

October, 1968

tropical fish hobbyist

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tropical fish hobbyist

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cover

The next time the fuses burn out in your house and you're sitting in a temporary blackout, think about what the world would be like if there were no light at all . . . ever. A world without light is difficult for the mind to imagine and accept. We who dally bathes in the glory of sunshine have taken this strange phenomenon of light for granted. Even our scientists have only begun to investigate this luminous energy and its effect on human activity. The light bulb is one of the most important inventions in the history of mankind, even if you don't enjoy paying your light bills. In terms of the tropical fish hobby it has enabled the aquarist to give his fishes light at all times in a controlled manner; it has also enabled the hobbyist to view his fishes any time he wants to. We in the hobby have always been aware of the importance of light to aquatic creatures, but as to the biological specifics of how light affects and effects, is still a matter of future research. We know for instance, that tetras such as our cover fish *Aphyoseiichthys panchax* can be further stimulated into spawning by being exposed to morning sunshine, but we still have a long way to go into formalizing our knowledge of this incredible entity called light and its role in the life of tropical fishes. That is why T.F.H. is presenting this article "Biological Effects of Light" . . . the goal of Dr. Axelrod and his staff at T.F.H. is to help bring the world of tropical fish maintenance from the darkness of ignorance into the light of knowledge and consequently successful tropical fish-keeping. Photo by Stanislaw Frank.

exotic tropical fishes supplements

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October, 1968

EDITORIAL . . .

The theme of this editorial could be called "Better Bettas." It is a response based upon an article I just finished editing for my friend Hilmar Hansen of Berlin. In his article on the Betta Apartment Skyscraper, Mr. Hansen voices a plea that people should raise bettas which don't fight each other, but are just beautiful and graceful. He would love to see a community tank full of bettas, but he knows they would tear each other's fins apart, even though they rarely kill one another.

Down at Gulf Fish Farms, I performed an experiment. I took 50,000 baby bettas and raised them together in a large outdoor pond that was covered with plastic to keep out the birds and keep the temperature as high as possible. Bettas really love heat!

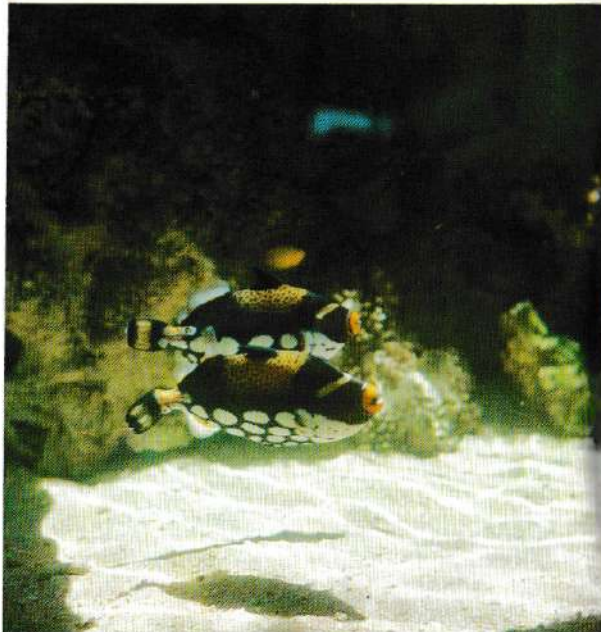
As the bettas grew the males could be seen circling each other in a challenging manner, but they didn't start tearing each other apart until one very hot day when the air temperature rose to 95°. The next day there wasn't a fish in the whole pool with undamaged fins. Further experimentation using 60° temperatures showed that bettas live longer in colder water, they rarely fight, the males NEVER build a bubbleness, and the females take almost a month to get ripe with eggs between spawnings, where they are ripe every week at 80°. All of these experiments, as well as many others, are reported in my new book "Siamese Fighting Fish..." This is a \$1 book written by Dr. Myron Gordon and myself in response to the thousands of letters we have received about some peculiarities of the Siamese fighting fish.

In the hopes of starting a non-fighting breed of Siamese fighting fishes, this magazine will pay \$500 for the first strain of bettas developed with long, beautiful fins, bright colors, males who can be kept together in a community aquarium of 80° F. without tearing each other's fins. Good Luck!

Herbert R. Axelrod

King of the Coral Fishes

BY DICK STRATTON



In its natural habitat *Balistoides conspicillum* is truly the reigning king; his throne is made of exotic coral, and his palace is the vast tropical Indo-Pacific waters. Until one sees this species in person it is difficult to believe that such unusual coloring and markings exist in one fish. Any aquarist who falls under the spell of this enchanter though, must realize from the outset that if he wants to purchase this species, he'll have to take some money out of his bank account, because the selling price of this royal aquatic creature is about \$250.00. And there's no money back guarantee, in case the fish doesn't live for any reasonable amount of time.

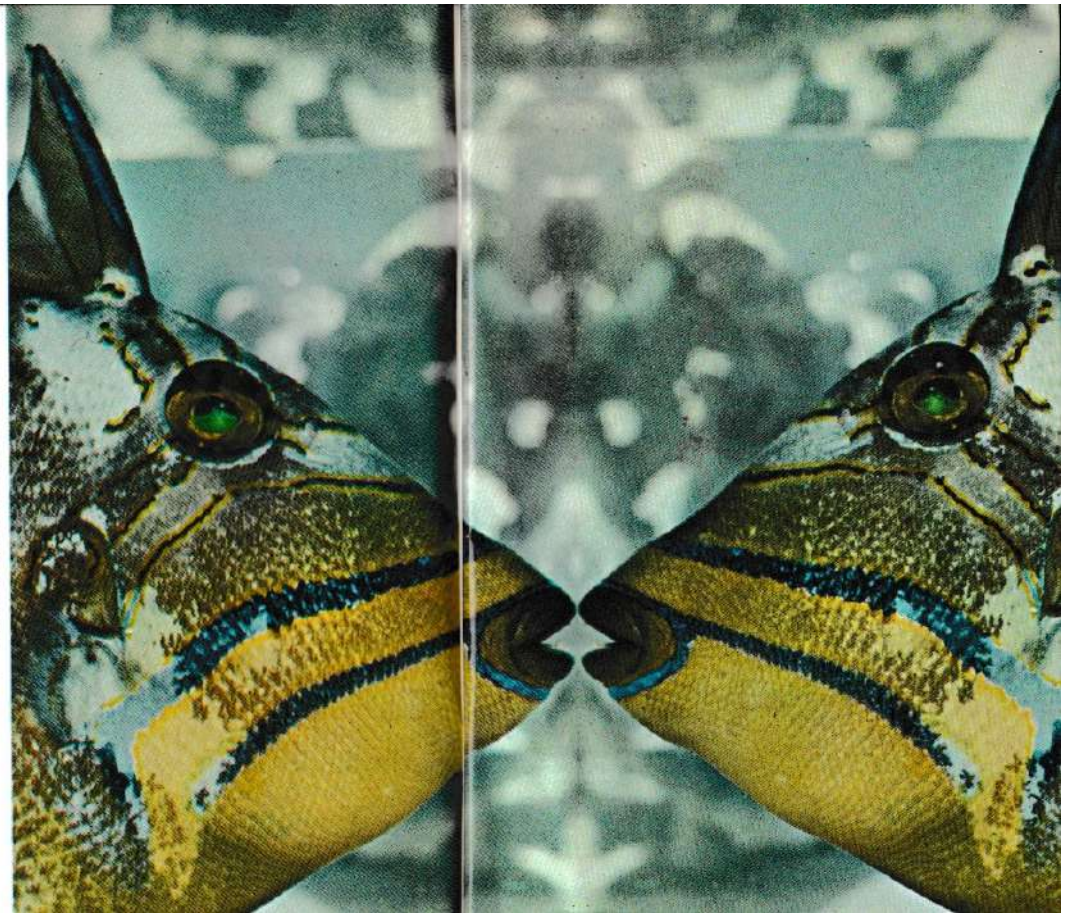


A sunburst of color makes this triggerfish a most desirable addition to the *Balistidae* family (triggerfishes). One does not have to be a trained ichthyologist in order to visually recognize a triggerfish. The similarity in external morphology such as the body profile allows for a ready identification for this group of fishes.

Just as the angel is usually the first fish a novice notices in a freshwater tank, so it is the triggerfish that captures the attention of those viewing a saltwater tank. Although most balistids (triggerfish) have beautiful coloration, it is their unique shape which makes them so striking. Interested aquarists might like to know that the life habits and aquarium behavior of these fish is every bit as intriguing as their appearance.

