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FEATURES	
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COVER	
This month, our cover features <i>Epiplatys annulatus</i> , a fish that is new to aquarists but which has been known to science since 1915. The fish is really a beauty and is on the verge of becoming generally available to aquarists. The most unusual thing about the species is the beauty of the female. No other <i>Epiplatys</i> boasts such beauty in its ladies, and the male <i>annulatus</i> rivals even such beauties as male tetras and <i>Aphrasma</i> ceterum. One thing about <i>E. annulatus</i> , however, is that it is quite small, even at maximum size. I doubt that it will be much of a drawback with its little beauty, though for more about <i>Epiplatys annulatus</i> in the article beginning on page 3. Photo by E. Roloff.	
EXOTIC TROPICAL FISHES SUPPLEMENTS	
Pages 22 and 24, 31 and 52. These pages are not printed, but are removed and punched to fit into the Looseleaf Edition of EXOTIC TROPICAL FISHES.	

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March, 1966

EDITORIALLY ...

I have always heard it said, and indeed said it myself on many occasions, that a judge who has to pick a winner from thirty entries at a fish show could make himself one good friend and twenty-nine bitter enemies. Last year I had the honor of being a judge at three shows, one in Dallas, Texas, one in Hutchinson, Kansas, and the other in Pittsburgh, Pennsylvania. I hope I didn't make myself any enemies. I made a very special effort to be absolutely fair and impartial. An entry, let me hasten to say, is strictly an entry, and should not even carry the name of the exhibitor. It is very important for a judge not to have any knowledge at all as to who owns that big, beautifully colored pair of guppies. This allows him to evaluate them strictly as an entry. Not that any judge worth his salt would ever let who owns fish be a factor in his decisions. Be that as it may, I have met a great many fish fanciers in my travels and consider myself a very lucky person to have it brought home to me that my opening statement is not often so at all. I have made many, many friends, and if there were any enemies, I don't know of them. What I find is that people do not, as a rule, question a judge's decisions; they may sometimes want to know how the decisions were arrived at, not to take issue with them but to know what to avoid in shows to come. This is a healthy attitude, and whenever possible I try to give a short commentary for the exhibitor's guidance.

William Vorderwinkler

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March, 1966



The colors of the male *Epiplatys annulatus* are truly exciting. Note particularly the red in the tail and dorsal fins. Photo by E. Roloff.

Like 'em small?

Epiplatys annulatus

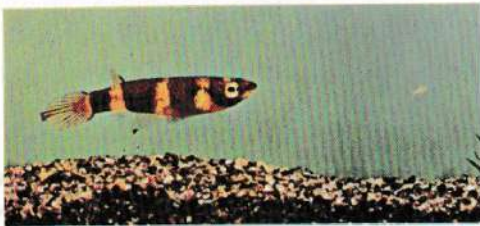
BY E. ROLOFF

Epiplatys annulatus was described in 1915 by Boulenger from two specimens which were caught in Sierra Leone, West Africa, near Matca and each had a total length of only some 16 mm. It was not until 1955 that this beautiful fish was first brought alive into Europe by the Belgian scientist J. Lambert. Unfortunately these fish, which were collected near Conakry (Guinea, West Africa), soon died, because the aquarium water offered them was not suitable. I myself searched vainly for *E. annulatus* on my expeditions to Sierra Leone in 1962 and 1963. Not until recently did my friend Mr. A. Todd, whom I had told about this fish, succeed in finding 11 specimens of *E. annulatus* in the Kasewe Forest of Sierra Leone. He sent me five living specimens. A short time later *E. annulatus* were also found by the Danish zoologist Stenholt Clausen near Monrovia (Liberia), and several living specimens were sent to Col. J. J. Scheel in Denmark. At about the same time a Dr. Beni received some which had been caught near Conakry (Guinea) and put them at a Dr. Foersch's disposal for an attempt at breeding them.

It is an extraordinary coincidence that *E. annulatus*, which had been sought for so many years, should show up at about the same time in three different West African countries and be successfully introduced into Europe.

In order to become better acquainted with the habitat of *E. annulatus*, I

5



The female *Epiplatys annulatus* lacks the fin development and red coloration present in the male but is still the most attractive of all female killies. Photo by E. Roloff.

searched Kasewe Forest in Sierra Leone on Easter, 1965, along with my friend A. Todd. In contrast to the places in Liberia and Guinea where they were found, which lay in the open coastal savannah, we were able to find *E. annulatus* here in an almost-dried-out river in the forest. The waters were shaded by old trees. Large rocks, which were covered by underwater ferns, stuck out of the water. Doubtless these rocks are flooded by the water during the rainy periods. My visit was at the end of the dry season. At this time, most small bodies of water in Sierra Leone become completely dry. The water in which *E. annulatus* occurred had a temperature of 78° F. Thanks to a water testing kit we had brought with us, the pH was found to be 6.7 and the hardness 5 DH. During the rainy season the hardness is probably a good deal less.

In the slow-flowing water of the river there were found large quantities of young fishes of many small species, which because of the shortage of food were suffering a miserable existence and were very emaciated. The greatest number of these fishes seemed to be *Neolebias unifasciatus*, which had attained a size of only $\frac{1}{4}$ to $\frac{1}{2}$ of an inch. This comparatively unattractive fish normally reaches a size of about 1½ inches. It prefers the middle and lower parts of the aquarium. Right below the surface there swam huge swarms of an *Epiplatys* species, which seemed to be *E. bifasciatus* or a closely related species. These fish were $\frac{1}{2}$ to 1 inch in length, and were probably capable of doubling this size when fully grown. Now and then we noticed some small silvery dots among the *Epiplatys* swarms. These were our coveted *E. annulatus*, easily recognizable by the silver region atop their heads, which makes them relatively easy to pick out and catch. They had a size of 1¼ to 1½ inches and were much in the minority compared to the other fish species. Here I also found some larger specimens of *Epiplatys fasciolatus*, which were well nourished because the vast numbers of young fishes in these waters gave them easy hunting. I caught about 50 specimens of *E. annulatus*, which

because of the poor food conditions were scarcely transportable and died before or during their voyage to Germany.

Those that were caught by Mr. Todd in the same place—with the exception of one specimen—averaged a length of about 1½ inches. In my aquarium, they grew quickly and in a short time had already attained the same size as their uncles and aunts that had been left in the river. This is an indication that growth in the last months of the dry period becomes greatly retarded. It is, therefore, no wonder that in old scientific descriptions, the sizes given for fish species caught in Sierra Leone are usually too small. As a rule, during the dry season one finds young and half-grown specimens, but the short-lived *Aphyosemion* species (for instance, *Aphyosemion sjoestedti*), are an exception. Most fish species do not attain maturity until the rains begin. But during this time the capture of fishes is difficult because of the great quantity of water. (Oddly enough, when the rains have stopped one finds very few grown specimens.)

In the summer of 1965, I effected an exchange with Col. J. J. Scheel and Dr. Walter Foersch, which gave them some of my *E. annulatus* from Sierra Leone and gave me some from Liberia and Guinea, in order that I could establish the color differences between the three different varieties.

The fin coloration in the males of the three groups differs strongly. The form from Liberia has red parts in the anal and caudal fins. Besides, the pectoral fins are colored red. The ones from Sierra Leone have red markings in the forepart of the dorsal fin and in the caudal fin, besides which there are two gleaming bluish-green horizontal stripes that stand out particularly well. In the form from Guinea, the red coloration is confined to parts of the caudal fin and the tips of the pectorals, while the forepart of the dorsal fin and back part of the anal fin show yellow to orange markings which do not stand out

Aphyosemion sjoestedti is one of the short-lived aphyosemionid that are also caught in Sierra Leone. Photo by Dr. Herbert R. Axelrod.



