

June

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DOMESTIC 35¢ / British Isles 2/6



tropical fish hobbyist

June, 1968

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cover

Somewhere between the land of *Maybe* and the country of *Impossible* lies the territory of *Hopefully*. And it is here in this middle realm, that the fate of *Alectis ciliaris*, is so far as becoming a suitable marine aquarium fish, danglies. For even though there are scant biological facts known about this salt-water species, the fantastic appearance of *A. ciliaris* has spurred the serious avant-garde aquarist into further research so that he can hopefully, one day, be able to maintain this species in his home marine aquarium. Some say this quest is impossible, others say maybe it can be done. We, who can't sleep nights, thinking about the tropical fish hobby, are no longer counting sheep, instead we count *Alectis ciliaris*, for we think that there is more than a chance that data concerning this salt-water species will soon be uncovered. *Tropical Fish Hobbyist* magazine is dedicated to the pursuit of knowledge of all the fishes of the world. And we know, that we are not alone in this dedication, for there does exist a brotherhood of aquarists . . . men, women, and children all over the world, who would like to share the knowledge they have acquired through their own personal experiences in maintaining fishes in aquariums; we receive manuscripts every day from these enthusiastic and earnest hobbyists. It is the efforts of people like this, that will one day free *Alectis ciliaris* from the domain of *Hopefully* so that this species can become a member of the land of *Definitely*. Photo by Hansen.

exotic tropical fishes supplements

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

rates

35c per copy in the U. S. 35c per copy in Canada or foreign. \$3.50 for 12 issue subscription in U.S. Add 50c per year for foreign subscriptions. Index available in every 12th issue.

In England and the western Sterling area *Tropical Fish Hobbyist* magazine and T.F.H. Books are distributed exclusively through T.F.H. Publications (London) Ltd., 13 Rutley Lane, Bexley, Surrey, England. All subscriptions and inquiries should be sent directly to them. ©1968 T.F.H. Publications, Inc. Second Class Postage Paid at Jersey City, New Jersey. Published monthly by T.F.H. Publications, Inc. at 245 Cornelison Avenue, Jersey City, N. J. 07305.

editorial

Aquarium books and magazines devote most of their space to the care, feeding and breeding of aquarium fishes. Few, if any, tell you how to take care of an aquarium **BEFORE** the fishes are put in.

The best aquariums are made with **soft** mastic cement. This softness has many advantages, but its prime advantage is that it enables the tank to expand and contract as the water level lowers, or when the tank is emptied or refilled. Should the cement become hard, the tank will leak after repetitive refilling and emptying because the mastic is unable to expand and contract with the varying pressures. So you'd think that every aquarium is manufactured of soft pliable cement? But you are wrong!

Soft cement has a problem. If the aquarium is not stored with the bottom down, then the weight of the slate or glass bottom slowly pulls the bottom away from the frame and the tank might leak. So two distinct types of aquariums have developed: those made with soft cement, which will probably be leak-proof for 20 years or more if they don't leak when you first use them, or those made with hard cement, which might not be inclined to leak when you first use them, but which might leak after they have once dried out and been refilled with water. I don't know which aquarium is better in the long run, as reputable manufacturers use both kinds of cement.

Regardless of which aquarium you buy (or sell), stock it in an upright position and be sure the aquarium cement is soft enough to ooze out when you first fill it with water. If you fill a tank with water and the pressure doesn't push out the cement, you're probably headed for a leaker problem sooner or later.

Herbert R. Axelrod

Tropical Fish Hobbyist

June, 1968



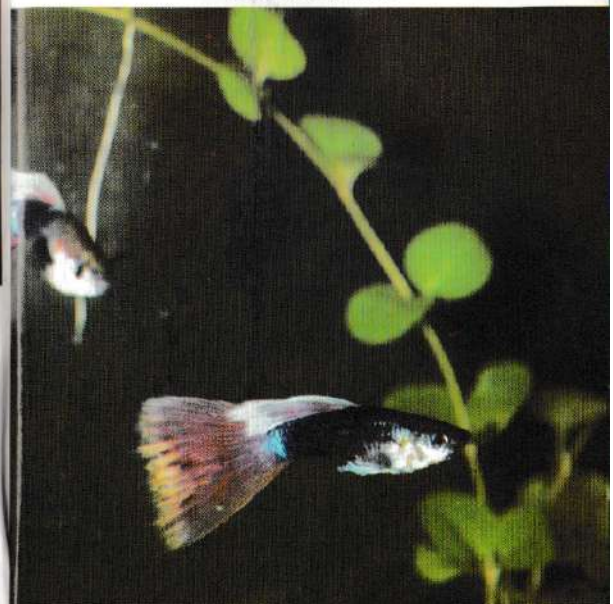
Although this guppy does not possess the large show-tail so currently popular, its striking assemblage of unusual color patterns (including a variation of the snakeskin pattern) more than compensates for the lack of super-size. According to a well known authority, the snakeskin pattern came about not through genetic experiments, but purely by accident.

The Color Genetics of Certain Show Guppies

BY TED F. PARKER

Many color patterns in show guppies are determined by color genes that follow a special form of inheritance that geneticists call sex-linkage. From the practical standpoint, this means that the guppy fancier must first understand how sex is determined in guppies before he can even hope to understand the "secrets" of controlling color inheritance.

Typically, a male guppy is a male because he inherited a chromosome for maleness from his father. He also inherited a chromosome for femaleness from his mother, but, because the chromosome for maleness is dominant to the chromosome for femaleness, he develops into a male. The typical female



The popularity of *Lebistes reticulatus* (= *Poecilia reticulata*) has risen to even greater heights in the past five years. Some familiarity with the ABCs of color genetics will increase the aquarist's chances of producing desired guppy efforts, but such knowledge in itself is no guarantee of total-breeding success. Photo by Hansen.

guppy is a female because she inherited two chromosomes for femaleness—one from her father and one from her mother. The important point to keep in mind is that it is normal for a male guppy to have a chromosome for femaleness, but it is usually impossible for a female guppy to have a chromosome for maleness.

In the shorthand used by geneticists, the chromosome for femaleness is known as the X chromosome and the chromosome for maleness is known as the Y chromosome. Thus the genetic makeup of the typical female guppy can be symbolized as XX, indicating the presence of two chromosomes for femaleness. Likewise, the genetic makeup of the typical male guppy can be symbolized as XY, indicating the presence of a chromosome for femaleness (which is recessive) and a chromosome for maleness (which is dominant).

In the reproductive process, half of the offspring inherit a copy of the male's Y chromosome and a copy of one or the other of the female's X chromosomes and thus develop into males. The other half inherit a copy of the male's X chromosome and a copy of one or the other of the female's X chromosomes, and thus develop into females. The key point here is that the Y chromosome is always passed to the sons and only to the sons.

In the first sentence we stated that many color patterns in show guppies follow the pattern of inheritance known as sex-linkage. By this we mean quite simply that a gene capable of producing a particular color pattern is tied (linked) to a particular sex-determining chromosome.

For example, we have in our tanks a line of three-quarter-blacks wherein the three-quarter-black color pattern gene is linked to the Y chromosome and only to the Y chromosome. A gene for red coloration is linked to the X chromosome in this line. Thus, because the Y chromosome is passed on to all the male offspring, all the male offspring inherit the three-quarter-black pattern. But, because the Y chromosome is not passed on to any of the female offspring, none of the females inherit the three-quarter-black pattern. (Rare exceptions do occur. Approximately one male in a thousand will turn out to be red; approximately one female in a thousand will inherit three-quarter-black coloration. This, however, is due to the genetic phenomenon known as a cross-over and is not really vital to the present discussion.) Using our genetic symbols we can indicate the type of male found in this line as X-red Y-3/4-black and the females as X-red X-red.

A second type of three-quarter-black male to be found in our tanks is what we call a female-dominant three-quarter-black. In this type, the three-quarter-black gene is on the X chromosome. Males of this type appear identical to the male-dominant (X-red Y-3/4-black) but have the genetic makeup of X-3/4-black Y-red. When we mate an X-3/4-black Y-red male to a red (X-red X-red) female, none of the male offspring inherit the 3/4-black coloration! Instead, we get 100 percent red-colored male offspring

with the genetic makeup of X-red (from the mother) and Y-red (from the father). But, all the daughters inherit the three-quarter-black coloration from the father, plus X-red coloration from the mother, and thus have the genetic makeup of X-3/4-black X-red.

A third type of three-quarter-black male guppy found in our tanks, identical in appearance to the first two, is what we call a double-dominant and has the genetic makeup of X-3/4-black Y-3/4-black. (Both the X and the Y gene carry the three-quarter-black gene.) When this male is mated to a red (X-red X-red) female all the male offspring inherit X-red Y-3/4-black and all the daughters inherit X-red X-3/4-black.

