

May 1967

tropical fish hobbyist

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tropical fish hobbyist

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contents

| | |
|---|----|
| On Standards for Showing and Judging Bettas Including Another Proposal | 5 |
| The White Cloud Mountain Minnow | 7 |
| Sol Kessler Passes Away | 12 |
| The Pike-Head, <i>Luciocephalus</i> | 27 |
| <i>Labetropheus juelleborni</i> | 33 |
| Guppy Fertilization | 37 |
| The Tanganyika Rainbowfish | 45 |
| Aquarium Mineralogy | 49 |
| The Three-Spined Stickleback: The Aquatic Nester | 61 |
| <i>Hemigranmus marginatus</i> | 67 |
| Tropical Marines from Singapore | 85 |

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features

Notes From All Over - 31, Mail Call - 69, Guppy Corner - 79, Salts From The Seven Seas - 81, Your Fishes' Health - 83.

cover

The betta, or Siamese fighting fish, has won its way into the ranks of the most popular of aquarium fishes almost entirely on its good looks. For this reason, it seems strange that there is no one way to judge a betta for beauty. What with the many all-betta shows and the beta divisions of general shows, some kind of a standard for judging these fish would be very useful. Many people have tried to write such standards, and TFH has presented several of them in the past. This month one of the foremost experts in the world on bettas presents his ideas on what the standard for a good betta should include. Read it all in the story beginning on page 5. Photo of a prize-winning Libby betta by Dr. Herbert R. Axelrod.

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May, 1967

publisher's note

What nature-loving person is as happy to see the first crocus on his lawn and hear the first robin warbling as a fish hobbyist? Things begin to come to life at this time, not only outdoors but in the aquarium. Plants that have been dormant over the winter begin to show signs of life, putting out new shoots and leaves. The fish seem to take on new color, and the males become more interested in females that until now have been just tolerated. The guppies, which were always obsessed with ideas about procreation, become even more vigorous drivers and act as if there is no tomorrow.

The hobbyist can take advantage of the extra surge of energy so generously provided him by Mother Nature at this time: tanks can be torn down and cleaned, heaters and pumps can be cleaned and overhauled, and old, leaky tanks can be taken down and replaced or re-cemented. You'll be sure to need the tank even if you don't need it now; the hobbyist who doesn't at some time require an extra tank just does not exist! And of course, it's time to begin investigating that pond that you've always figured harbored daphnia or some other life your fishes would like. So what if it's a disappointment? You can always buy freeze-dried foods that are practically as good, and look at all the fresh air and sunshine you got!

William Vorderwinkler

3

Tropical Fish Hobbyist



4

May, 1967



By virtually any standard some bettas are superb. To the left are Libby bettas. (Note that one male has torn the center of the other male's tail out.) Photo by Dr. Herbert R. Axelrod. Above is a fantastically colored red betta that was photographed in Germany by Hansen.

On Standards for Showing and Judging Bettas . . . Including Another Proposal

BY GENE A. LUCAS
DEPT. OF BIOLOGY, DRAKE UNIVERSITY

As interest in a particular species of fish develops, it is natural that some hobbyists desire to show their fish and compete with one another. It is also natural that certain rules or standards be established in order to eliminate inequities and conflicts which are bound to arise because of variation in likes and dislikes of hobbyists and, of course, of judges.

Continued on Page 15

5



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6

Start with an easy one

The White Cloud Mountain Minnow

BY DOROTHY O'QUINN

One of the first big thrills the beginning aquarist experiences comes when one of his livebearers produces her first young. Whether they be guppies, platies, mollies, or swordtails, from the very beginning these young fishes are large enough and hardy enough to be raised entirely on dry food if necessary. However, with frozen baby brine shrimp easily available to most aquarists today, faster growth and finer specimens can be obtained if this or other frozen or live food is used. But regardless of how they are raised, they play an important part in the development and education of the aquarist, for it is here that he gains his first satisfaction of accomplishment. If he stays with the hobby long enough, he begins to read books and magazines and soon the fascinating reports of successful breeding among the hitherto mysterious egglayers take hold of him, and he has the urge to try his own hand at it. Challenge breeds interest, and there's no end to the challenge egglayers have to offer.

If you are a new aquarist, and the urge to spawn an egglayer has hit you, why not start with an easy one—one you are more apt to succeed with in the beginning. With your first success you'll gain confidence and much good experience.

One of the very easiest ones is the white cloud mountain fish, *Tanichthys albonubes*, so named because it was originally found in the streams of the White Cloud Mountain in China. (It's interesting to note that this is one of the few aquarium fishes that comes from China.) With so many good qualities it shouldn't be overlooked. It is small, hardy, colorful, well-behaved and really beautiful, especially when kept in a group of its own kind. A sizeable school of the same fish always makes an attractive and interesting display and how else can you get a nice school as inexpensively and satisfyingly as by raising the fish yourself?

There's little need for description, for white clouds are usually plentiful in aquarium shops, but briefly, they are about an inch and a half in length, have an olive-green back with a light-colored breast. A dark brownish-red horizontal stripe runs the full length of the side, ending in a bright red spot on the tail with a black dot in the center. Running parallel and above the dark stripe is a metallic stripe that may look gold or green, according to the way the light strikes it. (It is "neon" blue in the young.) The dorsal is sometimes yellow with a red edge, but sometimes the red is at the base of the fin. The anal fin on the male often shows the same red and yellow coloring.

There are many reasons why this fish is a good one with which to start. Its requirements are not rigid. The fry are larger than some egglayer fry

7

and, therefore, easy to bring through the critical early days. If the breeders are kept well fed, they refrain from eating the eggs or the newly hatched fry. So, if it isn't convenient to sit and watch to see when or whether they have spawned, the breeders can be left alone for several days without worry. Your first indication that spawning has taken place may be when you actually see the tiny fish, like little black splinters, lying at the surface of the water, where they will appear as soon as they are freeswimming. I'll guarantee you'll get a big thrill from your discovery.

But let's start at the beginning:

The tank: This may be a 3- or 5-gallon size, but better results can be obtained in a 10- or 15-gallon size, as the fish will have more freedom. There should be gravel on the bottom, and the tank should be thickly planted. Some floating plants should also be used; water sprite is a good plant, for it is usually plentiful and prolific and does equally well rooted or floating. If other plants do better for you, use them. An undergravel filter is ideal since it will furnish adequate aeration and take care of possible overfeeding after the young have hatched. Charcoal filters will suck in the fry and should be avoided. *And don't use snails!*

Water pH: This is not critical, but keeping it near 7.0, or neutral, is a safe bet. (I have, however, spawned this fish in concrete tanks with a pH more alkaline than 8.4.)

These male white clouds are easy to sex by their deep body color and the dark well defined markings on their dorsal, tail, and ventral fins. Photo by Dr. Herbert R. Axelrod.



8



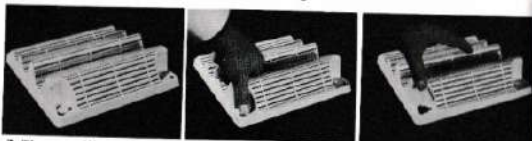
The two bottom fish are easy to sex by their color and markings. They are males. The next two are also easy. They are females. But what about the top fish? If you say it's a male, you're right. Photo by Dr. Herbert R. Axelrod.

Temperature: Here we find one of the big advantages in this fish. It does not require a heater so long as the tank is kept in a reasonably heated room. White clouds seem to do best at temperatures between 65 and 73° F., and are not likely to be harmed if the temperature drops lower, though this should be avoided if possible. (80° F. is too high for white clouds, and at 92° F. they are about dead!)

Light: The tank should be in a well-lighted area, but not in direct sunlight. The reflector lights may be kept on a regular number of hours to keep the plants fresh and green.

9

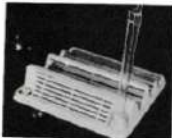
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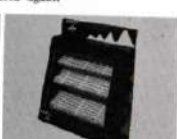
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10

May, 1967

Breeders: White clouds may be spawned in single pairs or groups. Personally, I like two pairs. The sex of the mature fish is easily determined by the size of the body and the shape and color of the fins, the male being more slender and having more color. The shape of the anal fin on the male is larger and runs out toward the tail. The anal fin on the female is shorter and fan-shaped. The sexes should be separated for a few days and fed on brine shrimp, daphnia, or small mosquito larvae.

Spawning: With this simple setup, the fish are put in the tank and left on their own. Continue feeding live and frozen foods if possible. The fish may be left alone, and it may be several days before anything happens. If you actually see the fish spawning, or feel sure by the diminished size of the female that they have spawned, take the fish out and leave the tank alone. Otherwise, leave them in the tank till you actually see the tiny "black splinters" at the top of the water. Although it is not absolutely necessary, take the breeders out so as to give the young every advantage of food and good growth.

Hatching time: The eggs will hatch in 2 days but the young will hang in the plants and will be hard to see. It may be 3 or 4 days before you see the first ones at the surface.

Feeding: Infusoria feeding may be started as soon as the fry are seen swimming horizontally at the top of the water. If you can get it, the specially prepared liquid food that comes in a tube and is made for egglayer fry is simpler and safer than making your own culture. (Ask your dealer.) Feed a few drops at a time three or four times a day. If the water clouds, you are overfeeding and should discontinue till the water clears. Small amounts of newly hatched brine shrimp and very fine dry food may be started when the fish are 8 to 10 days old.

