

# TROPICAL FISH

HOBBYIST

APRIL, 1956

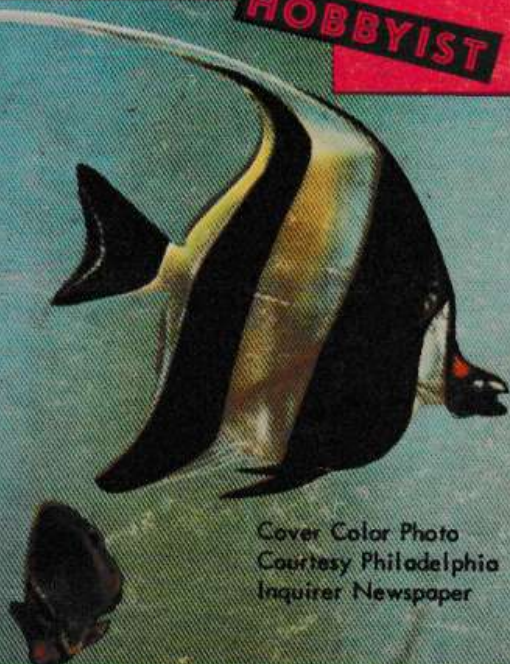
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Siamese Fighting Fish  
in Full Color Series!!  
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Innes' Life History  
\*\*\*\*\*

SCARLET CHARACIN  
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Fabulous TV Tank!!!  
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Miami's SEAQUARIUM  
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**EDITORIALLY...**

For quite some time now we have been working in the background trying to help build the number of aquarium societies into something more formidable. To further this cooperative attitude, we are inviting aquarium societies to send us in their news reports, fish show dates, etc. for our publication. Wherever possible we would like the material sent 3 or 4 months in advance so we can get it into the earliest possible edition. The preparation of the magazine is such that this issue for March-April, 1956 is being written in January, 1956. Thus you can appreciate why so much time is necessary. All types of club news is welcome. Pictures are most desirable and should bear the credit to the photographer.

We are quite pleased to announce that the sales of the HANDBOOK OF TROPICAL AQUARIUM FISHES by Axelrod and Schultz has reached over 4,000 copies the first month of publication. This is a very encouraging sign to us and we heartily recommend that each and every reader obtain a copy from their library (on loan) or buy one from their neighborhood petshop. The book has been accepted by scientists and aquarists all over the world as being the most complete and accurate sourcebook ever published. The price of the 704 page book is \$10.00 and it contains more than 180 color plates (that's 100 more than ANY other book on aquarium fishes), and 450 black and white photographs.

Have you seen the television show "TIME FOR PETS" on Channel 13, WATV Sundays 5:30 to 6:00 P.M.? If you haven't you are missing some terrific entertainment.

**TROPICAL FISH HOBBYIST**

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**FIGHTING FISH**

**SCIENTIFIC NAME:** *Betta splendens*. Described by Regan in the Proceedings of the Zoological Society of London, page 782, 1909.

**RANGE:** The fighting fish is found in Siam (Thailand).

**SCALE COUNTS:** There are 30 scale rows on the body of the *Betta splendens*.

**FIN RAY COUNTS:** The dorsal fin has 4 spines and 6 rays; the anal fin has 5 spines and 25 rays; the pectoral fins have no rays; the pelvic fins have 1 spine and 5 rays each.

**LONGEVITY:** Ordinarily a *Betta* will live 2-3 years.

**TEMPERATURE REQUIREMENTS:** 70-90°F. Breeding is best accomplished at 84-86°F.

**BREEDING**

**THE FIGHTING FISH**

The Siamese fighting fish is perhaps the easiest of the bubble nest builders to spawn. The spawning procedure and preparation are similar to those of most egglayers and all that is needed is a pair of fish in spawning condition, proper water, the correct type of aquarium and finally the correct kind of foods for the developing fry. Let's take each of these separately:

**THE PAIR OF FISH**

Some people might confuse the word 'pair' to mean any two fish; in this case we mean 'two' fish but fish of opposite sex! Telling the sex



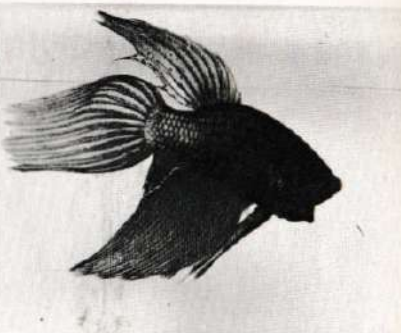
A WILD TYPE FEMALE BETTA, PLUMP AND READY FOR SPawning. PHOTOGRAPH BY G. J. M. TIMMERMAN.

of Siamese fighting fish is simple since the male has much longer fins than the female and the male is always fighting if another Siamese fighting fish (be it a male or female) is in the same aquarium with him and they are not breeding!

**CONDITIONING THE BREEDERS**

It is best to condition your fish in separate aquaria. If separate aquaria are difficult to maintain, then place the male in a small jar and let the jar float in the community aquarium. This problem of separate aquaria being a problem should rarely arise, however, for you must have a separate aquarium in which to breed the fighters and rear their young. If you have the breeding

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A MALE BETTA, WITH FINS FULLY EXPANDED IN A TYPICAL FIGHTING POSE. PHOTOGRAPH BY G. J. M. TIMMERMAN.

tank set up, then place the female fighter into a small jar and float the jar in the breeding aquarium with the male being the only other fish in this aquarium.

Feed the pair continuously, as often as possible each day, with live foods. Tubifex and *Daphnia* are the best foods, though baby guppies or other baby fishes, or frozen *Daphnia* (or brine shrimp) are satisfactory. You must keep your fish on this heavy diet until the female swells up with eggs and you can notice a small white projection from her anal pore. This projection is the only sure sign that the female is ready for spawning. Without this indication the female cannot breed and it will be disastrous to allow the pair to come together if the female isn't ready.

Though it is difficult to observe, the male will also develop this white nuptial projection at the same time that the female manifests her readiness. If, perchance, the male doesn't show this projection, then there are other signs to look for.

When the male sees the female in the jar, he will probably attack the jar furiously (if, and only if, he is in proper physical condition), trying vainly to bite his way into the container. The female might try to get back at him or may simply ignore him depending upon many factors. If the female has been bred before she will only show signs of eagerness to meet the male if she is sexually prepared to breed. If she is not up to breeding standards she will usually ignore the male's actions. On the other hand if she is



The male squeezes the eggs from the female.

a virgin female, she will usually try to reach the male regardless of her physical readiness to breed. This is sometimes difficult to understand.