For one thing, a triggerfish is a fisherman's nightmare. Its mouth is small, but its jaws are unbelievably powerful! It is able to bite right through an ordinary fishing line, and the largest species (about 2½ feet long) can even bite through the hook! Even if the line holds, a triggerfish is likely to find a hole in the coral or rocks, and erect his dorsal spine (the so-called "trigger")

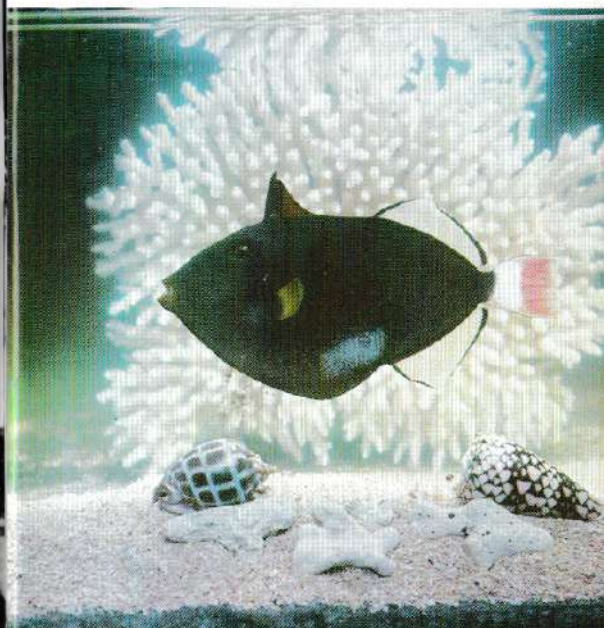
Cleopatra . . . meets Cleopatra. Actually this photo layout of *Balistes vetula* dramatically illustrates the question of species recognition, i.e., how does a fish recognize its own kind? Before attempting to answer this difficult question, remember a fish has never seen itself: it has never looked in a mirror so as to get an image of its physical identity. So if it isn't aware of its own appearance, how is it able to swim over immediately to its own kind when approached even by fishes of various species?



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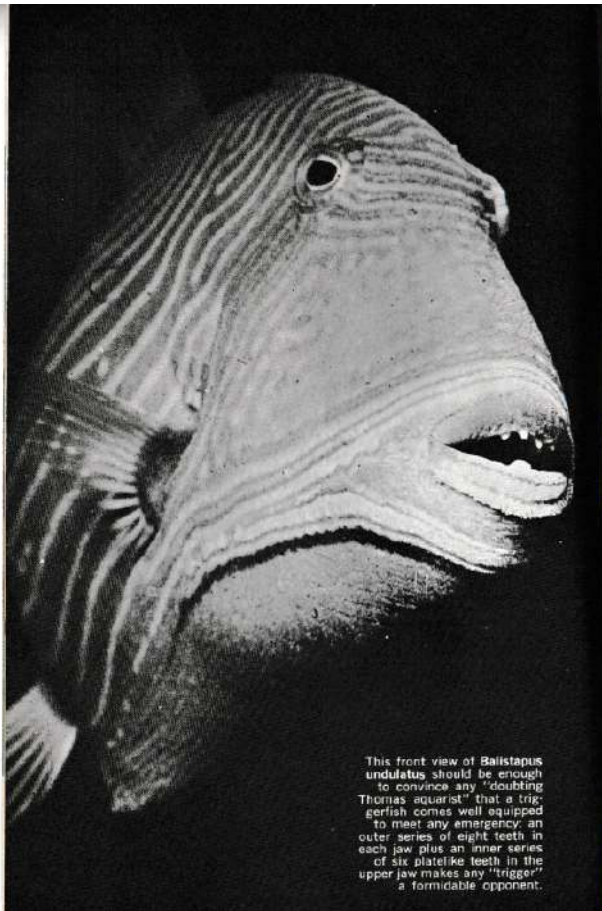
and wedge himself in so tightly that he cannot be removed. A skindiver, however, can capture a balistid by carefully reaching in, and depressing the second or third spine which has locked the large one into place. He had better watch out, though, and make sure that the fish doesn't get hold of him with those powerful jaws! If the fisherman successfully lands a triggerfish, he is advised to be very cautious that he doesn't get bitten by the triggerfish which bites savagely. And many species have spines on the caudal peduncle which they lash with painful accuracy . . . so beware! The triggerfish is truly a fish that fights back. Even assuming the fisherman has caught the triggerfish and has escaped any damage to himself or his fishing equipment, this fish may still claim final revenge . . . for the flesh of many species is deadly poisonous!

Supplying the enthusiastic tropical fish hobbyists of the world with gorgeous specimens of triggerfishes requires the work of skillful and dedicated divers who must risk their neck and take the chance of getting painful coral burns. Since we haven't as yet unlocked the reproductive secrets of these salt-water species, each and every one of these fishes must be captured by hand. Photo courtesy of the film "The Sea Around Us".



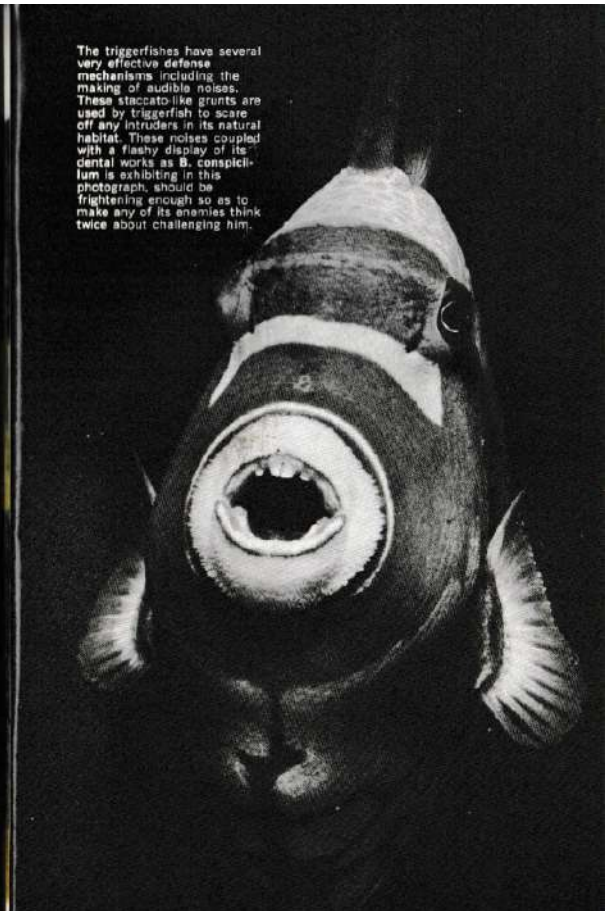
When we humans question whether or not there is beauty and value in life, it would be helpful if at such times there were available for those questioning, such an inspiring beautiful scene as this one of *Melichthys videra* in a hauntingly impressive tropical marine setting of coral, sand and shells. Such an exquisite composition from nature would serve to reaffirm the worthwhile and marvelous facets of existence. Photo by Earl Kennedy.

The triggerfish is highly respected by scuba divers. Many ruefully report that, while they were not bothered by sharks, they were chased by a 10-inch triggerfish defending his lair (usually a hole in the rocks or coral). According to Jacques Cousteau and Robert Straughan, even sharks are chased by territorial triggerfish.

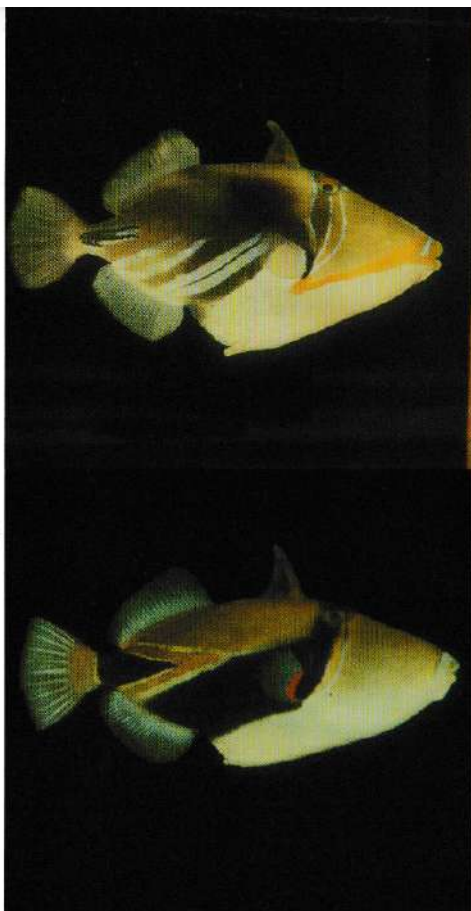


This front view of *Balistapus undulatus* should be enough to convince any "doubting Thomas" aquarist that a triggerfish comes well equipped to meet any emergency: an outer series of eight teeth in each jaw plus an inner series of six plate-like teeth in the upper jaw makes any "trigger" a formidable opponent.

The triggerfishes have several very effective defense mechanisms, including the making of audible noises. These staccato-like grunts are used by triggerfish to scare off any intruders in its natural habitat. These noises coupled with a flashy display of its dental works as *B. conspicillum* is exhibiting in this photograph, should be frightening enough so as to make any of its enemies think twice about challenging him.



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Most of the attacks on sharks (and men) probably occur while the triggerfish is defending a nest site. The female digs a hole in the sand and lays a number of large eggs in a grape-like cluster. The male guards the outer perimeter while his mate keeps the eggs free of debris by "blowing" a stream of water over them.