As you might expect, the fourth type of male found in our tanks is not a three-quarter-black but a standard red (X-red Y-red). When this male is mated to a red (X-red X-red) female, 100 percent of the offspring, both male and female, will be standard reds. Not one will show even the slightest hint of being in any way related to three-quarter-blacks. And this remains true even if the red female used comes from a spawning where all the males were three-quarter-blacks. However, should we choose, we can use this red (X-red Y-red) male to produce three-quarter-black offspring by simply mating him to the right female.

If we mate him to a female with the genetic makeup of X-red X-3/4-black, 50 percent of the offspring, both male and female, will be red and 50 percent three-quarter-blacks. If we mate him to a female with the genetic makeup of X-3/4-black X-3/4-black, 100 percent of the offspring will be three-quarter-blacks.

Hopefully, these few examples will suffice to explain the basic principles of color genetics in show guppies. One final point will, we hope, clarify most of the "exceptions" that have been pointed out to us. The examples used above were selected because they show a clear-cut dominance-recessiveness in our tanks and in the tanks of every breeder with whom we have compared notes. However, dominance and recessiveness are relative. While the red color pattern of our guppies is clearly recessive to the three-quarter-black color pattern, it is not recessive to all other color patterns.

In crossing our reds with different lines of blues and greens, we have found that the red is consistently dominant to the blue or green color patterns of certain lines, but is consistently recessive to the blue or green color patterns of certain other lines.

In still other crosses we found what we term "incomplete dominance". This is a blending effect between two characters such as two colors. For example: red x green crosses that produce red-green male offspring; red x blue crosses that produced violet (or purple) male offspring, and red x blue crosses that produced offspring of a definite blue pattern which later changed to a red-blue multicolor pattern, then finally to a definite red color pattern. However, the occurrence of incomplete dominance in no way alters

the basic pattern of color inheritance and should be of little concern to the breeder with accurate pedigree records.

The same is equally true of guppies of the albino, gold, blond, and bronze types which frequently produce "surprises" simply because the genes for albinism, gold, blond, and bronze have the ability to inhibit or prohibit the production of certain color pigments.

A bit complicated? Perhaps. But by understanding the basic principles underlying the genetics of color in guppies you should be able to predict with great certainty the coloration of the offspring from any mating. More important, you should be able to take a single outstanding line of show guppies and work it into as many color variations as you please.

For those who are of the blue persuasion in guppy coloring this particular specimen should exhilarate. An outstanding entry of the 1967 International Guppy Show held at the Berlin Aquarium, this guppy belonging to Heinrich Brachet of Wiesbaden, placed second in its class. Those who have attempted breeding showguppies can well appreciate the work involved to produce such a prize individual. Photo by Hansen.



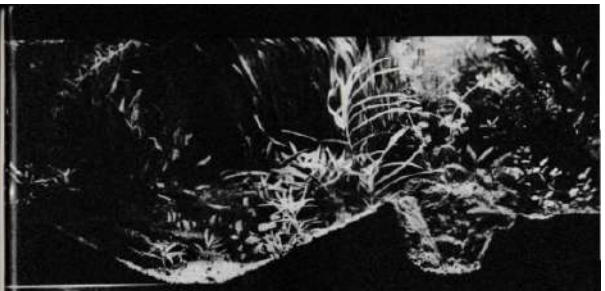
The Germans are big on guppies. Some of their current trends in show guppies include an upgraded variation of the lyre-tail. This isn't really a new concept, but it can be a show-stopper when it is enhanced with bold color markings and somewhat increased size. Do you think this jazzed up version of the lyre-tail will take the U.S.A. by storm? Photo by Hansen.





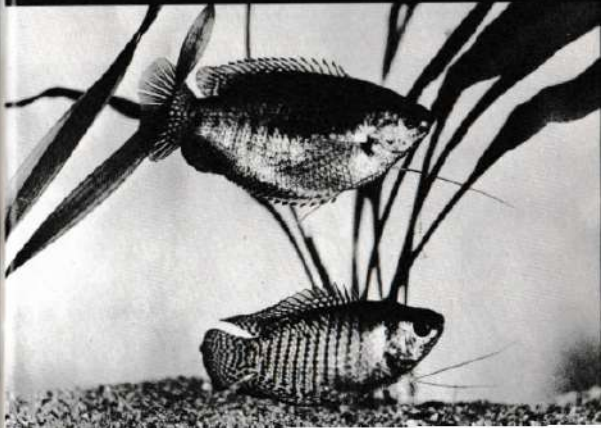
Photo Contest Rules

1. There will be two prizes each month, a two-year subscription to *Tropical Fish Hobbyist* magazine will be awarded to the monthly winner in each of the two photographic categories. At the end of the year a grand winner will be selected from the monthly winners of that year and will be presented with a \$50.00 grand prize. The monthly winning photographs will be published in *Tropical Fish Hobbyist* magazine. And there will be a "Meet The Hobbyist" article written in this magazine about the yearly grand winner.
2. Only black and white unmounted photographs will be eligible. The smallest size photo acceptable will be 3" x 4".
3. There will be two photographic categories: 1) Aquarium Interiors—these photographs must include the total length and width of the aquarium. The edges of the tank may be included in the photo, but none of the roses in which the tank is displayed may be shown in the photo. Fishes, naturally, must be included in the photographs but the main consideration should be the total photographic effect of the aquarium landscape with its integration of all elements (fishes, plants, lighting, aquarium decor, etc.) 2) Close-Ups of Fishes—either singly or in group compositions. In these photographs a segment of your aquarium interior can be used as background or foreground, but the main consideration must be the fish or fishes.
4. All photographs will be judged on the merit of their technical excellence and their pictorial effectiveness. The condition, quality, or kinds of aquarium decor, or the conditions, and kinds of fishes will not be deciding factors, although a messy tank setup and ragged fish specimens will naturally detract from the final effectiveness of the photo.
5. All photographs must be accompanied by the submitter's name and complete address. Photographs of aquarium interiors must include data as to the gallon capacity of the tank in the photograph. The fishes in photographs for either category must be identified.
6. All decisions by our editorial judges will be final. The judges will be the editors and publisher of *Tropical Fish Hobbyist* magazine.
7. All photographic entries for our first contest, starting with the August, 1968 issue, must be received at the T.F.H. offices by June 9, 1968. The deadline for each monthly contest will be the ninth day of the second preceding month. For example, the deadline date of the September, 1968 issue will be July 9, 1968.
8. All winning photographs become the property of T.F.H. Publications, Inc., who in becoming the owner of the complete rights of these winning photographs can publish them where and how T.F.H. so deems.
9. No photographs will be returned, so do not include return postage. T.F.H. will not be responsible for the loss, damage or non-receipt of any photographs submitted to this contest.
10. No employees of T.F.H. Publications and its subsidiaries, or members of such employees' immediate families are eligible.
11. This contest void where prohibited.
12. Mail all photographs to: *Tropical Fish Hobbyist Magazine "Photo Contest"*, 245 Cornelison Avenue, Jersey City, New Jersey.



Category I. (Aquarium Interiors) Photos submitted in this category should show the length and width of the aquarium. These landscapes must include fish. The total composition is important, including the placement and grouping of the fishes. The tank size and scientific names of fishes in photograph must be attached to photo.

Category II. (Close-Ups) These photographs could be one fish or a group of fish in an interesting design. The landscape of the aquarium can be used for background or foreground, but only a portion of it can be used. The scientific name of the fish within the photograph must be attached to photo.



Not only is this tank setup attractive to the eye, it is also functional, serving the purpose of breeding *Apistogramma trifasciatum trifasciatum*. Cozy, comfortable . . . and correct. Photo by Hans Joachim Richter.

Observations of *Apistogramma trifasciatum trifasciatum*

BY HANS JOACHIM RICHTER
LEIPZIG, GERMANY

The *Apistogramma* genus shows a marked sexual dichromatism and *A. trifasciatum trifasciatum* is no exception. This male proudly wears his magnificent blue spawning robes. Photo by Hans Joachim Richter.



Male dwarf cichlids possess strongly structured dorsals. And at courtship the dorsal of *A. trifasciatum trifasciatum* seems to increase in size. Some of those weird hat designers in Paris might set the fashion world agog by the headress of this cichlid. Photo by Hans Joachim Richter.

Color phenomena during the breeding processes includes the female's change to an attractive lemon yellow hue after the eggs have been deposited and fertilized. Does this color change have any significance? Is it a warning color to the male *A. trifasciatum trifasciatum*? Photo by Hans Joachim Richter.



At the beginning of the 1960's there was another member added to the group of dwarf cichlids for the hobbyist, one which today still has no common name and is known only as *Apistogramma trifasciatum trifasciatum*. Certainly it is no fault of the shape and color of the fish that it is still only rarely offered.

This beautiful fish, whose dorsal fin can be reminiscent of the colorful headdress of an American Indian, can really be the source of much pleasure. In its normal colors with its fins folded, it is very plain. For this reason, if kept in a large community tank with many other fishes, its beauty is lost. The entire body under these conditions becomes a grayish yellow, and one can see no differences in individual specimens. *Apistogramma trifasciatum trifasciatum* is therefore not suited to the community aquarium, and is best kept either a pair or two pairs alone in a 10- to 15-gallon tank. Fully grown males attain a length of 2½ to 2¾ inches. Females remain about ½ inch smaller. They do not show the elongated dorsal rays as do the males.