Growth: This will be somewhat irregular and the tube food or infusoria should be continued for a short time to be sure all the young fish are eating. They will astound you with their rapid growth and development. First you will notice their shiny eyes. In 4 weeks time their iridescent horizontal stripes will look a greenish-blue. They will flash like neons as they school around the tank. If tank space is available, they should now be sorted as to size. This will not only give the smaller ones a chance to catch up, but a uniform group makes a better appearance.

Maturity: They should be mature and ready to breed in 6 to 7 months.

Now have fun with your white clouds, and when you get them up to a nice size, share some with fellow aquarists and your pleasure will be doubled.

11

Tropical Fish Hobbyist

Sol Kessler Passes Away

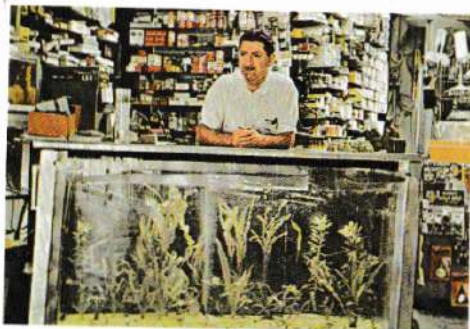
BY WILLIAM VORDERWINKLER

One of New Jersey's best-known and most popular pet dealers, Sol Kessler, passed away February 23, 1967, victim of a heart attack. He leaves his widow, Pauline, and two sons.

Sol had his own store, "The Fish Bowl" since 1951, and, since that time, has been visited by many hobbyists from all over the world. "The Fish Bowl" is a must for any hobbyist who visits this part of the country, and I recall with pleasure the many times Dr. Axelrod came into my office with guests of the company and said to me, "Bill, take these people over to Sol's place!"

We at TFH will miss Sol greatly. He was a real friend, and always earmarked a couple of pairs of his newest imports for us, so that we could photograph and, if necessary, identify them for him and our

Sol Kessler leans proudly upon his snazzy fish tank counter. Sol may well be the only dealer to have ever used a tank as a sales counter. (Other dealers have tanks that are built into their counters rather than tanks that use their counters.)



12

May, 1967



Sol was one of the few people in the Eastern United States to raise brine shrimp to adult size in commercial quantities. He did it in several large vats that were housed in the store next to his shop. One day he posed proudly with some of his "crop" and this picture was taken.

readers. Thanks to his uncanny eye, the hobby and the world of science has been greatly enriched with new species. It was always a joy to hear his voice coming over the phone, saying, "Hey, Bill, got a couple of new ones I want you fellows to see!" Then when I got to the store we'd have a great session, trying to figure out what they were. Sometimes he'd pull my leg: one time he showed me a marbled catfish that was native to the Middle West but looked as if it might come from anywhere. When I told him it looked like one of our native bullheads, he admitted that it was, but he pretty nearly had me fooled.

It's when a fellow is flat on his back that he finds out who his real friends are. When I was recuperating from one of my several strokes, and things seemed to be way down in the dumps, Sol visited me and cheered me immensely. I'll never forget him for that.

Sol will be sorely missed by the many hobbyists who are always on the lookout for "something new" (and who of us aren't?). His crowded but immaculate store on Springfield Avenue in Irvington, New Jersey will seem awfully empty!

13

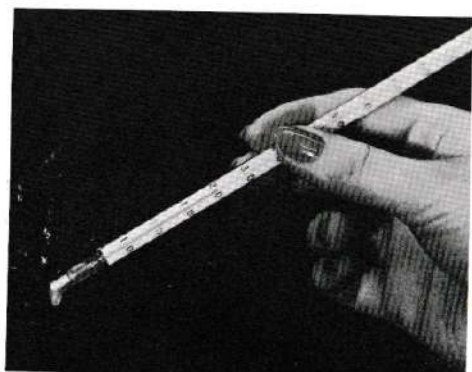


Photo by Robert W. New, Jr., Canada



We employ this amazingly simple method to establish the numbness, or solidity, of fats.

Tropical fish can digest only fats which become liquid in the range of the fishes' own temperature. Fats with a high melting point, such as suet or bacon of warm-blooded animals, are indigestible and harmful.

But the fats of insects and their larvae, as well as that of small crabs and certain other organisms living out of water, have a low melting point and are readily edible by tropicals.

Melting points of various fats we have examined in our laboratory include that of the yolk sac of the Spring Dog-Fish, 61° F.; of baby brine shrimp, 43° F.; daphnia and bloodworms, 46° F.; and cod fish roe, 55° F. By comparison, beef tallow has a melting point of 95° F.



Our Research and Your Success Speak for TetraMin

Continued from Page 5

Preliminary steps have been made to establish criteria for the judging of bettas, a move which, I feel, is somewhat overdue. Most aquarium shows have established beta classes which are independent of other cglayer classes. But the development of judging standards usually awaits the efforts of some "super-enthusiast" (fanatic?) like myself.

Following the trail-blazing efforts of the guppy people, steps are now being taken, most notably by the Cleveland Beta Associates, but also by others, to create a standard. My purpose is not to support or reject these efforts but to offer some rationale for still another type of beta standard, in hopes that ultimately a best composite standard may evolve.

The primary intent of a standard is to idealize a type. I feel it should also provide for further experimentation and development. In addition, I believe it should be an aid to the judge. It should make judging easier and quicker, allowing fairer comparisons of the increasingly larger classes. With these things in mind, I offer the following factors and recommendations concerning beta standards. The first will deal with pointing systems and judging and the second with types and classes.

A POINT SYSTEM: While the day may come when classes are large enough so that extremely critical pointing systems are necessary, I think that they are not necessary at this time. Therefore, I think a distribution of points designed to give consideration to various features of the fish and yet allow a judge some choice as to how he might award points would be ideal. The following text explains such a system, and figure 1 shows the exact distribution of points on a proposed judge's record sheet.

Color: Pigmentation occurs in three variables, which I would designate as *intensity*, *spread* (or distribution), and *purity* (or uniformity). I would consider these on the entire fish rather than on separate parts such as body, caudal fin, etc., since one of the objectives of the standardization is promotion of uniform color types. The spreading would refer to distribution of the basic color and the purity to the uniformity of pigmentation. For example, a green fish may have limitation of spread so that it exhibits red on the fin extremities. Spread would be enhanced by pigmentation of pectoral and pelvic fins, and obviously would be upgraded by the judge. Some greens have fins which fade to aqua or blue. This color grading would be faulted in single color classes, again by the judge.

Size and proportion: Premium should be allowed for maximum development. However, poorly proportioned large fish should be faulted. Overly fat bodies, for example, that look large for the finnage, are undesirable. Large fish with well proportioned structure would be considered better than small fish of the same developmental type.

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Finnage: Since finnage is important in fancy bettas, development and conformity to the standard will be the object with maximum development and most precise conformity the goal.

Showiness, or deportment, and condition: The most excellent fish may not show up well. This is a simple and well known fact. Fish that do not show well should be faulted, whatever their other features. Condition, while probably a requirement for deportment, may certainly be separated from it, since poor fish may be in excellent condition and show well while good fish may be in poor condition.

CLASSIFICATIONS: One of the most important features of beta competition will be the establishment of entry classifications. This obviously will depend upon the size of the show. Most aquarium shows probably have few enough entries that classifications are unnecessary. However, since

Fig. 1—A sample judging sheet. Point system is designed to give values relative to the importance of specific areas of the fish or to the overall importance.

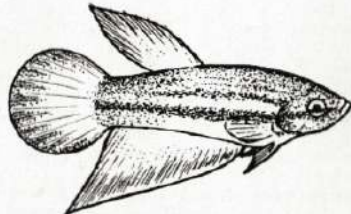
| JUDGE'S RECORD SHEET | | | |
|---|---------------------|---------------|--|
| <i>Betta splendens</i> | Entry # | _____ | |
| Sex | Class # | _____ | |
| Color type | _____ | | |
| Finnage type | _____ | | |
| Judging Characteristics | Points Possible | Judge's Award | |
| COLOR: Intensity | 10 | _____ | |
| "Spread" (distribution) | 5 | _____ | |
| "Purity" (uniformity) | 15 | _____ | |
| SIZE: (overall) | 10 | _____ | |
| PROPORTION: | 10 | _____ | |
| FINNAGE: Development | 10 | _____ | |
| Conformity to standard | 10 | _____ | |
| (If veil classes used, use 20 points for development) | | _____ | |
| SHOWINESS: (Deportment) | 15 | _____ | |
| Condition | 15 | _____ | |
| | TOTAL POINTS | _____ | |
| Class rank | Class size | _____ | |
| Additional award | _____ | | |
| Faults, comments, etc. | _____ | | |
| Judge's signature | _____ | | |
| Date | Location | _____ | |

there are already "beta shows", and in anticipation of expanded interest it is a good idea to have guides for classification. In general, I would suggest that small shows have only one class. If there are larger numbers of entries, say two dozen or more, two classifications might be made, one for "single" colored fish and a second for "multicolors". Larger numbers might provide classes for individual colors, such as red, blue, green, black, yellow, etc., and multicolors including variegations. The largest show should include all types and, if possible, consider fin variations such as the split-tailed form. Obviously, all colors could be included with various fin variations, allowing almost endless possibilities for classification. I would also include classes for new variations in a large show, with a premium being placed upon extremely unusual color or fin variation.