This ability of the balistids to "blow" streams of water helps make the triggerfish a favorite pet in the aquarium. For it will come to the surface and squirt water like a regular water pump, just to get its owner's attention. It also makes "growing" noises to attract attention, or when defending a favorite "cave" in the aquarium. A triggerfish will even threaten its owner while guarding his "cave." However, balistids become tame quickly, and enjoy being handled. Nevertheless, the aquarist should keep in mind that a fair-sized specimen is capable of biting fingers to the bone!

In the wild, balistids are basically nibblers; hence, the long snout which enables them to reach into crevices to gather such delectable items as sea worms, barnacles, and slugs. The triggerfish is a born opportunist, and if he happens to "flush" a school of small fish while nosing about, he gives instant chase. In the aquarium, he is more spectacular than the piranha when fed goldfish or other fishes. His powerful jaws dispatch a fish even more quickly than those of a piranha. The triggerfish also eats crabs, and will even attack an octopus. Triggerfishes have an interesting method for catching crabs which bury themselves under the sand. They simply "huff and puff" and blow the sand away!

Because triggerfishes are slow, deliberate swimmers in the aquarium, many aquarists (and even some ichthyologists) have assumed that they are weak swimmers. This is not true. When the occasion arises, a triggerfish is a powerful swimmer—as any fisherman who has ever hooked one will attest. For slow speeds, the triggerfish moves about by use of his undulating dorsal and anal fins. When more speed is needed, he swims like "normal" fishes, undulating his body.

Obviously, only small triggerfishes can be kept with complete safety in a community tank. They are not terribly quarrelsome, but they are so formidable that, should one go on a rampage, it would make short work of other aquarium inhabitants. But the unique appearance and interesting behavior of the balistids makes a single individual worthy of a tank of his own even if he should prove to be too rough for a community tank.

Keeping a triggerfish is not really difficult. They are among the most hardy of coral fishes. They eat dry food, other fishes, crayfish, crabs, bits of raw meat, and they even nibble at heavy growths of algae. I have used a

These two splendid color photographs by Dr. John Randall from his monumental work, "Caribbean Reef Fishes", published by T.F.H., clearly illustrates the typical triggerfish profile. *Rhinecanthus aculeatus* is the trigger in the top photo. *Rhinecanthus rectangulus* is the trigger in the bottom photograph. Both of these species were caught at Eniwetok, an atoll in the Pacific.

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subsand filter with them, but they dig down to the filter platform and bite chunks out of it! A large quantity of sand will discourage, if not stop, such activity. Also, with specimens over three inches long, air lines and filters should be protected with heavy rockwork, for your balistids will often bite holes in such equipment. They also will move small rocks and fairly large pieces of coral about the tank. One of their intriguing traits is that of picking up pieces of coral and small rocks, swimming up to the top of the tank, and sending them crashing to the bottom. If the habit annoys you, simply put in larger coral or rocks. (It is interesting, though, how a balistid will often drop a shell or piece of coral on tankmates repeatedly—just as though it were a favorite practical joke!)

The long snout of the triggerfish makes him look somewhat brainless, but he shows as much intelligence as any fish, and his unique habits and exotic appearance place him right at the top of any list of desirable aquarium fishes.

This species might cause some hippie to experience his first negative feelings of jealousy, for the exotic and electric color markings that *Balistapus undulatus* possesses outshines any far out body-paint patterns and colors that some of the psychedelic hippie segment has been sporting lately. Photo by Dr. John Randall.



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ANOTHER TRIUMPH FOR THE EHEIM TURBINE

Apartment "Skyscraper" for Bettas

BY HILMAR HANSEN
Berlin, Germany

By its richness in color, its interesting breeding, and its tolerance for almost any type of water, the betta has found a vast audience of admiring hobbyists. Unfortunately, it is opposed by some "friends" of tropical fishes since male bettas show an intensive desire to fight each other beginning in early youth. Even though today's breeding selection is more or less concentrated only on the brightness of color, and not, as in former times, on the fighting ability, the dominating characteristic of this species is still the fighting spirit. It is amazing that there aren't any breeders who set themselves the task to breed a more peaceful and thus a more "community-minded" Siamese Fighting Fish. Whoever keeps only one betta, because of its beautiful colors, in a community tank, will not have any difficulties, because the betta is rather peaceful towards other fish species. The breeder, however, who sees the manner in which the young males in his betta tank start to fight each other more and more, from day to day, is faced with the difficult problem of keeping them in separate compartments.

The use of normal fish tanks, even though they may be divided up into several smaller tanks by use of sheets of glass, is inefficient because it is too expensive. Besides, these compartments built into a normal fish tank would have very unfortunate proportions. It, therefore, would be necessary to buy special betta tanks which have to be long and low so that the various compartments might be similar to a cube of about 6 inches.

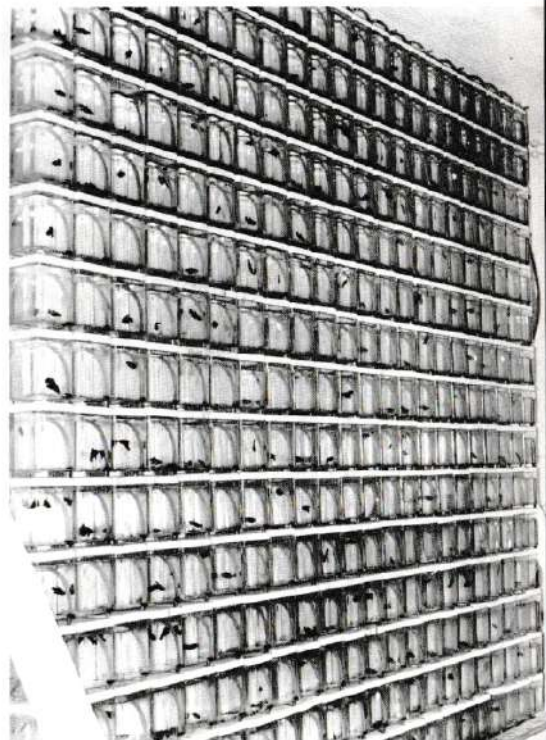
An answer to this difficulty lies in the use of glass-clear plastic containers made in a great variety of measurements by many manufacturers. The advantage of these plastic containers, compared with the massive glass tanks formerly used, is the low price, the good transparency resulting from the smooth surface, the light weight and smash-resistance; all these attributes are advantageous to their handling.

Some plastic containers, however, might get thin hair cracks, especially in the corners, due to inner tensions. Since this will happen only after a long period of use and only a few drops of water will be lost at any one time, it is not worth worrying about, because these thin hair splits can easily be sealed by smearing the dry container—in and outside—with a suitable solvent such as benzol, acetone, or toluol.

If such an accumulation of these plastic containers with perforated covers is set up, it will not take long to see that the water in the small containers becomes turbid and foul rather fast and has to be changed about twice a week; this means that all the containers should be cleaned at the same time. To avoid this regular unpleasant work the following suggestion may help.

One's first thought to remedy this maintenance situation would naturally be to keep the water clean by using a filter as generally used in fish tanks. But

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330 betta homes have been accumulated to make this Betta Apartment Skyscraper. Each is connected to the next with water inlets and outlets and one Eheim power turbine moves the water continuously from one betta apartment to the next. This method has proven so successful that one man, one hour a day, can raise, feed and clean 4,000 Bettas and raise them to selling size in three months. Photo by Hilmar Hansen.



A slight tipping of the jar is all that is necessary to remove one of the jars for inspection or sale of the fish. Feeding is automatic with food being placed in the topmost container where it spreads throughout all the containers in that row. Medication can also be administered that way. Photo by Hilmar Hansen.

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to use such a filter on every single container would be prohibitively expensive. Yet there is a way to have the waters in all the containers circulating and clean and accomplished effectively and inexpensively. This is done through the use of a central power filtering system which is accomplished as follows: first the connection of the containers must be effected by the use of pipes made of glass or transparent plastic material shaped like a U which are put into two neighboring containers with one end into each box, ending about $\frac{1}{4}$ inch above the bottom of the container. These U tubes must be transparent so that we are able to see that the tubes are full of water and that the water is circulating freely with no bubbles blocking the free flow. After connecting the containers in this manner, it becomes much easier to check and see that the water level in all containers is even. By using an Eheim Power Filter with a built in turbine pump, circulation and cleaning are both accomplished, since the circulated water will gradually carry all dirt and floating particles to the filtering tank where they will be removed. The construction of the Eheim filter was not changed for this special usage. The water runs through one of the usual U pipes into the bottom of the filtering tank, rises through a layer of filtering charcoal and Miracle's Dacron Wool, and is pumped into another somewhat higher chamber by means of the Eheim pump. The function of this chamber is to act as a reservoir, since the turbine pump carries more water than can run through the beta jars circulation. From this chamber, into which the heating system is mounted, the clean, warm water flows back through a U pipe siphon into the beta jar circulation. The circulation speed depends on the diameter of the U pipe, the level difference and the number of containers connected. The inside diameter of the pipes should be $\frac{1}{4}$ inch and the distance between the two legs one inch. The container itself can be used without any special characteristics.

The upper edge of all containers, including the filtering tank must be on a level line; if smaller containers are used in between, they must be raised to the given level (height) by placing them on a block of wood.