Like their larger cousins, these dwarf cichlids have the habit of digging, and it is best to avoid coarse gravel for the bottom so they will not hurt themselves. The finer sizes are better for the little fellows.

The need of dwarf cichlids to hide when disturbed can be filled by putting together some pieces of petrified wood in such a manner that caves are formed or by putting a small flowerpot or coconut shell into the tank. As for plants, the best are the *Echinodorus* species, for example *E. tenellus* or *E. magdalenensis*. With such a setup and a water hardness of 6 to 10 DH and a pH value of 6.5, the fish will surely do well. This *Apistogramma* species does not require a great amount of heat, being quite content with a water temperature of 70° F. A small amount of peat extract added to the water adds to their well-being but is not essential.

Kept under the above conditions, your fish will soon show the first signs of courtship: the males erect their dorsal fin and sparkle in wonderfully delicate colors. The dorsal fin rays increase in length up to the fourth ray, with the fourth ray the longest, considerably longer than the body height.

After several days of active courtship by the males, the females begin to show a recognizable egg supply. They get heavier in the belly region and begin to search about for a suitable place to spawn. Often a flowerpot suffices, and a pair begins to dig about in and around it. Sometimes they pay no attention to the flowerpot and dig under the pieces of petrified wood that lie on the gravel. I wanted, however, to observe the development of the eggs and watch how the female took care of them. For this reason, I placed all the pieces of petrified wood in such a manner that digging down under them was impossible.

But, back to the female: several hours before spawning the ovipositor tube can be seen clearly. She now gives the spot where the eggs will be placed a very thorough cleaning. Then the male gives his almost uninterrupted

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attention to courting the female. She becomes active at this time, placing herself parallel to the male and beating him lightly with her fins. These light blows usually brush the belly region of the male. In this manner, the male is lured into the cave and shown the spawning site. The female cleans off the place again and occasionally pokes the male's belly region. He draws away from these advances from time to time, but is always lured back again.

Then, at last, things begin to happen: the female swims so close to the cleaned area that her ovipositor tube almost rubs against it. Egg after egg is fastened to the surface of the area. Four to eight eggs are pasted down at a time. Then she swims to one side and the male swims over the eggs and fertilizes them. The eggs may be spaced at various distances. The widest space observed by me was about ¼ of an inch. In such a way, between 40 and 80 eggs are deposited and fertilized. They are oval in shape and are usually red. After time out for resting, the female begins with her brood care. At this time one can see a considerable change in her coloration. The entire body becomes lemon-yellow and there is a black horizontal stripe from the eye to the caudal base. The male is now no longer tolerated in the vicinity of the spawning site. He takes up his guarding duties, but at a safe distance.

The female keeps the eggs scrupulously clean and removes the infertile ones. After about 70 hours, the youngsters hatch. The female helps by picking the fry out of the bursting egg-shells. The fry are then transported into a previously prepared depression in the gravel. This is usually right near the spawning site and does service for only a few hours. Soon a new depression is dug out and then another and another. In this way, the youngsters are shifted all over the tank. About 5 or 6 days after hatching the youngsters begin to swim freely. Now is the time to take out the male. The fry are fed rotifers for the first 2 days and then brine shrimp nauplii.

Until the fry are about ½ of an inch long, they are herded by their mother and grow quite well. Once the female is removed, the youngsters seem to slow down considerably in their growth for a while. The pleasure of a successful spawning is dimmed somewhat, because their growth in a too-small tank is so slow that one is almost ready to give up. From my experience, relatively good growth can be attained in very large tanks. Once I got very good results when I raised only four or six youngsters in a 7-gallon tank. Raised this way, they grow at an astonishing rate. When more crowded, as has been said, they seem to stagnate in their growth even if fed the best foods. After 6 months they are barely 1¼ inches long.



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Eye "Fungus"

Q. I have a female betta with a clouded-over eye. I treated her for fungus but it persisted. Any suggestions?

Paul Falk

Whippany, New Jersey

A. One of the greatest difficulties with diseases is finding out what kind of organism is responsible for the condition. If the treatment for fungus did not work, try a treatment effective against bacteria. A medication with silver nitrate in 2 percent solution swabbed over the eye several times a day might work.

All Systems Go

Q. How will I know if the female is ready to breed when the male is?

Mary Ewanoski
Susanville, California

A. About the only way you can really know when a pair is ready to breed is to try them. Knowing when the male is ready is not always as easy to determine as some authors indicate. The usual indication is a bubble nest. Some males, however, will spawn before they have built a nest and others will reject the female even after the nest has reached ridiculous proportions. The female's readiness is sometimes recognized by her egg-laden condition and by her coloration when placed with the male. Females of non-cambodia colors will usually display dark vertical bars on the anterior part of the body separated by a creamy white. Females which are not in breeding condition become pale and show too horizontal strips.

Betta Tank

Q. I recently received a three-compartment betta tank. My problem is to find the most inexpensive and yet reliable means of heating and filtering each compartment. Could you suggest some way I could take care of this and yet

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The Smithsonian Institution and T.P.H. Publications, Inc., are pleased to announce the publication of a reprint, including the color plates, of the Philippine Bureau of Science's three Monographs on Philippine fishes: No. 1, Jordan and Richardson's Checklist, 1909; No. 2, A. W. Herre's Gobies, 1927; and No. 24, Montalban's Pomacentridae, 1927. These rare historical works are available in a clothbound volume for \$5.50.

Two earlier numbers in this reprint series are: Jordan and Erimann's "The Fishes of North and Middle America," U. S. Nat. Mus. Bull. 47, Vols. 1-4, 1896-1900, \$25.00; and Smith's "The Freshwater Fishes of Siam or Thailand," U. S. Nat. Mus. Bull. 188, 1945, \$3.50.

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Tropical Fish Hobbyist

not have to buy a complete and expensive unit for each compartment?

Cathy Lynas
El Cajon, California

A. It is not necessary to heat and filter each compartment separately. A heater placed in the center section will be adequate for heating all three. Filtering is more difficult. I would suggest a submersible filter. The partitions in the aquarium are loose enough to allow water to flow between compartments.

Lonesome Male

Q. I would like to know why my male betta repeatedly blows a bubble nest when there is no female betta in the tank.

Tom Neylon
Peoria, Illinois

A. This is normal behavior. It is not necessary for the female to be present for the male to be in breeding condition. And

a male does not have to be present for the female to fill with eggs.

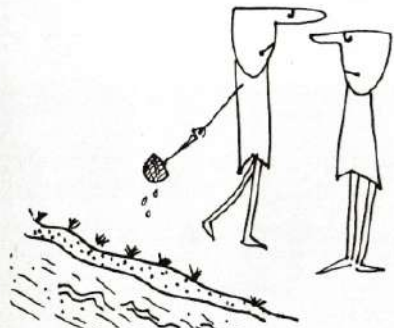
Betta varieties

Q. 1. What is the difference between *Betta splendens* and the Cambodia? 2. Where can I get Libby, butterfly and black bettas in the San Diego area?

Russel Kraft
Escondido, California

A. 1. The difference between *B. splendens* and the Cambodia is the same as the difference between *Lebistes reticulatus* and the golden guppy. The Cambodia is a color variety of the *Betta splendens*. The first long finned bettas imported into this country were of the Cambodia variety.

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T.F.H. Publications, Inc.
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June, 1968

SOUND PRODUCTION BY THE AFRICAN CICHLID

TILAPIA MOSSAMBICA
DUANE T. RODMAN
Fishery Biologist
Bureau of Commercial Fisheries
Biological Laboratory
2725 Montlake Boulevard East
Seattle, Washington 98102

Sounds of fish have been recorded and analyzed for numerous marine species (Tavolga, 1960, 1964), but for only a few freshwater species (Winn, 1960). The African cichlid *Tilapia mossambica* (fig. 1), a freshwater fish, has never been reported to produce intentional sound.

Freshwater fish were studied at the Bureau of Commercial Fisheries Biological Laboratory, Seattle, Washington, for underwater sounds of biological origin during experiments with recording instruments. Six male African cichlids were maintained in a 22-gallon aquarium, with a 3-inch layer of coarse gravel on the bottom. The fish produced adventitious sounds while they ate food or mouthed gravel (fig. 2). After they became accustomed to their environment, each fish constructed a shallow depression and attempted to exclude intruders. Territorial-threat behavior involved short, repetitive advances and retreats by the opponents. Intentional sounds were produced at this time (fig. 3).

Fig. 1. *Tilapia mossambica* is an interesting mouthbreeder. Photo by Gerhard Budich.



Tropical Fish Hobbyist

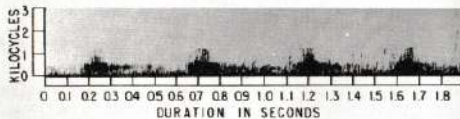


Fig. 2—Adventitious sounds produced by *Tilapia mossambica* while mouthed gravel.

