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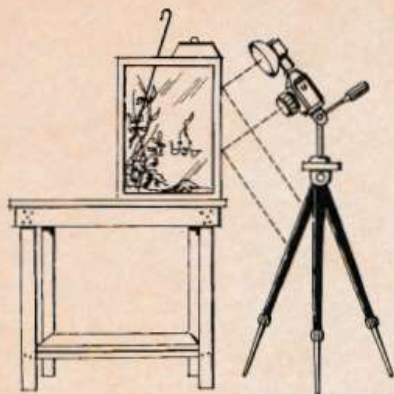
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cover photograph

Rare red seahorses as photographed by Douglas Faulkner,
who tells how to photograph marine life in an article
beginning on Page 527.





Douglas Faulkner

Summit, New Jersey

Capture the undersea world of nature
by photographing fishes in your own tank!

How To Photograph Marine Tropicals

PART I

(See Cover photo)

WITH the evergrowing interest in skin diving and underwater photography the reader may ask, as I once asked myself, why photograph anything in a small aquarium when all types of underwater camera housings and equipment are on the market for the photographer? Since I photograph both ways I feel I am in a good position to answer such a question.

Underwater photography is obviously more authentic from the standpoint of showing animals in their natural surroundings. It is also more suitable for

photographing relatively large animals and coral-reef scenes. The big problem is photographing the small animals, five inches to less than an inch in length, and still get the same control of subject matter and picture quality that can be attained in an aquarium. If this was not a problem, why would such magazines as *Life* and *National Geographic* for their nature articles, or Walt Disney for his movies, use set-ups to get many of their best pictures?

Even so, the would-be fish photographer does not necessarily have to think in terms of magazines' require-

Sketch: Illustrates the simplified set-up used by the author to photograph fishes in his own tanks.

ments. He may only want to make a collection of different fish pictures for his own enjoyment. If this is the case, photographing in an aquarium can be far more economical than buying an underwater camera housing, diving equipment and taking trips to areas in the world where reefs are found. Yet, even if you've been bitten by the bug and you decide to buy all that underwater equipment and take a trip, you may still want to be able to photograph fishes in an aquarium. I recently returned from New Caledonia, an island in the South Pacific, where I had gone for the sole purpose of photographing fishes. During most of my stay I was plagued by windy weather that hampered my underwater photographic activities. If I had been prepared to photograph only underwater, no doubt the trip would have been a failure. Fortunately, I had planned to do both types of work and was able to use my time most advantageously.

My photographic equipment is strictly personal preference. I do not use a barrage of different cameras and equip-

ment nor do I have a list of rules for everyone's need. I believe it is better to master one camera and technique than to play the jack-of-all trades who is more concerned with being able to photograph everything and never really photographing anything.

For my camera I use the Alpa, a 35mm single-lens reflex with a 45° viewfinder. The 45° viewing angle is particularly convenient for aquarium photography because it permits the photographer's head to be tilted at a comfortable angle when shooting. However, aside from this particular advantage, the camera body could be of your own choosing provided it is a single-lens reflex. The lens I use is a Kilfitt 40mm Makro-Kilar D which focuses continuously from infinity down to two inches without any attachments. It is an excellent lens for such work because of its superior advantage of its greater depth of field even though a theoretical distortion exists. The lens is made for several single-lens

Photo: Clown cardinal fish *Apogon nematoptera*, photographed in New Caledonia using Kodachrome and top lighting. (Also see color cover of the April issue of the Journal for another photo of this beautiful fish.)