Every container should have a cover to avoid the jumping of the fishes and the loss of warmth. The cover must have a hole in two corners for the U pipes; these holes should make it possible to remove the cover without hindering the U pipes. Small corner filter boxes are perfect.

At this point, it becomes necessary to say something of the security of the arrangement. It is absolutely necessary that the arrangement guarantees the greatest possible security while operating; special precautions should be taken that the water should not be able to flow off because a U pipe got blocked, because one fish decided to visit his neighbor by swimming through the pipe. Every hobbyist probably has had the experience already, of fishes succeeding in passing through the most narrow pipes without damage and against all rules of nature. But, sometimes it comes to a bad end. . . . Should

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the circulation be blocked in any U pipe with a ball of tubifex, the water level in the containers between the filtering tank and the blockade will not rise higher than the level of the overflow reservoir; the containers themselves will never overflow.

In the same way, bubbles which gather in one of the jars will finally be carried off by a rise in the water level. The level within the arrangement should fall equally from one container to the next; this makes it easy to find and locate any kind of irregularity.

A complete change of water is easy; the water out of the last container next to the filtering tank can be taken off by a hose and at the same time fresh water is filled into the filter. Preferably warmed up water should be used because the heating system will not be able to warm up the ordinary water to the needed warmth (or temperature) in one flowing cycle. Initially use the pump only in your presence as filtration on a constant basis is not completely necessary except for heating purposes.

Disadvantages of such an accumulation of plastic containers in horizontal arrangement are first of all the bad visibility since the containers in the back row can only be seen from the top, and the limitation of the number of containers of 30 to 50 pieces. This number, usually, is not even sufficient for the male Bettas from one single breeding. If a much larger number of separate containers should be necessary, it is recommended that you hang the containers on a vertical plane; preferably, they should be accessible from both sides. The jars are placed on a small shelf, so spaced that the container can be pushed under the side of the shelf of the upper container and stands absolutely safe. Every single container can be hooked or unhooked without hindering the others.

In this construction, the water runs from the top to the bottom through every container. Each container, therefore, must be supplied with an overflow pipe which keeps the water level constant within the container. Since the dirt should be carried from one container to the next and finally into the filtering tank, similar to the system of the horizontal arrangement, the overflow pipe has to suck the water very near to the bottom of the container and should, again, be shaped as the U pipes. Each container has in one corner a hole in the bottom through which the longer end of the U pipe can be connected with the container next under it and thus carry the water into the lower container. The cover has a hole in the same place through which the U pipe can be pushed. Furthermore, the cover is perforated at the back edge so that the angle comes through to hold the container. The U pipe is held off the bottom by a strainer so that the container cannot run empty when the pump is not working. The U pipe must have a hole for air on the highest part of the curvature in order to avoid a siphon effect. From the lowest container, the water runs directly into a long filtering tank, will be re-heated there, and pumped up again by the Eheim pump. Along the upper edge of

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The Eheim Power Turbine is the only unit now available to power the system. It sucks the water from the lower units and pumps it into a reservoir tank on top which feeds it into the beta jars under it. A single Model 388 Eheim can easily handle 350 jars.

the wall, a distributing pipe is mounted. For every vertical row of containers on the front and back side of the wall, a plastic hose acts as a distributing pipe; the end of these hoses are attached to the respective first containers. Every line is provided with a nylon air valve in order to adjust exactly the water quantity for the circulation. The distributing pipe has the sight of a millepede, due to the many small hoses, affixed to it. The U pipes in the various containers can easily be made of clear PVC material; the hoses are put into the containers bending diagonally back to the bottom, where it will rest in the corner due to its springiness. To avoid the end being sucked down

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to the bottom, the hose is cut transversally. The air hole in the highest part of the bow is just a small cross cut.

If there is a choice, containers should be preferred where the rim of the cover goes into the container in order that water cannot flow down on the outer side of the container.

For feeding, a portion of freeze-dried loose pack brine shrimp or tubifex will be put into the top container which will be distributed into the lower containers by the water current. Every minute about a half pint of water runs through the vertical row. It takes about 20 minutes before the first feeding will reach the lowest container, and all fishes have sufficient time to get enough to eat. Live tubifex should be avoided as the worms stick together like a ball in the first container because they can only be carried off in the current separately.

Should the turbine be too weak for the set-up so that the water movement through the containers is too low, a sufficient feeding is not possible. In this case, the following trick would help: The uppermost container will be used for food only and will be supplied with a delivery pipe that does not reach to the bottom but only to about one third of the level and which also does not have an air hole in its top. As soon as the container is filled up with water and the level rises over the bow, the water begins to flow off due to the siphon effect until the short end of the pipe fetches air and thus ends the procedure. By this periodical suction the food floating mostly in the upper part of the food container is sure to be carried off. This continues through all the containers and thus guarantees a good distribution of the food. In case of feeding live tubifex, the worms have to be put into the one container and constantly stirred as they live on the bottom and tend to ball up.

The containers need only be cleaned once, but then very thoroughly, when new fishes are put in, about every two or three months. During the whole working time of this arrangement, the filters are only changed in case of need, from time to time and when a partial change of water is necessary. Feeding should be three times daily. Under these circumstances, hundreds of bettas can be raised without much effort until they can be sold.



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This beta skyscraper competes for the title of "ninth wonder of the world". To the beta fancier it is a monumental contribution to solving the problems of betta-keeping. The Eheim Power filter rides again to help the betta-world with its dilemma of how to filtrate individually and inexpensively large numbers of bettas while still being able to view them at an advantage. Photo by Hansen.

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Wan't Spawn

Q. I have tried many times to spawn my bettas. I conditioned them and lowered the water to 6 inches with a temperature between 78° and 80°, but the fish do not spawn. The male would build a nest but the female would only be chased by the male who injured her. I have six females and three males and tried different pairs, but that still did not work. What can

I do to make my bettas spawn?
Thomas Schultz
South River, New Jersey

A. In two words, keep trying. It is not unusual when starting out to have luck such as yours. Keep giving the breeders the best conditions possible and different combinations of males and females. I have had males act as spurs three or four times before a successful spawning.

Two Colors

Q. I have purchased two bettas. The male is blue and the female is pink with red fins. Is it possible to breed these two bettas?

Marc Liebeskind
Bayonne, New Jersey

A. Yes, it is quite possible to cross a blue male with a Cambodian female. It would be better to mate these with mates of similar color, because that results in more attractively colored offspring. Your mating will probably give primarily blue offspring, but there is a possibility of half the offspring

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being blue, and the other half of the offspring Cambodia, i.e. if the male had one Cambodia parent.

Breeding Equipment

Q. What set-up would I need to successfully spawn and raise bettas? I now have two 10-gallon tanks I can use.

Andy Packer
Philadelphia, Pennsylvania

A. That depends a great deal on how many bettas you hope to raise and upon the number of varieties you wish to handle. You will need breeding tanks, rearing tanks, tanks for adult males and tanks for adult females. If you are going to raise only one variety and that, in a modest way, a five-gallon for breeding, a ten for rearing, a five or ten for adult females and a betta tank for males is one possible arrangement of many.

Disappearing Fry

Q. My friend and I bred some bettas in a five-gallon aquarium. After the babies were free swimming, we took the male out. About two days later all the babies disappeared. We had been feeding them infusoria.

William Benzing
San Antonio, Texas

A. I suspect that the most likely cause of the disappearance is the "infusoria." Many aquarists feed what they call infusoria but which is in fact just a stinking mass of bacteria. The infusoria culture should be clear except for clouds of dust-sized particles. These particles are the infusoria on which the fry feed. Young cultures are cloudy with bacteria and have little food value.

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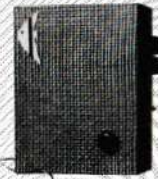
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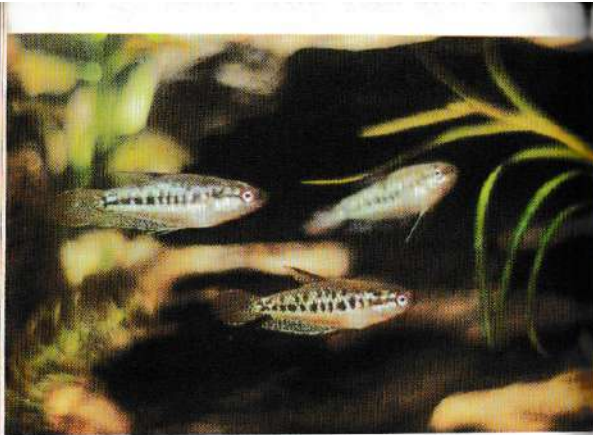
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Possibly while bathing in the dancing sunlight of the morning (what a time to dance) *Trichopsis pumilus* not only shows off its pearly iridescence to advantage but maybe the same time this fish also absorbs certain required unknown factors from the light which contributes to its well being. Photo by Zukan.