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very intensely. This comparison shows clearly how greatly the colorations of some fish species can vary when the isolation of their habitats can lead to new color variations. This example also shows, however, that more or less great deviations in color does not give one the privilege to designate a fish as a new species without making thorough genetic studies, as has in the past been done frequently with *Aphyosemion* species.

Breeding *E. annulatus* in the aquarium poses no great problems. Eggs are laid among the roots of floating plants and the leaves of *Myriophyllum*. Compared to other *Epiplatys* species, there are fewer eggs laid, and they are smaller. The young, which hatch in barely 2 weeks, are so small that for a week they must be fed with infusoria or its equivalent before they are in a position to accept freshly hatched brine shrimp. Later they can be fed with bosmina and cyclops.

My *E. annulatus* were kept at a temperature from 74 to 78° F., which is also sufficient for breeding them. The water measured about 7 DH and had a pH value from 6.5 to 7.0.

E. annulatus is the most beautifully colored of the *Epiplatys* species I have yet run across. Because of their tiny size, they should not be combined with other species. My largest male attained a size of 1½ inches, while the females got to be barely 1¼ inches long. The rarity of *E. annulatus* in its home waters can be explained by the fact that because of its tiny size it makes an easy prey for larger fishes. In the Kasewe Forest, the large numbers of other young fry seem to have protected it from extinction.

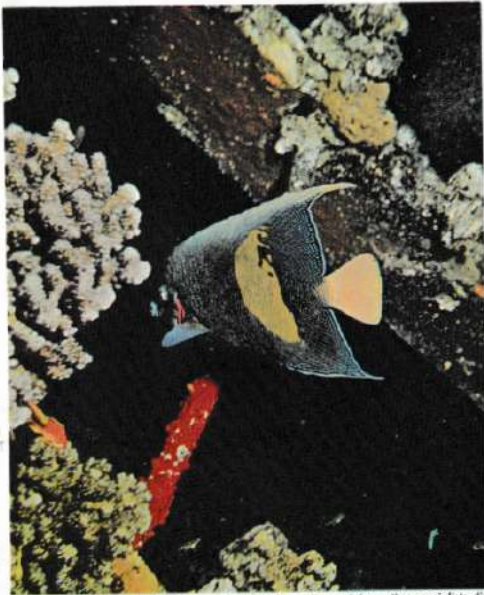
HARALD SCHULTZ DIES

On January 8, 1966, the world lost a great ethnologist, talented aquarist, and wonderful man, Harald Schultz. He died in São Paulo, Brazil, of a cerebral hemorrhage, at the age of 56.

Mr. Schultz was assistant curator of the Department of Anthropology at the São Paulo State Museum and served this magazine in the capacity of expedition chief. Since 1942, he made annual expeditions into the Brazilian interior where he lived with many little-known Indian tribes. He studied their language, customs, culture and everything he could learn about, often living with very savage tribes that had never seen or even heard of a white man. It is a great credit to the man's friendly, personable nature that he was accepted by these fierce, warlike tribes who would normally look upon a white stranger as a dangerous enemy.

His studies did not stop at analyzing the people; he was intensely interested in the fish life he found in the streams wherever he went, collecting many species that were new to science. A good number were named in his honor. Many of his articles on tropical fishes and Indian legends pertaining to tropical fishes have appeared in this magazine over the years.

He leaves his wife, Vilma, and a son, Alexander.



An underwater shot taken in the area in which the author and four other specialists did their research. Photo by L. Silver.

More About My Trip to the Red Sea

BY DR. WOLFGANG KLAUSEWITZ
Frankfurt, Germany

In my previous article in *TROPICAL FISH HOBBYIST*, *My Trip to the Red Sea*, I covered the details of why five specialists of the Indian Ocean Expedition (including myself), while aboard the research vessel *Meteor*, decided to do



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our research from the island Sarsø of the Red Sea. I also gave comparisons of Red Sea and Indian Ocean fish species. Now I would like to tell you about some of the unusual sea life that inhabits the Red Sea around the coastal zone of Sarsø.

In reports from tropical seas one always reads about the fascinating shapes of coral reefs and the gorgeous coloration of coral fishes. Of course, to swim around along a reef is one of the most fascinating experiences in life. But believe me, the coastal zone is also worth studying and describing.

During the stay of the "island group" of the German expedition, I studied the different so-called physiographical zones between the shore and the outer reef. I can, therefore, tell you that the region between the coast line and the reef is neither a uniform nor a monotonous zone, and that corals grow just along the shore. Some portions are rocky, others sandy. Some have sea grass and sea weed or other algae; only the outer part of the region is grown high up with corals as a reef which forms a living wall. The bottoms of these zones, their plants, and the fishes one sees in them are different and characteristic. Real coral fishes and the greatest part of the reef fishes are not found around the sea weed, and the typical inhabitants of the sand zone are not seen around the rocks.

Amongst the funniest fishes of the sand zone are the gobiids that live in a symbiotic, or cooperative, system with shrimp. The fishes belong mostly to the genus *Cryptocentrus*, the shrimp to *Alpheus*. The fish and the shrimp live together in a hole. Usually the goby lies outside the hole, just in front of

The gobiid fish *Cryptocentrus caeruleopunctatus* (top) and its symbiotic shrimp *Alpheus djiboutensis* (bottom). Photo by Dr. W. Klausewitz.



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Scorpius like this *Holocentrus diadema* abound in the Red Sea. Photo by Dr. Herbert R. Axelrod.

the entrance, and watches for prey. His diet consists mostly of plankton that drifts along with the current. The shrimp remains within and has the task of keeping the joint apartment clean. The current and the waves of the sea sometimes demolish these holes, and the shrimp has to shovel out the fine sand and carry out gravel and little stones. But the shrimp always stays in direct contact with the fish. Should a large fish, a diver, or any other potential danger appear, the goby warns the shrimp, which disappears instantly into the hole. The fish slowly backs up, but it watches the "trouble maker" and waits until the last moment before darting into safety. At night both remain together in the hole. It is a real symbiosis; the fish always has a clean living-room, and the shrimp gains security and perhaps some food from the goby.

Along the coast line one finds still other examples of unusual behavior. Normally fishes live in water, and once outside they must die. There are only a few exceptions: the freshwater lungfishes of tropical areas, the mudskippers (*Periophthalmus*), and a few related forms which in former times belonged to the gobiid fishes. Along the Red Sea coast there lives another species which leaves the water. It is called *Lophalticus kirkii magnusi*, and it belongs to the blennioid fishes. There are some other species of the same family with the same tendency toward amphibian life, but they leave the water only during the night, or they stay in small wet holes during the low

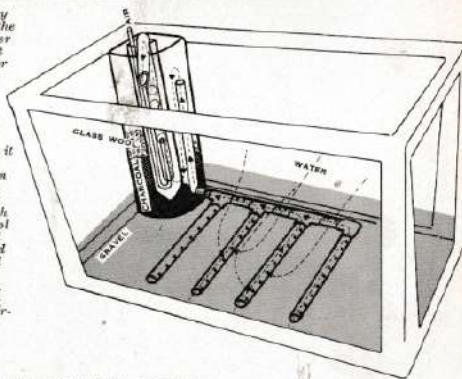
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This is the goby *Cryptocentrus lutheri*. Photo by Dr. W. Klavewitz.

tide. But *L. kirkii magnusi* usually remain out of the water. These fishes need a rocky coast, for they always sit on a rock a few inches above the waves. They wander with the rise and drop of the tide. But they do not dive. In case of danger, they fall down into the water but jump instantly back upon the rocks, reaching by this method of locomotion another spot on the coastal rocks. They are able to climb on the vertical wall- and ceiling-like parts of the stone. To accomplish this they use their pectoral, anal, and ventral fins. When undisturbed, they graze with their large mouths and many small teeth

This is the amphibian-living blenny *Lophalticus kirkii magnusi* from the rocky coast of the Red Sea. These fish are always above the surface of the water. They are endemic to the Red Sea. Photo by Dr. D. Magnus.