The male recognizes the female only as a fish. Experiments have shown that the male will be as attentive to a freshly killed female fighting fish as he will to a live female. He will usually attack the jar if ANY other kind of fish is in the jar also. His desires seem to be stimulated by any fish-form in the jar . . . even if there is no fish in the jar and he can see his own shadow, his gills will swell out and he will attack the jar with enthusiastic vigor.

After a little while, once the male has become conditioned, he will begin to construct a bubble nest in

some corner of the aquarium, or even against the jar which holds his bride-to-be. His construction of the nest is proportional to his vigor, condition and size. The more suitable he is for spawning, the larger will be his nest. The building of the bubble nest is the sure sign that the male is prepared for spawning, so look for the white projection from his anal pore when he starts building the nest and then you will know what to look for on the female to ascertain her condition.

When both fish are in prime condition for spawning you need merely tip the jar and allow the female to join the male. If the bubble nest is constructed against the jar it might be easier if you bent your net small enough to fit into the

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The eggs are heavier than water, and . . .



the male catches them before they hit the sand!

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mouth of the jar and then you lifted the female from the jar in the net. In any case consider the bubble nest when you handle the jar in any way.

#### PROPER WATER

The Siamese fighting fish are not one of the "finicky" fish as far as water itself is concerned. They hardly are affected by pH and as long as the water is not too acid nor too basic (within the pH limits of 6.4-7.6), the fish will get along well.

The water level of the aquarium should not be too deep. A depth of five inches over the gravel (if you use gravel and I don't recommend it) is ideal. It gives the male enough time to catch the eggs before they hit the bottom, and it will serve the young well in that they won't fall too far to the bottom so they won't have enough strength to swim to the top again.

As the male prepares his nest, you should be gradually raising the temperature of the water. Your final breeding temperature should be between 82 and 84°F, and a temperature as high as 86°F, is beneficial too. It seems that as the temperature increases so does the color and activity of the fish.

The water at this stage should be crystal clear. Naturally, the water cannot be filtered during the conditioning or breeding stages as it will disrupt the bubble nest. The water should be filtered and aerated BEFORE the fish are introduced (see details below). It is always best to use old aquarium water for breeding the fighting fish be-

cause the old water will more easily maintain an infusoria culture (the first food for the baby fish).

#### THE CORRECT AQUARIUM

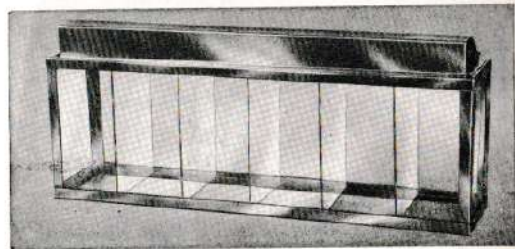
The size of the aquarium is very important. Siamese fighting fish lay about 250 eggs during an average spawning session. If you intend to raise this many babies you must breed the fish in an aquarium large enough to support 250 fish for at least one month. The minimum dimensions for a practical breeding venture would be a 12 x 24 inch base aquarium.

The aquarium should be filled to a depth of five inches with seasoned aquarium water. The water should be filtered until perfectly clear. Bunch plants should be tied together at the base with a strip of lead and two or three bunches placed in various parts of the aquarium. A few floating plants might be used to advantage.

It is imperative that a submersible type heater be utilized with the usual type thermostat for such heaters. The top of the aquarium must be covered completely with a glass or plastic top. A reflector, though not essential, does help matters greatly by attracting the infusoria to the light during the evening hours.

If the aquarium is so situated that the breeders can see other fishes in nearby aquaria, it would be better if you covered the sides of the aquarium with some cardboard or other suitable opaque material. Distractions of other fishes or inquisitive human beings might cause the fish to eat their eggs or

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THE AQUARIA-TYPE STAINLESS STEEL BETTA TANK WITH 6 COMPARTMENTS. THESE AQUARIA ARE MADE IN ALL SIZES. THEY ARE VERY HELPFUL IN BREEDING, DISPLAYING, AND RAISING SIAMESE FIGHTING FISH.

their young. Aside from the distraction of the parents from the care of the fry, they might well be distracted from spawning, though Siamese fighters are known to spawn under practically every known condition.

Special *Betta* tanks are on the market. These aquaria are usually long and narrow and they are manufactured with a slotted top so that pieces of glass may be fitted into the tank to divide it into several compartments. The size of the tanks vary with the number of compartments they are potentially capable of maintaining, so if you order an aquarium from your dealer tell him "I want a 4 (or 6 or 12) compartment *Betta* tank." The tanks were created mainly for the display or Siamese fighting fish, but they can easily serve the breeding purpose just as well.

When used for breeding simply divide the tank into two parts.

Make one section as large as possible by placing the glass in the farthest slot. Naturally, by making one compartment a maximum size, the other compartment is made the smallest. Place the male into the largest compartment and the female into the smallest compartment. After they are in breeding condition you can either remove the partition or, if the nest has been made against the glass partition, you can simply lift the female into the other compartment with a net.

I have found that the compartment type aquarium is valuable for other reasons too. Many times when I breed the Siamese fighters I leave the last partition in and when the time is ripe I begin my infusoria culture in that compartment. The glass doesn't fit too tightly usually, and the little microbes can swim into the whole aquarium. More about this technique under feeding the fry.

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The male then blows the eggs into his nest.

By keeping the compartment up you also have the advantage of being able to place the female back into the compartment if the male gets too rough or if she is a little too stubborn to breed.

Just in passing, it should be mentioned that the compartment type aquarium is also very suitable for egg-laying fishes of all types (if they are small) and for livebearers. Then if you have your pregnant female in the large compartment, you can always catch the newborn livebearers and place them into the small compartment until they are large enough to be placed back in with their parents. Thus you don't have the problem of another aqua-

rium to heat and maintain.

I also find another two uses for the small compartment after I've placed the female into the male's compartment. That is for filtration and aeration.

Ordinarily it is impossible for the Siamese fighting fish tank to be aerated or filtered during the breeding session because the flow of air bubbles and the turbulence would cause the bubble nest to break up. But, if you aerate and filter the water in the empty small compartment, then the water in the large compartment will benefit greatly. This is a very successful technique and should be adopted by all breeders.



He then tends and guards the eggs until.....



the eggs hatch and the young are swimming.

It should be mentioned that if you don't have a *Betta* display tank you can do the same thing by placing a breeding trap with slotted bottom (the kind usually used for breeding livebearers) inside the aquarium and put the airstone in the trap. Have the top of the trap above the water level of the aquarium so the turbulence does not disturb the surface of the water and destroy the bubble nest!