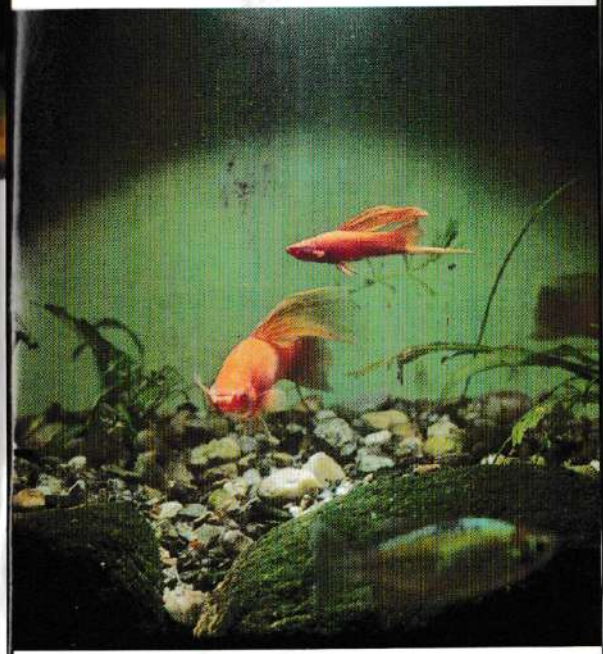
Excerpts from
RECENT RESEARCH FINDINGS ON THE BIOLOGICAL EFFECTS OF LIGHT

BY DR. JAMES W. BENFIELD
Assistant Clinical Professor, School of
Dental and Oral Surgery, Columbia University

Research has shown the importance of the full spectrum of natural light not only to plants, but animals and man as well. He stressed the near ultraviolet normally present in sunlight and compared the trace amounts known to penetrate the atmosphere to the trace elements in biochemistry which at one time were ignored as unimportant, but are now recognized to be of great significance. Light energy entering the eyes of animals directly stimulates the pituitary gland and other areas in the mid-brain and hypothalamic regions. Since the pituitary and pineral glands are known to exert great influence over the endocrine system, which includes

October, 1968

Man has always sought to find answers to his own biological mysteries by probing his total environment. Now ichthyologists are exploring the intriguing complexities of light to determine whether aquatic creatures such as this super-specimen of *Xiphophorus helleri* is in any way affected or controlled by solarization. Most aquarists are aware to some degree that light is a necessary ingredient in the maintenance of tropical fishes. The problem is always ... how much light, what kind and intensity, and what should be the duration of such light. Photo by Jiri Taborsky.



the thyroid, adrenal, pancreatic and sex glands, it can readily be understood that light has a potential for widespread manifestations.

Among these manifestations, sex ratios were affected in mice and tropical fish born of parents kept under various types of artificial light; there was also a significant difference in the life span and in the time in which spontaneous tumors developed in O₃H strains of mice; complete necrosis of the tails of these mice occurred when these animals were exposed for 12 hours a day to pink fluorescent light, but this process could be reversed if the animals were returned to natural daylight before the damage had become severe.

In my 1967 report, I stated that the Miami Seaquarium had successfully treated exophthalmus (pop-eyes) in fish by adding ultraviolet in the 370 nanometer range to their tank lights for short periods of time twice a day. The curator and his staff at the Seaquarium have since advised me (personal communication) that they have been able to keep certain species of fish in captivity that previously had died after a short time. They had attributed these fatalities to the probability that they did not know what to feed them. Now, they believe that lack of ultraviolet was responsible. They also report that tissue damaged from handling, equipment and by other creatures heals with unusual rapidity.

Controlled animal studies on rats were begun at the Environmental Health and Light Research Institute in Sarasota, Florida, as soon as the new full spectrum fluorescent light source became available some nine or ten months ago. One group is under standard cool white fluorescent and the other under the Vita-Lite³ at a level of 750-foot candles for 12 hours a day. Both groups are under the same number of tubes of similar wattage and at the same distance from the cages. All conditions other than the light sources are identical. As of this writing, the animals under cool white fluorescent have had fewer litters and fewer in the litters. They lose equilibrium quite easily and hold their heads high and at an angle to the spinal axis. A population explosion is occurring under the new fluorescent light. No abnormalities have been observed and the birth rate is comparable to that of similar animals raised under daylight.

Now that it is evident that light must be taken into consideration as an environmental factor in the raising of experimental animals, those engaged in such research will note with interest that Hoeltge, Inc., of Cincinnati, Ohio, one of the largest manufacturers of laboratory animal cages, has designed a new series of cage racks equipped with special lighting so that all animals in each cage will receive a uniform intensity of standardized light, including a proportionate amount of ultraviolet. One internationally known scientist associated with Rockefeller University in New York made the comment to me recently that it is incredible that the scientific community should have overlooked light as an environmental factor.



It is well known at this point that in order for the young fry of the discus to survive, they must be kept with their parents when first born for the youngsters require as nourishment a strange slime which the parents secrete and the babies feed upon. But little is known of the biochemistry of this unusual excretion. Could light be a factor in the production of this slime?

Blood and Lightning

BY JERRY CURRIER AND MARTY SMITH

We have often suspected that the suppliers of exotic fishes must be hard pressed to meet the demand for the new and unusual. As with many hobbyists, we have found ourselves fascinated with the quest for fishes never before seen. When our dealer gets a new shipment of fishes we peer anxiously at them in hopes that one or two strangers may have slipped in unnoticed. The virtues of some of the old favorites are often overlooked in this preoccupation with the new. Oddly enough, some of the new species that are so highly praised are not nearly as desirable as some of those that have been relegated to obscurity.

We have recently rediscovered a fish that has been around for quite awhile. When we first happened on this fish in our dealer's tanks, it was a pretty plain looking individual. Upon investigation in EXOTIC TROPICAL FISHES we found that this fish was an easy spawner and supposedly quite colorful. One thing led to another and a couple of pair were purchased. After being installed in a 5-gallon tank and fed heavily on live brine shrimp and tubifex worms for a few days, these plain fish began to show the color and activity that has endeared them to many generations of hobbyists.

Imagine, if you will, a slender, steel gray body with blood red fins tipped in pure white on a fast swimmer that loves to school near the surface and spawns like one of the danios. Yet this fish is called a tetra. A school of these beauties can be an impressive sight as they turn and dash through the water with blood red fins shimmering and light gleaming from their flanks like flashes of glittering lightning. Sound a bit melodramatic? Perhaps. Yet here is a fish too rarely seen. If you are an old hand you have probably guessed that we are speaking about the bloodfin tetra, *Aphyocharax rubripinnis*.

Everybody has heard the old saw about the zebra danio being the easiest fish on which to cut your spawning teeth. Yet, strangely enough, the bloodfin is just as easy to spawn and raise. But, before we go into detail on spawning, let's look at some other important things about the bloodfin.

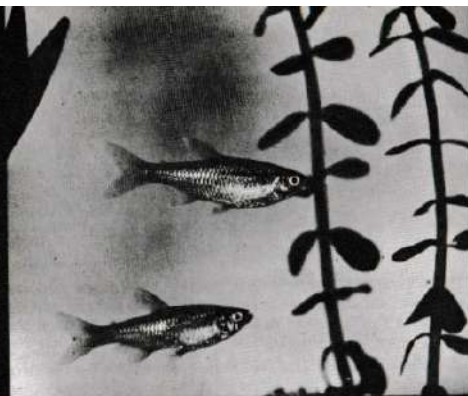
If there were policemen in the fish world *Aphyocharax rubripinnis* would constantly be getting tickets for speeding. These "bloodfin tetras" are always rushing about as if they are trying to get to the church on time for their own wedding. These speedy tetras have a vitality and hardness that makes them an excellent choice for the beginning hobbyist who doesn't always watch his ps and qs, as far as aquarium maintenance is concerned. *Aphyocharax rubripinnis* could even survive your landlord's shutting off the heat in the to 50°F. Another point in their favor is, that they'll eat almost any kind of food you happen to have around (except peanut butter) the house. Flake food and freeze-dried varieties are gobbled most greedily. According to the old aquarium literature, the popular name for *Aphyocharax rubripinnis* is "bloodfin". But we think a better name would be "Little Hercules". Photos by Dr. Herbert R. Axelrod.



While many of the tropicals the average hobbyist keeps require temperatures above 70° F., the bloodfin can take temperatures as low as 50° F. We would not recommend this as a general maintenance temperature as they become sluggish below 60° F. But this does give some idea of just how hardy the fish is. The high temperature for the bloodfin would be around 82° F., although we have kept them for short periods at 85° F. and above. Of course, at temperatures above 80° F., overcrowded bloodfins quickly show the effect of a lack of oxygen. Most authorities indicate a 75 to 77° F. temperature range, and we will agree. This means the bloodfin will be perfectly happy in an aquarium with the other species of tropicals commonly seen in the hobby. Although they prefer soft to medium hardness (DH 2 to DH 7) and a pH of 6.7 to 7.0 they seem to easily adjust to more extreme water conditions. Again, they can be fitted into the conditions found in the average home aquarium.

They are not given to bullying their tankmates and are such fast swimmers that few fishes can catch them, much less harm them. If kept with zebra or leopard danios, lively chases may occur, but damage is rarely done. So, from the standpoint of temperament, the bloodfin is quite compatible in all but a few situations.

A tankful of *Aphyocharax rubripinnis* is a delight to observe especially in an aquarium whose decorative elements and background have been keyed so that the red and grey colors of the fish will stand out. Also by keeping these piscivorous midgill racers in large numbers rather than in groups of 3 or 4, you will avoid quarrels amongst the fishes which arise when there are only 2 or 3 of them in a tank.