Since no single color is to be regarded as standard, a few comments concerning colors are in order. In general, color classes should express the interest of the entrants or the "climate", so to speak. It obviously does no good to have a black class, for example, if no one in the area has blacks. Colors should be as uniform or *pure* as possible and the goal should be to have the entire fish pigmented with the single color. Multicolored and variegated fish are a bigger problem. A cambodia could be considered multicolored as could a red-finned blue or yellow-finned black. Variation, on the other hand, refers to such types as butterfly, or what I call fringed. In these fish there are unpigmented, or white, areas interfering with an otherwise normal coloration. In addition there are unorganized multicolors that might be called *mosaics*.

Body and fin form may be easier to standardize. A suggestion has been

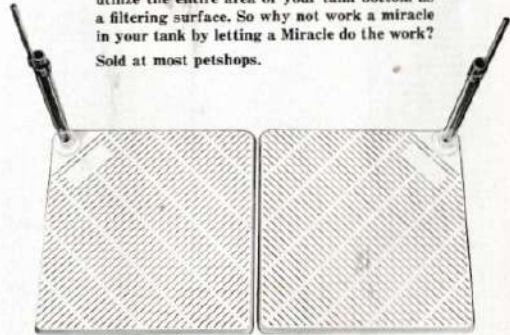
Fig. 2—Females of the current state of development can be judged on the same basis as males are. Maximum points for color and finnage are merely awarded at a realistically lower level of achievement.



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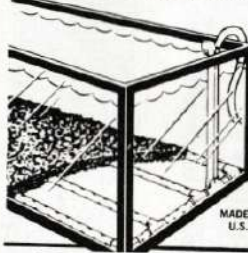


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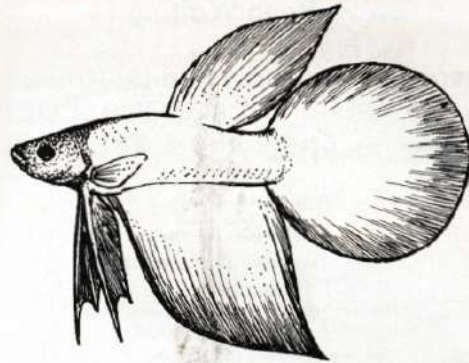


Fig. 3—A large circular tail combined with an anal fin shaped like a parallelogram with vertical edges that sweep toward the tail creates a fine looking betta if all else is satisfactory.

made that the caudal fin (tail) be circular or as nearly so as possible, and that the anal fin be shaped like a parallelogram. I think that this particular combination is not really very pleasing and, therefore, would not be attractive if it were actually to be achieved. A form of parallelogram involving backward sweeping curves on the vertical sides would, however, blend with the curve of the circular tail, and I would bow to this suggestion.

The current state of development of females does not equal males but well developed mature females certainly resemble young males in finnage. Coloration in most cases will also approximate that of males and, because of the differences in temperament, they make excellent contributions to the populations of community tanks, providing both color and behavioral variation. Females, if classes are provided, would be judged on the basis that males are, with the premium being placed upon the same color, developmental, and behavioral criteria.

One problem exists, one that is similar, in my opinion to that in guppies, angels, and other fishes. This is the one involving extreme development of finnage. Probably the most coveted betta is the true veiltailed form. After a certain stage in development finnage passes the point of no return as far

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| | | | |
|----------------------------|----------------------------|--------------|-------------------|
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| RED | RED | PLATIES | COHLISS |
| BLUE | BLUE | HELLEVES | CHARACINS |
| GREEN | GREEN | MOLLIES | SABES |
| MULTI COLORED | MULTI COLORED | | PANCHAK—ALL TYPES |
| HALE BLACK | CANDORA | | CAPISS—ALL TYPES |
| SHAKE SKIN | OPEN (Types Not Specified) | | SOLO FISH |
| OPEN (Types Not Specified) | | | OPEN |

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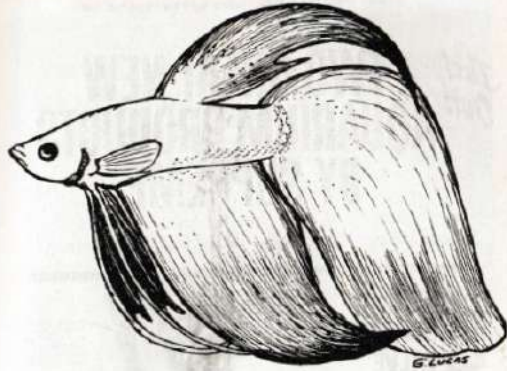


Fig. 4.—A betta which should be designated as "veiltail" and judged outside of the usual standard so as not to be hurt because of its gorgeous (but non-standard) fin development.

as erection, or spread, is concerned. I think a well developed veil tail and extreme finnage, which has endured long development without damage, is the ultimate in betta development. Conformity to the standard described would automatically, and unjustifiably, penalize the fish possessing this ultimate development!

In order to eliminate this unreasonable discrimination, I suggest that judges be instructed to consider either conformity or extreme development when allotting points for finnage. As an alternative to this, I would suggest provision of a class which is specifically designated *Veil Tail* to provide for these beautiful fish.

While the color classes and body form variations mentioned represent current development, I think standards should be open to change. If developmental trends produce different types, the standards should be altered to keep pace. Classification groups might be expanded, for example, to include ruffled fins or the split-tailed form previously mentioned or perhaps some other variation which may turn up. Obviously, they would be faulted under the present standard.

25

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May, 1967



Two *Luciocephalus pulcher*. Photo by Klaus Payson.


The Pike-Head, *Luciocephalus*

BY ONG KAY YONG

One Sunday in February, 1965, a couple of boys brought five pike-heads to me. To revive my interest in this species I went through the ILLUSTRATED DICTIONARY OF TROPICAL FISHES for further information. It was rather surprising to learn that reproduction is not yet clearly explained and that spawning them in the aquarium has not yet been achieved. Also, the supposition that they might be live-bearers has not yet been confirmed.

The above information brought back the memory of my capture of a very large female pike-head some years back. I did not take the measurement at that time, but the mention in the book of 7 inches long is about what I remember. I put this fish into a 2-gallon bucket and filled it with stream water. To my great surprise and joy the female pike-head began to give birth inside the bucket before my eyes. I was so happy that I hurried home with it. By the time I reached my house and put the fish into a large jar, she had

27

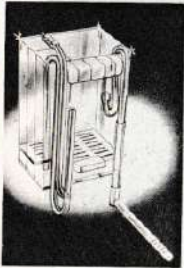
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given birth to 60 fry, each about 1/4-inch in length. This, of course, proved to me that the fish are livebearers.

I kept the mother with the babies under observation for another hour and saw another strange spectacle! All the fry seemed afraid of the mother and spread around the jar at a safe distance, all pointing their noses towards the mother. The attitude of the fry made me decide to release the female pike-head back into the stream again. On reflection, it was a rare occurrence. The grave mistake I made was that I did not use stream water in the jar and leave it outside in the open in the sun and rain. Neither did I provide aeration or proper feeding. I brought the babies into the house and put them into a glass tank. They did not like it. Some jumped out, and the rest died of hunger. I hope to carry out further experiments with this species to get more information.

NOTES FROM ALL OVER

HOBBYISTS SWAMP TFH WITH LETTERS ON PROPOSED NEW TANK DESIGN BY BADER

On page 11 of the March 1967 issue of TFH our readers were asked to send in their opinions of a tank design being considered by Bader Industries, Inc. for future production. Thousands of letters poured in from all over the world, and, although the number per day has now fallen off considerably, we are still getting responses. The general trend seems to be that hobbyists would accept and even welcome a new tank design, but they question whether this particular design would not limit viewing area too much. At the present time, Bader officials are still studying the overwhelming number of responses, and no definite decision to abandon the new idea has been made. Regardless of the outcome, hobbyists have shown by the number and quality of their answers that beyond doubt they are truly concerned with the progress of their hobby and the companies that manufacture their needs. Both TFH and Bader wish to extend thanks to the thousands who spent their time and energy to write. We are behind in sending out the promised samples of Miracle Freeze-Dried Fish Foods and hope you will be patient with us until we catch up.

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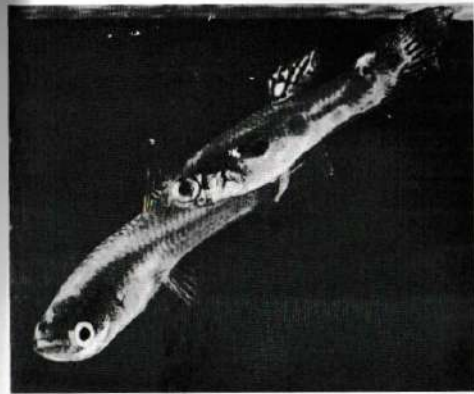
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Note the thrust-forward position of this male guppy's gonopodium as he darts toward the female in an attempt at mating. Photo by Dr. Myron Garden.