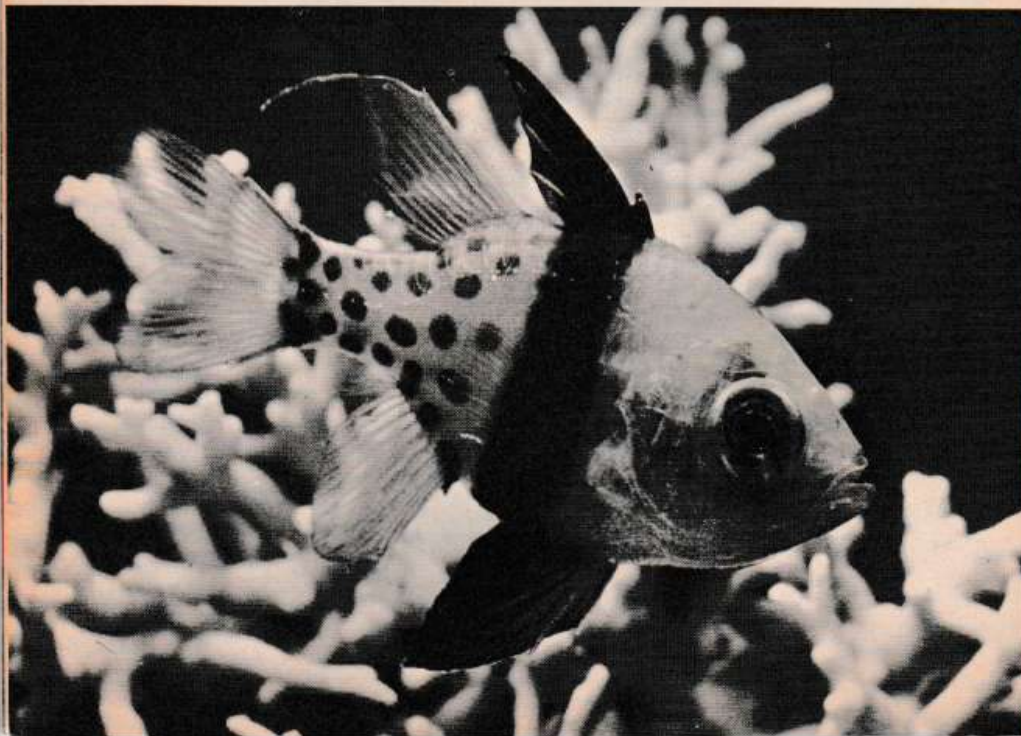


Photo: Cardinal fish
photographed in
New Caledonia
using Kodachrome
and top lighting.



reflex cameras and can be adapted to most others.

For lighting I use a single speedlight, the Standard Braun Hobby which I have been using ever since I started photographing fishes seven years ago. However there are fine, less expensive speedlights available. Some photographers use standard tungsten lighting which is very unsatisfactory. Usually I spend hours photographing one fish and if for no other reason, several hours near hot lights can get very uncomfortable for both the photographer and the fish. A speedlight has a number of advantages. Its intense, yet short flash duration is perfect for stopping motion and allow-

ing small f/stops. It is small and quite portable. It also has the advantage of requiring very little electrical power which means it can be used most anywhere without the hazard of blowing fuses, and in the long run is very inexpensive.

Last on the list of photographic necessities is the tripod. Any tripod with a horizontal-vertical tilt head is satisfactory but all metal surfaces should be painted or taped black to prevent reflection. Movable parts should be covered with a black cloth.

In the non-photographic department the most important item is, of course, the aquarium. Its size will depend on

the fishes you want to photograph. For photographing very small specimens up to three inches long, a standard two-and-one-half gallon stainless steel frame aquarium is sufficient. For specimens up to five or six inches long, a six gallon tank is sufficient. Another item, an aquarium light with a twenty-five watt bulb, is needed for general illumination. A piece of picture frame glass, a fraction of an inch smaller in size than the front of the aquarium glass, is necessary at times for restricting a fish's movements. One or two appropriate lengths of coat hanger wire are needed for coaxing uncooperative fishes out of corners and moving coral into the desired position

dental items which will be apparent once you make an attempt to photograph fishes.

My technique, though it may seem obvious to someone who knows nothing about fishes or photographing them, is not as obvious to those who do know. Fishes, especially fresh-water tropicals, are small and somewhat unpredictable in their swimming movements. In the standard home aquarium (10 gallons or larger) a one or two inch fish, less than pencil thickness in width, presents a photographic problem.