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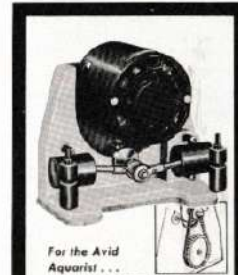
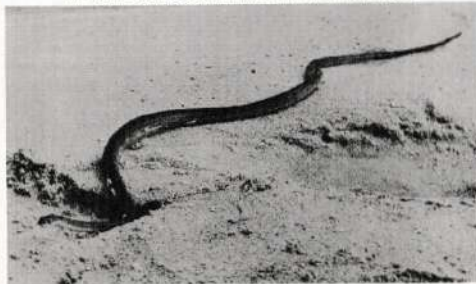
NEW JERSEY

on the tiny green algae that live on the rocks. One necessity for their lives, however, is that the stone must be wet, and that sometimes spray from the waves must hit them and keep their bodies wet. It is this that dictates that they must wander along the rock walls with the changing surface of the tide. At some points one can find hundreds and thousands of these small blennies (they are only about 2 inches long). Yet, despite their great frequency, this species was first described only a few years ago.

L. birkiti magnusi has many enemies. During the daytime various herons and other water birds stalk about looking for them. Furthermore, there are large crabs that prey on these blennies. At night other crabs come, as do some cuttlefishes of the genus *Octopus*, to catch the blennies. Also, land snakes come down on the rocks, go into the water along the coastal line, and prey on them. But, despite their many enemies, their unusual life seems to have enough survival advantages, for one can see them in great populations. How do they live outside the water? How do they breathe? What modifications do they have in their bodies for this special mode of life? How do they climb the wet rocks? How do they breed and hatch? Where do newly born and young specimens live? All these are very interesting but unsolved questions. To answer at least some of them was one of our tasks during our time on the island Sarso in the Red Sea.

The greatest number of the fish related to these blennies live well under the surface around the coral beach. Here also live many well-known coral fishes belonging to the families Pomacentridae, Chaetodontidae, Pomacanthidae, Acanthuridae, and some others. But it is a great error to believe

This is a new species of snake. It was collected on the coast of the island of Sarso. A short time ago it was described by Prof. Mertens as *Coluber insulanus*. It eats mostly the little blennies of the rocky shore line. Photo by Dr. W. Klessowitz.



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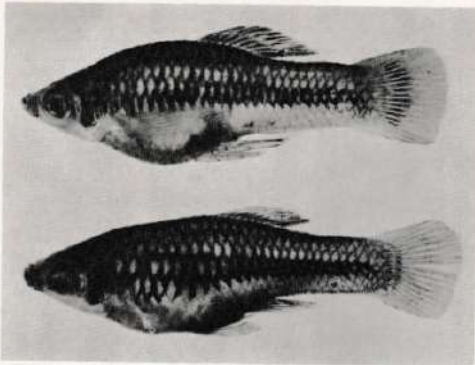
that all these fishes are brilliantly colored. Also, the corals are not bright in color. Their dominating tones are gray, green, and brownish. Only the tips of the branches and the (mostly nocturnal) polyps are rosy red or bluish. Of the fishes living in this habitat about 70 to 80 percent are rather dull. Only a rather small number of the remainder are really brightly colored. There is a biological significance: rare fishes have striking colors or patterns. Solitary-living fishes with great distance between individuals also do, as do those adult fishes living in monogamous couples for their whole lives (i.e. many species of the genus *Chaetodon*). All those fishes that have difficulty finding other individuals of the same species, for instance at mating time, or that have the tendency to keep together in small groups (i.e. couples or schools with few individuals) have conspicuous coloration. All the other species are usually rather dull.

Very often one gets a wrong impression from a fish in an aquarium: due to the small distance from the observer and due also to the artificial illumination of the tank, such a fish often has a rather bright image. Also such a fish might have lost much of its brilliance in its natural surroundings, for a great part of the portion of sunlight that contains reddish and yellowish rays is filtered off by the water. Therefore it is very difficult to make exact statements about the significance of the coloration (or, incidentally, the special behavior) of those fishes one knows only from aquarium observation.

The Red Sea is one of the hottest parts of the world. But in wintertime the thermometer drops to about 80°F. Usually a European feels happy in such temperatures. But at Sarso there was a great deal of rain, many real storms, strong currents, and high waves. On some days it was impossible to swim in the water, despite the fact that we had chosen a rather well-protected place. Out in the Gulf of Aden, the research vessel *Meteor*, on which we had come, had to fight with a considerably high wind velocity. When she returned to pick us up it was impossible for her to go through the small channels to reach our island. She anchored 10 miles away, in deeper water, and sent her rescue boats for us. On our way back to the ship, we had to fight against the high waves for more than 3 hours. But—"good to begin well, better to end well!"—we reached the ship wet, but safely.

One week later we had the opportunity to see our islands once more, but this time from a high altitude in an airplane. The captain of a plane we took on the way from Aden to Cairo agreed to make a little turn so that we could see the Farasan group from above. Once more we studied the reefs and the shallow and deep water around the islands, and we got a good impression of the whole area.

Meanwhile, the collected fishes, corals, and fossils from those islands reached our museum at Frankfurt. We soon started with our scientific work. And you, dear hobbyist, got the first report on this expedition both here and in my previous article, *My Trip to the Red Sea*.



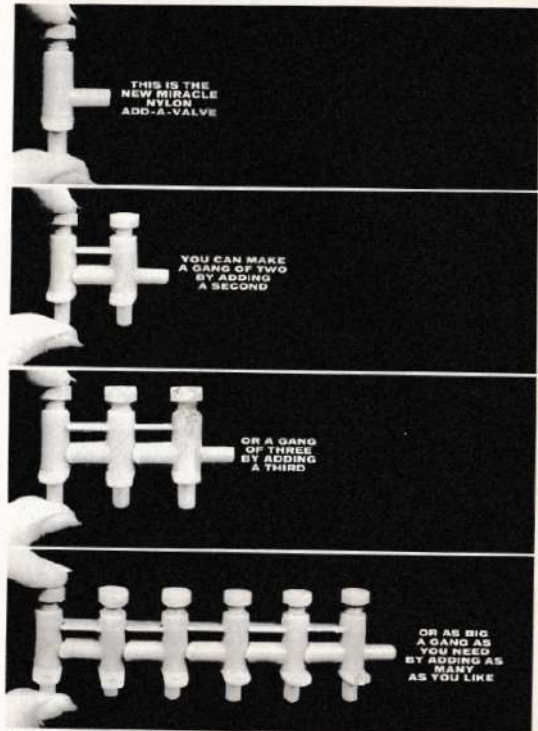
Xiphophorus gordonii pair. The male is above, the female below. Photo by W. L. Cristoforelli.