Guppy Fertilization

BY TED F. PARKER

How are female guppies actually fertilized? Does the male guppy insert his gonopodium or does he simply use it as a sort of rapid-fire rifle with which he fires the sperm at the female's vent? Or perhaps he merely releases the sperm into the water, leaving it up to the female to "pull in" the sperm in some way.

I have a strong opinion on the matter. Opinions, however, are not facts. So... let me give you the facts as I know them and allow you to draw your own conclusions.

Today, my largest guppy tanks are of 10-gallon capacity, but at one time I used tanks of the 20-gallon and 30-gallon sizes, each divided into halves with a tank divider. Once old enough to sex, the males were placed in one half of the tank and the virgin females in the other.

The dividers I used were a type I haven't seen recently. They were con-

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structed of nylon mesh stretched over a metal frame. The spacing in the nylon mesh was sufficiently wide to allow guppy fry to pass easily from one side of a tank to the other. Obviously, sperm-cells, which are microscopic in size would have passed through the openings very easily either under their own power or borne by the small water currents in the tank.

That the males were well aware of the presence of the females in the other half of the tank was always quite evident from their actions.

However, none of these females ever became pregnant as long as they were separated from the males by this divider.

Another thing is that old show males frequently have great difficulty breeding. We have seen how males spent 3 to 4 months with a female before a successful mating took place. On the other hand we have often had occasion to take old, showy males that couldn't breed at all and trim off large hunks of their finnage. Once relieved of all that cumbersome extra weight, they rarely have difficulty breeding with any female we put them with.

Another fact is that the older a virgin female is, the more likely we are to have difficulty getting her to breed to the male of our choice unless we first prepare her for breeding.

To prepare an old virgin female for breeding we place her in a breeding trap in a tank loaded with healthy young males. (Here, again, we have virgin females swimming in the same water as males.)

Not until the female begins to swim in a certain characteristic fashion most guppy breeders are familiar with do we place our selected male with the female. The offspring from the mating are always fathered by the selected male and no other.

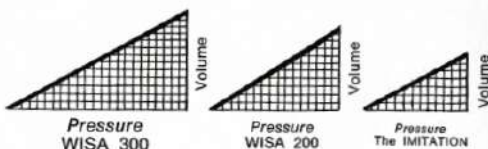
Also interesting is that on various occasions we have placed young, inexperienced males with old, unprepared virgin females. What takes place almost immediately is almost as painful to watch as the results must be to the young male. As a rule, the young, inexperienced male swims up alongside the female, swings his gonopodium toward her . . . and then goes limping off across the tank in obvious pain.

The last fact I will present is not my own observation. A number of ichthyologists tell us that female guppies possess what is termed "an ovarian occlusion apparatus" located between the ovarian sac and the oviduct. The primary purpose of this is to retain the developing guppy fry within the ovarian sac. Apparently, the ovarian occlusion apparatus is open only during the short period during which guppy fry are being born.

Thus, all our experience with guppies and the observations of ichthyologists suggests the probability that the male's gonopodium must actually enter the female's vent and force open the ovarian occlusion apparatus, thus removing the roadblock from the path of the sperm.

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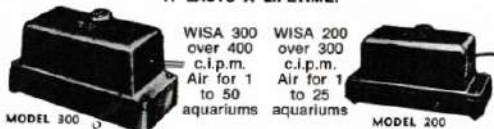


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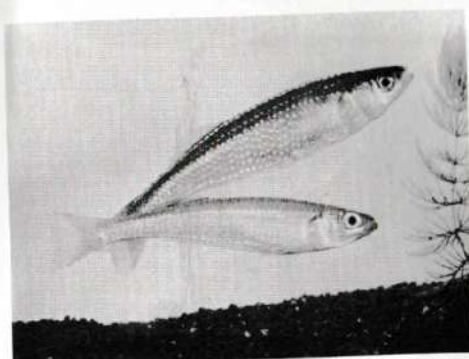
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The Tanganyika Rainbowfish, *Lamprichthys tanganyicensis*. The upper fish is a male, the lower a female. Photo by Dr. Herbert R. Axelrod.

The Tanganyika Rainbowfish

A gorgeous newcomer

BY KLAUS MECKE

I still remember the first photo of *Lamprichthys tanganyicensis* published by Dr. Herbert R. Axelrod in *Tropical Fish Hobbyist* (Jan. '60). It showed the new Rainbowfish in color and described some peculiarities about their keeping and about the habitat of the species. I would like to enlarge upon this little report by adding my own experiences with this fish.

The world-famous firm Aquarium Hamburg first imported *Lamprichthys tanganyicensis* in 1959. At this time it was not made public, but now I can make my experiences available to every hobbyist.

The few imported specimens were placed in an aquarium which also contained some Australian Rainbowfishes, but some of them died within two days. Dr. Ladiges determined that the cause of death was an injury of the scales which resulted in pus-filled, bloody sores. The loss was a serious one for Aquarium Hamburg and they had to go to a great deal of trouble to get replacements. Finally the second importation arrived in good shape, and they could be set up again. The fish were very timid, but soon got accustomed to their new surroundings. *Lamprichthys tanganicus* occurs in Lake Tanganyika as a school-fish and feeds on small crustacea and other plankton. This single species of *Lamprichthys* can be compared to the *Melanotaenia* species, but they are somewhat more slender and of a more delicate structure.

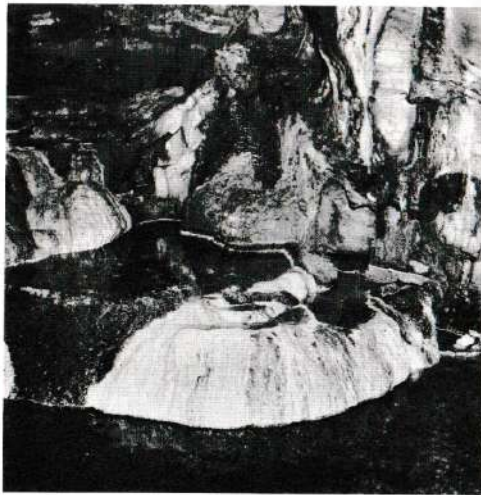
The color of the male is olive-green on the back, shading to a gleaming silver on the sides and belly. Some of the scales have an azure shimmer. The rows of blue scale dots are immediately striking to the viewer, especially if the fish are swimming back and forth and their aquarium gets a weak lighting from above. The dorsal and anal fins as well as the tail have an ochre yellow edge, and are also spotted in places.

Besides being smaller in size, the females have less intense colors. Note-worthy is the difference in the shape of the anal fin; in the female this fin is shorter at the base than that of the male, but is spread out like a sail. These fish would be excellent for a show aquarium, as they have just the right size. The females attain a length of about 3 inches, and the males almost 4 inches. Unfortunately no breedings are available and we must still depend upon the few imports. One day, however, Aquarium Hamburg reported a small spawning. Dr. Ladiges told me the following:

"One day when the Australian Rainbowfish, which were in the tank with them, had spawned, the breeder discovered some larger eggs among the others. They were glassy clear and the breeder picked them out. After the eggs in the other tank had hatched, 4 out of 5 of the eggs which had been separated hatched. The youngsters did not resemble their parents in the least, but looked more like the *Apocheilichthys* species. Mr. Petersen, the breeder, was successful in raising these very delicate fish to a size of slightly more than 1½ inches."

Dr. Ladiges assumes that the hormonal activity of the spawning Australian Rainbowfishes stirred up the spawning ability of the *Lamprichthys*. The eggs were released freely, exactly like those of *Melanotaenia*. It is to be sincerely hoped that the fish will spawn again and that there will soon be a good breeding stock as a result, so that every aquarium hobbyist will be able to keep this jewel among fishes in his own aquaria.

48



This is a portion of In Cueva Chico of Mexico, the natural habitat of Blind Cave Fish. The rocks here turn the water very basic. The result is that you can keep Blind Caves in an aquarium with rocks that test high on the pH scale. Photo from the New York Zoological Society.

volcanoes that formed the Earth's crust so long ago belched forth the "parent stock" of all our later kinds of rock. Well-known members of the igneous group are lava and pumice.

Then someone invented "weather" (it's still talked about today). Wind and rain lashed the volcanic peaks, wore them down, and carried their way a grain at a time, finally depositing them in some faraway spot. There they settled, became cemented together, and formed sandstone, limestone, and other *sedimentary* rocks.

While all this was going on, other rocks were busy undergoing physical or chemical changes subsequent to their original formation. These changes,

52

Aquarium Mineralogy

BY CRYSTAL GORDON

How often have you heard that "Not all rocks are safe for aquarium use"? It's a rather well-known statement; you are always being told that you can't put any old rock in your tank. Unfortunately, no one seems to go any further with it. While some do explain exactly *why* you can't put certain rocks in your tanks, no one has much to say about *which* rocks are safe and which are not.

Mineralogy, which studies rocks and what they are made of, is quite an involved and confusing subject, especially for an aquarist who's more interested in studying a fish than a lump of stone anyway. If he does attempt to thumb through a good book on mineralogy, he's likely to wind up floundering in a morass of chemical properties, tables of oddball abbreviations, assorted graphs, charts, and whatnot, concluding in disgust that all the rocks are in his head. He may give up the whole thing as a lost cause and throw out all those rocks he so carefully placed in the tank. About that time, he may also eye askance all that gravel on the tank floor. What is gravel, after all, but crushed rock?