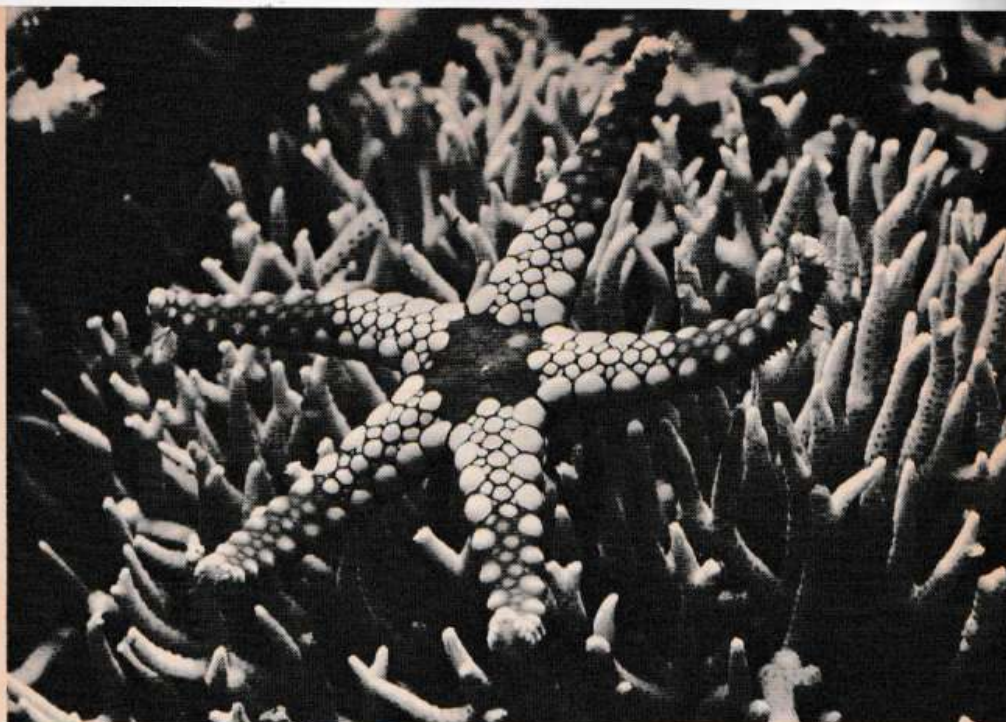
A photographer may be able to get an image of the fish on film but the size and sharpness of that image is another



in the aquarium. Occasionally a fish will decide it likes to swim in the "wings" instead of "front stage center." After a few minutes of competing for swimming space with a coat hanger wire, it discovers there's more room out front. Last on the list of absolute minimum necessities is an aquarium air pump and one or two plastic buckets or larger containers. The containers are for holding the fishes that are to be photographed. The pump supplies air to the animals while they are in the containers. I could mention such things as coral, extension cords, sand, dip nets or any number of inci-

matter. In the days when various fresh-water tropicals were being photographed, one inventive fish fancier decided it would be easier to photograph a fish if he restricted the area in which it could swim. He made a special photographic aquarium which was only a few inches wide from front to back then added an adjustable glass divider to further restrict the fish's movement when desired. This arrangement kept the fish in focus in a broadside position and allowed the camera to be focused for a

Photo: Lace jack-knife photographed at the Miami Seaquarium using Ektachrome and front lighting.



large image on the negative. In my estimation this technique is perfectly legitimate providing the fish looks natural; in other words, as long as it doesn't look sandwiched between two pieces of glass.

When salt-water fishes made their appearance in the aquarium world, the fresh-water fish photographers naturally retained their old way of photographing. I had observed saltwater fishes, not only in my own aquariums, but also in those belonging to friends. I observed that fishes maintain a territory and a home in or around a particular piece of coral, and repeat their swimming movements over and over as though they are almost running on railroad tracks. After several minutes I was able to set up my camera, focus on a predetermined spot and wait for the fish to make its rounds. I rarely photograph in an established aquarium. Most of my pictures are taken on trips where an established aquarium is non-existent. My present technique is the one I will discuss at some length.

It is almost as highly controlled as using a glass partition. The difference (as will be seen) is that I use coral instead of glass to channel the fish's movements. Nevertheless, it is important to remember that as a general rule, saltwater fishes are much more predictable in their swimming patterns than their fresh-water relatives. I wouldn't be able to use coral as a control if the fish didn't swim around it in a certain way. You might think I'm splitting hairs but it is my belief that the more freedom you give a fish, the more natural will be its appearance. After all, if it's easier to photograph stuffed animals, why is it most nature photographers photograph them alive? You have to be your own judge when it comes to deciding how natural you want to make your pictures. What follows is a fairly complete explanation of my technique.