#### THE CORRECT FOOD FOR THE FRY

After your fish have spawned you must remove the female and allow the male to tender the fry. He will take great pains to make certain that the fry which wiggle free of the nest are placed back where they belong. At a temperature of 85°F, the eggs will hatch in 33 hours. After the eggs hatch the young stay suspended in the mass of bubbles for another 48 hours until they become free swimming. During the 48 hour stay in the bubble nest you might notice some fry falling from the nest and struggling to get back. It is important that the water level be low at this time as the young can only swim a few inches and if they fall too far and can't get back to the surface, they will suffocate.

After the fourth or fifth day the fry actually look like real baby fish and they leave the nest and swim about searching for food. By this time the bubble nest is merely a few scattered bubbles and if you look down on the top of the water you can see hundreds of tiny black dots moving about in short, jerky movements. Feeding the fry should

begin at this time.

The first food should be infusoria and egg yolk infusion.

Infusoria are tiny microscopic animals that move about in the water. There are many hundreds of different kinds of infusoria which make good food for the baby fishes, but without a microscope it would be impossible for you to tell which is which and the problems of raising a pure infusoria culture are enough to discourage anyone but a scientist!

It is easy to purchase infusoria tablets or powder from your pet-shop. A new product is on the market called "Infusyl." It guarantees that you can produce living infusoria in one hour. (This product is manufactured by Longlife Fish Food Products in Union City, N. J. Ask your dealer to get it for you if he doesn't stock it.) This is very important to know because you must begin feeding your fish infusoria immediately after they become free swimming.

Let's assume that you bought the 'slow' infusoria tablets (or powder). Now get about 20 grains of rice and crush them; also a few pieces of spoiled lettuce leaves. Put these into a small refrigerator jar and add some water from an old aquarium. Place this culture in the sun, if possible, by the window inside the house. Keep it at room temperature. Within a day or two the water should become cloudy with tiny organisms swimming about. These are the infusoria and bacteria which the fry will feed upon.

You can feed it to the fry by

pouring in a small glassful of the culture every few hours and replacing it with water from the same aquarium; or you can set up a drip bottle, prepared in such a way that a drop of the culture drips into the tank every minute or two. Either method is satisfactory.

Many people ask the question: "Should I leave the light on the nursery tank every night so the fish can see what they are eating?" The answer usually is "Yes!" but it can also be "No!"

In the dark the fish do not move. They merely remain in a semi-stationary position. In this state they grow slowly and use little energy, thereby reducing drastically their need for food. Thus they can get along for 10 hours or so without any food.

With the light on they move about searching for food, thus they must find it to replenish their supply of used-up energy.

If you are in a hurry for the fish to grow, then leave the light on (it helps in the growth of the algae and this might be beneficial for the fry), but if you want to conserve money on electricity, then feel assured that the light is not absolutely necessary.

Along with the infusoria, or instead of the infusoria, you can offer the fry egg yolk infusion. The infusion can be prepared in many ways and is the best fish food for any kind of baby fish. First boil a chicken's egg for 10 minutes until you are certain that the yolk is hard. Then cool off the egg and remove the yellow yolk. Take a small piece of the egg yolk and put it

into your handkerchief or another piece of clean cloth. Now twist the handkerchief with the yolk inside until you actually squeeze the yolk right through the fine pores of the cloth. When a little has been squeezed through, merely shake it in the water until the fine cloud of yellow yolk particles can be seen fogging the aquarium water. Do this every hour or so, if possible.

You might foul the water if you have gravel on the bottom, so take care! At this stage it is safe to introduce snails to the breeding tank (you couldn't do it before because they would eat the eggs, but my experience has been that even if there are snails in the breeding tank, the *Bettas* will usually kill them before they start breeding). The snails will eat the uneaten particles of egg which fall to the bottom and are not eaten by the baby fish.

If you can get your hands on some powdered egg yolk, then the battle is won and you may offer that to your fish directly. The egg, besides being nutritious of its own merit, also supports an infusoria culture of its own and the few infusoria that are to be found in every old aquarium are sufficient to begin a strong culture when the proper food for them arrives.

Many people (including the author) begin their infusoria culture in the breeding tank as soon as the fish have accomplished their reproductive purpose. They use the small compartment and merely place in a few pills or some powder and then add a little torn, soiled lettuce leaves. This is a fine and easy

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## Tropical Fish Hobbyist

method to handle the first week's food for the fry, providing you don't foul the water!

When the fry are a week old, they must be offered larger and more nutritious food. True, many of the fry at this age will still be feeding upon the infusoria and egg, but if you want them to grow fast and well you should offer some sort of crustacean food. The best available is the nauplii (new born) of cyclops or *Daphnia*. Again it is possible to culture these in the same aquarium with the fish PROVIDING the tank is large enough. Then, as the *Daphnia* breed, the young can gobble up the nauplii. Lately, since the appearance of the less expensive brine shrimp eggs, more and more breeders are turning to using these eggs as a source of food. The eggs are hatched in a separate container (directions for hatching are to be found on every package) and they are netted or siphoned out and fed directly to the fry. There is no doubt that this is the finest possible food for growing *Betta* fry. The fry should be maintained on this diet until they are old enough to take tubifex worms and large *Daphnia*.

### THE ACTUAL SPAWNING PROCESS

When both male and female are ready for spawning, and the male has completed his bubble nest, the spawning process begins. The male will chase the female, first gently, then a bit rougher, until he finally entices her under his nest of bubbles. He uses various devices to

lure her to the nest; sometimes he dances in front of her with his beautiful fins spread in a gorgeous array; other times he bites her and makes life so difficult for her that unless you remove the female he will surely injure her (this is a sign that she is not ready). Regardless of the female's willingness to breed, she always likes to be induced. (This seems to be true of all female animals!)

Finally, after an hour or more, the female follows the male under his nest and they awkwardly embrace with the male's body wrapped about the female's. Usually the first couple of embraces fail to produce any eggs for the eggs have a long oviduct to travel inside the body of the female and it requires the constant pressure of the male to squeeze them down the tract. After the first attempts the male will finally be successful in producing eggs from the female and his embrace will result in 15 or 20 white eggs falling slowly from their embrace. The embrace is so arranged that the anal pore of the male is approximately touching the anal pore of the female. External fertilization takes place during the embrace. Immediately prior to the actual expulsion of the ova, the female is rendered immobile by the action of the egg-filled oviduct against a few delicate nerves! After the male releases her from the nuptial embrace she merely floats away, frozen in an orgasmic position, until she returns to normal after a 45 second interval. This interval of time is very important to the reproductive cycle as it gives the

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March-April, 1956



THE SIAMESE PEOPLE LOVE TO WATCH THE FISH FIGHTS. THEY WAGER ON THE OUTCOME OF THE FIGHTS; THE LOSING FISH IS BARELY KILLED, HE MERELY RETREATS. PHOTOGRAPHS TAKEN IN BANGKOK, THAILAND, 1951.

male time to pick up the falling eggs in his mouth before the female has a chance to eat them. Many times the female recovers before the male has picked up all the eggs, in which case she will pick up the eggs too, but instead of placing the eggs in the bubble nest (see this sequence illustrated in color on the cover) she will eat them!