A New Platy from Mexico*

BY WILLIAM VORDERWINKLER

Platies and swordtails are among the most popular of all the livebearing fishes known to aquarium hobbyists, as all but the least initiated of us know. All these fishes are in the genus *Xiphophorus*, and most of them come from Mexico. There is of course the famous swordtail, *Xiphophorus helleri*, and the common platy, *X. maculatus*. Then there is the sunset platy, *X. variatus* and its little-known subspecies *X. variatus xiphidium*. You may never see *X. monzeanae*, *X. couchianus* and *X. pygmaeus* unless you have access to the preserved specimens in museum collections. The rarity of these species among aquarium hobbyists is not so much because they are scarce in their

* Thanks are due to Robert Rush Miller, W. L. Minkley, and The American Society of Ichthyologists and Herpetologists for allowing us to draw upon information published in the 1963, No. 3 issue of COPEIA in the article entitled "*Xiphophorus gordonii*, A New Species of Platyfish from Coahuila, Mexico" and to use the black and white photo of *X. gordonii* which appeared originally with that article.



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native waters but because although they have a certain amount of color and are doubtless interesting, only a very few would bother to keep them when there are so many more beautiful types available.

Relatively recently another species has made an appearance, one which is probably destined to take its place among those never kept in aquaria. This is *Xiphophorus gordonii*, named after the late Dr. Myron Gordon, who did a great deal of work on this and other livebearing groups. This species seems to be native to only one region, the Cuatro Ciénegas basin of central Coahuila, Mexico. Here it has been found in the Laguna Santa Tecla, which is located in the southeastern end of the valley of Cuatro Ciénegas. Here they were not found in the open waters, but in spring-fed feeder ditches which drained into the laguna.

In the aquarium, the colors of this fish leave much to be desired. However it probably interbreeds readily with the other *Xiphophorus* species. What the results would be if they were hybridized with, for instance, the many color varieties of *X. variatus*, is anyone's guess. Perhaps in this way it will be a valuable fish some day, and this fact plus its membership in a genus popular with aquarists makes it worthy of mention in this magazine.

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Little bits of learning...

The Amazing Planarian Worm

BY DOROTHY CLARE WILLIAMS

Many people who raise tropical fish have discovered small, wormlike animals in their tanks and have become alarmed, thinking that these animals might be harmful to the fish. The animals are planarian worms, or flatworms, and are actually harmless. Despite the fact that these little creatures inhabit many aquariums, few aquarists know anything at all about them. They are fascinating creatures, and have more value than is at first apparent. Most interesting, they are being used in scientific experiments to find out if such a low form of life is capable of learning.

Many experiments to determine the learning ability of animals have been performed with vertebrates, but only recently has there been any work done with lower forms of life, such as planarians. Planarians, or flatworms, are the most primitive of all wormlike animals, and are also the first animals with heads. They are of the phylum Platyhelminthes, the first part of which is from the Greek word "platy" meaning flat, hence the name "flatworm." They are usually from one-eighth to one-half inch in length and have a blunt, triangular anterior end and a tapering body. The body is usually patterned with dark pigment. On the top of the head are two black eyespots which are not eyes as we know them, because they cannot distinguish definite shapes, but can differentiate only between light and dark. Because they appear to be crossed, these "eyes" give the animal a great deal of personality.

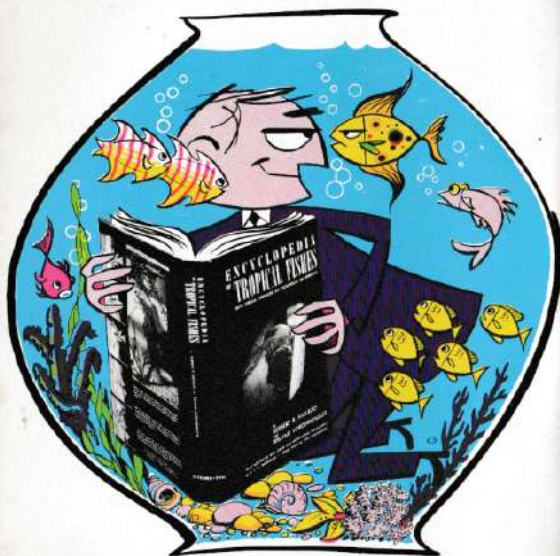
Planarians are regenerative animals, that is, they are able to regrow entire animals from only small portions of their bodies. They will easily accept tissue transplants from other planarians, and they can grow entire new brains if the original one is removed. Planarians are very likely to be contemporary representatives of an ancient animal form. It is possible that the higher invertebrates and also the vertebrate animals evolved from this animal or close ancestors of it. Because of its nearness to antiquity, and also because of its regenerative powers, the lowly flatworm has been the object of extensive research and experimentation. It was thought that perhaps such an animal (with a brain that could be regenerated and transplanted) might be trainable and thus help to expand the information gained from learning experiments already done with higher vertebrates such as rats and dogs. These experiments, if successful, would also help clarify the relationship between higher and lower forms of life.

Several experiments with planarians have seemed to indicate that the animals can exhibit attitudes that in man are called emotions, such as fear.

A mechanical stimulus with a hair or fine glass rod to one side of a planarian will bring either a positive response (the worm turns toward the point stimu-

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March, 1966

lated) or a negative one (the worm turns away from the point stimulated). Usually a worm will react positively to a weak stimulus and negatively to a strong one. If the planarian is stimulated again and again by an agent that proves injurious in the long run, the worm's reactions will become consistently negative and very rapid and strong. The worm seems to be trying to get away from the harmful stimulus. In higher forms of life, including man, this type of reaction is associated with the emotion of fright.

"Classical conditioning" experiments also point to the idea that the difference between higher animals and lower organisms is not so great as most people seem to think. Such experiments, similar to those done with vertebrates, have been done with planarians since before 1956. A classical conditioning experiment is a learning experiment in which some stimulus, such as food, acts as the "unconditioned stimulus." This means a stimulus that normally, without training, evokes a response from the subject-animal. As an example, salivation is the normal response of a dog to food. Before the unconditioned stimulus is presented, a conditioned stimulus is presented. For example, the sound of a buzzer precedes the food for the dog. After a number of trials, the conditioned stimulus evokes the same response as the unconditioned response. Thus the dog salivates at the sound of the buzzer. This stimulus-reaction series is obvious in higher animals (i.e. the salivating dog), but it is also found in lower organisms such as planarians. Before 1956, Robert Thompson and James V. McConnell performed a classical conditioning experiment with planarians at the University of Texas. They shined a strong light on a planarian. The animal's normal response to this unconditioned stimulus was to stretch itself. Several seconds after the light was turned on, the planarian was given a mild electric shock. The worm's normal response to this stimulus was to either turn its head or contract. After repeating this trial about a hundred times, with the shock following the turning on of the light, the response of the planarian was modified. Then, when the light was turned on, the worm would either contract or turn its head. This seems to prove that planarians are capable of reacting in the same way as higher animals when placed in the same position of reacting to a stimulus. The planarians just described seemed to "remember" what had happened before and reacted according to what they "learned." However, a trained worm must be exposed periodically to the experimental conditions, or it will "forget" what it has "learned."