This does present something of a problem. You can, of course, take the easy way out and dispense with everything but fish and water. In some cases this is the best thing to do anyway . . . a breeding tank needn't be cluttered up with a lot of unnecessary decoration. But what about that community show tank in your living room? You don't want that looking as stark and bleakly uninteresting as a desert! Your fish won't be entirely overjoyed about it, either. They like the security of a handy place to duck into and hide if they feel that danger threatens. So there you are, wondering how you're going to have your tank looking just right, with your tropicals happy and healthy in an environment that is safe for them and attractive to you. What you need is a course in simplified aquarium mineralogy.

First of all, what fishes are you keeping? How do they like their water: hard and alkaline or soft and acid, or neutral? Some fishes, such as the Blind Cave Characin, which lives in limestone caves, have a taste for the former, but the majority of aquarium fish come from places where the water is softer and on the acid side. Our aim is to duplicate as nearly as possible the composition of a fish's native water, and rocks play a big and important part in water conditioning, both in a fish's natural habitat and in the home aquarium.

The cadless rock that forms the Earth's crust can be divided into three major groups. First are the *igneous* rocks, which have been formed by the cooling and solidification of a once hot and fluid rock mass. The mighty

49

caused by pressure, heat, or movement, formed the *metamorphic* rocks, such as slate and marble.

So much for the history of rocks. Now let's take them apart and study their "personality" . . . their chemical makeup and influence on their surroundings (water, in our case). We have the three kinds of rocks; now for the three types of rocks.

First, there are the *acidic* rocks. As the name implies, these are of an acid nature, and just the thing for a soft-acid water tank. All rocks rich in silica (Si O_2) are acidic. The Si O_2 formula simply means that silica is a compound of the elements *silicon* (Si) and *oxygen* (O). Granite is an acidic rock.

The *intermediate* rocks are those containing 5% or less silica. They are more likely to be alkaline than acid and will release some alkali into the water. Some types of basalt fall into the intermediate class, and are fine for those fishes that like alkaline water.

On the far end of the scale are the *basic* rocks, containing virtually no silica. They are purely alkaline. Limestone, marble, and the rest of the basalts will look fine in that tank full of Blind Caves, and the little devils will flip over the alkali released into their water.

Because so many of our fishes are soft-acid buffs, the remainder of this study will concern the rocks which are safe for their tanks. Intermediate and basic rocks are out of the picture, as well as a few "taboo" rocks that should be kept out of *all* tanks, no matter what fishes you have. Turquoise, for instance, contains the element "As" . . . better known as arsenic. It is present in very small amounts, along with antimony, another poison, but even small amounts can be fatal to a fish. Turquoise is the only one of the arsenates common enough to fall into the hands of the aquarist, with the barely possible exception of a mineral called apatite.

In order to start at the bottom of things as far as usable rock is concerned, let us consider gravel. One of the best gravels is crushed granite. Commercial granite gravel is usually a little coarser than the commercial aquarium gravel, but used properly it is safer and very pretty. It is hard to tell what kind of rock is in commercial aquarium gravel, and it sometimes tends to be alkaline. Granite is composed of quartz, feldspar, and a small amount of mica. Studying each of these minerals separately, we find that quartz is pure silica, its chemical composition being Si O_2 . Feldspar is a potassium aluminum silicate. Its chemical composition is $\text{K (Al Si}_3\text{O}_8)_2 (\text{OH})_2$. Translated into plain English, it means that feldspar is about 17% potassium, 18% aluminum, and 65% silica. While aluminum and potassium are not good in the tank alone, they are so far overshadowed by the silica content of the feldspar and the pure silica quartz that there isn't much they can do about it. Chemically, the mica is the same as feldspar.

53

To obtain the best results with granite, first spread a good layer of peat moss on the bottom of the tank and put the gravel over it. Plants won't take too well in the gravel alone; the peat gives them a good root hold. And that black-and-white gravel with its minute crystals catching the light can really pep up a drab-looking tank!

So far, the impression has been (I hope) that rocks containing silica are the best for your tanks. The reason for this is that silica does not, either directly or indirectly, react chemically with water. It does dissolve very slightly, which does no harm to fish or plants.

As far as decorative rock is concerned, all the members of the "quartz family" of minerals are made-to-order for aquarium use. The quartz family is the largest in the world, and by using them alone you could have an endless variety of form and color to work with. There are, however, a few non-quartzes just too beautiful to be left out.

Massive granite is every bit as good as granite gravel. One particular type, called "graphic granite," is so formed in crystalline structure that it looks like some sort of ancient writings engraved upon white stone. A chunk of it could be a very interesting addition to your tank. Its one disadvantage is that it sometimes attracts more attention than your fish.

Another beauty is obsidian (volcanic glass). An igneous rock, it is patterned by "flow lines" formed while it was cooling. It comes in black, red, brown, and translucent. "Snowflake" obsidian is black, with white spots resembling lacy snowflakes. "Silver sheen" and "gold sheen" obsidian are rarer kinds, black with a silver or gold overlay. "Rainbow" obsidian is black with a sheen of rainbow colors.

Rhyolite, or wonderstone, is similar to obsidian in origin and formation, but not glassy. It is called "scenic wonderstone" because the flow lines in it actually form pictures of mountains, deserts, sunsets, sand dunes, and lakes. It comes in shades of red, yellow, brown, and sometimes lavender.

As for the quartz family: The following is a list of suitable rocks (all quartzes) for your tanks and a few words about their predominant colors and other interesting facts concerning them. They are available at "Rock Shops" catering to the many rockhounds and lapidary hobbyists in this country. (These people are as bad about rocks as we are about fish!)

ROCK CRYSTAL: Clear, colorless quartz in crystalline form.

AMETHYST: Clear purple quartz crystals usually lining the inside of hollow geodes.

ROSE QUARTZ: Pink quartz often showing a "star," as in star ruby or star sapphire.

SMOKY QUARTZ: Clear yellow-brown quartz often mistaken for topaz.

CITRINE: Clear light yellow quartz.

MILKY QUARTZ: Opaque white quartz.

56

RUTILATED QUARTZ: Clear or smoky quartz with fine, hairlike threads (rutiles) inside it.

PHANTOM QUARTZ: Clear or smoky quartz with another ghostly crystal inside it.

AVENTURINE: Green with gold-flecked appearance (like metallic auto paint) caused by minute mica inclusions.

TIGEREYE: Originally asbestos fibers that turned to stone in shades of yellow, brown, reddish and blue.

CHALCEDONY: Brown or reddish. An interesting variety is the "chalcedony rose" which looks just like a rose made of rock.

CARNELIAN: Red with fine banded patterns.

SARD: Brown.

CHRYSOPRASE: Green.

AGATE: All colors with many bands and patterns. Like wonderstone, agate contains many pictures of landscapes, forest fires, figures of birds, animals, and, yes, fish. The author has a round agate pebble dubbed "Charlie" because of the amazing likeness of a Charles Addams cartoon character it contains.

PETRIFIED WOOD: All colors, some with pictures; some with the bark still intact. Tiny crystal groups often cover the outside. In limb sections, the growth rings of the wood are perfectly preserved.

ONYX: Banded yellow, brown, red, white, or gray. Often used for carving, lamp bases, and pen stands.

SARDONYX: Sard and onyx combined.

FLINT: Dark brown or black.

CHELT: Same as flint but lighter in color.

BLOODSTONE: Green with red specks . . . looks as though it had been spattered with blood (an unpleasant concept for such a pretty rock).

JASPER: Multicolored, similar to agate.

JASP-AGATE: Combined jasper and agate.

QUARTZ SANDSTONE: Pale yellow or buff sandstone made of quartz grains cemented together.

GASTROLITHS: Actually round jasper pebbles used as "bird gravel" by dinosaurs.

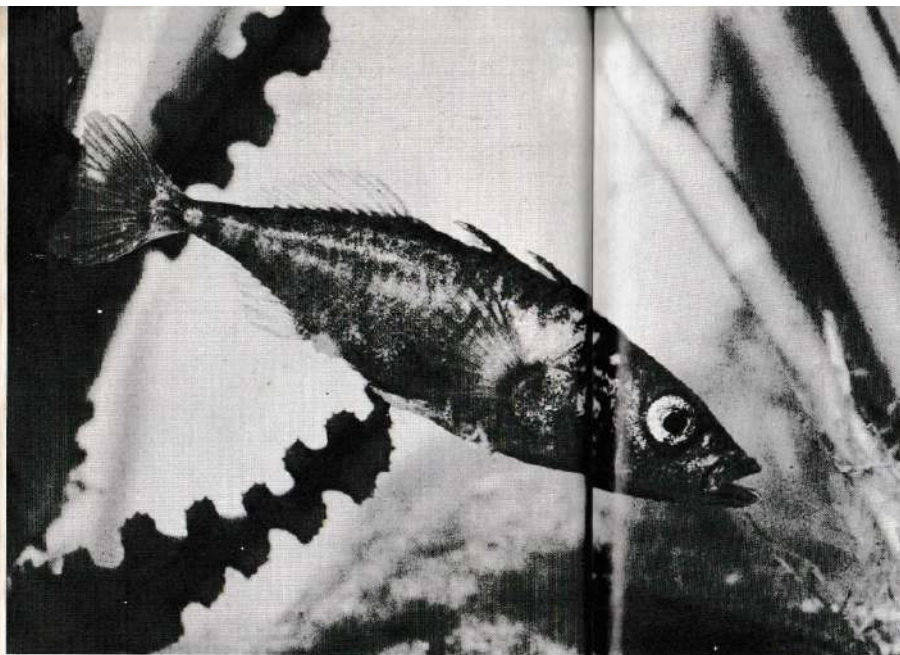
TEKTTITES: Silica glass, believed to be extraterrestrial in origin. The much-talked-about invaders from Mars?