As with most tetras, there is no marked sexual dichromatism with *Aphyocharax rubripinnis*, except at breeding time, the bloodfin male tetra does become more intense in coloring. The aquarist also has another guide in trying to distinguish between the sexes of this species—the male usually is more slender in body shape.

Feeding presents no real problems. Bloodfins are omnivorous and are greedy eaters. Dry foods, frozen foods, live foods, boiled spinach, chopped liver, and practically anything else edible are taken with gusto. As with most fishes, they should be generously fed on live foods if breeding is contemplated. We feed a combination of dry flake foods, live brine shrimp, and tubifex worms. On this diet, the females quickly fill with roe and the males show their best color and activity.

Sexes are easily distinguished if the fish are properly conditioned; the female will show a definite swelling in the ventral area while the male will show a much slimmer profile. Also, males can sometimes become caught in the mesh of a handling net as they have the so-called "tetra hooks" on their anal fin.

As we mentioned previously, spawning is not difficult and is similar to that of the various danios. We use a 5-gallon tank that is bare of all but a spawning net. Due to the fact that bloodfins are notorious spawn eaters, we have found that the net is preferable to marbles or large pebbles because the fish cannot burrow into it. An added advantage is that the eggs are readily seen on the bottom of the spawning tank when a net and bare-bottomed tank are used.

Continued on Page 62

we did it!

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GUPPY corner



by paul hahnel

Unusual Female

Q. In one of my 10 gallon tanks containing guppies, a few months ago, I noticed a female with exceptionally good coloring. The dorsal fin tip is blue and the rest is black. Its tail has red, green, and black near the beginning. The tail is rounded and edged in black. I have six fish which are colored in this manner. The size of all these fish is quite large.

1. Are these fish worth working on for breeding others of this same kind?
2. Do you know of any guppy clubs near my area?
3. I feed my fish freeze-dried foods, such as tubifex, brine shrimp, and alternate with dry foods. Is this diet good for condi-

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- tioning them for breeding?
4. Is Anarchis a good plant for protecting babies from females in a 10 gallon tank?

Stewart Hellman
Woodhaven, New York

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A. Guppies are fascinating to us for many reasons. One of the reasons is that they sometimes produce surprising color combinations and mutations, like the female you described in your letter. Now you should try and find a male guppy that is also colored in about the same interesting fashion.

2. Yes.

3. Call Gene Baiocco, (212) EV-1-4480.

4. I also use the same foods you mentioned, plus a large variety of dry foods and some live food.

5. Any good floating plants will provide the kind of hiding places required for the babies.

Guppy Breeding

Q. I am a new subscriber to your magazine. I enjoy Mail Call. But I especially like Guppy Corner very much, and I have a few questions I would like to ask you.

1. I have a 26 gallon tank. I keep and breed guppies. My guppies do not seem to mate. What is the best way to get a pair of guppies to mate?

2. Is a breeding trap with slits in the bottom so fry can get through into a nursery tank recommended?

3. What plants are particularly good for guppies?

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4. Does color food really work?

Miss Karen Green

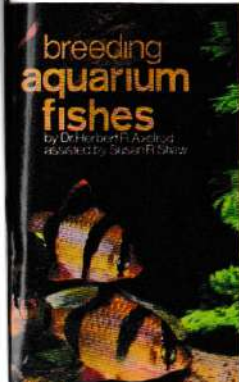
Brooklyn, New York

A. 1. Guppies do not have to be coaxed into mating; it is quite spontaneous. If guppies do not mate, then there is something wrong that is not within your province to attempt to correct. It would be best to purchase a pair of another strain.

2. I never use breeding traps, because my tanks are heavily planted.

3. Any plant will do in the guppy tank. Guppies are not particular as to the kinds of plants, but I personally use fine leaf water-sprite.

4. I do not use any form of color food, because I am afraid that in the long run it may ruin the fish.



How often have you read an account of how to breed a species of fish and found the account lacking several important details?

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salts OF THE seven seas
BY ALFRED A. SHULTZ

Q. I know that live plants don't do well in salt water aquariums, but I would like to have a little bit of "greenery" in my small (10 gallons) marine tank, which now contains one small Pacific clownfish (no anemones). Would the plastic plants sold for freshwater tanks be safe in a marine aquarium?

Robert Denker, Rock Island, Illinois

A. Some might be, but I think you'd be better off by passing them up —

at least until someone makes a plastic plant guaranteed to be safe for the marine aquarium. Besides, you have so many other types of safe decorations available for the marine aquarium that you don't need plants.

Q. I was informed, after setting up a 20-gallon salt water tank, that I wasted money by purchasing artificial marine salts when all I had to do was add water to plain (and blessedly cheap) rock salt. The



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Blood and Lightning

Continued from Page 51

The net is constructed by slipping plastic air tubing over a straightened coat hanger and bending the hanger to make two, large flat bottomed "U's" that extend the length of the tank. (The purpose of the plastic tubing is to prevent rusting of the coat hangers.) Over these U's is stretched a piece of nylon netting, available at fabric shops for bridal veils and cocktail dresses, which is formed into a box around the U's. The net is held in place by sewing it onto the U's with nylon thread. The weave in the net makes openings of about 1/4 inch, large enough for the eggs to pass through but too small for the fish. Thus, the fish are prevented from getting at the eggs and eating them. The bottom of the net should extend about 6 inches down into the tank and water is added to a depth of 3 inches below the top of the tank. These fish may leap from the water in the spawning act, and if the water is too close to the top of the tank they could injure themselves on the hood.

For spawning, we use freshly drawn tap water which is adjusted to a DH of 2 or 3 and a pH of 7.0. Temperature is held at 80° F.

The female is placed in the spawning net in the morning and the male that evening. If the tank is located where early morning sunlight will illuminate it, the fish will usually spawn the next morning. However, artificial light will suffice if a sunlit location is not available.

Spawning is accompanied by frantic chases in which the male pursues the female or vice versa. This is frequently interrupted for quivering, side-by-side pauses during which a few eggs are expelled and fertilized. The eggs, which are non-adhesive and glass clear, settle to the bottom. The spawning act may take up to 3 hours, and as many as 500 eggs are dropped. When pursuit ceases, the parents and net should be removed as they are of no further use in the spawning aquarium. We usually add one of the commercial fungus-inhibiting drugs to reduce egg losses. This is not an absolute must, as the eggs seem to resist bacterial attack quite well. They hatch in 30 hours at 80° F. and the fry may be seen clinging to the sides of the breeding tank.

The fry are small and transparent and have a peculiarity we have never seen in any other fry; they will float tail down just under the surface of the water giving the appearance of tiny, colorless mosquito larvae. By the third day they have consumed the yolk sac and are freeswimming. They are then fed infusoria for a day or two. This is best supplied by one of the infusoria tablet preparations available from your dealer.

After they have been freeswimming for about 3 days, the fry are graduated to newly hatched brine shrimp and microworms. Finely crushed dry food is also fed at this time. When the fry are about a week old, we usually introduce a few mystery snails to clean up left overs, reducing the risk of fouling the water.

62

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Big Tiger

Q. I have been seriously thinking about purchasing a Siamese Tiger Fish, *Daniolepis microlepis*. I understand that they can grow to 15 inches in their native lands which are Thailand, Sumatra, and Borneo.

1. Could you tell me what size they can reach in an aquarium?
2. What size aquarium do they need? Is a 20 gallon tank sufficient?
3. What foods are reliable? Can guppies, raw meat and shrimp be fed?
4. Where can I purchase one? Are they expensive?
5. What kind of catfish is large enough to be with this type of catfish without being eaten?

Cindy Griffith
Whitman, Mass.

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some fish for an aquarium. I returned with about twenty-five young catfish which were about one-half inch long. I put one into a ten gallon tank in which I already had two Oscars (*Astronotus ocellatus*), one which was 3/4 of an inch, and one which was one inch, and four Black Tetras (*Gymnocorymbus terezae*) about the size of a nickel. Before the young catfish even made it to the bottom of the tank, the larger Oscar ate him alive! He showed no signs of distress or pain. Was he just hungry or what caused him to do this?

Rick Nilex
Enid, Oklahoma

A. The larger aquarium fishes such as Oscars do require more food

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than the smaller species; they'll eat all day long if they have the opportunity, especially if you serve them live food feedings. Your Oscar wasn't being mean in the strict sense of the word; his nature is such that a young catfish is a very satisfying meal and at the same time he got rid of an intruder from his premises. So keep your small fishes away from the Oscars, this way they won't be tempted into consuming them.

Cloudy Water
Q. I've had this problem on and off for about 6 months—since I began my tropical fish hobby. Nobody but nobody has been able to help me.
I. I have a 29 gallon tank with about 12 cichlids. I take out one-third of the water once a week. I have a dyna-flow acid inside

filter going and it's still cloudy. I don't believe that I overfeed. What is this cloudiness?