After collecting the fishes and corals I place them in the holding con-

Photo: Starfish photographed in New Caledonia using Kodachrome and top lighting.

tainers with aeration supplied by the air pump. If the fishes are to be photographed the same day I do not keep them in a darkened room as they will go to sleep and their color will fade. I mention this only because you might unknowingly keep the containers in the same room with the photographic tank (which must be in subdued light to prevent unwanted reflections on the aquarium glass when photographing).

The aquarium can be placed on any object three to four feet high that will safely support its weight. I've used everything from a wooden packing crate at the Waikiki Aquarium in Hawaii to a bedside table in my hotel room in New Caledonia. Since I do most of my photographing on trips I use whatever is handy. The aquarium front should be flush with the edge of the table or other support. Once in place, the aquarium can be filled with water to within a few inches of the top. The last inch or so allows leeway for the water displaced by the sand and coral. The next ingredient is the sand, which should be thoroughly washed in a bucket with running water until no silt can be seen. The sand is then sprinkled as a thin layer on the bottom of the aquarium. Even though it may not appear in the picture the sand helps as a reflector.

My coral arrangement usually consists of one large center piece flanked by several smaller corals that fill in the

back corners of the tank. All the corals are placed against the back glass so that the fish has no other alternative than to swim in front of the coral. As a further control, I place a few small corals on the sand between the center coral and the front glass of the aquarium. This, so to speak, makes the fish jump through the "photographic hoop." By adding a little coral here and there, a fish's swimming direction can be fairly well channeled.

Once the sand and coral are in place and the water topped off, the front and back outside glass of the aquarium will need cleaning. The glass should be sponged off with freshwater and then dried with a lint-free cloth. The freshwater sponge bath is a necessity. If the

★ **I D E A S** ★

BY HOBBYISTS

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Emergency Tanks

In an emergency, gallon jugs make good small fish tanks, if you know how to cut the tops off. Here's how. Tie a piece of twine tightly around the jug, where you want the cut. Cut off the string at the knot very closely. Then saturate the twine with kerosene. Never use gasoline or lighter fluid, too dangerous. Then light the string with a match. As soon as the flame starts to burn out, pour a liberal amount of cold water evenly over the jug. A cut should form where the twine was tied. A certain percentage of poor cuts occur: cutting glass involves a risk. The edge of your tank is now razor-sharp. Before use it should be well dulled with a whet-stone or emery cloth. Larger tanks and carboys can be cut in the same manner.

—Robert J. Wyndham, Upland, Calif.

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salt-water were merely wiped away, a small amount of salt content would still remain on the glass and rapidly pick up moisture from the air. After the glass is clean the fish can be transferred to the aquarium. When transferring the fish there is the possibility that water may be splashed or dripped on the glass in which case the glass will have to be recleaned. Nevertheless, it is better to work in this manner so that the fish is disturbed as little as possible. If the glass is cleaned while the fish is in the aquarium, the animal may become frightened and possibly lose its natural coloration.

After the fish is safely in the aquarium, the light should be placed on top and turned on so that the animal will immediately associate it as an element of its new environment. The two coat-hanger prodders are then placed in the corners of the aquarium. The prodders will only disturb the fish when they are moved about. At this time a piece of colored craft paper can be placed directly behind the aquarium. The paper acts as an overall solid background behind the coral. A shade of blue is most natural for salt-water fishes but any color can be used. When photographing fishes with live coral, a light-tan background is very good. Most live corals are also tan in color. When used together, the colors blend and give the feeling that the coral goes on and on.

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Now that all is in readiness and the room darkened, the camera should be placed in front of the aquarium. Both the camera and the flash should be aimed at a slight downward angle to the glass (see diagram), to prevent unwanted reflections. The flash should be handheld directly above the camera. The lens should be focused to include the amount of coral background desired in the picture. A more accurate focus can be made when the fish swims past the coral after which the diaphragm should be closed down to the proper aperture.

At first the fish will probably spend most of its time exploring the aquarium and the possibilities of swimming through the glass. If the fish shows a willingness to swim back and forth in front of the coral, wait and give it a chance to perform on its own. If, on the other hand, the fish decides to do all its exploring in one corner, move the coat hanger around until the fish discovers it is easier exploring in another part of the aquarium.