OPAL: There are many kinds of opal . . . fire opal has internal flashes of red, blue, and green; other opals are plain red, yellow, white or gray.

REFERENCES

Dana's Manual of Mineralogy by James D. Dana
Quartz Family Minerals by H. C. Duke, Frank L. Fleener, and Ben Hur Wilson

57



The three-spined stickleback, an interesting fish that is suitable for the aquarium and is native to waters throughout the United States. Photo by Gunter Senft.

The Three-Spined Stickleback: The Aquatic Nester

BY ALFRED SCHEINBERG

One of the most graceful fish, both in movement and color, may be found living in fresh and brackish water in the United States from New York to California. This fish, noted for its odd nesting habits and the three spines in front of its dorsal fin, is called the three-spined stickleback, *Gasterosteus aculeatus*. In Europe, the stickleback is often kept as an aquarium fish, but

very few of these fish are seen in aquariums in the United States. There is no concrete reason for their lack of popularity, as they are common and certainly interesting.

Most aquarists can catch sticklebacks for themselves. Although principally found in freshwater ponds and streams, sometimes they are carried

60

61

by flood waters into the salt or brackish water of estuaries. The coloring of the fish is most attractive, usually a mottled green on the sides with a silver body and pink tinges. In salt water the fish seem often to be a decidedly silvery color all over. During the breeding season the fish have a brilliant blue coloration on the sides and a scarlet coloration on the belly. Of course the spiny rays of the dorsal fin, usually three in number, help in identification. The rest of the dorsal fin has about 14 soft rays, all connected.

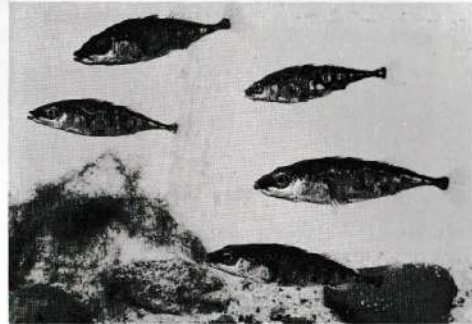
The diet of the stickleback consists in nature of fishes, fish eggs, and crustacea. In the home aquarium, they are best fed on live food, although they occasionally will accept dried food with an animal base and often take freeze-dried foods. If you feed dried food, remember that the fish have a very small mouth, so get a fine to medium grain.

The most fascinating trait of these fish is their nest building. During the breeding season (spring and early summer) the males assume brilliant nuptial colors and stage many battles among themselves. Each male builds a round nest of water plants which are held together by mucous threads formed by a secretion of their kidneys. Each male then entices as many females as he can to deposit their eggs in the nest. The eggs are dutifully fertilized, and until they hatch, the male guards them, fighting off intruders as vigorously and pugnaciously as he did when winning his mates. After an incubation period of 10 days, the eggs hatch. The male destroys the nest, but he continues to guard the young until they can fend for themselves. The young are about 1/5 inch long on hatching, and they should be fed newly hatched brine shrimp, infusoria, or sifted daphnia. The female should be removed after the eggs are laid. If cared for properly, by the end of 6 weeks the young should be about 1/2 inch long and closely resemble the adult fish. It should be noted that if only one female is available in the home aquarium, the male may return to the nest with her three to five times.

In the home aquarium, the stickleback can withstand a temperature variance of from 50-85°F. The water should be kept at about 60°F, if possible, with a gradual 10° increase at spawning time. To aid in nest building,

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These are four-spined sticklebacks, *Apeltes quadracus*. Photo by Milan Chvojkic.

the tank should be supplied with *Riccia* or other floating plants. The only drawback of this fish is that it will bully smaller fishes, so it is advisable to keep sticklebacks only with larger fishes than itself.

Aquarists with an ornamental lily-pond, will find sticklebacks to be a most welcome addition. The fish can feed on the abundance of small life which these ponds contain. Their temperature requirements are easily met in most areas of the United States.

There are several other species of sticklebacks, but their requirements are similar to those of *Gasterosteus aculeatus*. The four-spined stickleback, *Apeltes quadracus*, requires brackish water (1 tablespoon of salt per gallon), temperatures of from 60-70°F, and a shorter hatching period (from 3 to 4 days). The brook stickleback, *Eucalia inconstans*, is mainly a freshwater fish, but is otherwise very similar to *Apeltes quadracus*. The last common species is the nine-spined stickleback, *Pungitius pungitius*, whose principal difference from the three-spined stickleback is that it builds its nests among plant stems rather than at the bottom of the aquarium.

For the aquarist who is interested in novel fishes and the amateur ichthyologist who is studying the breeding habits of fishes, sticklebacks are certainly worth investigating. Even the most experienced of aquarists can not help feeling a sense of awe upon witnessing the breeding of these fantastic creatures. Why not give these native fish a try?

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MAIL CALL

By William Vorderwinkler

If you have an aquarium question that you would like answered, send it to MAIL CALL. Each month the most interesting questions received and their answers will be published in this column. Letters containing questions cannot be acknowledged or answered personally. Address all questions to: MAIL CALL, T.F.H. Publications, Inc., 243 Cornelison Avenue, Jersey City, N. J. 07302.

Pelmatochromis kribensis

Q. 1. I am planning to buy several pairs of *Pelmatochromis kribensis* and want to know what their special needs are if I wish to breed them?

2. Would a 5-gallon tank do for breeding them?

3. What chemical will change the hardness of water from hard to soft?

4. Are these fish suitable for a community tank with large swords, large plastics, and one very large bleeding heart tetra?

5. How many medium-sized fish will a 10-gallon tank hold?

Stanley Perkins Jr.,
Palacios, Texas

A. 1. If you want to get several pairs, I would recommend that you use a roomy tank, about 20 gallons, with plenty of rocks and plants. There should be a number of nooks in this tank, where the fish can get a certain amount of privacy if necessary.

2. Although it is not impossible to spawn a pair in a 5-gallon tank, it is not advisable to use anything under 10 gallons.

3. There are some synthetic resins that do the job very well, and for this reason

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are used in commercial water softeners. For a small closed system like an aquarium there are easier softening pillows available which can be hung in the tank or in the filter.

4. They should get along fairly well.
5. This question is asked so frequently that I often wonder if anyone ever reads my column. Under ordinary conditions, 1 1/2 inches of fish length to every gallon of water.

Get him a cuspidor!
Q. I have a 6-inch hoplo carfish (*Hoplosternum thoracatum*) and understand that it is typical for the fish to come to the surface every few minutes for air. I would like to know if there is any reason why he should poke his head out about 2 inches above the water's edge and spit water at the same time. The

puddles are a terrible nuisance and a hood has not remedied the problem. He either lifts the hood in order to spit down the front of the tank or uses the openings in the back to fulfill this "whim". Can this nasty habit be broken?
Mrs. Emilie Dembeck,
Takoma Park, Md.

A. I wouldn't think he has enough strength to lift the hood, probably he uses the openings. You can close these openings with a little masking tape, and if you find that he still persists with his expectations, fasten the hood down to the tank frame with the same masking tape.

Saltwater fish in freshwater lakes
Q. A few years ago I read an article about various saltwater fishes being transferred to freshwater lakes in one of the southwestern states. Some species

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had a growth rate triple that which they would have had in the ocean. I wonder how they are doing now and if these transplants are being made more extensively or not.

William H. Hoppe, Hensenville, Ill.
A. It is a common practice to put fish like a striped bass in freshwater lakes where it is desired to clean out "junk fish", fish that overpopulate such lakes at times and destroy the eggs and fry of the more desirable species. These introduced fish have the characteristic of being able to survive fresh water, but are not at home to the extent that they can reproduce in it. Such fish have happy hunting for a while, gorging on the unwanted species and at times growing fat while they can get much more food than they usually do in the ocean. I once heard of an angler

in one of the local lakes getting the surprise of his life, when after a heroic struggle, he pulled out a 15-pound striped bass.

Frogs' eggs
Q. I have a good supply of frogs' eggs, which I can easily hatch and raise to any size I want. Would it be safe if I took a large amount of the tadpoles and cleaned and froze them for use during the winter?

Craig Harris, Iowa Falls, Iowa
A. Frog and even toad tadpoles are excellent food for the larger cichlids, and the unhatched eggs are good for smaller fishes that can swallow them. Unfortunately, sometimes fishes simply refuse them. If they accept them, by all means freeze them for winter use. Of course, as with all frozen foods, take ordinary precautions when feeding, and do not pre-

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Fig. (Culture, breeder for plus 1 yr. Media supply.)

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the fishes more than they can clean up in a few minutes. A little practice will soon tell you how much you can feed safely. Try freezing both eggs and tadpoles, so that

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them get in captivity, top size is about 1 1/2 inches.