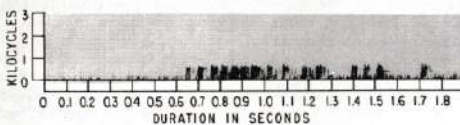


Fig. 3—Intentional sounds produced by *Tilapia mossambica* during territorial-threat behavior.

The sounds were detected with a University Model 402S microphone, waterproofed with a rubber diaphragm. They were recorded on tape with an Ampex PR-10-2 recorder-reproducer and subsequently analyzed with a Sound Spectrograph (Sonograph-Kay Electric Company). The intentional sounds were in a series of paired bursts that lasted up to 0.6 second and included individual bursts of 0.02 second. The distribution of energy was uniform in all frequency bands from 50-600 cycles per second.

LITERATURE CITED

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The Hobby in Hawaii

BY GLENN T. TAKESHITA HONOLULU, HAWAII



Hawaii, the enchanted land of swaying palm trees and beautiful swinging hula girls, is also a tropical fish hobbyists' paradise. Many articles have been written about Hawaii in respect to our hobby, but all of these articles were written by the *malihinis* (non-residents), as they are called here by us, the *kamaainas* (local residents). And like most *kamaainas*, I feel that the articles have missed much of the small-but-important things that are not seen by most of the *malihinis*. With this in mind, I would like to present to you a *kamaaina's* version of Hawaii.

First, may I touch on the most important and essential item relating to our beloved hobby, water. Being presently employed by the local water supply company, I believe that I am capable of giving fairly accurate information on this topic as it pertains to our hobby. Like most *kamaainas*, I am quite prejudiced when it comes to our water; all of us believe that we have the best and purest water in the world! Most of Honolulu's water is from an artesian ground source. Only in a few areas on Oahu do we get surface or perched (tunnel) water. But on the whole, the artesian well water remains as our main source. Unlike the people in many cities in the continental U.S., we here on the island of Oahu draw our water not from one centralized source, but from 52 different sources located throughout the island. The quality of the water from the hobbyist's standpoint is considered very good. Honolulu's water leaves the tap at about 74 to 76° F. throughout the year. The water is moderately soft (from 60 to 80 ppm, expressed as CaCO₃), slightly on the alkaline side (pH 7.6 to 8.35), with no chlorine treatment in most areas. Being an avid discus fancier myself for

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Photo by Dr. Herbert R. Axelrod.

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This looks like a typical lazy afternoon on Main Street U.S.A., except if you look further, you'll notice the lush mountainous background which is typical of the islands'. The prominence of the Petland store sign is indicative of the popularity of the fish hobby in Hawaii. Photo by Dr. Herbert R. Axelrod.



Dramatic skies decorate Honolulu's landscape all day long; you can almost reach out and touch a cloud on one of the higher mountain peaks. Notice the modern apartment projects which are changing the old world look. Photo by Dr. Herbert R. Axelrod.

the past 7 years, I was a bit concerned with the slightly high pH of Honolulu's water at first, but in this respect I have found that it is neither the hardness nor the pH of the water that really matters to the well being of the discus. It has been my experience that it is the temperature of the water that is the most important factor to consider.

In regards to the pH picture, the local tetra breeders seem not at all handicapped by our slightly alkaline water for they reproduce constantly with great ease many of the difficult species for the local market. And as for the guppy, swordtail, and molly fanciers—Honolulu's moderately soft water is just what the doctor ordered, for these fishes all seem to thrive in it.

Water changes by the hobbyists on Oahu are made generally straight from the tap without any pretreatment or aging of the water. In Honolulu proper, the water as it comes from the tap is generally a mixture of waters

Betta fanciers are stationed all over the globe, and Hawaii has its share of them. Photo by Dr. Herbert R. Axelrod.



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Tropical Fish Hobbyist

from several different sources, the type of water you get depending upon what area you live in and at what time of day you get it.

Almost all the hobbyists on Oahu keep their tropicals outdoors in setups ranging from just a few aquariums plus some washing machine liners to elaborate semi-outdoor hatcheries with several hundred tanks, tubs, and concrete ponds. Such outdoor setups are possible only because the air temperature on Oahu never goes below 60° F. or above 90° F. throughout the year. Although the climate is ideal for tropical fish farming, there is no commercial-caliber operation on Oahu as yet. Why this is so, I really do not know, for the people on Oahu have the money, land, and knowhow; and shipping of tropicals is no longer a problem because of the wonderful jet airline service from here to the rest of the world. But puzzling as it is, no one has ever started this type of operation. There are areas on Oahu like the Waiau, Waiwa, and Waimalu areas where freshwater springs are quite numerous and would be ideal locations for a commercial Florida-type fish farm. Here, in these areas, large volumes of the spring water remain unused and escape into our world-famous Pearl Harbor Basin. Only a handful of watercross farmers that have established themselves in these spring areas benefit from the natural springs. Today, on Oahu I know of only three semi-commercial type operations being undertaken, and these are very small operations when they are compared to the Florida fish farms.

Who says marine tanks are hard to maintain? This one looks like its in full swing . . . and the entire operation seems effortless. In this picture a wonderful Hawaiian family symbolizes the joy that is intrinsic to the Kamaainas tropical fish enthusiasts. Photo by Dr. Herbert R. Axelrod.



This is not a poker game . . . but a Koi conference. Koi collectors in Hawaii are very intense about their passion for the many subtleties which may be possessed by a Koi specimen. And they'll pay all kinds of high prices to obtain the prize Koi beauty they are searching for. Photo by Dr. Herbert R. Axelrod.

Also, in the marine fish exporting business, I know of only two operations, both part-time, on the island of Oahu. Why is this so? This question has puzzled many mainland visitors, and it also puzzles me, for our shores just abound with all types of prized marine fishes like the *kikihiki* (Moorish idols), many species of butterflyfish (aurigas, ephippiums, milliaris, etc.) and colorful tangs like the yellow and striped tangs. I believe if someone sets up a well organized operation for the export of marine tropicals on Oahu, a very profitable business is sure to emerge. So far no one has taken the initiative. Why don't you!

Although there seems to be almost no response from the people of Oahu in respect to tropical fish farming and fish exporting businesses, the tropical fish hobbyists on Oahu are many. These hobbyists are divided roughly into three different so-called "specialty groups" spearheaded by their three respective clubs. The first group is composed of the carp and goldfish specialists, headed by the Hawaii Carp and Goldfish Association. The second group is composed of the guppy specialists, headed by the Hawaii Guppy Association. And the third and last group is composed of the all-around tropical fish hobbyists, headed by the Honolulu Aquarium Society. Each group has at least a hundred members and holds at least one show every year. To give you a little background on each group, I will cover them one at a time.

Tropical Fish Hobbyist

The Hawaii Carp and Goldfish Association has a membership of a little over a hundred members. These members come from all segments of Oahu's society and are dedicated to the improvement and culturing of the koi (Japanese colored carp) and the goldfish. This group has one big annual show for which they import experts from Japan to judge the local fish.

Since the early 1950's, the koi craze has been a big thing in Hawaii, and thousands and thousands of dollars are spent in acquiring superior stock from Japan every year. Many koi hobbyists have quite expensive collections, some running into thousands of dollars. The best known collections of koi are those of Mr. H. T. Hayashi of the Pagoda Hotel and Mr. Nakamura of Diamond Head Circle. These koi hobbyists have spent as much as \$4,000 for one koi to add to their collection. Koi valued at \$300 to \$1,500 each are quite common in the more expensive collections.

There are also many goldfish specialists in Hawaii. These people, too, spend hundreds of dollars for their breeding stock. The most popular goldfish in Hawaii seems to be the challenging and beautiful lionhead, closely followed by the calico variety of the oranda goldfish called the *azumamishiki*. Lionheads and orandas valued at \$300 to \$500 each are quite common in the more expensive collections.

Also in Hawaii there are many of the different bizarre and unusual types of goldfish. Types like the dragon-eye, celestial, bubble-eye, pearl-scale, blue-fringe, red-cap oranda, etc. are quite common and are bred extensively locally.

The koi and goldfish hobbyists of Hawaii have come a long way since the craze began, for now they have become experts in the breeding and development of superior stock which I know will, in a few years, be seen in the continental United States and Europe. This koi craze has already caught on somewhat on the west coast of the U.S., and I know it will eventually spread to the midwest and the east coast.

As for the guppy specialists, Hawaii has a very large number of them. The Honolulu Guppy Association is now led by Mr. James Izumi, who has dedicated himself and his group to the development of the guppy in Hawaii. The HGA generally has one show annually, which is held in conjunction with the Windward Fair in Kaneohe. Mr. Paul Hahnel of world-wide fame and the author of *FISH's* "Guppy Corner," has been a frequent judge at the HGA's annual shows. He has also aided Hawaiian guppy enthusiasts through his helpful instructions and by giving them some breeding stock which he brings with him from the continental U.S. to help improve the Hawaiian strains.