— Reprinted from the October
1963 issue of *U.S. Camera*.

(To Be Continued)

★ IDEAS ★
BY HOBBYISTS

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Snails in Breeding Trap

If you are using a net breeding trap, keep one or two small snails in it. The constant cleaning will keep the pores of the net free from algae and other debris. If there is outside filtration in the same tank, keep the return stem in the net. Both of these will increase circulation of water through the net. — *Fraser G. Tulk, Brooklyn, N.Y.*



Photo: Mr. Buttner shown in the backyard of his home where his hobby has spread over the patio! Photo by author.

An avid fish hobbyist since 1916,
Richard Buttner has "lived" his hobby

A German Aquarist

PART I

WHEN the average hobbyist has been keeping fishes for 10 years or so, he considers himself to be a real old-time veteran. True, he is when you consider that often after a year many an aquarist has put up all of his tanks on the market and thrown in the sponge. The 10-year aquarist is really a beginner for recently I met a man who goes back to the "stone age" era in the hobby, wayback to 1916 when he first started keeping fishes in Germany.

Richard Buttner has known well the "model T" days of the hobby. Back to the time in the old country when all of the angle-iron tanks had slate bot-

Diane Schofield

Burbank, California

toms with a hole cut in them, into which was cemented and bolted a porcelain cup. Under this cup, the hobbyist placed a small alcohol lamp that was kept burning constantly with a low flame during the winter season to keep tropicals from dying of cold. The hobbyists of that time, along with Mr. Buttner, may not have had any method of filtering a tank, but they did have a method of aerating their tanks. Furthermore, Mr. Buttner relates that aquarists

at that time had no need of expensive pumps to accomplish this feat. Aerators were all run by water pressure. Their devices had two air cylinders and two smaller water cylinders. This system turned water from one cylinder to the other like a small pendulum that was erect instead of pendulous, and would aerate from 15 to 20 tanks at once. All of these early aerators were made in Berlin and later exported to the United States.

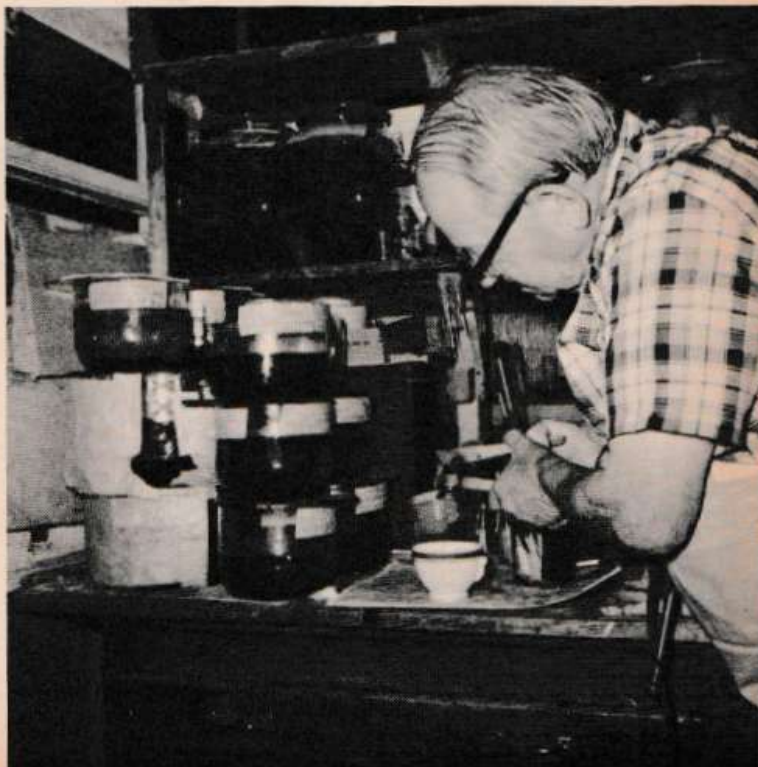
Although some of these early heating and aerating devices perhaps leave a bit to be desired, the tanks were obviously much stronger than anything that we have today. Mr. Buttner says that the cement was so adhesive that it was impossible to remove the glass without it breaking. Usually there was never any reason to remove the glass because these "prehistoric" tanks never leaked. The tanks were large too, ranging from 40 gallons down to 5 gallons capacity.

