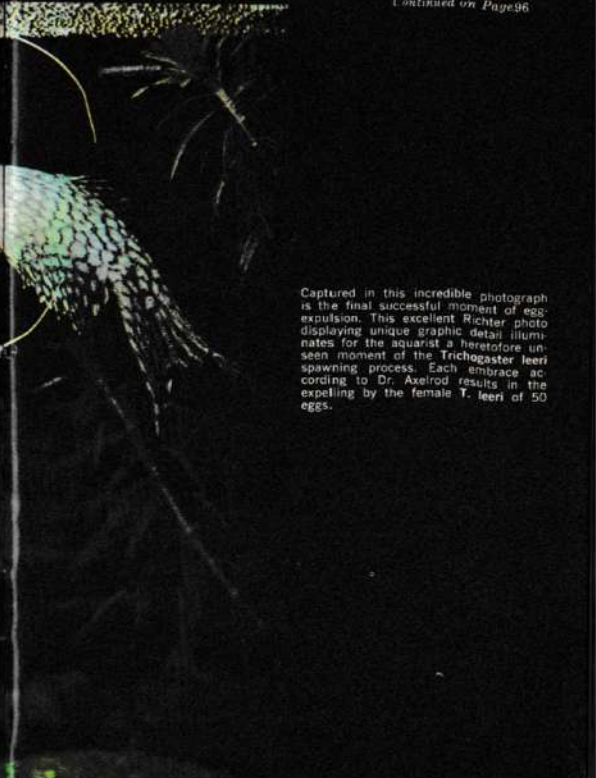
Life seems not to be born in this startling sequence of photos but rather to be the product of a violent explosion with the tiny precious eggs appearing in a torrent. But of course, the mercurial somersaults and embraces of the male and female are not some kind of prelude to a storm, but rather a mechanistic means of accomplishing the all important egg-expulsion.



The female had left almost immediately after spawning and the fry are now scattered over a wide area. They seem to have learned to stay at the top of the water, for they never venture more than half an inch below the surface.

Feeding upon microscopic infusorians in the water, the fry grow quickly; in about 6 weeks they are miniature pearl gouramis with the mosaic pattern already evident on their bodies. About this time they begin to feel the need for atmospheric air and take their first gulps, filling their labyrinths. Only

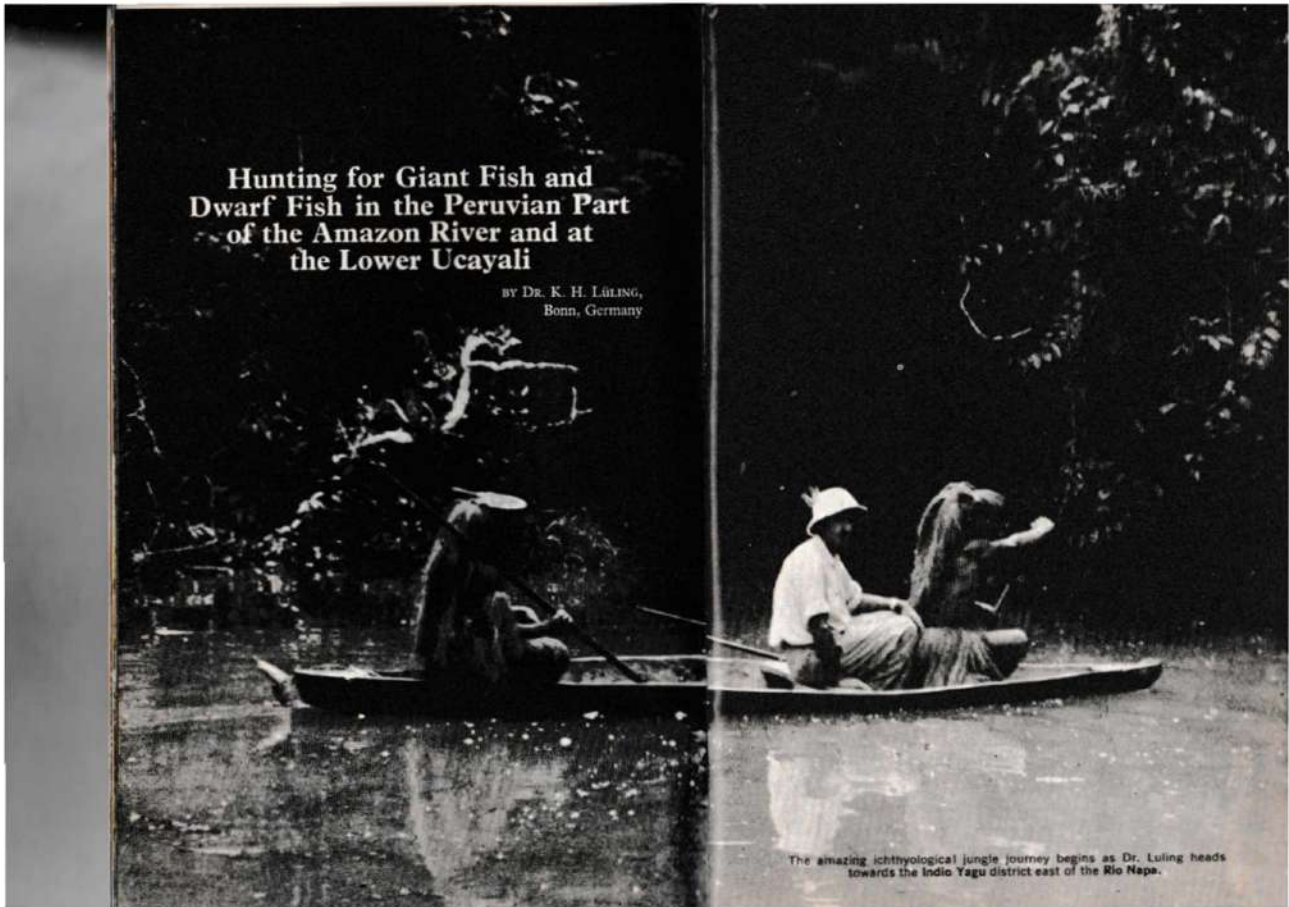
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Captured in this incredible photograph is the final successful moment of egg-expulsion. This excellent Richter photo displaying unique graphic detail illuminates for the aquarist a heretofore unseen moment of the *Trichogaster leeri* spawning process. Each embrace according to Dr. Axelrod results in the expelling by the female *T. leeri* of 50 eggs.

Hunting for Giant Fish and Dwarf Fish in the Peruvian Part of the Amazon River and at the Lower Ucayali

BY DR. K. H. LÜLING,
Bonn, Germany



The amazing ichthyological jungle journey begins as Dr. Luling heads towards the Indio Yagu district east of the Rio Napo.

Tropical Fish Hobbyist

Towards the end of the year 1958 I received an invitation from the Bureau for Fishing and Hunting, of the Peruvian Department of Agriculture, requesting me to carry out studies in the faraway Amazon River, at the so-called "Oriente" ("East") of Peru, namely, in particular to study the habits and life of the large Paiche fish *Arapaima gigas*. This giant fish, throughout the entire Amazon region, is a very important fish in the economic life of the district on account of the fact that its meat, rich in fat, is very much in demand as a foodstuff in the form of dried filets by the people living in the region of the Rivers of the virgin forests.