How much?
Q. I have read conflicting instructions about how much should be fed to tropical fish. Some state as follows: "Feed as much as can be consumed in 3 minutes," others say anywhere from 5 to 10 minutes. Can you give me a more precise method?

Carl Tucker, Brooklyn, N.Y.
A. You just can't give a hard-and-fast set of instructions, because some fish are much faster eaters than others. The idea is never to feed so much that some of the food will be left to foul. If your fish becomes disinterested in food after about 10 minutes, you have fed too much and should remove the surplus, remembering to feed less next time.

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Male or female?
Q. In a small book I read, it mentioned the rare happening of sex reversal. In my new litter of guppies, I have noticed a female with male characteristics. Her anal fin has thickened, but no color is present. The other males in her litter have already gained bright colors. She also has a vent, but not as large as the others. She and the others are virgin. Is this caused by breeding my stock too close? Could it be that it is a male that is late in obtaining its colors?

Patty Roser, Pittman, N.J.
A. I don't think that this is a case of sex reversal; this fish was probably never a female, but just a male that is a bit slower than the others getting his colors. Be careful of keeping "her" with females, if you want them virgin; you are very likely to find that some of them are be-

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coming pregnant for no apparent reason. Males that develop slowly like this are very apt to become very big, very beautiful specimens.

Hemigrammus armstrongi
Q. 1. I have found the golden tetra (*Hemigrammus armstrongi*) to be an ideal community fish. It is both peaceful and colorful, looking exactly as though someone had dipped it head first into a pot of metallic gold gilt. I am interested in breeding it, but aquarium literature indicates that tank-raised fry do not inherit the solid golden color of their parents. What is the reason for this? Is



Hemigrammus armstrongi.

there some indigenous condition which cannot be reproduced in the aquarium?
2. The most beautiful guppy I have ever seen is one which I bought in a dime store. His tail was absolutely spectacular — iridescent blues and greens, exactly imitating the colors of a peacock. Unfortunately he died not long after I bought him. Is this an established

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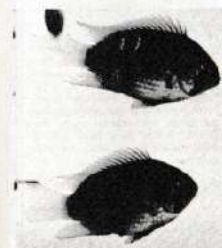
strain, or is there no hope that I can obtain another like him?
3. Ever since I "discovered" your magazine, I have been borrowing back issues from the fisheries library at the University of Washington.

Mary Isa, Seattle, Wash.
A. 1. Maybe you could borrow a December, 1963 issue of TROPICAL FISH HOBBIYST, which carries an article by Drs. Géry and Delage entitled The Pathological Origin of the Stratum argentum in the Brass Tetra. It seems that the gleam is caused by a layer of guanine, a sort of defense mechanism against a parasite which is carried on specimens collected in South America. Aquarium-bred specimens are free of this parasite and already in color, with no guanine to give them that pretty golden gleam.

2. There are many so-called "established" strains, and without any guide but your description it would be impossible to tell. Keep your eye on the source where you got him: there might be more some day!

3. I'm glad you "discovered" us.
Keyhole cichlids
Q. I have a beautiful spawning pair of *Aequidens maronii*. They have spawned four times. Since they were frightened and devoured the eggs the first two

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times they spawned, I was determined to hatch them artificially. I moved the rock they had spawned on into a 5-gallon tank and put an airstone near the eggs. My fry hatched and lived about 2 weeks and then began to die. They were very active and I could see them eating the freshly hatched brine shrimp I fed them. About eight times a day I fed them a small amount. Evidently it was too much as the water was a little foul smelling and there was a gray fungus on the bottom of the aquarium. This happened twice.

1. Did this fungus kill the fry?
2. Do the parents keep the aquarium clean so that this fungus does not form?
3. Should I try harder to let the parents hatch the young?

4. How soon should I begin feeding these young?

Mrs. Joyce Clark, Cottonwood, Calif.

A. 1. No, not directly, but it points to the fact that you overfed your fish. When there is more food than the fish can eat, it lies on the bottom and rots, frequently becoming fuzzy with fungus. Eight times a day is certainly often than most of us would feed our fish, even if they are young and growing. It would not be a bad thing, as long as you do not feed so much that some is left to rot and foul the water. The foulness, not the fungus, kills the fish.
2. Only indirectly, for they are more likely to eat the food that would otherwise be left behind.
3. A pair of cichlids tending their young is a sight you should not miss.

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However, it must be remembered that keyhole cichlids are very shy and should have a lot of places where they can hide. If a tank is not thickly planted and does not have some rocks, the fish become scary, especially at a time when you want to watch them most, when they have spawned.

4. Cichlid fry, like most others, emerge from the egg with a yolk-sac which contains all the nourishment they can handle until it is completely absorbed. Once it is absorbed, they are frazzled and begin searching for food. This is the time you have to make good use of your judgment and feed generously but not, as you have done, too generously.

Feeding
Q. A month ago I set up a new 20-gallon tank. I put six 1½-inch tiger

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barbs in. I fed them in the morning, alternating dry food with frozen adult brine shrimp. In the evening, I turn on the fluorescent light and sit down to enjoy them, but there is the unsightly debris of brine shrimp floating about. The amount of frozen brine shrimp I cut off the lump to be fed is not much larger than an uncooked navy bean. I told the dealer about this and was told that I was overfeeding them. Is my dealer correct or is it that these particular fish consume the shrimp but their digestive tract does not break it down, passing it out in its whole form?

Mrs. Harriet Hutchinson Toledo, Ohio

A. No, this is hardly likely. Frozen brine shrimp is considered a delicacy by most fishes, and the tiger barb is no exception. What you must do is to make sure your frozen brine shrimp is fresh. If it has a

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rotten odor, throw it out and get a fresh lot, and keep it solidly frozen when you have cut off what you need. I have known even some hearty eaters like tiger barb to pass up spoiled food. Get into the habit of feeding them in the evening, when you can sit down and watch them. Then you can see how long they take to consume the food. If there is any food left in 10 minutes and the food is in good shape to begin with, you are overfeeding. Tiger barbs are not at all choosy as far as food is concerned and if you are left with some after feeding only a small amount, there is definitely something wrong with what

you are giving them. Never feed what you feel is a generous amount, feeling that they will come back and eat it later; food spoils very quickly and spoils the water in the tank. A tank in which the fish have been fed properly never shows debris in it. The only debris you should ever find after the fish have been fed 10 minutes back would be their droppings.

pH for cichlid breeding

Q. A few friends and myself have been attempting to breed both the *Aptistogramma* and *Pelmatochromis* species for quite some time. We are in possession of your fine book ENCYCLOPEDIA OF TROPICAL FISHES but it often neglects to give the proper pH reading that these fish require. Any help, particularly concerning *rambuzi* and *aribensis*, would be deeply appreciated.

Dr. Warren Aime, Monroe, La.

A. It might seem neglectful if we left out some details on pH requirements, but this was done when the water chemistry was not at all important. You might run into trouble if you take a fish that has been raised in acid water and suddenly put it in alkaline water, or vice versa. Most cichlid species do well in water that is neutral to slightly alkaline, and if you feel that a change is indicated, never make a drastic one suddenly.

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By Paul Hahnel

"Semi-fancy" guppies

Q. As a recent subscriber to T.F.H., I am very much interested in your column since one of my books on guppies mentions you in particular. This is my question: I raise for a dealer a large number of "semi-fancy" guppies. They are of various colors and innumerable tail shapes. Some grow to be quite large. The females all have large colored tails and dorsals. Some show blue-white coloration in the anal and pectoral fins. Recently some of the females have thrown some unusual young. At birth they appear to be golden (there have never been any golden guppies in this tank). These fish have bred true for several generations; I say "appear to be golden" because in a week or two the very top edge of the back, the whole tail, and the lips turn black. This blackness gradually increases. None of these

young are now over 3 weeks old, but even an inexperienced eye can notice them right away. More and more of them are appearing. Does this constitute a mutation? They are all strong, and slightly larger than others born at the same time. I have segregated them, of course, since they could never pass as "semi-fancy" guppies. Do you think it worthwhile to try breeding them? As nearly as I can tell, all the black-marked young are males. Could this cause problems? I would very much like to be responsible for introducing something new, as most hobbyists would, I guess.

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A. The description you give me in your letter about the unusual coloration on the newborn babies is quite interesting, and I would recommend that you keep this type of guppy under special care and breed it. Mutations or other types of genetic changes very often appear among our guppies and a new type is always welcomed by hobbyists. This type of change happens usually through the reshuffling or "crossing over" of chromosomes. Pairs of chromosomes (the bodies that carry genes) sometimes become twisted around each other, exchanging their parts. Such an exchange process leads to the mixture of gene sequences obtained from the parents involved and are responsible for hereditary mix-ups. In a gray guppy, by this mix-up,

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the black pigment (which is called melanin) got lost and the golden guppy resulted. But in your case, some of the black is still present, and appears only in certain parts of the body.

Oldtimer

Q. A female that I have had for 4 years has stopped giving birth. In addition, her back is curving so that she is developing a hump. She has always been very healthy and produced up to 60 young a month. She gets the best foods and water conditions available. What's wrong with her?

Sally Ruane, Fair Hills, N.J.
 A. It sounds to me like your female is just getting old. She has lived a long productive life, and you should be proud to have kept her healthy all that time.