The HGA is a tightly run group with very high ideals and standards, a group that is known not to put up with any "monkey business" from its members. The products of this group exemplify the high standards and



It just goes to show you that T.F.H. books are helping the many hobbyists in every part of the world. These adorable little girls are representative of the Hawaiian children who are becoming interested in the tropical fish fancy. Photo by Dr. Herbert R. Axelrod.



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goals set by them. Through the hardships of this group, good guppies are plentiful in Hawaii. But what the HGA wants are not just good guppies, but all show quality specimens, and toward this goal they are hard at work.

The third and last group is the Honolulu Aquarium Society. This group is what is generally called the "catch-all" group. Its members do not specialize in any one tropical fish. They are interested in all tropical fishes. The group has about 100 members, 60 per cent of which are youngsters below the age of 18. Most of the monthly meetings are geared more specifically for the youngsters' enjoyment, with such things on the program as a monthly table show, auction, door prizes, movies or slides, and a discussion.

This group, which I had the honor to lead in 1965, holds its annual show every June in conjunction with the Honolulu Farm Fair, which is held on a high school campus in Honolulu. In 1966, we had on display a total of over 300 tanks involving 21 classes of tropical fish. Most of our shows are judged by local experts, and every year competition is becoming keener. In our club we have many talented breeders whose only desire is to create something different for the hobby by careful selective breedings and hybridizations. It is from these breeders that such fishes as the hi-fin platys, albino hi-fins, black hi-fin lyretail swords, Lau's black-eyed hi-fin marigold varietus, and veiltailed hi-fin swords have emerged.

The caliber of work of all three of the above-mentioned groups is very high, their universal goal being the creation of more and better fishes for the hobby.

The pet shops in Oahu are few when compared to cities of comparable size in the U.S. There are six well-known ones in Honolulu proper, and a smattering of not-so-well-known ones are found in the suburbs and department and dime stores in Honolulu. In the vicinity of the world famous Ala Moana Shopping Complex there are three of the best known Pet Shops:

Birdland, the House of Pets, and Modern Garden Center, Inc. in the heart of downtown Honolulu is Jiro Matsui's Shop, Portland, and in the heart of the Kapahulu district is Leroy Akimoto's Pet City, and, last of all, just around the corner and down the block from Pet City, is Ideal Pet Shop. These six shops are actually the nucleus of Honolulu's pet and tropical fish trade.

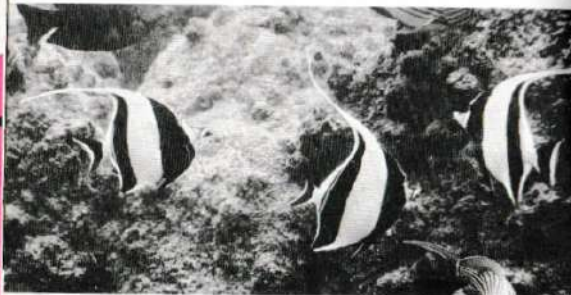
All of these shops are well managed and stocked with goods for hobbyists. The fishes are very reasonably priced and of good color and variety. Live, frozen, and prepared foods are plentiful throughout the year. Most shops carry tropicals from the continental U.S., the orient, and local-bred stock at all times.

For those who specialize in koi and goldfish, the shops of importance are Mr. Dan Miyata's Miyata and Sons Shop in Iwelei and Bob Gornichecs'

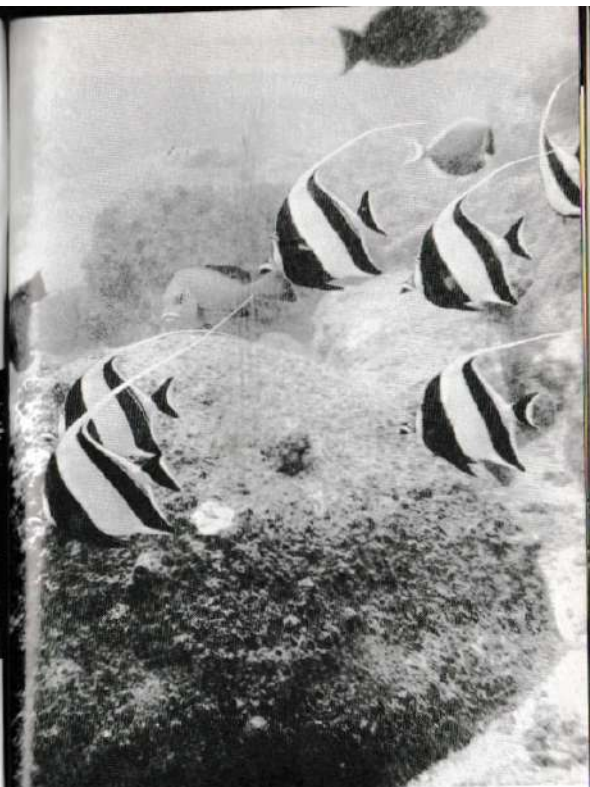
shop, Modern Garden Center, at Ala Moana.

The streams and reservoirs on Oahu are stocked with many different fishes, almost all of which were introductions. The only endemic fish in Oahu's streams is the freshwater goby, which is known locally as *O'opu*. The introductions to these waters include the following: common carp and goldfish, mollies (both *latipinna* and *sphenops*), *Gambusia* (several species), wild guppies, swordtails, smallmouth and largemouth bass, bluegill sunfish, four species of *Tilapia*, channel catfish (*Ictalurus punctatus*), oscars (*Astronotus ocellatus*), tucunare (*Cichla ocellaris*), scull (*Cichlasoma cutleri*), fire-mouth cichlids (*Cichlasoma maculata*), and rainbow trout.

Although the waters off the islands teem with the mysterious moorish idol (*Zanclus cornutus*), there has been no organized effort to export these incredible marine inhabitants to other lands. Imagine swimming alongside one of these moorish schools! Tennis anyone? Photo by R. Jonklaas.



Most of the freshwater game fishes are found in the Nuuanu and Wahiawa reservoirs and also in some mountain and drainage streams. The mountain streams generally have a mixed population of *Gambusia*, wild swordtails, wild guppies, and liberty mollies (*Mollienesia sphenops*). In brackish water inlets, streams, and drainage channels, like the ones found at the Ala Moana Park, you will find good numbers of sailfin mollies (*Mollienesia latipinna*—both gray and black color varieties) and the different species of *Tilapia*. Only in one stream (the Ala Nao Stream), which originates from the freshwater spring of the famous Willows Restaurant, is the cichlid *Cichlasoma*



Fact or Fantasy? A school of *Zanclus cornutus* is enough to start anyone wondering whether he's seeing things. These particular specimens have magnificent dorsal extensions of the proportions not often seen on the idols offered for domestic sales. Photo by R. Jonklaas.

cutters well established. Also in some mountain streams (not so much on the island of Oahu, but on the other Hawaiian islands like Kauai and Maui), common goldfish, or *funa*, as they are called locally, are well established. The common brown river carps, or *ma-goi*, are established mostly in reservoirs used in the irrigation of pineapple and sugar-cane lands. Occasionally, you will find large populations of firemouth cichlids, especially in reservoirs number 3 and number 4 in the Nuuanu district in Honolulu.

Most of the scientific work done on fishes in Hawaii is carried on by the following organizations: Bureau of Commercial Fisheries, who are doing research on the commercial tuna industry and oceanography; State Fish and Game, under the State Department of Land and Natural Resources, which is responsible for most of the freshwater game fish introductions in the State of Hawaii; the research staff in marine biology, operating out of the University of Hawaii and also out of Coconut Island, on the windward side of Oahu; the staff of the Honolulu Aquarium in Waikiki, which is led by Mr. Spencer Tinker and which is affiliated with the University of Hawaii; and the staff at Sea Life Park at Makapuu Point on Oahu, which is responsible for a display similar to California's Marineland and, also, for much research in the different areas in marine biology and oceanography. The Sea Life Park group is led by the much publicized Taylor A. Pryor.

Such a clinical aura is not uncommon to the island's petshops when displaying their tropical fish tanks. These meticulous set-ups, you'll be surprised to know, do not usually contain what we might consider the rarer and more exotic, for the most popular fishes in Hawaii are those which are more "everyday" to us . . . such as the guppy, swordtail, and goldfish. Photo by Dr. Herbert R. Axelrod.



These above-mentioned organizations form the foundation on which all professional work with fishes is undertaken in Hawaii. In these organizations are many men of stature in their respective fields of endeavor. The work that these professional men and organizations do with fishes is much too complicated and advanced for the hobbyist like you or me to understand. Therefore, I just mention them to you. Not mentioning them in an article about fishes in Hawaii would make the article incomplete, for indirectly the progress of professional people working with fishes affects hobbyists immensely; we continually use the information gathered by these researchers.

EDITOR'S NOTE:

I had visited Hawaii almost a dozen times since 1962 preparing an article on the islands, their hobbyists and the stores which serve them. I had accumulated hundreds of photos and interviewed a few dozen people in depth. I took almost 2,000 color photographs of the marine fishes of Hawaii . . . but I still couldn't generate the type of article that proved so easily from Glenn's pen.