The purpose of my investigations in connection with the Paiche fish (called in Brazil "Pirarucu" or Red Fish) was to submit, on the basis of the totality of my studies and observations, to the Bureau for Fishing and Hunting in Lima (Special Division for Fishing and Hunting) suggestions for the protective steps to be taken in connection with this fish. The purpose and intention is to maintain this fish in those territories of semi-civilization, where it is caught, under the supervision of the Department of Agriculture, with heavy hand harpoons, in such a manner that its productive supply is also assured in the future.

At the beginning of the year 1959 I was ready; I arrived from the cold, dark weather of Europe, amply provided with nets, fish traps and sport fishing equipment, arriving at Callao, port of Lima. In a country which is so rich in fish, and is so manifold in its features, like the Amazon region, even an expert fisherman is not able to tell in advance, fully and completely, what kind of nets and above all, what kind of sport fishing equipment he should take along; it was necessary therefore to take along rather too much equipment than too little.

From Lima I then took a four-engine plane, in the middle of April, of the domestic Peruvian Aviation Company, namely, the "Faucett" to Iquitos at the Peruvian Amazon region. This flight took in the rapid plane hardly three hours. However, it was surely one of the most interesting flights which can be offered throughout the world, for it took me, in rapid sequence, over the most extreme landscape and vegetation zones of Peru, which are abundantly rich in contrasts.

At first I noted, when looking out of the window, on the left side, the white surf edges of the Pacific Ocean and looking out of the right window I saw the far-stretching absolutely barren grayish, yellow sand waves and hills of the middle Peruvian coastal desert. Wherever the westward-extending Andes river discharges into the Pacific, the river ceases lying crosswise with respect to the coastline, greeted me with dark green corn and cotton fields. After less than a half hour of flight, the plane turned towards the east into the Andean Region and ascended quickly. Far below there in dark relief extended the barren slopes of medium-high mountain massives, which are

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entirely located in the shadow caused by the natural light. Here and there, we note exceptionally deep ravines and valleys completely covered by mists and clouds which, against the naked rocks appear from high-up like soft and compact white cotton swabs. The passengers of the plane have a wonderful view of the mountains which extend higher and higher into the sky, over which the morning sun spreads its sparkling light.

It became very cool in the plane, at which time appeared between the very steep rocks of the tremendous mountains, a lake covered by a thin layer of ice. The still higher mountain cones and slopes in a northern direction were powder white with eternal snow. A few minutes later we then flew over an entire field of snow, which was illuminated by the tropical sun, one might even say, painfully so.

After a half hour of flight over the Sierra of central Peru the picture on the outside completely changed. The summits of the mountain region rounded off and were completely covered by the deep green of a tremendous virgin forest, we reached the eastern slope of the Andes.

From my view way up in the sky the thought of this forest, down below, with its rich animal life and its Indians, its secrets, and its winding rivers, containing hundreds of the most different kinds of fish, gave me a heightened sense of wonder and mystery. And the thought that I, a naive European, loaded only with theoretical knowledge, having to make observations, during the next few months, somewhere in this forest, and go fishing, increased my practically feverish unrest.

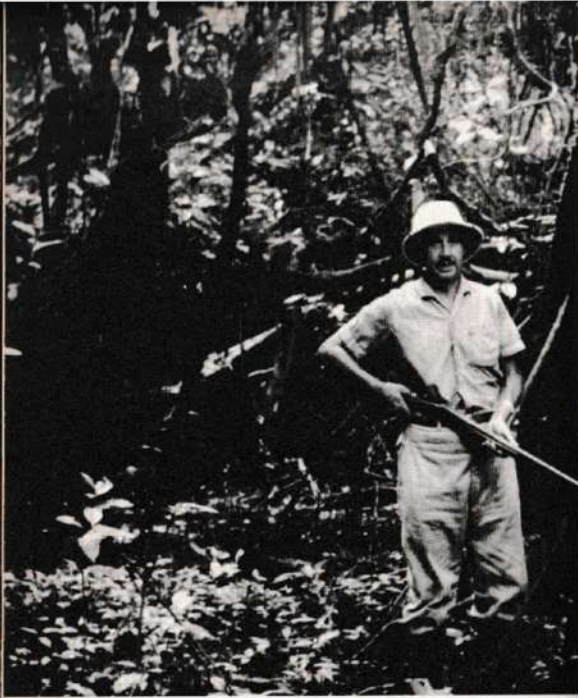
The country below was becoming continuously more level and flat and the weather had turned clear. The flight was no longer hindered by airholes and wind squalls; also our plane quickly passed over the unfathomable and immense virgin forests which, interrupted by silver-bright rivers, appeared to be like a green colored endless cauliflower field over which, below us, the clouds were passing.

At this point we heard the voice of the Flight Captain. He announced through the loud speaker that below us, at the right side, could be seen the remarkable place where the Marañon River and the Rio Ucayali unite, the place where the Amazon River is born—the Brazilians call this stream only beginning with Manaus, as the Amazon River.

A quarter of an hour later we crossed the Amazon, our plane went down and the muddy yellow waters were seen brightly below us. We were flying a loop. The Quisto Cocha Lake, along the Rio Itaya we spied out of the virgin forest; then we flew with loud motors over the rusty brown corrugated metal roofs of Iquitos and a few minutes later we are landing at the airport.

As soon as the plane was opened, we were met with the moist, hot air of the Amazon forest which pressed down on our lungs as if it were coming from a gigantic laundry. A short time afterwards I was standing at the River

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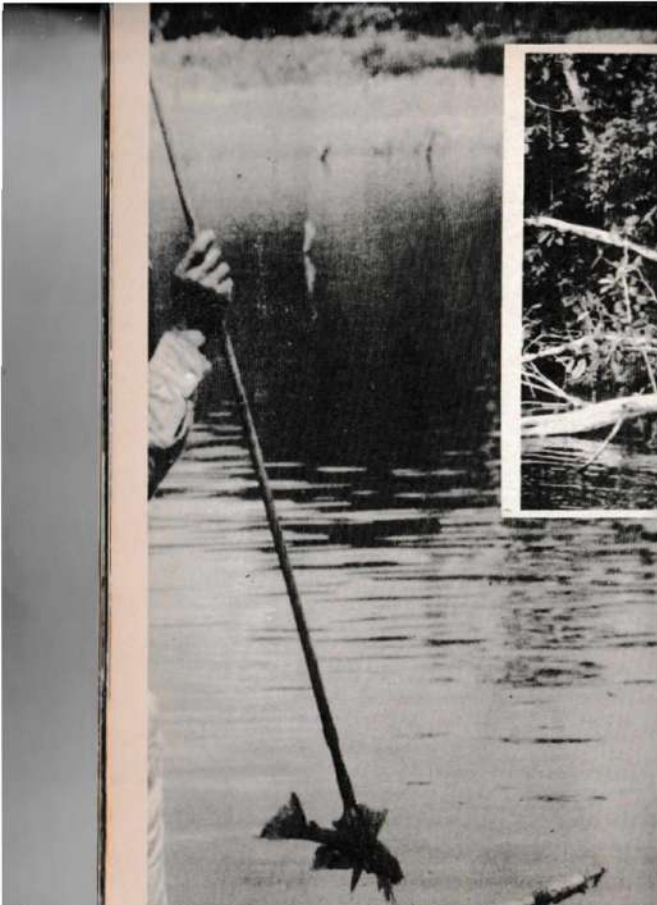
Preparedness for any emergency is the rule of the jungle. Dr. Luling entrusted with heavy government responsibilities must safeguard the expedition.
Continued from Page 19