This spawning procedure will take a few hours until, finally, the male will not be able to induce the female to come under his nest again. At this time the female should be removed or the male will surely kill her (unless the tank is

large enough for her to hide from his view).

Since for all practical reasons you might not be there at the exact instant of the completion of spawning, it is wise to have a few bunches of plants laying about on the bottom of the aquarium behind which the female may hide until you are able to remove her.

In nature the female merely swims away from the male when she is finished spawning; the male continues to tend the nest and the developing fry. Keep the male with the young and the eggs until the fry are free swimming.

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March-April, 1956



MR. O. TUTWILER RAISES MANY SIAMESE FIGHTING FISH IN HIS HATCHERY IN TAMPA, FLORIDA. THIS IS A VIEW DOWN ONE AISLE. HE BREEDS THE FISH IN THE TANKS ON THE RIGHT; HE RAISES THE FRY IN THE Pools ON THE LEFT. RIGHT, KEEPING THE Pools FRESH WITH FRESH SPAWNING OF FIGHTING FISH. THOUGH THEY ARE ALL THE SAME AGE, AFTER 4 OR 5 WEEKS HIS DAUGHTER (AGE 1) SEPARATES THE SEXES AND PLACES EACH MALE IN A SEPARATE JAR ON THE LEFT WALL. TUTWILER HAS 10,000 MALE BETTAS AT ALL TIMES, IN ONE OR ANOTHER STAGE OF DEVELOPMENT.

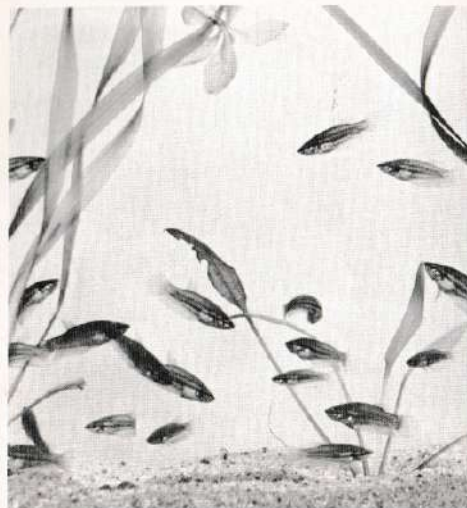
### RAISING THE BETTA TO MATURITY

Once your fish have reached a half inch long (this should take about a month), you will find another problem has arisen. The males, even at this age, will begin to attack one another. The only safe way to handle this problem is to isolate each male. This is easier said than done and in every commercial hatchery you will find row upon row of *Betta* jars. Usually the jars are quart Mason jars, or the small size goldfish bowls which are available at any petshop. I pre-

fer the goldfish bowls because they are easier to see through and they are easier to clean. In the long run they are cheaper too!

Select the males by their longer fins and more intense coloration. Look especially for red colors in males. Females usually develop their red colors late in life, while males get their red colors early. You must have the jars in a room which is fairly warm as it is impossible to put heaters in each and every jar. If worse comes to worse you may have to place the jars in a large aquarium which is filled deep enough to come halfway to

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A SCHOOL OF WILD-TYPE BABY SIAMESE FIGHTING FISH. AT THIS AGE THEY BEGIN TO FIGHT EACH OTHER AND THE MALES MUST BE SEPARATED. PHOTOGRAPH BY GERRARD J. M. TIMMERMAN.

the top of the goldfish bowls (or jars). Then have a large heater keeping that water up to 84 or 86°F.

If you are a fancier and are interested in only a few really fine specimens of fighting fish, then merely pick out the two or three largest males and give them special care to insure that they get large *Daphnia* and a few worms every day. Leave the rest of the fish to

grow up as best they can and when they are 6-8 weeks old take them down to your local petshop and sell them to him as unsexed baby Bettas. Don't expect to get too much for them as they are usually more of a headache to the dealer than a blessing. Then he is faced with the responsibility of taking out the males as they develop or else he'll have a tankful of fish with torn fins!

### DISEASES

The Siamese fighting fish, like all fish, are susceptible to certain diseases. Aside from the common diseases, which are treated fully and in great detail in the work **DISEASES OF TROPICAL FISHES** (by Herbert R. Axelrod; available at your petshop or from TFH Publications, Inc., 91 Jackson Avenue, Jersey City 5, N. J. for 50¢), the fighter is susceptible to four important afflictions.

#### VELVET DISEASE

Sometimes for no apparent reason, your fighters will start dying off like flies, first one, then two and finally in the final stages many will die every few hours. From a quick look at the fish they look perfectly healthy, but should you look closely, you will find that they are literally covered with very small, fine white spots. When viewed with reflected light this covering of spots appears as a coating of velvet and that's where the disease got its name.

Velvet is a disease caused by a small plant scientifically known as *Oodinium limneticum*. If it is caught in its earliest stages it is very simple to cure.\* There are three simple methods to cure this disease:

1. Place a copper sponge in with the fish; the minute amounts of soluble copper sulfate on the sponge will be enough to kill the velvet without killing the fish.
2. Put the fish in COMPLETE and total darkness. The plant cells will die because they depend upon light to manufacture their food.

3. Add 4 drops of a 5% aqueous solution of methylene blue to each gallon of water in which the fish are maintained.

It is wise to combine the first and second technique with the third. In other words whether you use the copper treatment or the darkness treatment, use methylene blue as well.

#### BLOODY FIN DISEASE

Bloody fin disease is actually a bacterial infection and is simply cured by the addition of 500 mg. of Terramycin hydrochloride or Aquaracycline per gallon of water. Aquaracycline is the name given to a very satisfactory antibiotic (Tetracycline hydrochloride). The symptoms should be cleared up in 48 hours, but repeat the treatment every day for 5 days anyway.

Most diseases of Bettas are due to chilling during transport or during a cold night in the fall or spring of the year. Be careful! It is easier to keep your fish healthy than to cure them.