An even more fantastic experiment was conducted with planarians as subjects when James V. McConnell, Allan L. Jacobson, and Barbara Humphries trained planarians to conditioned responses, chopped them up, and fed them to untrained worms. A second group of untrained flatworms was fed pieces of untrained planarians. The worms that had eaten their trained counterparts showed a higher proportion of conditioned responses than those which had eaten the untrained ones! One possible explanation for this

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shocking finding is that since the digestive systems of planarians have amoeba-like cells which engulf food by a process of ingestion, it may be that these cells can take in large molecular units, perhaps even whole cells. If this is so, entire molecules from eaten planarians could be ingested without change, possibly carrying small amounts of whatever learning is made of!

The experiments described thus far have been based on mere classical conditioning. In 1958, Jay Boyd Best, now a professor at Colorado State University, and Irvin Rubinstein experimented at Walter Reed Hospital in Washington, D.C., to find out if planarians are capable of "instrumental" learning as well as conditioned learning. In instrumental learning, an animal is trained to do something in order to get or avoid something. The animal's response determines its reward or punishment. Maze learning is an example of instrumental learning. The planarian is rewarded if it makes the right choice, and punished if it makes the wrong choice. The first experiment was to see if a planarian could learn a simple two-choice maze situation. The motivation for the animals was removal of their water, which is necessary to their lives. If the correct choice was made, the water would be restored. The cues were light and darkness. The maze was a Y-maze, so called because it consisted of 2 cylindrical wells one at each end of the arms of a Y-shaped tunnel. The arms and the stem of the Y were, therefore, separate, but interconnected alleys. This maze provides a definite choice point at which the animal must choose which of two alleys to take. One arm alley was lighted, the other kept dark. When a planarian was in the well chosen as the incorrect well, the water was withdrawn from the whole system. If the worm chose the correct alley (light or dark, depending on how the individual was being reinforced), water was given to it when it entered the well. The entire maze was then left dark for ten minutes and the worm tested again. Reinforcement (the reward of water) was withheld until the worm made the correct choice. The results of this experiment showed that planarians are capable of instrumental learning.

During the first trials, the planarians passed through the tunnels without hesitation. During the second set of trials, the worm would often pause and swing its head from side to side, as if to make a decision. Sometimes a worm would enter a tunnel, travel down it, then turn and go back to the choice point and approach a second time. This resembles the "conflict" behavior known in higher forms of life. When a higher animal is confronted with an experimental situation—to choose between alternatives—it will choose without hesitation at first. After being punished or rewarded a few times, but before it has learned which choice to make, it hesitates at the point of decision. This is called the "trial and error" or "conflict" stage.

After the planarians passed through the first phase of learning, there was a period of active rejection of the correct cue stimulus (light or darkness). The attitude of the animal resembled the rebellion processes in higher animals, in which the animals exhibit behavior that appears to be rebellious or negati-

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vistic when one is attempting to train them. In the trial set following the one in which the worms refused to make the correct choice, they became very lethargic and refused to "play the game" at all. Even at the risk of dehydration, they would refuse to move or go through the tunnels. Some of them would remain at the choice point and heave as if dying until they were returned to their home bowl. At first it was thought to be fatigue or injury that made the planarians react like this, but when they were returned to their home bowl they moved quickly and easily without any sign of fatigue or injury. This seems to show that there is a psychological basis—even in a planarian's "brain"—for the same types of reactions as are exhibited in higher forms of life. To try to overcome this unexpected lethargy on the part of his "pupils," Dr. Best analyzed that perhaps the planarians were suffering from a type of "claustrophobia" because of the cramped situation in the maze.

Another maze was built, identical to the first one, except that it had a rim around the edge so that there was a large chamber for the planarians to crawl around in. The trials were exactly the same as before, except that between trials the worms had an opportunity to crawl out in this larger rim. In this set of trials, the flatworms never rejected the choices and never refused to run through the tunnels. Between trials, the planarians almost always took advantage of the rim to swim and crawl in it. This seems consistent with the idea that the rejection and lethargy were produced by the cramped situation in the maze.

If all these experiments have shown that planarian behavior resembles such things as boredom, conflict, decision, rebellion, frustration, anxiety, learning, and cognitive awareness in higher animals, does that mean that we can say that planarians get frustrated, rebellious, and anxious? Not necessarily. All a person can "know" of the mind of another organism is from its similarity to his own. As Dr. Best states it:

When one does not know how an animal perceives the world, it is difficult to know whether an animal's failure to learn a task set by the experimenter arrives from incapacity or communication failure.

It is time to recognize that psychological behavior may not have its origin in the particular anatomy and physiology of the vertebrate mind. Lowly planarian worms have been shown to exhibit the same types of behavior as higher animals and even man. Therefore these harmless and seemingly inconsequential animals are really of great value to scientists, primarily in studies of evolution, learning, and regeneration. If the theories propounded by certain scientists are true, these lowly animals that often inhabit our aquariums may very well be related to man in some far-distant way.

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MAIL CALL

By William Vorderwinkler
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Selling fish
Q Recently I joined the happy band of tropical fish hobbyists in a small way with two aquaria and a small tank for young fry. I took up this hobby purely for pleasure, and I calculate that I spend (with equipment) about \$150 annually. I keep, or try to keep, everything as per textbook, and my fish are lively and in good condition. Now, my gripe is this: when I try to sell excess fish, I have little success, and I have become so frustrated that I intend to dispose of the lot as I can and also advise other would-be hobbyists of this situation. I can quote just two examples for your edification:

I arranged verbally to sell approximately 150 guppies at 6 cents each to a dealer. After I delivered them, he reneged and offered me less than half the original price. This little episode was followed by an offer of 3 cents each for marble mollies of approximately 1 1/2

inches in length. To say I was disgusted would be putting it mildly. If this is a sample of the treatment generally given, I want no part of it. As previously stated this is a hobby, and I did not expect to

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James L. Clark,
Pasadena, Calif.

A. I can sympathize with you, but I can also sympathize with the dealer. You come into the store and offer him something which he probably does not need. Instead of refusing you outright, he offers you what may seem to you to be a very low price, without even seeing them. The mere fact that you have only two fair-sized tanks and a small one and had 150 fish to sell is an excellent indication that they were unmercifully crowded and could not have grown properly. Also if you want to get a good price for your surplus fish, don't breed the inexpensive livebearers, but try breeding something that will bring a better price. Then your dealer will be in a position where he is buying something he actually

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March, 1966

Topsail platies

Q Referring to the article by Dr. Joanne Norton in your June issue, and with all respect for the efforts of Dr. Norton to create "new varieties" of sundry species of tropical fish, I really think things are going a bit too far, converting the nice platy into something the cat wouldn't even bother to bring in. The swordtail has a body length which may be sizeable enough to carry a high dorsal, but the platy!!! The result here is in my opinion a monstrosity and is hideously out of proportion. The platy has one of the nicest and most esthetically built forms, at least to us who "like cm fat like that" and needs absolutely no "improvement." Any touching up by human efforts in this detail can only set

these proportions out of focus. This is common sense, or should be, anyway. Fish hobbyists know about the "Golden Rule" when decorating their aquaria, but why should we bother to try to make our tanks look nice and proportionally planted when some people do all they can to make the fish look like anything but a fish? In my opinion, Dr. Frankenstein did a much sicker job than Dr. Norton, and in the name of all conservative platy lovers I solemnly protest against this beginning of the end.