road (dike) of Iquitos and looking over the arm of the River to the other shore. The muddy water gurgled as it rushed by (it was the fading high tide). We saw the broad banana leaves floating to the left along a green papaya tree, with thick, yellowish fleshy fruits; primitive motorboats are moored behind same, and towards the entire right there could be noted the native part of the city of Belen with palm straw covered frame houses located on the River, and partly built on heavy balsa floats.



tion success and the lives of its participants in a foreign unpredictable geographical area, so he must carry many different hunt and defense gear and equipment.

In the Belen part of the municipality and in its environs, the poor population, consisting of civilized Indians and Mestizos, were living in floating huts which rose and lowered depending on the different water levels. The most important food consists of cooked bananas and rice, and above all, river fish. These fish, both large and small, namely, fish of the surface water and fish of the bottom of the river, are caught with simple nets such as dragnets, the tarrafá, with light three pointed spears and the heavy hand



These slightly brackish waters surrounded by snarled and twisted exotic foliage are the rich home waters of many tropical fish-species including *Moenkhausia lepidura* and the large predaceous *Hoplias malabaricus*, and probably many specimens which will constitute new species in the ichthyological world.

In the photo on the left, Senor Raphael, Dr. Luling's native fisherman-guide, catches *Pterygoplichthys punctatus*, a relative of *Plecostomus*.

to pull him in. The unexpectedness of this kind of fishing for fish in the Amazon region in the faraway little investigated waters is undoubtedly the main attraction of this kind of fishing.

My task as ichthyologist was to catch for general information as many fish as possible—small and large kinds of fish—and therefore any method available had to be satisfactory to me.

About 15 kilometers or so from Iquitos is Lake Quisto Cocha, imbedded in a very dense, partly marshy, virgin forest. Along the dry western shore of this lake there are arranged a number of pools in which young fish of the Paiche family (which were transported here with great difficulty) attain only a certain size. These still young black-blue fish with whitish blue-green color along their belly do not show any sign as yet of the wonderful colors

of the grown fish. It was intended to place them in virgin forest rivers, which up to the present time have not yet displayed this valuable type of fish.

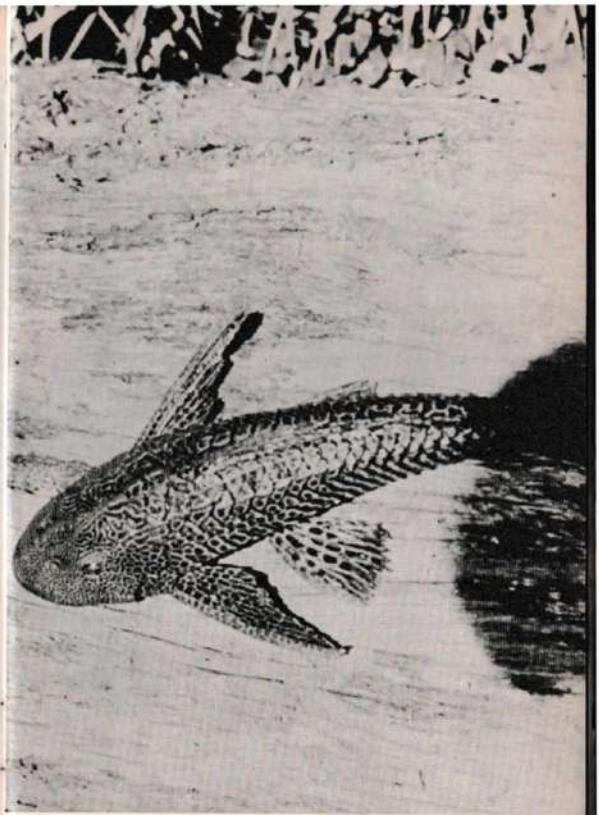
From the beginning of May until the beginning of August 1959 I was practically every day in the canoe on this lake so as to place basket nets to catch different kinds of fishes which I required for my collection and for the feeding of the young *Arapaima gigas*.

I was especially interested in the sport fish of this lake, including a number of large predatory fish, such as the *Acestrorhynchus falcirostris* with a pile mouth, the colored Tucunare *Cichla ocellaris* belonging to the Cichlids, and the very predatory *Hoplias malabaricus* also the silver white piranha called in the Peruvian Amazon region the "Paña". *Serrasalmus rhombus* has razor sharp teeth.

I had to catch a few small characids as bait for these predatory fishes. At the Quisto Cocha Lake, the best bait was the 5-7 cm. attractively colored *Moenkhausia lepidura*, which has a light yellow spot at the upper part of the tail fin. Below the Aquaje palms, along the shore, one can always find prematurely dropped palm fruit. The firm core of this fruit is attacked by heavy insect larvae (Suri larvae). My Indian helper, Raphael, before going out on the lake with the canoe, cut few palm kernels with the machete, and skillfully pulled the whitish *Suri larvae. He tells me grinning widely "this is the best bait for the Mojarra" (Peruvian collective name for a number of small colored characids), "and the Suri which we do not need, you will find that they are very tasty at noon when roasted". Then he said making a sour face, "I only hope that you will not invite me".

After we had collected quite a number of Suri larvae, the catching of the Mojarra started. I am greatly surprised at the primitive catching equipment Raphael used in this connection. He owns nothing but a simple flexible rod, which he cut from a long strong branch of a tree. A rather coarse silk cord, without floater and without any fine equipment. He also used a hook which looked to me much too large for the small Mojarra. He divided a Suri larva into several pieces and then attached one of these pieces directly to the tip of the hook. The cord and the hook were lowered into the water by means of the rod and thereupon immediately pulled out again with a moderately strong pull. As a matter of fact, Raphael has succeeded with this primitive

* Suri means "worm" and this especially is used for all soft animals which are long and live in a somewhat firm and sealed-off living space. The "Suri" living in the palm fruits are grubs which are eaten by the Indian people, and also are used generally as angling bait. A cautionary note, wherever piranhas are found in South America one should always use in angling for predatory fish, a wire leader, for these fish, which are encountered so often, and which take any natural predatory fish bait irrespective of the size and kind, immediately bite through any other material, without any special effort.