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particular to worry about. That water eaten food can pollute quite easily. If I were you, I wouldn't worry

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about purchasing more fish, but I seriously would think about purchasing an additional large capacity aquarium to take care of the cichlids you now own. Not knowing specifically what cichlids you are keeping, it is difficult to inform you as to sexual distinctions. Generally, amongst cichlids though, there is a sexual dichromatism — the male being more colorful. Of course there are exceptions to this as in the *Pelmatochromis* genus.

Paradise

Q. I am afraid that in my area there are few reference books and little available literature on the subject of tropical fish. The Tropical Fish Hobbyist Magazine is therefore most welcome and also the only source of more detailed



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information. Nevertheless, I still have one or two problems the answers to which I hope you will print.

1. Could you tell me the Latin name for the albino paradiac fish, and how to sex them?

R. A. Thresher

Somerset, England

A. The scientific name for the albino paradiac fish remains the same; it is not a new species only a domestic variety. Macropodus opercularis is the correct binomial nomenclature. Of course with an albino variety, you cannot use differences in pigmentation between the sexes as a means of distinguishing identification. But the male's more pointed dorsal and caudal fins should still be a reliable method for discerning the sexes.

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Many interesting accounts have been written about this 2½ inch long dwarf cichlid. It is not seldom that their behavior affords surprises. And that is why I have devoted many hours sitting in front of the fish tank to observe the behavior of this magnificent fish. They come from West Guiana, Venezuela, and Colombia. In 1934 they were imported to Europe. Since then, we find the fish being kept not only by admirers of cichlids, but also by aquarists with community tanks. Outside of spawning time, they are not quarrelsome among themselves. Exceptions, however, do occur. A certain egotism rules the behavior of these fish. One can observe often, that the female, and sometimes also the male (but then there can be no female nearby) assume a position over the feeding place, or more exactly, above the bowl of tubifex, and allow no other fish to even approach it. Could it be, that this behavior is due to the well-developed parental behavior? They do not dig and do not damage the plants. In a medium sized, well planted tank, at a temperature of 22° C., they can be kept as mentioned before, with other peaceful species. The water should not be hard, the pH on the slightly acid side. They prefer to feed on coarse live food.

The sex differences are well marked in the adult, so that a novice might think that these fish do not even belong together. The male with his pointed fin is much larger and differently colored than the female.

For purposes of breeding, it is best to use at least a 15-gallon tank with well established vegetation, and add flat stones on top of the sand upon which the female can deposit her eggs. The temperature should be 26° C. If at all possible, the water should be soft. Frequently, however, I managed to spawn and raise these fish in ordinary tap-water of 12-15 D.H. The fish spawn on all hard surfaces, and also on the leaves of large plants, or in a flowerpot. The eggs are of a tawny shade, sticky, and approximately ⅓ inch in length. About 50 to 100 eggs are being laid at one time. Immediately after spawning, the male should be removed, since the female might bite and kill him. After spawning, the female takes on her characteristic chessboard warning coloration. After about two days, the brood hatches, which is already pretty big then. On the seventh day, the young fry swim freely and follow their mother all through the tank. At first, very fine live food must be fed. But after a short time, their ration can be larger. By the fifth month, the young are sexually mature.

If I may, I would like to add a few more observations which I made during the time I spent photographing these fish: during the courtship behavior, the male takes on a beautiful deep color and displays his spread fins, and frequently extends the gill covers to attract the female. During mating, the partners circle around each other; often, they lock jaws, as is customary in almost all cichlids. But beware if a rival should come near. Immediately the two males oppose each other and it does not take long

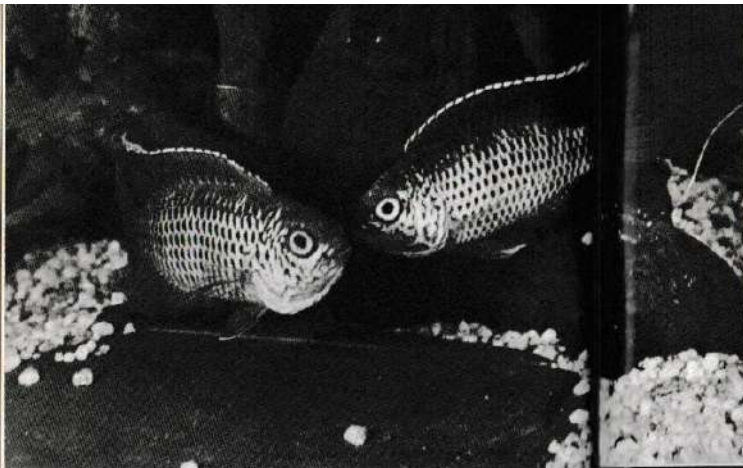
Nannacara anomala

BY RUDOLF ZUKAL
BRNO, CZECHOSLOVAKIA



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Tropical Fish Hobbyist



In the animal kingdom, the spectacle of two males competing for the attention of a female is not uncommon. And in the world of fishes this scene of masculinity proving itself is most furiously played by the cichlids. The male *Nannacara anomala* when confronted by a rival opponent spreads his gill plates defiantly, quickly unfurls his fins, and becomes flushed with color. This bravura display is the prelude to cichlid combat which ends in a fierce tug of war when the males lock jaws. The victor then commences with his responsibilities in the spawning partnership. During all these trials and tribulations the male *Nannacara anomala* has heightened his color so that all his metallic elements are glistening and the gold in his eyes is all aglow. Photo by Zukal.

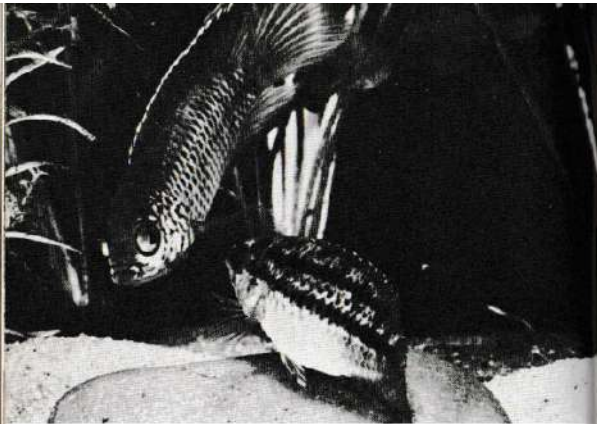
The females of the Cichlidae family disprove that old myth about the female of the species being fragile and passive. These females are contesting each other, for the honors of spawning with the male in the background. Their aggressiveness is most surprising to the novice aquarist, but not to the experienced hobbyist who has seen from his experiences with fishes that the size of an aquatic creature is no indication of its individual aggressiveness. Size and aggressiveness are not related. In fact, some of our smallest fishes are the most aggressive. Once the winner of this battle begins to spawn with the male, she will go so far as to kill him, if she feels in any way threatened, or believes her eggs or brood are in danger. Photo by Zukal.

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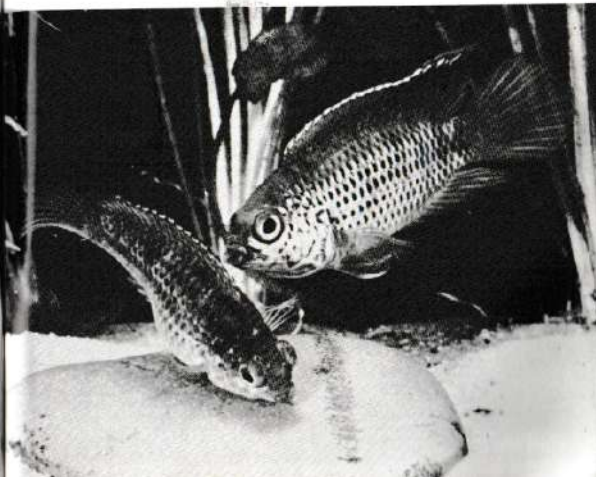
Nannacara anomala has been known to utilize various hard surfaces for their spawning site—even the inside of a flowerpot. It is best if you are attempting to spawn them, to give them several choices, so that they can satisfy their preferences, which will vary from pair to pair. This pair has shopped around the tank looking over very carefully every nook and cranny. Now the male is being called over by the female *Nannacara anomala* who has been heading this shopping spree. Photo by Zukal.

Naturally the female *Nannacara anomala* is the best qualified to determine the suitability of the surface, since she will oviposit. Any site that is selected will undergo a cleaning procedure that would put Mr. Clean out of business. The eggs placed with her ovipositor must be kept free of any materials that could harm and infect them. So the spawning site is scrubbed down orally by these fishes till the area is almost antiseptic by their standards. Of course the aquarist must sometimes assist in this process of safeguarding the eggs from infection by the judicious use of certain chemicals used in fungi prevention. Photo by Zukal.



before the fight starts with violent movements of the fins. Usually, there is a locking of jaws and often the fight ends badly, frequently for both partners. The females are not inferior to the males when it comes to their fighting spirit. Before spawning, the female clears the selected place very carefully. She tries out the smoothness of the flat surface; with fanning of the fins and with the mouth she removes the last remains of dirt. During these first trials, the male arrives already in the close vicinity. At this moment, the female still shows normal coloration. Then she starts to deposit the first eggs. At the same time, the male approaches carefully. But it only takes a few seconds and the male comes to the side of the female. Next, the fish circle around each other, while the female lays the eggs which are immediately fertilized by the male.