I have added many of my own photographs to illustrate Glenn's article. I have attended meetings of many of the aquarium groups on the island, and while it is very much against TFH policy to "promote" one petshop against the other, I cannot bring myself to "cut" Glenn's article to eliminate the names of some of the shops he mentioned for I am certain that he feels strongly that some shops have done such excellent work in promoting fishes in Hawaii that they deserve special attention. The photos of shops in this article are those which existed from 1960 until today. Some undoubtedly have changed or gone out of business, but they should still be of interest since they helped start Hawaiian Hobbyists with fishes.

What Glenn could not say about Hawaii is probably the most important characteristic of kamaainas (local residents). In all the lands in which I have lived and travelled, none has more friendly and courteous people than Hawaii. If you want an experience that will reaffirm your faith in human nature, visit Hawaii. Walk into the first tropical fish store you find and you are on your way to a wonderful vacation among your own kind of people. I want to thank all of my Hawaiian friends publicly, especially Warren Tom, Ernest Tom, Arthur Lee, Harry Yee, Dr. Jack Randall, Mr. H. T. Hayashi who allowed me to photograph all of his carps (koi) for my new book, and Spencer Tinker who runs one of the best public aquariums in America.



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Hobby Thompson, Fredericksburg, Virginia.

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Sick Scats

Q. I have a 55-gallon aquarium with a variety of fish and live plants in it. I'd like to ask some questions. I had a scat who lived about 3 months in my aquarium and then developed the shimmies, and then died. I then went ahead and bought 2 more who died in 2 days. They were fine the first day. They swam around and ate tubifex worms. The next day all they would do is skim the top of the water and in the evening they died. I then went ahead and bought 3 more from another pet store with the same results. I can't understand why the first scat lived as long as it did and the others died so quickly. No other fish bothered them and my pH level is 6.6. I would like to know what I did wrong.

2. I also have 2 discus who appeared fine for the first month I had them. They are about the size of a half dollar. They were eating tubifex worms and frozen red worms and now for the past 3 days, they won't eat at all. They swim right away from any kind of food. I was told they could go for a month without eating. Is this true? They swim around and every now and then fight with one another. They don't act the

same way the scats did. Could you please tell me why they won't eat? I would like to save my discus before it is too late.

Mrs. Louis Mate,
Trenton, New Jersey.



Scatophagus argus can live in fresh or salt-water but with a partial soil contents it is most comfortable.

A. 1. There's a long list of things that could have went wrong in your large tank so that your scats, *Scatophagus argus*, would not be able to survive any considerable amount of time. What kind of filtration are you using? Is your heating adequate? And how many fish and kinds

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of fishes are you attempting to maintain at one time in this tank. Your first scat may have lived longer because the water in your tank may have more approximated the water from the petshop tanks of your other secondary scat purchases may have been too different from the water in your 55-gallon tank. Also, it is wise to first isolate new fishes, so that if they are latent with disease they will not spread the sickness to your other prize fishes. Scats usually require a certain amount of salt in their water.

2. Believe me, any fish that goes a month without eating, is not going to be a healthy fish afterwards. You say that your discus, *Symphysodon aequifasciata*

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axelrod, swim away from any kind of food. What do you mean by any? From your letter it sounds that you're only feeding tubifex and frozen red worms. You have to put variety into their diet. Grated beef heart, brine shrimp, and other kinds of worms would help. Make sure all live foods have been cleaned. This purging, will help prevent your discus from later becoming distasteful.

Rasbora Riddle

Q. I recently bought a pair of Rasboras and would like a number of questions answered about them.

1. What should the water pH be?
2. What should the water temperature be?
3. What should their diet be?

4. Would a 5-gallon tank be alright for them?
5. What other fish of the Tetra family could I put in with them?
6. I think you have the best column in this magazine.

Richard Hatch,
San Bernardino, California.



Rasbora heteromorpha at one time was a rare aquarium fish sought after by the over-guards aquarists. It is still a gorgeous fish to observe when they are swimming in school formation.

A. 1. When people say they have a pair of Rasboras, they usually mean *Rasbora heteromorpha*, the harlequin rasbora. I

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shall assume then that you are referring to this species from the genus *Rasbora*. The harlequin rasbora requires a slightly acid water—a pH of 6.8 to 6.7 should do nicely.

2. This rasbora is comfortable in a water temperature of 78 to 80.

3. Their diet should consist of frequent feedings of live and frozen foods, but they'll probably live very well on good freeze-dried foods such as Miraflex's Freeze-Dried Brine Shrimp or Daphnia. They will also accept certain dried foods.

4. Two *Rasbora heteromorpha* in a 5-gallon tank should do well.

5. The genus *Rasbora* belongs to the family Cyprinidae. I would suggest 3 more of the same species of fish in your 5-gallon tank as maximum. They are happy with their own kind.

6. Thank you, Bill Vorderwinkler should get all the credit for creating this column.

Fish Friends

Q. I would like to correspond with other tropical fish hobbyists. I am sixteen years old and I am mainly interested in guppies and cichlids, but I would like to hear from all tropical fish hobbyists across the country. I have written this



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letter and mailed it to you, because I have no friends who raise tropical fish. I would like to find some people to exchange ideas on tropical fish, and maybe exchange varieties of tropical fish.

Gregory A. Coleman, 1515 Ashland Avenue, Louisville, Kentucky 40215

A. Gregory, we are including your complete address so that anyone who wishes to write you may do so. We have many wonderful people reading our magazine, and possibly someone in your own home-state may care to answer your letter.

Reluctant bridegroom

Q. Recently I purchased a pair of red velvet swordtails. Shortly after I bought them the male died, leaving the female the only unmated fish in the

tank. I then purchased a male molly. After a couple of weeks I witnessed a mating between the male molly and the female swordtail. After this I purchased a female molly and put her in with the other two. This resulted in the male molly's leaving the female swordtail again to mate with the molly.

Now it seems that the male molly is paying no attention to either of the females. I can usually find him in the back of the tank in one of the caves.

Can you explain why he now refuses to mate with the females (who are both only about 1 1/2 years old) and why he spends so much time in the caves?

Tom Ventresca, Chicago, Ill.

A. There is no set explanation; he obviously prefers exploring the caves to mating with the females. Offhand, I'd say that he might be too old; maybe he's afraid of the females.

Q. I. In recent issues of TFH I've seen "Mail Call" letters about female bettas who aid the male in caring for the spawn. I have spawned my bettas twice, using the same male and two different females. In each case the female picked up any eggs that the male missed and placed them into the nest. The male, though nervous, allowed her to do this unmolested. Two of my neighbor's females

Can a male molly find happiness with a female swordtail?



also have displayed this helpful behavior. I'm beginning to wonder whether this is the norm rather than an occasional occurrence. What has your experience been?

2. I bought a pair of corydoras cats, sold under the specific name, *trilineatus*. In a book I have, the species which they



The *Betta splendens* breeding behavior poses many questions.

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appear to be is *Corydoras brachypterus*. In Dr. Herbert Axelrod's *CATFISH* they look most like *C. punctatus*. They are young (1 1/2 to 2 inches), have black on the forehead and through the eye region and, on the dorsal fin, they also have coarse black spots on a gray body, a black-tipped adipose fin, and heavy black spots on the caudal fin. What are they?

3. Do catfish suffer from any ailments, and, if so, how are they cured (besides salt and high temperature)?

4. Would frozen beef heart be an acceptable food for bettas and corydoras cats?

I read each issue of TFH from cover to cover. The magazine is highly informative and a unifying force for squarfish of the world.

Greg Inskip, Tonawanda, N.Y.

A. I. It's been some time since I spawned bettas last. When I did spawn them though, I never ran into a case where the female helped the male care for the eggs. However, it is possible that such a trait could be becoming more prevalent in our domesticated lines of bettas.

2. It sounds most like *Corydoras punctatus* to me.

3. Catfish do, of course, get sick. They seem to have their own set of ailments to a certain extent. Unfortunately, little attention has been paid to our scavengers, and so little is known about their illnesses. The thing to keep in mind when treating them is that they cannot take as much heat or salt as can many other tropicals.

4. They should like it. It's very good for them, too. Be sure you feed other foods in addition, for your fishes need variety.

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Does shark turn white?

Q. I recently purchased a red-tailed black shark. It was a baby when I bought it, and the dealer told me that if I had light gravel in my tank the fish would turn white. As it happens the fish died before any color change took place. I have never heard of one of this species turning white. I have another red-tailed black shark in a tank with light gravel, and it has not turned white. Is there any truth to this?

Richard Miller, Jr., Grosse Pointe, Mich.

A. Not an awful lot; a living red-tail black shark shouldn't turn white under any circumstance. It is true, however, that a fish that normally is darkly pigmented will grow paler when kept in very light surroundings, especially in surroundings in which the bottom covering of the tank is very light in color. Chances are that the red-tailed shark that you keep in a tank with light gravel would be even darker if kept in a tank with dark gravel.