These Amazon catfishes are caught by the hundreds and then they are worked into a popular local delicacy known as "Garachma soup". These Amazon fishes are an important foodstuff for the jungle inhabitants but they might serve, because of their unusual appearance, as aquarium inhabitants for us here in the states and the rest of the aquarium world.

manner in catching in a short time about a dozen of Mojarra fish. The fish, in most cases, were loosely hooked and many of them fell down into the water where they floated for a fraction of a second a few centimeters above the water, then back into the tea-colored and slightly greenish water of the lake. Nevertheless, due to the skill of this Indian fisherman, who swings a self-cut rod every time elegantly in a half arc over the canoe, most of the fish landed on the very bottom of the canoe.

"Just a moment, my friend, I shall show you how one really catches these colored small fish"; I thought to myself. I arranged my very finest angling equipment, which consisted especially for this purpose of my light bamboo rod, a very light floater, and a very fine "plait" cord, a still finer leader and a minute brass hook. But when I lowered the cord with the Suri-baited hook into the water, the light float immediately showed for a fraction of a second and then again and again. However, every time I pulled, I found that my hook was empty. While Raphael had already caught more than a dozen of silver-white Mojarra, I myself had only caught two of them, and I was ashamed of my poor showing. Raphael pitied me it appeared, for he looked as if he wanted to say with his dark eyes "the strange gringos—they are not willing to eat the attractive Suris and they are not even able to catch these easy catchable Mojarras".

Even my moderate success was only due to the fact that this exceptionally agile kind of fish touches the bait simply with the tip of its mouth and within a fraction of a second removes it from the hook, so that it only really hooks if it is immediately pulled up. However, I wasn't going to reveal the real reason for the little luck I did have. Instead of this, I prepared my heavy angling apparatus and used a strong cord on the reel, a large thick float and a wire leader making use of a strong triple hook. To this hook I attached one of the freshly caught Mojarra. Thereupon, I threw the line from our canoe, which had been anchored at the shore far into the sea water of the lake, for it is known that the great white piranhas are frequent in these free waters somewhat away from the shores which are matted with brush.

Raphael, also stopped catching the Mojarra since he wanted to catch first of all in the brush on shore a few large specimens of the predatory Characid *Hoplias malabaricus*; in any event, there can be found here in the quiet zones of the water, between the shrubbery, those large powerfully toothed robbers who share their catch with the colored Tucunare. The white piranhas, on the other hand, as already stated, are staying, in most cases, somewhat distant from the open water. Whether it swims in schools like the red piranhas (*Serrasalmus nattereri*), I am, however, not able to say. Raphael did not need any new equipment; all he did was to apply to the same hook, but instead of the Suri larvae, he now used a piece of a Mojarra. And again, in the same manner, he let down the baited hook into the water and pulled it

up again immediately using a moderately strong pull. In between he struck with the point of a rod, on the smooth surface of the water, in this way producing a noise as if a *Hoplias malabaricus* were successfully steering a small characid, for he believes that this will attract the predatory characid.

Then suddenly from my reel the heavy float was being strongly pulled under the water. As if electrified I jumped from my seat and nearly fell into the water. I immediately felt a heavy fish on the line and in a few minutes. I was able finally, with the help of the fishing net, to pull in a wonderful Paña blanca into the boat.

The fish, as is generally done by the piranha, has a bite which is so strong and sudden that one of the barbs struck outside at the head, directly over the large upper lip. Raphael helped me to loosen the hook from the fish. He proceeded very carefully in view of the razor-sharp teeth of the fish. For although the piranhas in this situation cannot aim well, they only need to close their powerful jaws, to bite off a piece of the ball of the finger or hand, producing hemorrhage, if it should just then be in its way. I still have a scar at the present time on the index finger of the left hand which came from a bite when I was trying, at the far away Rio Pacaya, to loosen a red Paña carelessly from the hook.

The white piranha concerned here is a large fish of about the width of two hands, with silvery sides and fiery red irises, in all probability a fish in its wedding dress.

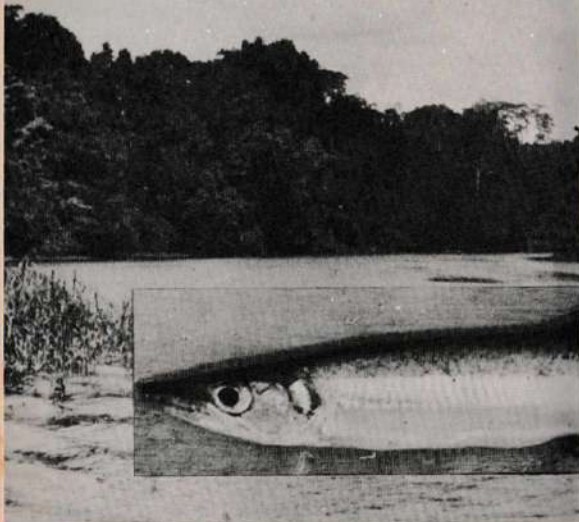
While I was devoting all my attention to this piranha—(a fish about which, outside of the Amazon regions, one hears so many exaggerated stories) Raphael pulled a 60 cm long dark greenish-grey *Hoplias malabaricus* inside the boat. He was also very careful to remove this fish from the hook for this robber, called Puñundero or Fasacuy, does not have razor-sharp but needle fine teeth.

Raphael caught a total of four more Puñundero or Fasacuy during this forenoon; then we paddled back to our place on the lake.

When paddling back so comfortably, I got the idea of putting a teaspoon-sized blinker into the water and pulling it in from behind with the rod and a heavy leader (line). The blinker whirled through the water but there was no bite. Then I began to pull back the line on the reel and at the same time I felt that I had a bite. I landed a large, slender and predatory Cachorro, *Acestrorhynchus falcirostris* into the boat. On the side, at the long stretched mouth filled with plenty of teeth, the blinker was struck. The entire situation reminded me very much of the bite of a pike.

Now, after this success, we again rowed slowly for several yards over the sea and let the blinker rotate behind us in a depth of water of about half a meter. Another bite was not felt immediately but it was repeated again exactly at the moment when I was starting to pull in the line. In this way I

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found out that this slender characid, looking like a pike or a barracuda, followed the uniformly rotating blinker (especially in the shade and along Aquaje palm trees which have fallen into the water), for quite some stretch and then bit if the blinker jumped forward somewhat more quickly this time was because this predatory fish considers this flight movement of his prey. About the evening of this day we were ready to eat a few attractive, bright Puñuero with rice. One of these fishes we decided to keep alive for

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This muddy contributory becomes isolated and cut off during the dry season. The haunting stillness it projects is contrasted by the teeming fish-life of its underwater realm which houses many species including *Colossoma bidens* and specimens of the *Acetrorhynchus* genus. The species mounted within this river photo is *Acetrorhynchus falcirostris*, a characid with a pike-like mouth and a most predatory nature.

tomorrow's meal in a large tub (we had no icbox while we were so far away in the virgin forest). While we were sitting down to eat we heard a terrific noise behind our camp. The youngest, three year old son of my Indian cook Antonia ran crying to us and fell over a tree stump. His right hand was bleeding terribly. What had the boy done? He gripped with his right hand, as he was curious, into this tub with the large fish, and the fish immediately took a bite out of him. On account of the danger of infection, I had to with

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Tropical Fish Hobbyist

iodine coat the wounds of the badly treated hand of the boy, where bites were caused by the needle-sharp teeth of the fish, while the badly frightened child was shaking over his entire body, and a few tears rolled over his sun-tanned chubby cheeks. Never again would I make available living Puñuero fish for anyone to grip them at the edge of a primeval forest.