#### ICH

Large white spots on the fighting fish are caused by a protozoan parasite known as Ich (short for *Ichthyophthirius*). In order to cure this disease you must place the *Betta* into an aquarium and raise the temperature of the water to 88°F. Keep the fish there until the spots leave him then add enough Ich remedy (available from your petshop with directions for use on the container) to kill the free swimming parasites. (The heat makes the white spots (eggs) hatch out and become free swimming. The



A MALE SIAMESE FIGHTING FISH SHOWING VELVET DISEASE. NOTE THE FADING APPEARANCE OF HIS BODY. PHOTOGRAPH BY LAWRENCE E. PERKINS, F.L.S.

drug, administered at this time, kills the free swimming parasites). If your petshop doesn't have an Ich remedy then you can use Koi-sher-type salt; add four heaping tablespoons per gallon of water. Leave the fish in there for about 30 minutes then remove him to another aquarium with freshly conditioned water at the same temperature at which he was treated. This is easily done by floating a small container in the aquarium which was heated. Add 2 drops of 5% methylene blue solution to this container, per gallon of water, and the fish should be cured. Repeat this treatment if necessary.

#### FUNGUS

Sometimes when a *Betta* spawns or has a fight it might get a slight

fungus infection. The fungus might also attack a fish which was chilled or one which just has experienced a drastic change in water conditions. Treat the fungus with salt and methylene blue, as per the Ich treatment. If possible, after the treatment with salt and methylene blue, place it back into fresh water with some antibiotic added, 500 mg. per gallon.

With all the treatments herein recommended, it should be borne in mind that the 500 mg. of antibiotic per gallon dosage can be cut in 1/2 if you are only using a quart container to treat your fish in. Thus 100 mg. per quart would be a close enough dosage (though 150 mg. for the first treatment might be better).

WILLIAM THORNTON INNES by Herbert R. Axelrod



WTI aged 3

It was the day of the Army-Navy football game, 1955, that Gerrard Timmerman and I decided to drive down to Philadelphia and visit with Wm. T. Innes, the "Dean of American Aquarists." I carried with me a copy of the just-published "Handbook of Tropical Aquarium Fishes" which I wanted to present to my good friend. Upon our arrival at Innes' home I was amazed to find Dr. and Mrs. Leonard Schultz (co-author of the "Handbook"). It was the first time either of us had been at Innes' home, though I have spent hours at his office.

Since I had the idea for some time that I should do a biography of "Mr. Tropical Fish," Innes gave me the incentive by showing me his family album. It was rather a complete album, the kind that an amateur photographer would have, with pictures of himself and his family in every stage of a very full life.

\*A phrase I borrow freely from Myron Gordon's description of this same fellow.



Innes at age 24

Innes was born in Philadelphia on February 2, 1874, of a Quaker mother and Southern father. His dad was a newspaper typesetter in the days when type was set by hand . . . a rapidly dying art at that time, as linotype machines were just being mass produced. Taking the bull by the horns the elder Innes quit his job with the newspaper and opened up his own small printing shop in 1898. It was at this stage that W. T. I. had his future cut out for him and he started his apprenticeship in another printing shop. From copy boy to errand boy to printing salesman, Innes worked his way through the basic education of a printer, until finally he was capable of joining his father as a producing member of the firm. Two years later, joined by his brother, the family formed the firm of Innes and Sons, Printers, an organization later noted for their fine printing.

W. T. I., in the meantime, was still actively engaged in learning the fundamentals of good printing and in those days every sheet of paper that was printed had to be fed by hand into the press (compared to the press on which this very sheet was printed which takes 3,500 sheets per hour and prints several colors at a time). This was Innes' first job and he learned it so well that in a matter of a few years he was looked upon as one of the most skillful printers in Philadelphia.

The story of how Innes got into the fish world is of interest. It seems that even as a boy he had an interest in fish and Myers relates: "His maternal grandfather's home backed on the Delaware River at Bristol (Pennsylvania), and here was a spring on the lot, built with a hogshead sunk in the ground. The spring was overflowed by high tide by the Delaware River, and each day at low tide there would be different fishes left in the hogshead. These fishes fascinated young Bill and he wanted them badly, but he never succeeded in catching any. At another time he saw a goldfish caught with the herring at Bristol wholesale fisheries and carried off in a bucket by a man, Bill says he never finished wishing for that goldfish. Again, he was given a glass bowl that had been used by his mother to cover wax flowers. He set it in a wood and plaster-of-paris base and made a fish bowl of it. Its only inhabitants were snails from the Schuylkill River, but it was an *aquarium*." Thus we have the story of how Innes got his first aquarium.



Innes 11 years old

From this his interest grew and grew in fish until quite by chance he was invited to a meeting of the Aquarium Society of Philadelphia. This meeting was the turning point in his life, for after once having seen the many varied and beautiful fancy goldfish on display at this meeting, he became a goldfish lover, going on to keep fancy varieties himself. (As a matter of fact, Bill showed me with pride the now empty goldfish pond in the back of his home.)

At the Aquarium Society in 1906 he met a German-American aquarist, Herman T. Wolf. Wolf had written a manuscript entitled "Goldfish Breeds and Other Aquarium Fishes." It was a huge manuscript, beautifully illustrated with drawing done by Wolf himself. Wolf was a fine draftsman and a very temperamental fellow, for after several rejections of the manuscript by the usual publishers, he approached Innes with the idea of publishing the book. Innes wasn't too keen on the idea, but when Wolf told him that if he didn't publish it he would burn the manuscript, Innes changed his mind.

Here is the story as I find it: Innes the elder set the entire 336 page book by hand in his spare time. The typesetting job was a masterpiece, embodying the skill of a great craftsman. Then W. T. I. himself printed the book, 4 pages at a time, on a small job press. Printing of this sort is extremely expensive (modern presses print 64 pages of this size at a time), it took a year of tedious presswork and some ten years to sell out all 1000 copies finally, at a loss of at least \$1,000.00.

The Wolf book for years has been a collector's item, but I am the proud possessor of a copy, presented me by W. T. I.

At about this time (1916) the importation of tropical fishes for the first time became active, and Innes proposed to Wolf adding them to a new edition of the Wolf book, who rejected the idea. They split, and after paying Wolf for the old copyright plus a royalty, Innes re-wrote and re-illustrated the entire book, under the title "Goldfish Varieties and Tropical Aquarium Fishes." It took this excellent book several years to "catch on," but by 1920 it was rolling, and 32 editions were sold by 1934, to be replaced in 1935 by Innes' real masterpiece, "Exotic Aquarium Fishes," now still going strong.

As a natural consequence of his success in the publishing field, Innes became interested in reviving the defunct "The Aquarium" magazine. This magazine was published 1912-14 jointly by four aquarium societies (New York, Philadelphia, Brooklyn and Chicago). Innes said that it lasted less than two years when the societies ran it because of the difficulty of the editor in getting the material together in time for publication. Innes

Dr. Leonard P. Schultz, Gerrard Timmerman, W. T. Innes, and the author, Herbert R. Axelrod as Innes inspects the newly published Axelrod-Schultz HANDBOOK.



launched "The Aquarium" in 1932, using his own material and photographs.