Arowana Surprise

Q. I was looking back at the January, 1968 issue of Tropical Fish Hobbyist which contains all the articles printed in the Hobbyist for 1967. Please send me the September 1967 issue which con-

tains the article, "Arowanas Spawmed-Fry Doing Well". When I first purchased my arowana he was 4-5 inches long, and he would eat nothing but baby guppies. My supply of guppies lasted only a few days. I soon tried some of the freeze-dried brine shrimp that I got at the aquarium at the Pacific Palisades. That night I fed the arowana the freeze-dried brine shrimp, and I was really surprised to see the arowana eat this food. Now I feed my arowana freeze-dried brine shrimp, tubifex worms, three times a week, and now and then a small guppy.

Ron Macleod Pacific Palisades, California.

A. We're not surprised that your arowana, *Osteoglossum bicirrhosum*, accepts freeze-dried brine shrimp. The freeze-dried food process is revolutionizing the tropical fish hobby for it is enabling us to keep many species of fish that were otherwise difficult to maintain because of their demanding live-food requirements.

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Spawning the discus

Q. I am writing you for information regarding an article on breeding discus by Dr. Eduard Schmidt which appeared in TFH, August, 1962. Dr. Schmidt referred to a substance, Anteron Schering, which he utilized for spawning discus. I have been unable to find any other mention of this substance in other reports and have found that the chemical is a product of Schering Corporation and is not available in our

Discus can be spawned without any artificial inducement.



country. Do you have any information concerning this substance?

**Harry O. Specht, M.D.,
Sarasota, Florida**

A. Anteron is a registered trademark and is also known as P.M.S.G., or pregnant mare serum gonadotrophin. Perhaps you will be able to obtain a drug similar to this by writing to some other major drug manufacturers.

Figure-8 puffer

Q. 1. Are there any special foods or other requirements for the figure-8 puffer?

2. Can these fish be kept in a 23-gallon tank containing white convicts, scvrums, kribensis, barbs, a knife fish, a plecostomus, and an albino clarias catfish?

**Mrs. B. Duncan,
Paducah, Ky.**

A. 1. The figure-8 puffer requires no special handling as regards feeding, although it, like most of the other puffers, is very fond of snails and will do better if snails are included in its diet. They also like being kept in an aquarium to which salt has been added, although they'll live without it.

2. Best not to add the puffer to the tank you've described. Puffers look slow and awkward, but they are not slow enough that their nasty penchant for working over other fishes, even big ones like some of those in your tank, can be ignored.

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Proper Environment

Q. I have a small setup of aquariums which consists of one 20-gallon, two 5-gallons, two 2 1/2-gallons, and two 1-gallon fish bowls. They are all equipped with undergravel filters and thermostatically controlled heaters. My questions are:

1. Can a successful setup for breeding and raising veil tail guppies be made of these tanks? If so, how?

2. What disease causes the fish's scales to curl up and their bodies to curve in a half circle when dead? The body, which is relatively clear, also forms a foggy appearance, like the growth of a type of internal fungus.

3. When you buy a fish from the local fish store and the pH is not the same as in your own tanks, do you change the new fish's pH in the guppy trap or do

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you alter the pH in your tanks to suit the newcomer?
4. In several books I've read, it says to leave your lights on for a period of

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about twelve hours. This is causing a problem for me as the water is heating up from 78° to 85°. Will this hurt the fish? If so, what can I do to remedy this other than buying all fluorescent lights?

5. You should have your own television show on tropical fish. I bet you would have terrific ratings!

**Michael Funke
Thomas Warren, Michigan**

A. 1. You should be able to raise a limited number of veil tails, but I am afraid that if they really start breeding in quantities, you will have to dispose of most of the babies, since you really do not have enough space.

2. I do not know what the answer is to this question, for I have never seen anything as you describe. If anything ever goes wrong in a setup, the general rule for determining the cause is, examine the

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3. If there is not much difference in pH (6.7 to 7.0) the fish should not have difficulty. But it is not advisable to move fish from 6 to 7 pH. To enable the fish to better adjust to their new surroundings, mix the water from the pethop bag with your tank water. Some people utilize chemicals for this adjustment process, but I have never used this method.

4. I keep the lights on for about 8 hours a day, using incandescent bulbs placed 6 to 7 inches above. If your light bulb is right on top of the tank, then naturally, this will to a certain extent, heat the water. In this situation use lower wattage bulbs or change to fluorescent lights. Otherwise use my system.

Do you think so?

Breine Shrimp

Q. 1. I have heard so many conflicting ideas concerning the raising of brine

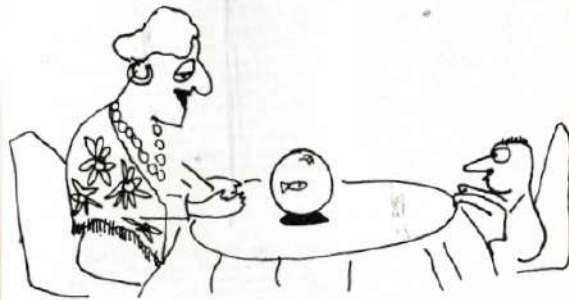
shrimp. Could you clear up some of this confusion by telling me some facts regarding their hatching and growth processes? That way, I might be able to really grow them to full size.

2. I find that even putting females in with my males doesn't seem to make them as aggressive as when I have 2 or more fish per gallon.

**Norman H. Letticeq
Greenbelt, Md.**

A. 1. I have never raised Artemia salina (brine shrimp) to adulthood, but there is an excellent article concerning these particular problems in the October 1967 issue of T.F.H.

2. If you want to keep more guppies per gallon in your tank so as to stimulate the fish into more activity then, it is advisable to maintain proportionate filtration and aeration.



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Salts From The Seven Seas

By Alfred A. Schultz



Dear Mr. Schultz:

I'm writing to you on behalf of all the hungry, undernourished saltwater fish! Brine shrimp—canned, frozen or live—is not a complete nor satisfactory diet for anything but a sea horse or pipefish! Saltwater beauties need a varied diet. And they are such eager eaters. This is what I feed my fish (it's all stored in the freezer):

- (1) Clams (raw) One dozen fresh clams, opened, cleaned of all black matter, washed, drained, chopped and frozen in a plastic bag. Break or cut off a small piece when needed and chop on a small wooden cutting boards with one-sided razor blade. Feed when thawed. Cost—about 50 cents.

- (2) Scallops (raw) Purchase one pound of frozen scallops and put in plastic bag in freezer. Wash and chop small pieces, as needed, and feed when thawed. This amount will last for months, unless you're feeding sharks! Cost—about 70 cents.

- (3) Cooked spinach—open small cans, drain well and freeze in plastic bag. Use small amount when needed, chop with scallop or shrimp and feed. Cost—about 15 cents.

- (4) Beef heart (raw) Cut away all fat. Wash, drain, chop and freeze in plastic bag. Cut off piece to chop on board, or use grater for smaller pieces. Cost—about 50 cents.

- (5) Shrimp (raw, table shrimp) Freeze a few in plastic bag. Cut small piece as needed, peel and chop on board.

- (6) Fish (raw) I use any scraps of fish meat that I might be cooking for dinner—sword fish steak, halibut, fresh tuna (not canned), red snapper or cod. Freeze pieces in plastic bag, and chop small piece as needed.

If there is any left on board after feeding the saltwater fish, I toss the rest to my freshwater pets. They love it too.

White worms are excellent food, once or twice a week. If you have a place to keep the culture box cool, the supply will last indefinitely.

Rita Weinberg,
East Brunswick, N.J.



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Tropical Fish Hobbyist

Q. How can you tell if a seahorse is getting enough food, and can you see a seahorse eat? If so, how?

A. Seahorses like living brine shrimp. If you are talking about the dwarf variety, then you can hatch baby brine shrimp from eggs. If you are referring to adult full grown seahorses, then try to purchase living adult brine shrimp from your pet shop. Put an overabundance of shrimp into the tank. Your seahorses will eat as much as they want, the rest will live in the tank until they are eaten. Seahorses suck food into their mouths. They usually don't chase after food but rather they wait until the food swims in front of its mouth. It's a good idea to supply something in the aquarium for the seahorses to lock their tails around, otherwise they have difficulty in eating.

Q. I became interested in tropical fishes about a year ago. I now would like to start a salt water aquarium. I have read all the available books that I can get my hands on and I have talked to many pet shop owners. Most say that I don't have enough experience. What is your opinion?

Norman Eubenstein,
Lincolnwood, Illinois

A. Norman, if you can keep fresh water fish, there is no reason for you not to be able to keep salt water fishes. They just require a little more understanding and just a little more love.