Hans Hals, Madrid, Spain
A. Mr. Hals, people have been doing this type of complaining against the "fancy" strains ever since the Orientals gave us their conception of what was beautiful with the goldfish varieties. Have you ever

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seen a "bubble-eye" goldfish? Or a "lion-head"? Or the type they call the "cog-fish"? Monstrosities? Certainly! But they are considered desirable, especially by people who pay steep prices for them in the open market. What you and I may consider monstrosities, others may consider gorgeous. This also holds good for art, music, literature, etc.

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2. What can cause my water to turn a yellow-brown color? Our water is very hard and I use pH tablets because it is alkaline. I "vacuum" clean the bottom at intervals and stir the sand to try to keep it clean. I use an outside filter. Any suggestions would be welcome.

Mrs. A. Marabella, Douglassville, Pa.

A. 1. As long as he does not bat them hard enough to do them any damage, there is no cause for concern. "A turtle likes 'rust plated decks'" at the post Ogden Nash puts it, and these "decks" make him a pretty tough proposition.

2. There could be a number of causes. There might be some old iron pipes in your plumbing causing the discoloration. Try using activated charcoal in your filter. This may remove some of the discoloration.

A slightly dissatisfied reader

Q. I currently subscribe to TFIH and I think it is a very good magazine. But I wish that you wouldn't talk so much about fishes that we never heard of and we will never see at a petshop. In the February 1965 issue you devoted almost the entire magazine to the fin structure of *Britannichthys axelrodi*, which I couldn't care less about. On the other hand, the May 1965 issue was crammed with articles about fish that I know about and have in my aquarium. I par-

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ticularly enjoyed the May 1965 issue. I wish you would make all of them on fish we hobbyists know a little about and can purchase at most petshops.

Terence McInerney, Pittsburgh, Pa.

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A. Perfection is a thing we all try to achieve, and no matter how hard we work, there are always some to tell us how far we have missed our goal. Strangest thing is this: one person tells us what a goddess-egg a certain issue laid, and the next letter we open says, "hurrah, that issue was great; give us many more like it." We know from long and bitter experience that we just can't please everyone, and if we get more mail that tells us we're good than mail that tells us we're not, we know that we're doing just about all we can expect to.

Guppy-Gambusia hybridization

Q. I am interested in breeding the guppy with the mosquito fish (*Gambusia affinis*). I obtained my mosquito fish from a weedy cove of a small muddy river near my home. They are very hardy and can take temperatures as low as 55° F. At the present time I am raising a batch of mosquito fish to get some virgin females in the hopes that they will breed successfully with guppies. In the book PLATIES AS PETS, Dr. Myron Gordon states that platies can be bred with swordtails because of a likeness in the structure of their gonopodiums. Also that a guppy can be bred with a molly for the same reason. He also says that a platy or swordtail cannot be bred with a guppy or molly because of the difference in their gonopodium structures (also because their chromosomes


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are different). If a guppy and mosquito fish have the same chromosome count and gonopodium structure, can't it be done?

Mike Daniels, Joplin, Mo.

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A. Forgetting about chromosome counts, as it is impractical, there is a considerable structural difference in the gonopodiums of the two species. Then, you have to figure that a fish would have to be comfortable. You say that your *Gambusia*



Gambusia affinis pair.

can take as low as 55°. A zuppy would soon be covered with ich as temperatures that were comfortable for the *Gambusia*. I do not think you will be successful, but I wish you luck anyway!

Convict cichlids

Q. 1. When I first saw albino tiger barbs, I was captivated and bought four. The petshop at which I bought them is an hour away from home. Halfway home we stopped and I checked the barbs. Much to my amazement they had spawned in the small plastic sack. The eggs were soon gobbled up, and I was unable to save any. Isn't this rather unusual?

2. Among other tanks, I have a 30-gallon community aquarium. In this aquarium are: six *Hyphessobrycon innai*, three *Hemigrammus gracilis*, two *Cory-*



Hemigrammus gracilis pair.

doras aeneus, two *Rasbora heteromorpha*, two *Pantius sachsii*, two *Hemigrammus ocellifer*, two white convicts (1 1/2), one *Acanthopthalmus huihui*, one *Cyprinocentrus symonieri*, and one *Xiphophorus helleri*. This tank is filtered by an under-gravel filter that covers half the tank, an outside filter, and an outside power filter. It is well planted and is aerated by an airstone. I have been told that this aquarium can support twice the number of fish I have now. What changes and additions would you make? It receives

light from an overhead reflector for 8 to 12 hours. Temperature is kept near 75° F.

3. In the April '65 TFH there is an article on the white convict cichlid. That article gives its name as the *Cichlasoma facelon*, which is the chanchito. Is this right?

Robert Kegerreis,
Woodfield, Ohio



The colored variety of *Cichlasoma facelon*.

A. 1. Unusual, but not unheard of. Years ago I had a pair of pearl danios do the same thing in complete darkness, inside of a wax-coated cardboard con-

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ainer. I was able to save some eggs and raised the fry to maturity.

2. On questions of fish capacity of an aquarium, it is far better to keep a few less than to overcrowd. My advice is to keep things as they are.

3. We have an expert identification which assures us that the fish is indeed *Cichlasoma facelon*.

Killies are tough!

Q. Recently I made a surprising discovery. While netting some killies for bait in a river near my house, I was surprised to find that some of them had colorful markings. Encouraged by the discovery, I captured some, set up a 3-gallon marine aquarium (the river is salty where I got them), and put them in. Although it had a slight odor, I kept it in my room. Unfortunately, the tank was broken when the wind blew a lamp

down on top of it. The water poured out, and I discovered what had happened a few hours later. All the fish died except one which had succeeded in finding a puddle of water. I was too tired to walk down to the river and set the fish free so in a do or die effort I dropped him into my 20-gallon freshwater tank thinking that if he went through this much, he could live in fresh water. The next day I expected to find his remains on the bottom, but there he was swimming around happily. Naturally, the shock was almost as great for me as it was for the fish. I have had no luck in identifying him scientifically other than the fact that he is called a killie. He is a fat sort of fish with a yellow underbelly, black bars down his sides, and a black spot on the rear of his dorsal fin. He seems to do very well and

has survived temperatures of 62° F., eats all foods, and has become quite fond of my kissing gouramis. The identification of this fish and any other information would be quite helpful.

Jay Harris, Rumson, N.J.

A. Luckily I have visited the *Shrewsbury River* at Rumson myself; years ago we used to go there to seine shrimp and then fish for weakfish a ways downstream. Rumson is fairly far inland, and, therefore, the water is only slightly brackish rather than salty at certain stages of the tide. This would be of some help to your fish when dumped into fresh water. From your description and my own experience in that river, you have *Cyprinodon variegatus*. In the latter part of June the males get orange fins and big blotches of blue all over the body. The belly, as you describe, is yellow. Here, the fish is scarcely ever kept, but, strangely enough, hobbyists in Germany prize it highly. They can be kept very well in fresh water to which a little salt (about 1 teaspoonful per gallon) has been added.

Salt in the aquarium
Q. I have one tank with mollies, sword-tails, and guppies. Can you tell me how much salt per gallon is advised in order not to damage the plants? I have had to replace all of my plants three times in the past month due to too much salt in the water.

Erich Hene, Magnolia, Ark.

A. There are some who claim that a little salt in the freshwater aquarium is beneficial. There are even some who say it is absolutely essential. Unless we are dealing with a brackish water fish like a molly, which I note you have, my contention is that salt in a freshwater aquarium is not at all necessary. This is especially true when you are keeping species from inland waters, which are totally devoid of salt. In your case I would recommend a teaspoonful of salt to each gallon of water. This is not enough to cause damage to your plants, and is a small concession to help the mollies.