At the "El Bambu" restaurant in Iquitos we had practically "fish soup" every day. At the end of May suddenly there can no longer be found any Garachama fish in the market. Therefore two fishermen are sent to obtain more fish. I joined the fishermen. This time in our traveling we were provided with an old outboard motor, and we went on our merry way for several hours on the Amazon River downstream. Then we bent into a narrow side arm where the silent forest approaches us so near that we can touch it. Short-tailed tropical kingfishers sit on the side on the branches, turn their heads with their beaks which are sharp as daggers, to all sides, while their colored feathers shine in the sun. Two dark cormorans *Phalacrocorax brasilianus* fly off from the keel of our boat, and on the side, in the heavy thicket of wild sugar cane we now heard a clear sound. We judged from the extent of the movement of the shrubs that there was in all probability, some Ronsoco *Hydrochoerus hydrochoerus*, the largest rodents of the Amazon Region or it might even have been a tapir *Tapirus terrestris*, which was disturbed on account of our sudden appearance at the edge of the water.

After we had gone upstream for three-quarters of an hour, we tied up our boat at the shore. One of the fishermen took a machete while the other fisherman threw out the dragnet—the tarrafa—and threw a cotton bag over his shoulder. I took up my gun and walked behind the fisherman who cleared a narrow path with the machete. We entered slowly, step by step, into the felt undergrowth. I suddenly noted a rapidly passing rust-red and bluish iridescent scale-covered body of a rainbow boa, namely, *Epicrates cenchris*, the boa which is so characteristic of the inner Peruvian lowland rivers. After 20 minutes of walking through the underbrush the forest seemed as though it had been suddenly cut off. A large flat area spread before us, practically without vegetation, criss-crossed with dry crevices. Only in the middle of the depression could there still be noted loamy water. Four or five Jabiru storks (*Jabiru mycteria*) were flying with crops crammed full, while we were approaching the dried-out portions. A putrid smell was spreading over the water. The fishermen went knee-deep into the shallow water which was clearly still warmer than the air. I could hardly believe that it would still be worthwhile to go on fishing here, for many dead fish, and even some small electric eels *Electrophorus electricus*, floated over the water. The warm water was practically free of oxygen and all fish which only depend on gill breathing must suffocate here. However, I was very much mistaken about fishing here. The net was full of large Garachama

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October, 1969

Pterygoplichthys punctatus and small catfish *Hoplosternum thoracatum*. The fish possessed in addition, a well-functioning intestinal breathing system.

In a jiffy, we filled the great bag full; the fishermen were now compelled to carry the bag with difficulty, bumping into each other, until we returned to our boat. After a further 3½ hours we delivered the full bag with the Garachama which are rustling around inside, to "El Bambu".

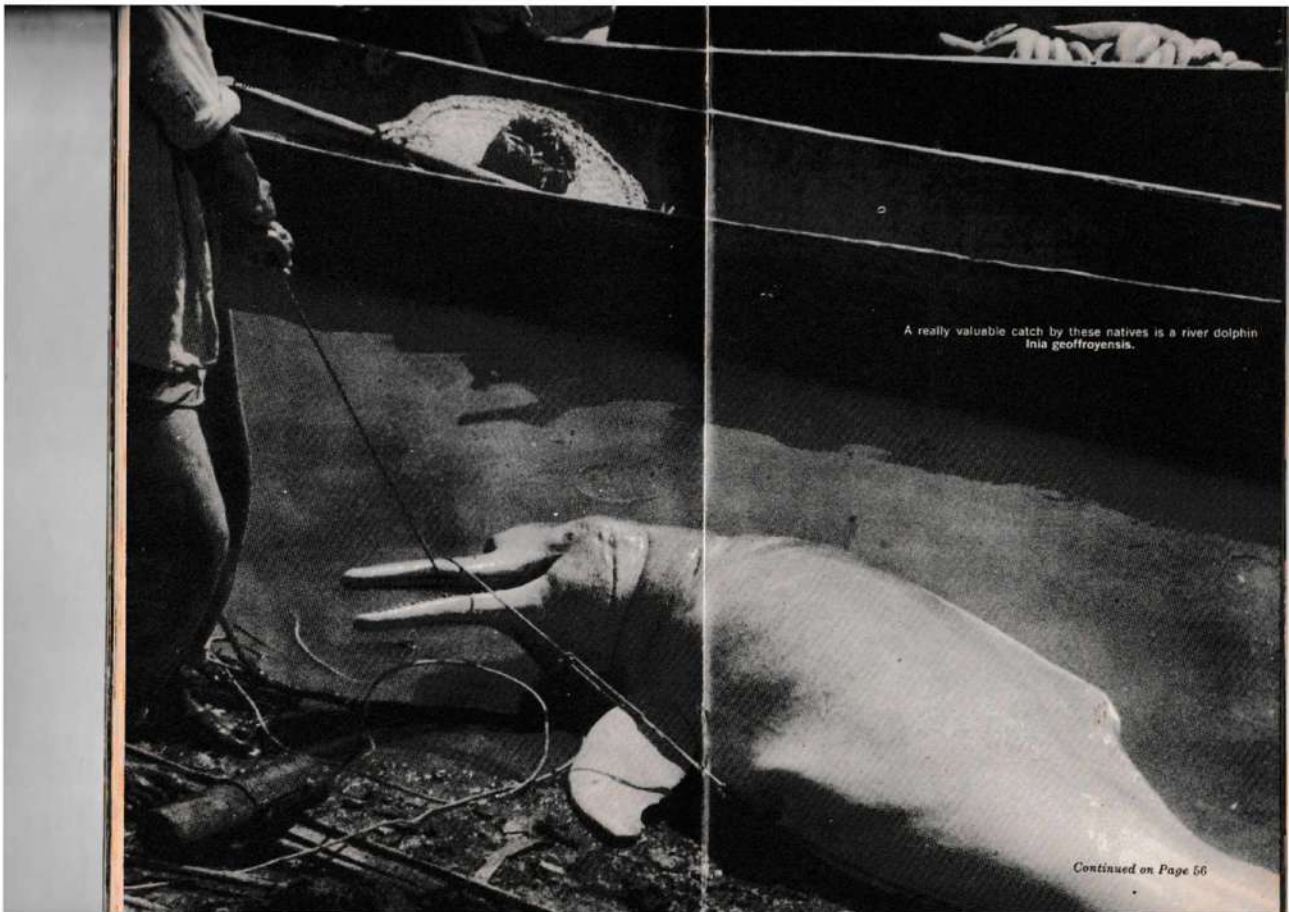
At the wharf side (shore road) of Iquitos we observed in the same way as in the Municipal part of Belen, a few palm-covered frame houses at the shore, placed on large floats of light wood. I began angling, at the beginning from such a balsawood house (located in the loamy shore water) with dried Paiche meat with a medium-sized hook. I held the bait, after I had ascertained the depth, slightly above the bottom, as the float drove very slowly along the balsa house. In about an hour and a half they promised to call for me with the motorboat "Orellana"; then we intended to catch, above the city, on the loamy muddy shore, with a few hand nets, small colored Amazon fish, which were to be transported in cans to later be shown in the aquariums of the Bureau of Pisciculture in Iquitos to the people there. The great mass of these small fishes represents ornamental fishes for which there is a demand throughout the world. These fishes which are being exported from Iquitos to an ever-increasing extent, for they bring in considerable amounts of foreign exchange. It is therefore worthwhile to show these fish with luminous colors alive in Iquitos, and thus bring them to the attention of the population.