Temple University of Philadelphia, conferred the honorary degree of Doctor of Humane Letters upon Innes in 1951. This was excellent recognition of the achievements of his lifelong devotion to the aquarium hobby.

He was several times president of the Philadelphia Aquarium Society, as well as of The Typothetae, the trade organization of Master Printers. While in the latter capacity he was responsible for the founding of a now famous school for printing in connection with the Dobbins Vocational and Technical School of Philadelphia.

**IN PASSING . . .**

We really did some passing this time! First Mrs. Axelrod and I drove down to Florida to visit with O. Tutwiler and to see some of his fabulous new Swordtails. He obtained his original stock from Dr. Myron Gordon of the Genetics Laboratory, New York Aquarium, and through sensible selective breeding he has developed a 6-inch swordtail that is remarkably brilliant in color, very hardy and very fertile. Before we left for Tampa we visited Dr. Gordon at his laboratory atop the American Museum of Natural History. Dr. Gordon has about 600 small aquaria in the various sections of his lab where he breeds platies and swordtails according to strict genetic schedule in order to learn as much as possible about the basis of inheritance in these small fishes. Most of Dr. Gordon's work is directed at a better understanding of the cancer problem and his laboratory aquaria bear many examples of unique type cancers. One of the most interesting to me was the albino swordtail with a black cancer (melanoma). This is quite odd as albinism by its very definition is the absence of black pigment.



Tutwiler's Swordtails—from Gordon's stock.



Donn Eric Rosen Relaxes During Research



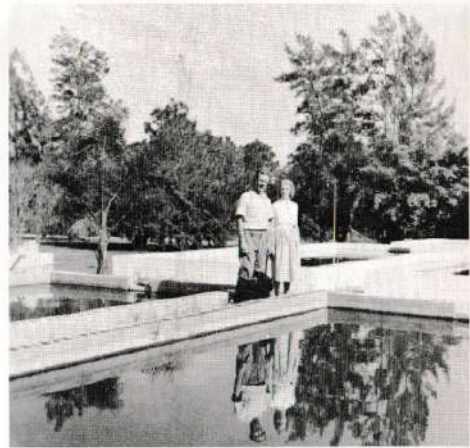
Dr. Myron Gordon, author of the recently published book SIAMESE FIGHTING FISH, shown in his laboratory.

Working with Dr. Gordon is my good friend Donn Rosen, probably the world's leading expert on the gonopodial structure of small livebearing fishes. Our readers have had a chance to meet Donna in his article on mosquito fish...he was also the first person on record to have been able to breed the rare *Tomemurus gracilis*.

I have known Tutwiler for a good many years now and I can say, without exception, that he is as active and progressive as any breeder of tropical fishes can be. His mind is always working on new gimmicks to make tropical fishkeeping a more pleasant and more enjoyable pastime...and the development of his new TV Tank is certain to set some people to thinking about aquarium design.



Tutwiler's TV Tank



Tutwiler and daughter...they raise Daphnia in this pool.

Tutwiler has been experimenting with tank design for four or five years now and many of his aquaria set the style for the more modern designs. He was the first one to use a curved glass aquarium...and this is only one of his major accomplishments. To me his greatest accomplishment is in training his daughter to breed fish. Even at the young age of 10 years old Martha has been able to sex 3-week old Siamese Fighting Fish; lately she has been successful in breeding some of the hardest-to-breed fish we know. I saw her spawns of the never-before-bred *Exodon paradoxus* (we are preparing a story on this fish for the next issue of TFH), and other rare fishes, but like everything else, her time must be spent on more profitable enterprises and she can only "fool around" with these fishes in her spare time.

Continued on page 34



Continued from page 31

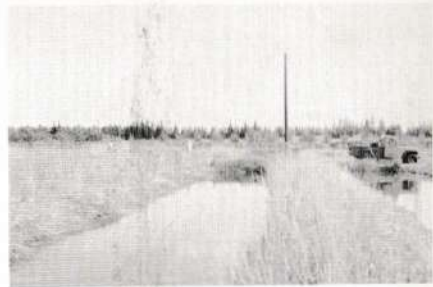


Miss Martha Tutwiler, first person to spawn *Exodon*.

The Tutwiler Tropical Fish Farm is very different from the rest of the fish hatcheries around the Tampa area. For one thing they only specialize in egg layers. For another, they do not use pools dug into the ground but prefer smaller pools above the ground made from concrete blocks. Tutwiler says that pool fish are too hard to acclimate to an aquarium and there are heavy losses in the transition period. He prefers to raise his fish in tanks and small pools. To shade the pools from the hot sun he uses Spanish moss which grows from the trees, telephone lines and any other projection in that area.

Once his fish spawn, Tutwiler feeds the young on Sanders Brine Shrimp raised in trays. He gets a better hatch that way, he says. Taking care of the brine shrimp is another one of Martha's jobs.

Besides breeding tropical fish, Tutwiler raises parakeets, fancy fowl, fancy rabbits and fancy covies. Dealers interested in his price list may write to him at P.O. Box 2624, Tampa 1, Florida.



The open pools in which most Tampa breeders raise their live bearers.

Martha Tutwiler tends the brine shrimp



Miami's fabulous SEAQUARIUM!!

After leaving Tutwiler in Tampa we drove on down to Miami to visit the new Miami SEAQUARIUM on Rickenbacker Causeway on Virginia Key. The SEAQUARIUM is under the capable control of the curator Craig Phillips. Phillips has conducted and is still conducting experiments to determine how best to re-create the natural habitats of thousands of marine tropical fishes and marine animals.

"It took months of testing to discover how we could filter the saltwater to prevent formation of green algae and bacteria on the inside of the 50- and 80-foot main tanks, as well as the 26 six-foot corridor tanks," the tall soft-spoken zoologist said. "The chemicals must destroy any bacteria in the water which might cause fungus growth on the fishes' fins and tails, yet not affect the health of the fish," he added.

Craig has supervised construction and installation of the revolutionary fiberglass aquariums in the circular viewing corridor around the main tank. The main tank is a two-story circular steel structure 240 feet around, 17½ feet deep and contains 565,200 gallons of salt water and some of the most varied marine specimens found anywhere in the world.



The corridor of the SEAQUARIUM is lined with small marine aquaria... if they only had freshwater tropicals.

The corridor tanks, measuring four and one-half to six and one-half feet in length, are underwater showcases for communities of brilliant marine fish and sea life—everything from octopuses, seahorses, cowfish, loekdowns, sea anemones to hermit crabs, porcupine fish and Splendid Razors.