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Fry problems

Q. 1. Is it possible to completely eliminate all "not-so-good" guppies from a strain?

2. Can you tell me what would promote the growth of my fry?
3. I have separated 2-month-old fry by sexes. Why do the males chase each other around as if the one being chased was a female?

4. My mother has put a male marble molly and a male black molly into my male guppy tank. Will they do any damage to the fry?

**Pamela Robbins,
La Mirada, Calif.**

A. 1. Yes; all you need to do is what all the successful breeders tell us to do: "Cull, cull, and cull some more!"

2. The most important thing a young fish needs and frequently does not get is enough space. Next to that is a constant deficiency but never an overabundance of

good, healthful foods. The proper, constant temperature is also important, and the water should always be clean and free from wastes. Changing part of the water regularly has also been found to be beneficial.

3. It is natural for males to bestow their favors upon females, just as it is for the females to swim about quietly until they are singled out. Put together a tankful of males and you have them trying unsuccessfully to find a female for their attentions and playfully chasing each other. No harm done!

4. As long as your guppies are big enough to escape being swallowed, they should not be damaged.

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Color

Q. 1. Recently I acquired a dry food that brings out guppy colors. How would the components of this food bring out the colors in fish? (Such components as carotene, astaxanthin, oleo peromorph, and pollen.)

2. Do you use hormones? I would never use them, but understand that they would bring out colors.

**Glen Heller,
Englewood, N.J.**

A. 1. I never use any of the so-called "color foods" on my fish. Giving them the best of care and environmental conditions is enough for me. But if you want to please your eyes, go ahead and use it. I told a manufacturer of such a food that his 4 or 5 other foods are excellent and sufficient, and he may discontinue that item.

2. As I understand it, hormones are manufactured by glands in every living thing, just the right amount for every function, even in a little thing like a guppy. Why add any? Hormones should be supplemented only where a deficiency exists. The right kind and amount can be prescribed by an authorized person, but 99% of us hobbyists do not know how to use them, in any case.

One of a trio

Q. I recently bought a trio of guppies which were shipped to me by mail. I have no reason to doubt the respect-

ability of their source, but when they arrived, only the male was alive. He showed no sign of disease and looked healthy; my only problem is that he is sluggish, sits on the bottom, plants, rocks, etc. He is alone in a planted, heated and lighted tank. What is the matter with him, and what can I do to cure it?

**Rick Wojtya,
No. Riverdale, Ill.**

A. The fish might have been in bad condition to begin with, but probably they were chilled by shipping during the cold months. Fish are often shipped in unheated compartments in planes, where even in the warm months it gets pretty cold. Your male will probably come through in time, and I hope it happens.

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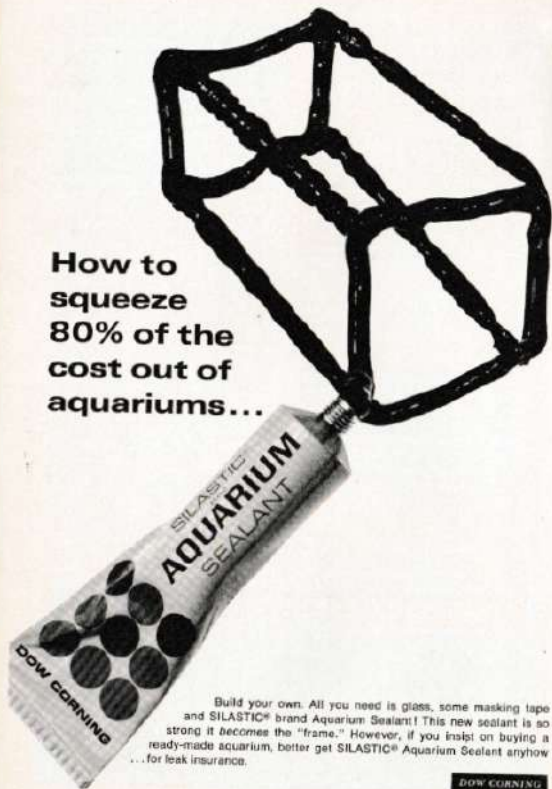
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By Alfred A. Schultz

Q. 1. I would like to assemble a 50-gallon salt water aquarium and would greatly appreciate your advice and guidance. Having read a great deal of all available literature, there are still certain problems. I plan to establish the tank as the books recommend. However, in addition to the outside power filter, I would like to use an undergravel filter and glass gravel since sand is rather monotonous in color. I realize the larger glass gravel is not preferable. Would this filter system break down the uncasten food as it does in the fresh water display, particularly when combined with the power filter?

2. Regarding stocking the 50-gallon aquarium, I have tentatively planned to use 1 Townsend, blue or queen angelfish; 1 black or French angelfish; 2 butterflies (different varieties); 1 rock beauty; 2 neon gobies; 1 beau gregory; 1 spiny boxfish; 1 cowfish—all of these to be different sizes as recommended. Now it seems to me that bottom feeders or scavengers would be the most important fish in the tank. I have therefore considered using 2 green sailfin mollies; 4 black mollies; 2 chirona; 1 snail, and 1 hermit crab. Can you foresee any unusual difficulties with this choice of fish?

3. Can you recommend other bottom feeders? I have read somewhere that certain species of fresh water botia such as the clown loach are convertible to salt water. If so, would it make a suitable scavenger?

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4. One problem appears to be in the decorative rather than efficiency category; mention is made of granite, marble, and glass as suitable rock. How about:

- Quartz crystal—is this considered a glass rock?
- Petrified wood—the attractive red variety from Utah?
- Common commercial freshwater shale?

5. Also, since live plants seem to be unsuitable, how about the plastic varieties (without metal supports or having supports withdrawn)?

Ronald H. Tyson, Kew Gardens, N.Y.

As 1. There should be no uronated food after feeding time. If there is, it should be siphoned out afterward.

2. Not with the choice, but rather with the too-great amount.

3. Whoever gave out this information evidently confused saltwater clownfish with freshwater clown loaches. The freshwater clown loach cannot be converted to salt water.

4. Quartz crystal is considered a glass rock. Petrified wood is excellent, but steer clear of freshwater shale, because it may contain iron.

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5. Plastic plants are fine as long as metal has been removed from them.

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This is one of the angelfish mutants that turned up at Lakeland Fish Hatcheries. Photo by Lakeland Fish Hatcheries.

A New Angelfish Mutation

BY WILLIAM VORDERWINKLER
Photos by Lakeland Fish Hatcheries

There are two ways to produce new variations and color varieties in tropical fishes. The time-honored way to arrive at a desired form or color

combination has been to *broad* them, taking fish that approach what we are looking for and rejecting unwanted specimens until, frequently many generations later, success is finally achieved. This is called selective breeding, and the guppy is a prime example of the selective breeder's art. Many years ago, Paul Hahnel took a nondescript pair of the common guppies available at the time and decided that he would make of these something special. By giving them the best living conditions, conditions which were far removed from what they had to put up with in their home waters, constantly rejecting those which did not come up to standard, and breeding the best of the ones that did, Paul has arrived today at a strain of guppy which is considered as the finest guppy anywhere. This is Hahnel's way: don't wait for a mutation; create one by selection from natural minor variations.