I still had a little time. I saw how nervously the float bobbed up and down on the loamy water, instead of really going down. Something must be wrong, I decided. I pulled moderately and when the hook arrived with the fish flesh that was attached to it, I was really surprised; four small dark-striped fish had baited. They immediately dropped and fell back into the water. Thereupon, I dropped the bait immediately again into the water and again the float begins to dance. And again, I am pulling up and this time I pulled out three small fish which immediately dropped back into the water. Again this dance continued, and again and again small fish are heaved up. Then I tried to get these fish into my collection. I requested a large plate from the Mestizo family in the wooden house and placed it, filled with water, at the edge of the balsa frame house. Again the float "danced" in the water and again I pull up high. This time I had four small fish and with a little agility I threw the rod quickly over the tub. Three of the fish, as a matter of fact, landed in the tub where, a little shaken, they swam around in a circle. I succeeded in catching more small fish. After careful examination I realized that these fish were a type of *Pseudotogophilus nemurus*.

Now I let the float dance in the water without disturbing it. Should a larger fish living on the bottom have an appetite for the Paiche meat, he

Continued on Page 46

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A really valuable catch by these natives is a river dolphin *Inia geoffroyensis*.

Continued on Page 56

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salts FROM THE seven seas

BY ALFRED A. SCHULTZ

Q. Can you suggest any marine fishes which are not too large for my 50 gallon tank but are colorful and will get along with other marine species?

Abe Horowitz
Brooklyn, New York

A. Wow . . . that's quite an order! But there are such marine fishes. The pygmy angelfishes are ideal answers to your questions. They

grow to about 4 inches maximum and really do get along nicely with larger and smaller individuals of their own species and of other species. *Centropyge potteri* (Potter's angel) is a colorful fish having a completely dark blue caudal fin and blue vertical bars on the body with a lovely russet coloring in the dorsal fin. *Centropyge flavissimus* (the lemon peel angel) has a bright blue



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Quite often the victorious hunter cannot resist a final pose for the camera. But in this instance a sense of accomplishment and pride is quite justified for Dr. Luling's feat was beyond the average catch. Here he displays in an unusual juxtaposition the grand prizes of his jungle-trek, including a giant *Colossoma bidens* which he holds. In the foreground can be seen the skin of a Tiffand silver-lion (puma) and to the left is the rolled up dried skin of the Anaconda.



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Continued on Page 80



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Small Talk

Q. My question may seem ridiculous but with all the publicity recently given to a supposedly walking catfish, I would like to know if there is such a creature as a talking catfish?

Sally Lo Dello
Philadelphia, Pa.

A. Well . . . there is a spiny catfish capable of emitting a faint croak. *Acanthodoras spinosissimus* belonging to the Doradidae group of catfishes has been given the popu-

lar name of "talking catfish" but really only makes tiny little noises and infrequently. But you're liable to make a bigger noise in the form of a very audible yell if you ever handle one of these fish, for the first spine of their dorsal and pectoral fins is capable of inflicting very painful wounds because of the



Acanthodoras spinosissimus

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sharpness and stiffness of these structures. A more appropriate popular name for this species of fish might be the "Ouch" Catfish! Metynnis Species

Q. I just purchased some very young Silver Dollar fish. They are quite beautiful. So, I am very interested in finding out as much as I can about these fish.



Metynnis schreitmülleri

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1. How large can they get in my aquarium?
2. What kind of food do they like best?
3. Can I breed them?

Rita Grunsky
Cleveland, Ohio

A. 1. I've seen Metynnis schreitmülleri as large as almost 7 inches. The larger your aquarium, the greater your chances of getting them to that size.

2. They eat practically anything and everything, including aquarium plants (Amazon Swords/plants are their favorites), indicating that they definitely require greens in their daily diet in some form, whether in a manufactured food, or a food you prepare yourself. They also enjoy brine shrimp.

3. Yes, if you definitely have a pair. But these fish are not a beginner's species. The December

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1968 issue of this magazine has mention of such a spawning.

Plant Knowledge

Q. I have no luck at all with keeping my aquarium plants in good condition. I've finally admitted that I really don't know anything about plants. I have really made up my

mind to read all I can concerning the subject. I have some questions I thought you might be able to help me with.

1. Do aquarium plants have root caps?
2. What are the cells called that contain the chlorophyll substance?

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3. I heard that the plant genus Saggittaria has species where one stem might develop several types of leaves. Is this true?

Arthur O'Mara
Detroit, Michigan



Saggittaria

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A. 1. There is no root cap (calyptra); root hairs only exist with plants that have been growing in the mud.

2. Chloroplasts.

3. Yes, Saggittaria can grow three types of leaves - aquatic, floating and aerial.

Worm Food

Q. Recently, in an aquarium book I read where Grindal worms were advised as a fish food. Could you please give me some information regarding the Grindal worm. I honestly never heard of it before.

Max Broder
Davenport, Iowa

A. Grindal worms are a variety of

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white worms first cultivated by a Swedish lady aquarist, Mrs. Morten Grindal. The largest size this worm will obtain is about a half-inch in length and it is slimmer than the ordinary white worm. Since the ordinary white worms (Enchytrae) are related to tubifex and earthworms, so is the Grindal. Although the Grindal is similar to the white worm, its cultures are maintained at a higher temperature - 70°F or slightly higher, since it grows faster and thrives at that temperature. Even though your fishes may relish this worm, never overfeed a diet of this worm or any other kind of worm to your fishes.

Hates Cats

Q. For some reason or other I never particularly liked catfish although most of my friends and other

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aquarists I've read about really enjoy them. But just lately I did see a catfish that really impressed me. The label on the petshop tank simply said "Glass Cats". I'm thinking of purchasing them. Would they be easy to maintain. Could you give me any hints that

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shows itself by the appearance of small white knots on the skin, eyes, fins. This ciliate bores into the fish's epidermis, especially in the fin and gill region where the skin is the softest. The skin is then inflamed or destroyed and secondary infections may set in. This disease can be lethal and all the fishes in your tank can become infected if these organisms are not prevented from proliferating.

Companion Fish

Q. Which species of fish is it that is said to live with *Pterophyllum scalare* in its natural habitat?

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Would this fish then be a good companion to my angelfish?

Ronald Schuyer

Madison, Wisconsin

A. The cichlid which lives in association with *P. scalare* is *Cichlasoma festivum*, a species which can grow as impressively large as some of the larger angels you see around in certain shops. Although this is generally a rather unaggressive species, more assertive individuals are not uncommon within this species. If enough room is given to both the angels and *C. festivum*,



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there shouldn't be any major catastrophes. Of course, it all depends upon the uniformity or disparity of sizes amongst the fishes, and the number of each species within your tank.