Gradually, the coloration of the female changes the closer she comes to the end of the actual spawning procedure. This does not last very long, about 40 minutes. After they are finished the male is frequently being chased away by the biting and nipping female, until he prefers to stay in a corner of the tank. When the male has no opportunity to hide, it can happen that the female kills him with her bites. The female takes on the care of the fry all by herself. Already the following days one can notice the infertile eggs. They are of a white color. The eggs are not only deposited on stones by the female, but she uses also wooden branches and broad leaves, etc. After the fry hatches, the female collects her brood and guards them. At the slightest danger she collects her young to protect them. Before closing I would like to recommend these beautiful fishes to all hobbyists.

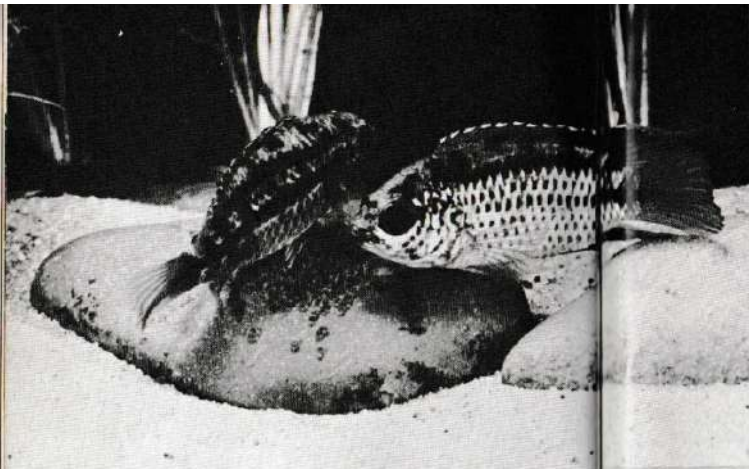


Camera close-up

Photos by Zukal.

This pair of *Nannacara anomala* has selected the site upon which the miracle is to happen. An ordinary rock has been turned into a cradle for the creation of new life . . . the cradle will rock. From these tiny, tawny adhesive eggs will come forth minuscule duplicates of their parents. The

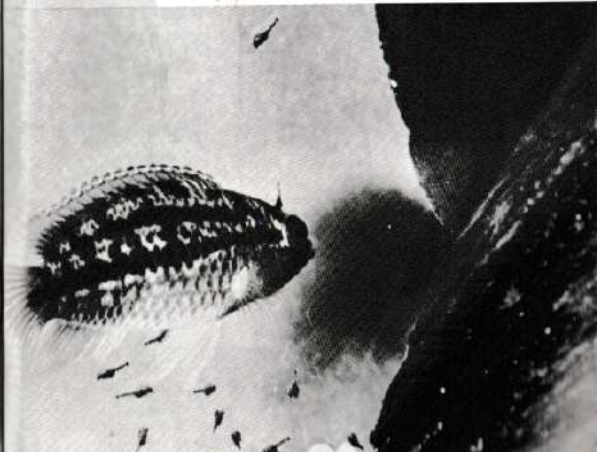
importance of the forthcoming event of course is not within the sphere of awareness for the two parent fish, although the mother fish has become tremendously possessive almost as if she did have an inkling as to the miracle she is going to be part of. Photos by Zukal.



October, 1968

Even though the male *Nannacara anomala* in this photo looks bored, he is performing some very real functions such as assisting in the guarding and fanning of the eggs. The fanning of the eggs is a fish's way of preventing any particles from settling on the eggs; this fanning might also help in oxygenating. Note the checkboard coloration that the female has taken on. She is letting everyone know that she is a mother and will be a warrior if the need arises to protect her valuable eggs. Photo by Zukal.

The miracle has happened. The oviparous process has finalized. Now off into the horizon with her new brood goes the justifiably proud mother who had to exercise great patience while waiting two days for the precious eggs to hatch. It took seven days for these fry to become free-swimming. And they will soon assert their own independence and before you know it, they themselves will become proud parents. Photo by Zukal.





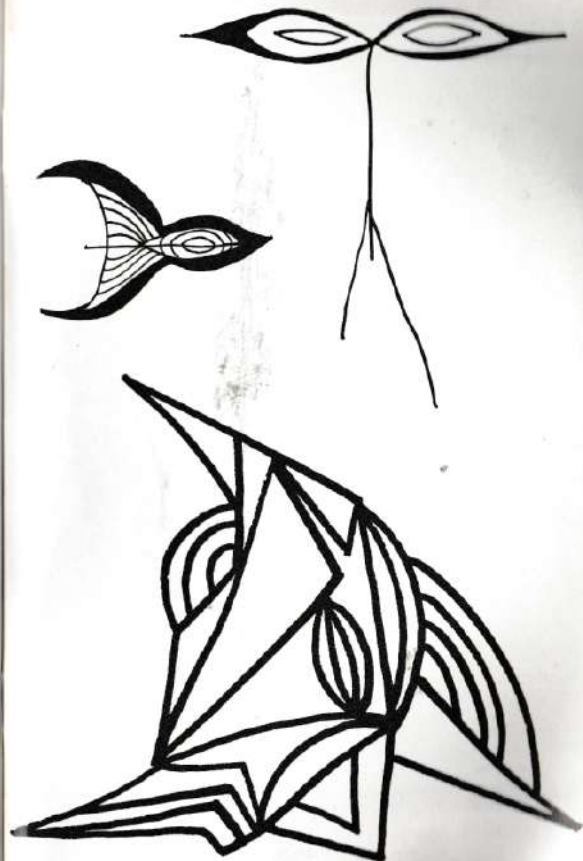
Designs For Aquarium Decor

DRAWINGS BY J. M. BELLANCA

The possibilities in styling an aquarium to one's own personal taste and preferences are endless—that's what makes this hobby so individualistic. Many people enjoy setting up their tanks with real rocks and natural plants. Some aquarists (it's getting to be a trend) are utilizing strictly plastic plants and manufactured ornaments; they say the plastic materials are less trouble. There is also another school of thinking which blends both the real and the manufactured product which attempts to simulate the natural object. Presented here are designs for aquarium decorations that are to be made, but not made to look like something already existing in nature.

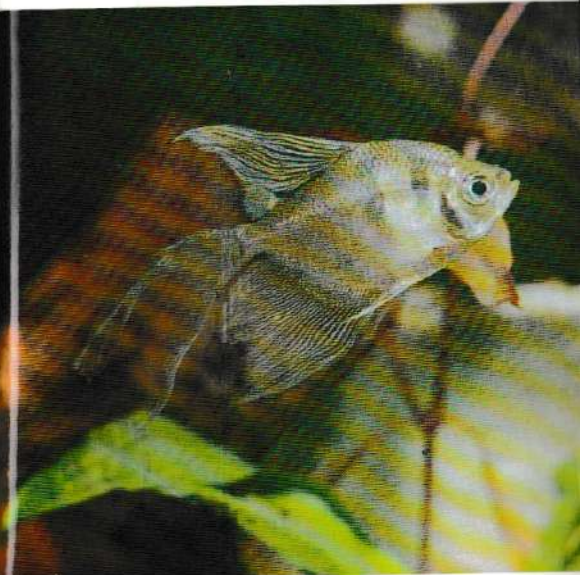
These sketches represent an attempt to design ornaments which will make use of plastics and other synthetic non-toxic materials in a manner which takes advantage of these modern materials.

No decoration by itself should ever detract from the overall effect. First one must decide on a motif, a general theme. Then you can select all your various elements to integrate with your selected theme. So, the next time you decide to decorate or redecorate an aquarium, why don't you have some fun by thinking differently.



Flash! the Latest Development in G.T.O.

October, 1968



The nimble fingers and alert minds of enthusiastic aquarists are always working at breeding experiments in the hope of producing some new marvelous fish-variation. Last month in the September issue of *Tropical Fish Hobbyist* we gave you a red hot report on an exciting new variation of *Gymnocorymbus ternetzi*, the G.T.O. Since then our mail here at *TFH* has been filled with hundreds of requests for more information and additional photographs concerning this fantastic new fish. So when we received these new photos from Europe of more G.T.O. experiments, we stepped the presses so that

we could insert these new unscheduled photographs at the last minute. From looking at these 2 photos, it is difficult to believe that these fish are developments from the old black tetra . . . but they are. We here at *TFH* are divided in opinion as to which of these 2 specimens are the prettiest. Some of us prefer the pearl grey fish. Others of us like the brown and honey colored tetra. They both have extraordinarily long flowing fins and colors that whisper, giving them both a most graceful and elegant appearance. We hear that these fish are as hardy as the old black tetra, so you won't have any trouble maintaining them. Photos by Jiri Taborsky.

October Contest Winners

If you don't win this month . . . don't lose heart. You have 12 chances a year. One of this month's winners, John Jawor, sent in 8 photos before he was finally selected. Give it a try. You'll learn a lot about fishes in attempting to take their picture.



(Category I) Close-Up. John Jawor, Glenwood, Illinois

(Category II) Landscape. William R. Kratt, San Francisco, California



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