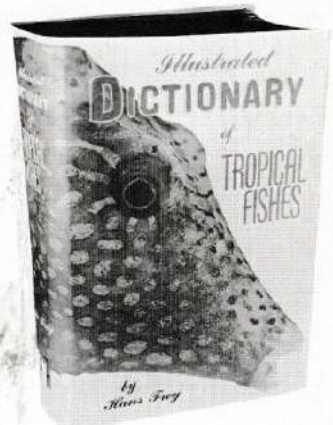
The second way is to wait for a mutation that is significant and to fix it by inbreeding. Of course a mutation is much more likely to happen in a large commercial hatchery than to an individual hobbyist. Here there are many thousands of fish produced, and a sharp-eyed breeder can sometimes detect aberrations that occur in some fishes, separate them, breed them, and cross his fingers, waiting for more.

It is the custom of H. M. Wingate at Lakeland Hatcheries, in Lakeland, Florida each April to put out about 4 or 5 thousand each of common and

Bob Wingate, the man who spotted the mutants. Photo by Lakeland Fish Hatcheries.



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The new mutants are colorful and robust. They will make ideal aquarium inhabitants. Photo by Lakeland Fish Hatcheries.

black-lace angelfish in large earthen pools to raise to large breeder size for sale or for their own use. In October, the angels are put in holding vats for the winter months. Breeders are selected from these and used to replace the older breeding pairs. A check is made periodically for fish which are outstanding as to finnage, size, shape, color, etc.

One day the owner's son, Bob Wingate, noticed three oddly colored angelfish in a vat of black-lace angels. The entire region from the lateral line to the dorsal fin, with the exception of a bit of the caudal peduncle, was a deep, sooty black with two points extending halfway to the ventral and anal region. The black reached over the forehead to make it look as if the fish were wearing a cap. The eye was reddish, the area below the black a brownish red, and the head below the eye silvery. Another startling feature was the dorsal fin: reddish with a large black area in the forepart, and striped with silver throughout the rest. The lower part of the body was silvery, and the anal and caudal fin slightly brownish.

He immediately and carefully proceeded to catch them and put them where he could observe them more closely. They were not quite mature. He noticed

that they seemed to be losing their black-lace coloring. At first he thought they might be sick or weak, but their entire appearance was vigorous. As their coloring became more vivid and distinct it became increasingly obvious that this was a new color strain. After feeding them carefully for a month, Bob made the unhappy discovery that he had three males and no females. A close examination of all black-lace specimens failed to turn up a single additional one, much less a female. Nothing left now but to breed them back to plain black females. He picked out six beautiful specimens and put them in a 60-gallon aquarium along with the three males of the new strain, to let them pair off naturally. Strips of slate were put in, hopefully to receive the spawn. It was not long before the first male chose a mate, and they spawned. The eggs, of course, were hatched artificially, and the pair was then removed to a tank which was to become their permanent home. Within 2 weeks all three males had found mates and spawned. As was to be expected, the babies were very carefully raised, but the color pattern of the males has not been repeated as yet. Each spawning from these "special" males has been carefully marked and segregated, and great pains have been taken to prevent them from being mixed with the regular youngsters. There are now about 4 to 6 thousand of all sizes. This fall the oldest of the youngsters will have become mature enough to breed, and the first thing that will be tried is to take young females and mate them back to their fathers, the original three males. The young second generation angels will also be bred to each other. Perhaps the recessive trait will put in an appearance again, and this time, there will be better luck in stabilizing it. Let us hope that some day this unusual strain will be seen everywhere. The three odd-colored males are still spawning, and the older among the youngsters will soon be mature. The males are as highly colored as ever, and the Wingates have high hopes!

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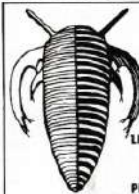
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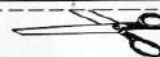
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Meet The Baron

BY ALVIN KAHN

In the keeping of aquarium fishes one is always subject to the lure of the mysterious, the unknown, and, more rarely, the deadly. A new fish or even a specimen of a long-known but rarely available fish will attract attention and command a high price.

Imagine my surprise and pleasure when window shopping at a local dealer to see a fish of strange and totally new appearance in very ordinary surroundings. In a tank of dwarf cichlids was a long, somewhat transparent, silvery fish, suspended motionless in the water. A label on the tank besides naming the cichlids read "ANOSTROMUS—\$2.50."

"What's the big one in here" (it was then about 3½' long), I asked.

"I'm calling it an anostromus," replied the dealer.

"Does it eat other fish," I queried.

"Everyone knows an anostromus has a very small mouth and is very peaceful."

This last answer struck me as a bit odd since the fish I was looking at had a mouth that extended back under his eye. Since the eye was about ¼-inch from the nose, the mouth was very large indeed. Besides, the largest teeth I have ever seen in a tropical fish were clearly visible.

"Well it looks to me as though it eats nothing but other fish," I argued.

The dealer said that with these new "African" fish you couldn't be sure and turned his attention to the paying customers.

Crenicichla lepidota, a tough customer in its own right, was to be one of the Baron's tank-mates. Photo by Harold Schultz.



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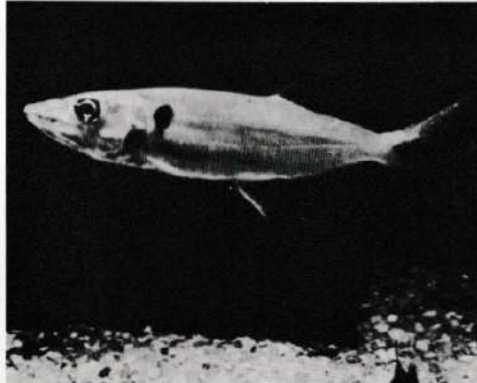
Having no place to keep a fish of this sort (community tank, you know), I left.

On the next day I returned to the store and studied the fish, waiting for it to open its fantastic mouth. "Say would you throw a guppy in there for me just so I could be sure it's safe in a community tank," I asked. The dealer sensing that I was hooked, obliged. Nothing happened, and to the delight of my youngster who was along I said, "I'll take it."

Needless to say, within a week the new "African anostromus" had devoured most of my collection. By then we were calling him "the Baron," for a miniature fresh water barracuda was what he looked and acted like. This may be a little unfair since he had no interest in any fish too large to be swallowed. In fact he was occasionally bullied by more aggressive fishes that he later ate when hungry. However, he did have the failing of overestimating his capacity, and once clamped within those alligator-like jaws (teeth up to ¼-inch long) the victim, if it survived, was never the same.

There was in the Baron's tank a *Crenicichla lepidota* (pike cichlid) of about 3½ inches in length who liked to bother the Baron. This ceased when the Baron, whose usual upper limit was 2-inch goldfish, mistook the pike cichlid for dinner and clamped down on his head. The bully got away but

This is the Baron in the author's tank. Photo by the author.



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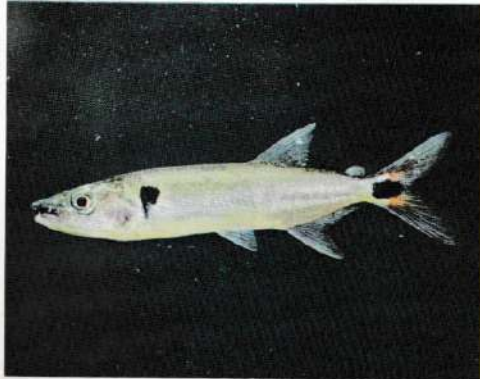
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Scientists at the New York Aquarium were quite sure that the Baron was a fish from the genus *Astrorhynchus*, perhaps *A. zackere* (above) but probably *A. falcatus* (below).
Photo: by Harold Schultz.



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