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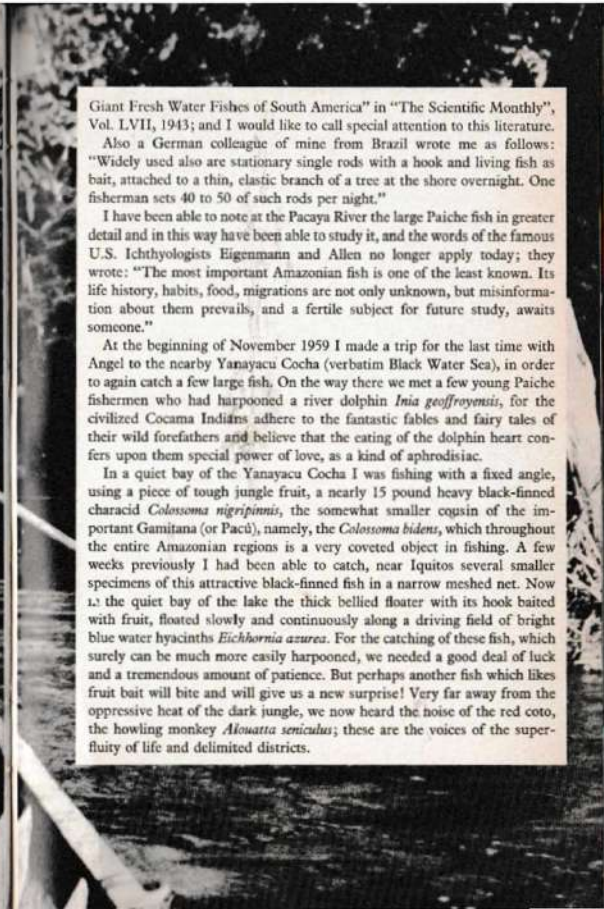
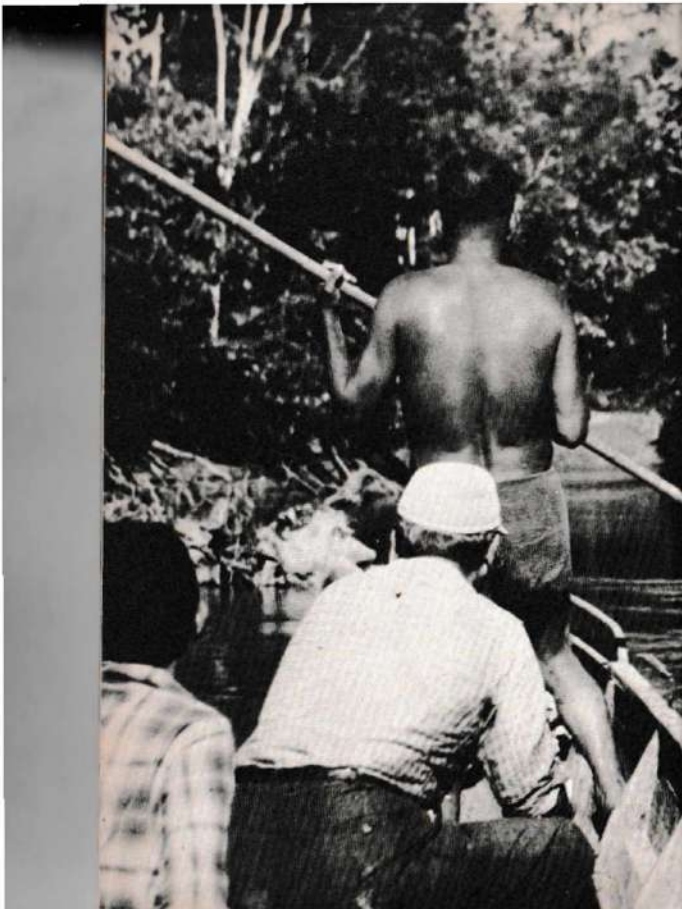
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Giant Fresh Water Fishes of South America" in "The Scientific Monthly", Vol. LVII, 1943; and I would like to call special attention to this literature.

Also a German colleague of mine from Brazil wrote me as follows: "Widely used also are stationary single rods with a hook and living fish as bait, attached to a thin, elastic branch of a tree at the shore overnight. One fisherman sets 40 to 50 of such rods per night."

I have been able to note at the Pacaya River the large Paiche fish in greater detail and in this way have been able to study it, and the words of the famous U.S. Ichthyologists Eigenmann and Allen no longer apply today; they wrote: "The most important Amazonian fish is one of the least known. Its life history, habits, food, migrations are not only unknown, but misinformation about them prevails, and a fertile subject for future study, awaits someone."

At the beginning of November 1959 I made a trip for the last time with Angel to the nearby Yanayacu Cocha (verbatim Black Water Sea), in order to again catch a few large fish. On the way there we met a few young Paiche fishermen who had harpooned a river dolphin *Inia geoffroyensis*, for the civilized Cocama Indians adhere to the fantastic fables and fairy tales of their wild forefathers and believe that the eating of the dolphin heart confers upon them special power of love, as a kind of aphrodisiac.

In a quiet bay of the Yanayacu Cocha I was fishing with a fixed angle, using a piece of tough jungle fruit, a nearly 15 pound heavy black-finned characid *Colossoma nigripinnis*, the somewhat smaller cousin of the important Gamitana (or Pacu), namely, the *Colossoma bidens*, which throughout the entire Amazonian regions is a very coveted object in fishing. A few weeks previously I had been able to catch, near Iquitos several smaller specimens of this attractive black-finned fish in a narrow meshed net. Now in the quiet bay of the lake the thick bellied floater with its hook baited with fruit, floated slowly and continuously along a driving field of bright blue water hyacinths *Eichhornia azurea*. For the catching of these fish, which surely can be much more easily harpooned, we needed a good deal of luck and a tremendous amount of patience. But perhaps another fish which likes fruit bait will bite and will give us a new surprise! Very far away from the oppressive heat of the dark jungle, we now heard the noise of the red coto, the howling monkey *Alouatta seniculus*; these are the voices of the superfluity of life and delimited districts.



Neons: Some Rules And Regulations

Sometimes the only way to learn is the hard way. And with neons *Paracheirodon innesi* that is quite often the case for most of us aquarists.

Neons are dazzling; they hypnotize the eye. They are rightly considered the aristocratic miniature jewel of the aquarium world. But they are *not* a species that is undemanding in its physical needs and requirements, let alone a species that even the most experienced aquarists are able to spawn satisfactorily. In certain respects these difficulties only enhance their magical image, making them even more desirable.