Salts From The Seven Seas



By Alfred A. Schultz

Caught in the net . . . The other day I received a phone call from a local doctor. He had just set up a 125-gallon marine tank in his office. His tank was constructed of Plexiglas and contained an undergravel filter and two outside power filters. It contained the usual amount of coral for decoration. It also contained about 24 small fishes. The reason for his call—he had lost five fishes in the past 2 days. Could I help him find the cause? I visited his office and examined his tank. Truthfully, I explained, as far as I could see, everything was going along smoothly. The fish in general looked healthy. The water temperature, pH and salinity were as they should be, and I could not ex-

plain his losses. After a bit of questioning, I discovered that he had purchased two fishes that had lived for 2 days after he had introduced them into the aquarium. The other three fishes died 3 days after the first two. The only conclusion I could come to was that his new fishes had been sick when he purchased them and they had somehow infected some of his older fishes. The only reason there had not been larger losses was due to his large aquarium. The moral? Upon getting new fishes put them into an isolated aquarium before adding them to your community tank. One sick fish can soon affect every other fish you have, and at the

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high cost of these fishes, who can afford not to take precautions?

Q. I am 10 years old and interested in a marine aquarium. What is the best kind of fish for a beginner?

Melanie Duke, Mundelein, Ill.

A. A few of the harder fish for a beginner are the clown fish, blue tang, and sergeant major.

Q. I have read your question-and-answer column for years, but I do not agree with you on a few things. For one, you say no fish can be kept with dwarf seahorses. I have kept dragonettes (*Callinectes borealis*), gobies, file fish, and blennies with them. All these fish eat the same food and get along fine with each other. The second is, you say no plants can be kept and maintained in the marine aquarium. I have kept the merman shaving brush and the red tumbleweed. I would be interested in your comments on the above.

John Seaton, N. Linthicum, Md.

A. If you have read my column carefully you have noted that I never said that these fishes could not be kept together. What I did say is that these fishes should not be kept together. All the above fishes eat food much faster than the dwarf seahorses, and unless you continually flood your tank with food, the seahorses will slowly starve to death. As far as plants are concerned, they serve no useful purpose in the tank.

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82

YOUR FISHES' HEALTH

BY MIKE REED

To Kill a Fish

Every now and then all of us run into a situation where we must destroy one of our fishes. This commonly happens when a fish becomes ill beyond cure. I have also had to destroy fishes that could be cured for awhile but were chronic "get sickers". I once had a dwarf gourami that would get ick and infect the entire community aquarium in which he lived. I would cure all the fishes, but 2 weeks or so later that little dwarf would start the whole thing over again. Isolation and special treatment didn't change things a bit. The poor fish was always being treated for ick, and he was a nuisance to keep. If he was with the others, they all got sick; if he was isolated, he took up a whole aquarium to himself and required constant attention as well. The only solution in this and similar cases is to destroy the problem fish.

It is not an easy thing to destroy almost any form of life. Those hobbyists who matter of factly destroy unwanted fishes are one up on me in professionalism. They tell me (rightly, of course) that in the end, they are doing their other fishes a great service if they destroy a weak, sick tankmate. Also, they are doing the patient (victim??) a favor by ending its life quickly rather than waiting until it dies slowly or, worse yet, is attacked and killed by its tankmates because it is too weak to defend itself. I know all this is true. So I do the job despite the fact that I find it most unpleasant.

People who keep living things as pets should realize that taking these animals out of their natural habitats and confining them to man-controlled environments makes each owner responsible in every way for his animals. Thus, because we are responsible for keeping all our fishes as healthy as possible, we must sometimes kill an individual. I believe that it is also part of our responsibility to kill such fishes in as painless a way as is possible.

Ichthyologists tell us that fishes, being "cold blooded", do not feel pain in the same way we do, but let's face it . . . they do feel some pain. Most good methods for killing fishes are based upon killing as quickly as possible, to avoid extended periods of discomfort or pain.

Unfortunately, the method most often used is the one that is most likely to cause the fish to suffer. This method is flushing the victim down the toilet. All too often, the water in the bowl is not cold enough to kill the fish instantly. Thus, the poor thing gets chilled badly, whirled frighteningly, and plunged roughly into dark, fast-

83

moving water. If he survives all this, he finds himself helplessly dragged along in a polluted, virtually oxygenless flow of water and debris. A rough way to die? You bet it is. Next time you're ready to flush a fish down, think it over.

There are two methods of killing fishes that are often recommended in good aquarium literature. They are: throwing the fish hard against the floor or wall and dropping the fish in boiling-hot water. I use both methods. The first method is good only with fairly large species. (Small ones just cannot be thrown hard enough, because they are too light.) The trick here is not to be squeamish. If you're going to do the job, do it right: throw *hard!* If you don't, you defeat the purpose and cause the fish excessive pain. Assuming you throw the fish hard enough, it dies instantly upon impact. The fish may move after this, but such movement is only automatic reflex. Needless to say you should throw the fish as quickly as possible after removing it from the water, or it will suffer from partial suffocation. Also, don't throw the fish in the best room of your home unless you're prepared to have it (the room) get all splashed up with water or worse.

Boiling water, of course, also does the job instantly. Really large fishes present a problem, however, because you need a really large pot. This is why I prefer to do away with them by the throwing method. Also, mothers and wives have a way of objecting to this use for their cooking utensil, and the need to destroy a fish does not arise often enough to warrant buying and keeping a special pot for the job.

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Plectrohynchus chaetodontoides, a fish which appears seasonally in Singapore's waters according to the author. Photo by Dr. Herbert R. Axelrod.

Tropical Marines from Singapore

BY RODNEY JONKLAAS
CEYLON

I was waist deep in green but transparent sea water. I was standing on a coral reef about a mile off shore. The location was Singapore island, the time about noon one day in April 1965 at low tide. And I could hardly believe that at my feet were dozens of clownfish, *Amphiprion percula*, several pit-pits, *Chelmo rostratus*; *Chaetodon octofasciatus*; and a good number of *Chaetodonoplus mesoleucus*.

Floundering about closely in the shallows was a small-but-sprightly Mr. Quack Kwong Hong, one of Singapore's chief exporters, who was acting as host to myself and Wim Wijnberg, of Amsterdam. In two boats nearby were Mr. Quek's fishermen-divers, cheerful Malays who puffed and cavorted

85

happily in pursuit of fishes. There was also Mr. Quek's elder daughter and Mrs. Wijnberg, plus other members of Mr. Quek's family and his driver-fishhandler who sat in the smaller boat with a happy grin on his face, carefully nursing two huge plastic bags full of fishes. Our morning's catch was a couple of hundred clownfish, several pit-pits, and a delightful bevy of marine headstanders, *Aeoliscus strigatus*.

After several years of wondering, I at last realized why Singapore tropical marines were exported so cheaply and in such numbers. They are simply supernumerous in the shallow waters around Singapore, which permit skin-diving operations almost the year round. Thus they are very easily collected by anyone who can even wade in with a net!

The day before collecting, I had paid a courtesy call on Mr. Quek Kwong Hong whose home and extensive stocking center was found after con-

Mr. Chou, the expert fish-handler, looks at the camera in between spells of changing water. In the distance is a diver.



Susan, Mr. Quek's eldest daughter, holds a golden sea fan collected by the author off Singapore.

siderable difficulty by an energetic taxi driver. Mr. Quek, with whom I had dealt and corresponded years ago, was delighted to see me. He had already been informed of my arrival by a mutual friend in Belgium, and very soon we were discussing fish, looking at his collection of TFH books on fishes, and also scanning his painstakingly compiled address-book of importers and exporters of fishes the world over. I was flattered to find my name and address under "Ceylon", and I casually mentioned that one of my best customers was in Holland, Wim Wijnberg of "Flying Fish", Amsterdam.

"You like to meet Mr. Wijnberg?" asked Mr. Quek. "He is now here in Singapore and tomorrow I will take you to see him."

This was delightful news. I was expecting Wim in Ceylon a few weeks

hence but did not dream of meeting him in Singapore. And to add to it, my friend Sane' of Bombay was due in Singapore from Perth in 2 days. This would be a splendid minor convention of tropical fish exporters and importers in an ideal city!

The next morning I found my way to Mr. Quek's, and we drove to meet Wim in the city. It was a splendid surprise for him, and we lost no time in telling each other everything about fishes and plants and what was new in the tropical fish world. I was also made to understand that we were on our way to a collecting trip. I immediately purchased a swimsuit.

We then drove several miles and finally arrived at a jetty and transferred ourselves, our lunch, and our odds and ends to an inboard-powered wooden boat, which towed a rowboat in which Mr. Quek's fishermen, Malays, in gay attire and moods to match, sat in a huddled group. We chugged along a creek lined with mangroves until we reached the sea which was green and turbid. We had some distance to go, and on the way we saw the immense *kelongs*, or fish traps, in which men lived out at sea in huts which overlooked the huge nets. Each *kelong* is an elaborate affair like a stockade out at sea and cost thousands of dollars to build. But they must be abandoned after 3 or 4 years, for the sea takes its toll of the woodwork.

At last, after several tries, the fishermen found a suitable spot. We were over a coral reef less than 3 feet below the surface at its shallowest point.

Dascyllus melanurus were seen in the north. Photo by Dr. Herbert R. Axelrod.



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