"These aquariums," Phillips said, "are designed and lighted especially to encourage photographers to 'shoot' and zoologists to study the unusual and beautiful specimens we are collecting here. The Sargassum fish with its seaweed disguise; the Frogfish that attracts its prey with a tiny fishing pole on its forehead; the little horned Cowfish with its teapot snout—these and thousands of other odd creatures will capture the imagination of the color camera enthusiast."

Phillips has created nature-like habitats for the fish as well as designing artistic panorama scenes as backdrops for the plastic tanks. His technique would make an aquarist's mouth water and some of his ideas are so original that they are breathtaking. His backgrounds are usually curved around the outside of the back of the aquarium and contain rocks, sea fans, coral,



Marine aquarium designs by Craig Phillips.



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Capt. Gray and associates collecting specimens for the SEAQUARIUM.

etc. Maybe his artistic background (he does scientific drawings for National Geographic Magazine) has something to do with this unique ability, but I urge every aquarist to visit the SEAQUARIUM and look over the work of this aquatic artist.

In the corridor tanks we find many unusual and very beautiful marine specimens which are the size that would interest a marine aquarium enthusiast. The specimens are collected by Captain William B. Gray, a twinkly-eyed Randolph-scotsman with a logbook of 40 years on the briny deep. He has chased down and identified more than 2,500 different kinds of fish.

Capt. Gray and his associates, Emil Hanson and Ed 'Woodie' Woodford, have spent the past year collecting every conceivable kind of marine life form for the SEAQUARIUM'S many aquaria. He is a specialist in the small aquarium sized fish and he has captured some prizes that have never before been seen in an aquarium.

When the going gets tough and Emil and Woodie dive down among the coral reefs and collect individual specimens with a hand net and some of their Neon Gobies and the like are really breathtaking. It takes a lot of small fish to fill the large 26 marine tropical aquaria that are to be found in the SEAQUARIUM and I tried to get the boys interested in collecting some aquarium specimens for some of our wholesalers . . . we'll see how successful I was.

After leaving Miami, Mrs. Axelrod went on to the Bahamas to collect some marine fishes of her own, while I went on to England and Spain (to collect some *Aphanius iberus* and *Valencia hispanica*, I'll tell you how lucky I was in the next issue!)

H. R. A.

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## AQUARIUM SOCIETIES

The Bronx Aquarium Society is having their Annual Guppy Show on March the 10th and 11th (Sat. and Sun.) at the Cornish Arms Hotel, 311 West 23rd St., between 7th and 8th Avenue, Twelfth floor. Everyone is invited to come and compete or to view the many exotic guppies.

There will be four guppy classes, Veil Tail—gold, black, red and blue class, Double Sword and Lyre class, Top Sword and Bottom Sword class, Open and Common class. All entries must be in by March 5th.

A cup will be given for the first, second and third prizes of each class. Also there will be a cup given for the best female of the show, and a cup for the best of the show. Three well known people have been selected to be the judges. A prize will be given away every hour during the entire show.

A hundred guppies will be on exhibition, and over 10,000 viewers will attend. This is going to be the largest guppy show in the Metropolitan area. If you will be in New York on the 10th or 11th of March, we would like you to visit our Annual Guppy Show.

For further information please contact, Martin Sebel, Chairman of the Committee, 2249 Morris Ave., Bronx, N. Y., Tel. Cypress 8-0322.

### MEETING OF THE INTERNATIONAL FEDERATION OF AQUARIUM SOCIETIES

The International Federation of Aquarium Societies is planning a convention of all members and interested parties in Chicago on April 14th and 15th. The host club will be the Mid West Aquarist Club, Mr. Ward Hanson, president. The meeting will take place at the Austin Town Hall. People interested in attending should contact either Mr. Robert Troy, 3742 West Huron Avenue, Chicago 24, Illinois; Mr. Ward Hanson, 1826 Crescent Avenue, Park Ridge, Illinois; or Mr. Don Abel, 2904 Probasco Court, Cincinnati 20, Ohio. There will be guest speakers and a very interesting program. The editor of TFH, Herbert R. Axelrod, will be one of the speakers, and plans will be discussed for enlarging the movement. We urgently request that all aquarium societies, throughout the country, have a representative at this meeting if at all possible.

### LONDON AQUARIA SOCIETY SEEKS MEMBERSHIP

At present some 50 members, with a future potential of 100 hobbyists, by May 1956, have formed "The London Aquaria Society." This active nucleus promises to become the centre for the hobby in Southwestern Ontario. Those interested in being associate members with this society should contact the Secretary, Mr. Ken Milson, 4 Landor St., London, Ontario, Canada.

The provisional Board of Directors set up for the year ending 31 December 1956 are as follows: Chairman—C. A. Kuppke, Vice-chairman—Neil Day, Secretary—Ken Milson, Treasurer—Bill Moisse, Convener—Bill Palmer.

The Miracle Filter Co., of Long Beach, California announces that they have several instructive bulletins available free to whomsoever wants them. The titles of the bulletins are as follows: Biological Filtration, Spawning Betas, No Ice, How to Grow Amazon Sword Show Plants and the Water Softener and Hardness Testing Kit. Anyone interested in one or all of these bulletins should merely request them on a postal card.

Mid Union Aquarium Society, a group of amateur hobbyists interested in the breeding and raising of Tropical Fish will present their Third Annual Show at Rendals, Route 22, Greenbrook Township on April 7th and 8th.

The exhibition will be open to the public on both sessions, no admission will be charged. On Saturday, April 7th at 9 P.M. the New Jersey States Tropical Fish Championships will be judged. Prizes, Rosettes and Trophies will be awarded.

The committee chairman, Sam McWhorter, assisted by Mr. Downie Rutherford, Mr. Walter Kelly, Miss Helen Corenholly, Mr. & Mrs. Alfred Lohse, Mr. & Mrs. George Lawrence, Mrs. Marjorie McWhorter, Mr. Joseph Komple and Mr. George Dahl anticipate an attendance of 1500 exhibitors, guests, dealers and general public to view the exhibit of approximately 125 aquariums.

## Tropical Fish Hobbyist

# THE AMAZING NEW FISH CALLED THE SCARLET CHARACIN

(From a Letter by Dr. Leonard P. Schultz)

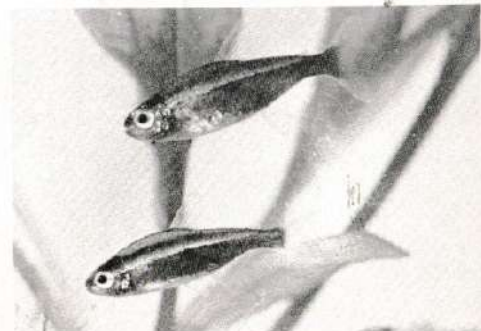
February 15, 1956

Dear Mr. Axelrod:

The two little characins that you sent to me are a gorgeous species referable to the subfamily Cheirodontinae and to the genus *Cheirodon*. It is indeed an exquisitely colored species and should be one of the popular favorites for aquarists.