But these truths concerning the difficulties in maintaining them, and the unanswered specifics regarding their reproduction in aquariums should be told to the general audience and novice aquarist. For if these truths are not made public, the beginner in the hobby may lose confidence in his own ability, thinking possibly, that such a much offered, beautiful, innocent looking fish, could not be all that complicated, and that it must be his own ineptness that is the cause for his frequent losses of this species. The novice might well give up the hobby, only for the fact, that he cannot afford to invest any more money in fish purchases. It's very discouraging to purchase 15 neons and have them pass away within a week's time without any kind of warning. It's even worse to bring home 10 neons from the local petshop . . . put them in your tank and find them the very next day all deceased. These are not uncommon experiences according to the many letters I have received.

The recorded data on neon physiology, neon behavior, neon reproduction, etc., is scant, and the little available, is highly conflicting. But even though this conclusive kind of information is not presently available, I believe that I can assist the average aquarist on a practical level in reducing his losses of neons, especially during the 10 day critical period from the time of purchase, by relating my experiences and some of the resulting maintenance-guidelines that I have developed from the trial and error method. And in this Part I of my article, let me first give a general description of some of the existing conditions within my neon tanks:

- Some aquarists maintain neons in individual, exclusive, species setups. I find this a very inhibiting environment for our little neon, especially considering the factor of the neon's "psychological" disposition which I shall describe and analyze in detail in Parts II and III of this article. I keep neons in tanks containing several species of small characins and various other small fishes which are not aggressive or overly active, but a little more self-assertive. This method of grouping acts as a "psychological" factor reducing the neon "fragility syndrome", thusly, generally improving their eating patterns and total

October, 1969

aquarium activity.

- With time and aquaristic experimentation, I have learned that our friend the neon doesn't really like things too hot! He is not at all comfortable in a water which is even considered moderately warm for other tropical species; 72°F. has been the temperature at which I have found the neon to be at its best. So thermostatically controlled heat is essential in maintaining this constant. For on the one hand,



Although the distinguishing of the sexes of *Paracheirodon innesi* is ordinarily difficult at spawning time the female becomes chunkier as the female in the bottom of this color photo.

this gorgeous species isn't able to live long in an environment which is even moderately warm, but on the other hand, a drop in temperature of even a few degrees from their existing conditions *immediately* weakens their systems causing them to become victims of various ills including the lethal "neon disease."

- In attempting to determine the water chemistry most suitable for the neon, I have so far obtained most satisfactory results when the water has a DH factor which goes no higher than 7, but is regulated to keep



In this photo, a pair of pert but not overly brilliant neons swim about over a naturally colored gravel. What kind of aquaristic procedure could increase the brilliance of the neons in this photo?

at an average of 5 DH. Since the pH factor naturally fluctuates somewhat, I attempt to limit even this natural fluctuation, keeping the water to the acid side, with a mean pH of 6.2. For non-breeding purposes, this water composition has been most conducive to the well being of *Pinnesi*.

- The pros and cons of light and its effect upon neon health and behavior have been openly debated, and there has been contradictory reports as to the use of light in neon-breeding. My tanks with neons are stationed in an area of the room which does not receive direct

excessive light; the tanks are for the most part illuminated by reflected light. I do not use the overhead tank lights (although the tanks are covered with the typical tank hoods and covers which do contain housing for light bulbs) in order to diminish the chances of a temperature increase. It has been my experience that this form of shaded environment provided by the utilization of reflected rather than direct light intensity also is a contributory element to the general well being of the neon while simultaneously enhancing its coloring and famous neon electrical appearance.



There are few sights that can equal the sparkling scene of an aquarium filled with healthy neons. This series of articles by J. M. Bellanca will discuss the hows, whats and whys of neon health and maintenance.

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YOUR FISHES' HEALTH

By Roger Lee Herman

Trichodina infestations are probably less common than *Costia* infestations and certainly are less common than *Ichthyophthirius*, but they are still a serious problem on occasion. *Trichodina* organisms are interesting little ciliated protozoans with teeth; from the top or bottom, they look like round bodies with spokes. These spokes are rather oddly shaped structures called teeth or denticles. Scientists who study these parasites use the size, shape and number of teeth to determine which species they have. At least 17 species are known to parasitize fish. They are found in both freshwater and marine fishes. While most are external parasites, a few species are commonly found in the intestine and the urinary bladder.

Trichodina infestations, as with *Costia* infestations, may cause a cloudiness to appear on the skin of the fish. This blue-white haze, caused by excessive mucus secretion and increased thickness of the skin, may be spotty or may cover large areas. With severe cases, a red tinge may appear in these areas; these red tinges are caused by small hemorrhages caused by the irritation of the bugs. The parasites apparently hold to the fish by suction and by means of their teeth. They appear to rotate continually while attached, thus irritating the skin and causing the increased mucus secretion as well as other inflammatory responses. The *Trichodina* parasites can actually destroy the top layer of skin in

severe cases.

The mucus and dead cell remains seem to serve as food for the ciliates. In areas of hemorrhages, they have been known to ingest red blood cells also. It is very likely that they eat bacteria and other microorganisms as well as organic debris on the tank or pond bottom, since they are able to survive for extended periods in the free-living state. It is possible, because of this ability to survive off the fish, to introduce the parasites into an aquarium by using live food (such as *Daphnia*) collected from an outdoor pond.

Infestations with *Trichodina* often indicate that something else is wrong. *Trichodina* are frequently mixed with *Costia*. I have seen *Trichodina* associated with leech infestations and with bacterial infections. When *Trichodina* is diagnosed one should be sure no other diseases are present before the examination is stopped.

Treatment of *Trichodina* infestations is easy. Formalin (37% solution of formaldehyde gas) seems to be the best chemical to use, but quinine bisulfate or hydrochloride, acriflavine, or salt are effective. Salt, of course, cannot be used with catfish. The recommended dosages are:

Formalin—4 drops of the commercial form per gallon for 1-2 days.

Quinine—20 ppm (1 1/2 grains per gallon) for 1-2 days.

Acriflavine—10 ppm (1 teaspoon

Continued from Page 93

of a 1% solution per gallon) for 1-2 days.

Salt—2.5% as a short bath of up to 10 minutes depending on the strength of the fish. This may have to be repeated several times.

The aquarium water should be changed after any of these treatments.

Continued from Page 13

then do they leave the surface of the water and search for food at the bottom of the pool.

The remarkable part of this bit of nature is that it happens thousands of times a week in the United States and Europe, where you could hardly find one pearl gourami living in a pool. This is a popular aquarium fish, you see, and one that breeds fairly easily for the professional and amateur as well. So you don't have to go to Borneo to see pearl gouramis breed: just visit your neighbourhood pet shop, buy a 20-gallon aquarium and a pair of pearl gouramis, and see what happens.

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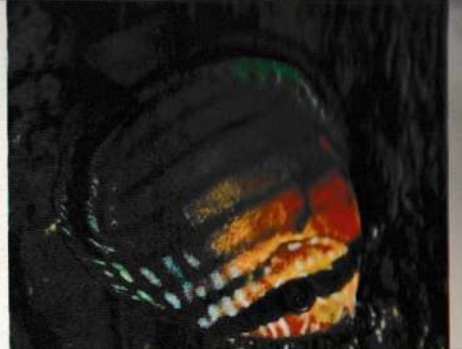


(Close-Up) Lance Peck, Nipoma, California
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