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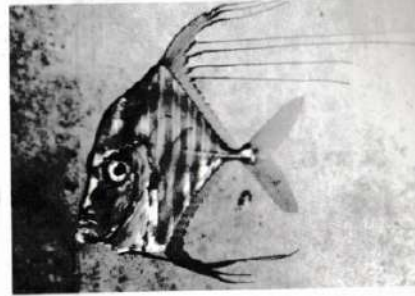
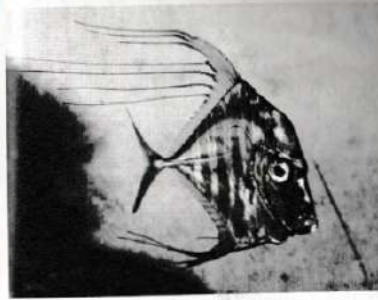
Have You Seen This One . . .

Alectis ciliaris . . . ?

BY J. M. BELLANCA

One of the great features of the tropical fish hobby is something called browsing . . . browsing is the disciplined art of discovery, whereby you allow yourself the opportunity to enjoy the unplanned and unpredictable. It is the civilized form of exploring. It is one of the unconscious methods the civilized man uses to temporarily get himself out of the trap of his humdrum workaday-life. There's a little bit of the adventurous explorer in all of us. We of the tropical fish hobby are practicing the high art of browsing (exploring) when we go down to the local petshop or aquarium store not seeking to buy any species in particular but rather to buy that which catches our eye. At these times, we are unconsciously allowing ourselves the opportunity to search for something interesting, beautiful, curious, intriguing or new. The tropical fish enthusiast when reading the pages of *Tropical Fish Hobbyist* is again perfecting this discipline of browsing (exploring) for through these pages he will experience the excitement of discovering aquatic creatures he never dreamed existed or could possibly exist. Reading *Tropical Fish Hobbyist* is the civilized man's way of trekking through the jungles and swimming the depths of the oceans so as to catch that breathtaking glimpse of nature's marvels.

We are presenting this month to our readers, with this same sense of exploration (browsing), a species of salt-water fish that we do not naturally expect the average aquarist to maintain or attempt to maintain. *Alectis ciliaris* is the kind of fish that the aquarist sets up in his mind as a future goal—one of those maybe impossible goals that he must strive to accomplish. This keeps things lively and keeps the aquarist going. And in the striving he acquires additional knowledge and awareness—a reward in its own way. *Alectis ciliaris* is a member of the family *Carangidae*, commonly known as Jacks and Pompanos. This family of fishes include some two hundred or so species. *A. ciliaris* can be found in the inshore warm waters of the Indo-Pacific. The common name for *Alectis ciliaris* is threadfin. Obviously, this common nick-name is because of the wondrous long wavy extensions of the dorsal and anal fins' first rays. These ultra-exotic characteristics are more pronounced in younger specimens as the fish matures, its body size increases, and the festive extensions cease growing. But possibly within the confines of an aquaria *Alectis ciliaris* would not grow as fast as when in their natural habitat, thus keeping the body proportions from changing and keeping the super-exotic look of the luxuriously long thread-like runners.



These dramatic off-beat portraits of *Alectis ciliaris* prove that he is a great, great character actor. If a Hollywood producer is reading this magazine, you can reach *A. ciliaris*' agent at Underwater 6-2934. He prefers to play the heavy Bogart type. Photos by Miloslav Kocar.

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This young specimen of *Nematobrycon palmeri* photographed in Germany by Hansen possesses the delicate pigmentation displayed by Emperor Tetras when maintained in a proper water-environment which includes a temperature from 72 to 78° F. Photo by Hansen.

The Emperor Returns

BY DANNY FREIDMAN

Even though *Nematobrycon palmeri* has been around for a long time (they were first discovered by Carl Eigenmann way back in the year 1911) you still don't get to see this charming little fish very often. So you can imagine my surprise when I read a sticker on one of my local dealer's tanks which read "Emperor Tetra". I leaned over and peered into the well planted tank and saw two little glowing and quivering shy fish. I immediately decided that I wanted them. But as I looked on the right corner of the tank I saw a "Sold" label. Anxiously, I questioned the salesman as to the validity of the "Sold" label. He related that he was obliged to hold them till 5 o'clock, and if the original party didn't call back, I could then purchase them. He said he could do this because the other party had left no deposit but said he would be back with the money. Needless to say that all I could think of till five o'clock was those beautiful Emperor Tets. When I called back at five, the petshop man said that I was lucky, the

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June, 1968

other party never called back, and if I wanted them I should hurry on down. I wasted no time in purchasing *Nematobrycon palmeri*, even though the dealer admitted he did not have very much information that he could give me in helping to maintain or breed them.

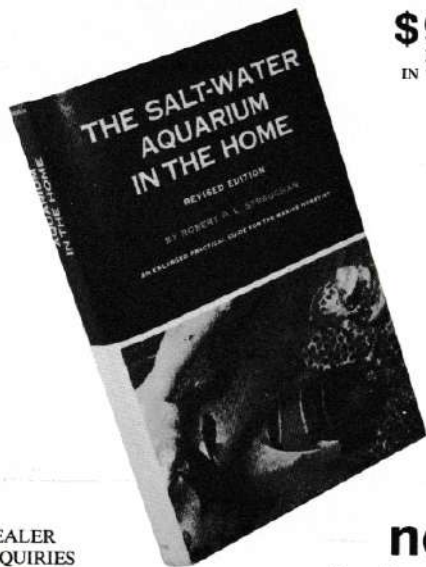
Determined to conquer all, I have experimented for over a year with *Nematobrycon palmeri*. This much I have discovered: the natural habitat of this species is a difficult to reach area in Colombia, the San Juan Basin on the Pacific slope, where the waters are on the acid side. Through the efforts of certain experienced breeders in Europe and the U.S.A., it was determined that this species, *Nematobrycon palmeri*, would readily spawn

An easy way to distinguish the male of *Nematobrycon palmeri* is by the three-pronged tail and their more intense coloring, although specimens do vary in their coloring. In this photo the male at the top justly deserves the nickname "Emperor Tetra". Photo by Dr. Herbert R. Axelrod.



in domestic aquaria without all of the painstaking procedures necessary for breeding some of our more difficult tropical fishes. In fact, I have discovered that if you've had any experience with other tetras, this pleasant little species should prove within your capabilities. They are oviparous, preferring to lay their eggs within bushy plants or the aquarist's good old standby, nylon mops. And most aquarists confirm my findings, i.e., the hardness of the fry and the relative ease with which the youngsters can be raised to maturity. I used an infusoria culture and newly hatched brine shrimp to keep the fry happy.

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Courtship

Nothobranchius rachovi



Preparation

Tropical Fish Hobbyist



Some day we fish-lovers should organize a "World's Fair of Fishes" and build a special pavilion for the *Nothobranchius rachovi*; this freshwater species from East Africa is one of the brightest stars in the Pisces galaxy. Part of the *N. rachovi* mystique is their relatively short life span and the infrequency of their availability. Photo by Kremser.



The ornial killifishes although diminutive in size present formidable problems to the aquarist who has great expectations about breeding them. PHOTO by Dr. Herbert R. Axelrod.

Here the male and female *Nothobranchius rachovi* in courtship regalia commence their "love-in". Photo by Dr. Herbert R. Axelrod.





Vibrations

This gorgeous, shortlived, egg-laying tooth carp comes from East Africa, Mozambique, in the vicinity of Beira. It closely resembles *N. guentheri*, but it is smaller. The body sides of the male are bluish green adorned with red-gold to orange-yellow and red patches and streaks. The belly is yellow. The fins are edged with orange. The throat is orange. The tail is edged with red and black. The dorsal and anal fins are marked with brownish red and blue. The female is smaller and colored a light gray. Her fins are light brown.

As these fish are quite shy, it is better to keep them by themselves in a small tank. The water should not be hard. The temperature should not be over 68° F., because at a higher temperature the life span, which is short even under optimum conditions (1 year), becomes still shorter.

For spawning, a small tank of about 1 gallon in capacity suffices. Well boiled peatmoss or finely sifted sand make a good bottom. The water should be soft and acid. A temperature of 72 to 74° F. is ideal. The male is put in first, the female the following day. The male begins at once to "ride" the female until he succeeds in pressing her down into the peatmoss. Then he holds the female from above with his dorsal fin, and, with much trembling, eggs are released and fertilized. With a single beat of his fins, the male pushes the eggs into the bottom. The spawning is repeated several times within 2 to 3 hours and lasts several days. When they have finished we take the fish out and then draw the water off very carefully, leaving only a little water in the tank. The tank is then covered and kept in the dark (the eggs are sensitive to light) at a temperature of 68 to 72° F. After 14 to 20 days we

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Expelling

pour the peatmoss with the eggs into a fine-meshed net and gently and carefully press out the water. The slightly damp peatmoss is then put into a jar and covered. When the upper layer becomes dry, the jar is covered with a glass cover and put away for 20 to 24 weeks at a temperature of 65 to 68° F. No harm is done if the temperature drops as low as 62° F. After this time has passed, the peatmoss with the eggs is placed in soft water at a temperature of 68 to 72° F., where within a few hours the fry will hatch. If well fed, the youngsters grow very rapidly and can be sexed in 3 months.



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