As I have told you many times, characins are notoriously difficult to identify and this one was no exception. Because of the small size, detailed observations of characters must be made under the microscope. The following characters place these 2 specimens in the genus *Cheirodon*.

(1) teeth in both jaws in a single series and similar in shape, (2) distal edges of teeth "multicuspid" or with 5 cusps, a large central one and 2 smaller ones on each side, (3) 1 or 2, probably 2, teeth on maxillary, (4) teeth in neither jaw forming a continuous cutting edge, (5) lateral line incomplete, with 5 or 6 pores, (6) adipose fin present, (7) caudal fin scaled basally, (8) origin of dorsal fin equidistant between tip of snout and base of caudal fin, (9) origin of anal fin slightly behind a vertical



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line through the rear of base of dorsal fin, (10) gill membranes free from isthmus and attached far forward, (11) midline of belly rounded and covered with scales, not trenchant.

This scarlet characin as defined above should be referred to the genus *Cheirodon* as broadly defined by the late Dr. Eigenmann and by work in progress by Dr. Böhlke of the Academy of Natural Sciences of Philadelphia. However, in reviewing the literature available to me I am unable to find any species in that genus or a closely related genus that fits these 2 scarlet colored specimens. Therefore, I conclude that it represents an undescribed species and since you have been so kind as to send it to me for scientific study and to the U. S. National Museum for permanent preservation, I am pleased to name it in your honor.

#### **CHEIRODON AXELRODI, new species**

The holotype bears USNM 164483 and the paratype USNM 164484. They measure 22 and 20.5mm, respectively, from snout tip to base of caudal fin, and came from near Porto Velho, Brazil.

The following counts were made on the two specimens: Dorsal rays ii,9 and ii,9; anal iii,17 and iii,17; pectoral i,9-i,9 and i,10; scales from upper edge of gill opening to base of caudal fin 31 and 32; pores in lateral line 5 and 5 possibly 6 on one side; scales in a row from dorsal origin to midventral line just in front of anal origin 10 and 10; predorsal scales 10 and 10; prepelvic scales 10 and 10; teeth on premaxillaries 5-5 and 5-5; teeth on maxillaries 2 and 1 or 2; teeth on dentary 5-5 and 5-5; gill rakers on holotype 7 + 11.

The proportional measurements are: Head 3.6 and 3.4; greatest depth 3.4 and 3.3; length of caudal peduncle 6.0, all in the standard length. Eye 2.6 and 2.7; snout 4.1 and 4.1; interorbital space 3.8 and 4.0; tip of snout to rear end of maxillary 2.6 and 2.8; least depth of caudal peduncle 2.9 and 3.0; length of caudal peduncle 1.9 and 1.8, all in head length.

Pectoral fins reach almost opposite pelvic insertion; pelvics do not reach quite to anal origin; dorsal origin equidistant between tip of snout and midbase of caudal fin; anal origin equidistant between rear edge of pectoral base and midbase of caudal fin; second suborbital expanded to cover area from eye to preopercle below eye; third and fourth sub-orbitals not quite touching the preopercular edge.

Coloration consists of a brownish back and upper sides with the lower half of the fish bright red including the caudal and anal fins; dorsal surface of the head behind orbits dark brown; a narrow wedgeshaped dark pigment streak on preorbital area, adipose fin with dark pigment.

The two type specimens upon dissection were found to be fully mature females. I am unable to find the usual glandular scales on the

caudal fin base nor do the peduncular "spines" appear to be present along the dorsal or ventral edges of the caudal peduncle, characters usually found only in males.

This species differs from all other members of the genus in having the lower half of the body, along with the caudal and anal fins, bright red. There is no dark caudal spot, nor a dark shoulder spot, and the dorsal fin is plain in color.

Dr. Eigenmann (Mem. Carnegie Mus. Vol. 7, pp. 64-83, 1915) revised the genus *Cheirodon* and summarized the then known knowledge about the species referable to the genus. Among the species listed by Eigenmann the following have more than 32 scales: *parahybae* Eigenmann; *interruptus* (Jenyns); *monodon* Cope; *ibicuiensis* Fowler; *madeirae* Eigenmann; *microdon* Eigenmann and *stenodon* Eigenmann. *C. pisculus* Girard and *C. annae* McAtee with only 12 to 15 anal rays differs strikingly from *Cheirodon axelrodi*. *C. notomelas* Eigenmann, *C. insignis* Steindachner, *C. piaba* Lutken; *C. microdon* Eigenmann and *C. stenodon* Eigenmann all differ from *C. axelrodi* in having a black caudal spot. *C. leuciscus* Ahl with 32 to 35 scales and 7 to 9 pores in the lateral line, along with a grayish green coloration differs from this new *Cheirodon*. *C. jaguaribensis* Fowler by having only 8 teeth on the premaxillaries, none on the maxillary, along with a deeper body 2-2/5 to 2-1/2 in standard length, differs from *C. axelrodi*. *C. macropterus* Fowler by having iii,19 to iii,23 anal rays differs from *C. axelrodi* which has only iii,17. *Cheirodon kriegi* Schindler is described without teeth on the maxillary and with a strong caudal spot, whereas *C. axelrodi* has 1 or 2 maxillary teeth and no caudal spot. *Cheirodon meinkenii* Ahl, in having the following characters, 17(iii,14) to 19(iii,16) anal rays, 35 scales along the side 12 or 13 in a crossrow and a caudal spot, also differs from this new species.

Fowler (Os peixes de água do Brasil, Arquivos Zool. São Paulo Vol. 6, pp. 181, 185, 1943) lists 2 other species of *Cheirodon*. Dr. Böhlke kindly examined the types of *Cheirodon troemneri* Fowler and *C. pallidifrons* Fowler and reports they do not belong to the genus *Cheirodon*.

As time goes on I shall keep this new species in mind and check on it further. There may be a species of *Cheirodon* unknown to me at the moment that is close to this new one but if so it is not listed in our usual bibliographic sources.

Sincerely yours,  
Leonard P. Schultz (signed)

Editor's Note: Credit is due to Mr. Sol Kessler, The Fish Bowl, 1066 Springfield Avenue, Irvington, N. J., for supplying Axelrod with the holotype and paratype.