Sometimes hobbyists think that just because they live in the fast modern

world that the hobbyist of yesterday must have had a difficult time, but Mr. Buttner has remarked, rather yearningly, that aquarists in the early days in Germany had much more live food available to them than now. For example, there was a large fresh-water shrimp that was twice as big as our familiar brine shrimp, also glass larvae, cyclops, white worms, tubifex, and daphnia. But no brine shrimp were known. They hadn't yet been utilized.

Many of our common fishes were rare then too. The scalare was in the Cadillac class at that time and Mr. Buttner and his wife used to go down to look wistfully at a pair that cost 150 marks at the local fish store. Scalare at that time were known as moonfish more commonly than as angels. The Buttners had to be content with black-banded sunfish which were being imported from New Jersey and which were called the poor man's scalare. The fish most commonly kept at that time was the old-time betta which hadn't

Photo: Mr. Buttner is shown enjoying his hobby by preparing food for his fishes. Photo by the author.



reached the degree of fin perfection known today. It resembled more closely the wild betta. Also well known were the betta's two close relatives in the anabantid family, the croaking gourami and the paradise fish. In addition, such livebearers as *Limia ornata* and *Mollienisia latipinna* were well known.

In 1923 Mr. Buttner came to the United States and although tropical fishes had only been an avocation with him before, they now became his vocation — at least part time, supplementing his usual occupation of machinist. He went to work for the Aquarium Stock Company in New York under the direction of Bernard Berkitz.

In 1929, seemingly a poor year to start out in any kind of business venture, Mr. Buttner embarked on his own wholesaling business, The Empire Tropical Fish Company, together with a fellow countryman, Mr. Carl Mertens. Mr. Mertens inherited some money in Germany in 1936 and since he was unable to get any of it out due to the policies of Hitler's Nazi regime, he went back to Germany, only to fall into all of the wretchedness brought upon Germany at that time. Mr. Buttner ran the Empire Fish Company by himself.

At that time there were no plastic

containers full of fishes flown over from some far distant shore in a few hours by jet. One of his main sources of fishes came from a group of wireless operators on one of the President liners. They doubled up in one of their cabins and let the fish tanks have the remaining one. Stopping in Hong Kong they bought 10 or 12 thirty gallon concrete tanks to hold the fishes that they would purchase from native fishermen when the ship touched Singapore and Ceylon. After delivering the fishes to Mr. Buttner, they would toss these tanks over the side because it was cheaper and easier to purchase new tanks each time.

Supplementing this source from 1932 to 1934, Mr. Buttner made three collecting trips to South America. The first one to the Amazon in Brazil came about when he accidentally met the man who did all of the collecting for the famous dealer in wild animals, Mr. Louis Ruhe. Through this connection, he was able to bring back over 100 cans of fish. These cans were five gallon tin containers with the tops cut off, and each contained approximately 100 fish per can. Fortunately there was some aeration available from the pumps that Mr. Buttner had brought along. However there was more than 40% fatality because the



Photo: Note the neat arrangement and labeling of bottles in this photo taken in Mr. Buttner's fish room. Photo by the author.

Photo: Mr. Buttner examining some of his tanks on a tour of the fish room. Photo by the author.



ship took more than the usual 12 days to sail to New York. It was diverted first to Boston to unload a cargo of nuts. Part of these fatalities was due to the fact that there was no pure fresh water available aboard. The "fresh-water" was diluted with salt water. It is surprising that the mortality rate wasn't higher than this when you consider that this water had to be used to make the necessary water changes and these were fishes that live part of the year in almost fresh rainwater.

The next two years, Mr. Buttner made trips to British Guinea and from experience gained on the previous trip, plus more direct routing, he had a much lower fatality rate. He was able to bring back many piranhas, various other species of characins, including three different kinds of hatchet fishes. Much of his success in British Guinea was due to a man, Mr. Albert Pinkus, a collector of butterflies for the Museum of Natural

History in New York and it was through his indirect help that the glolite tetras were discovered for the first time in a gold-diggers camp. Mr. Buttner was able to bring them back to his shop. The fishes of these last two shipments were not as colorful as those from the Amazon, however. The Essequibo and Demerara Rivers seemed to Mr. Buttner to be lacking in some of the more brightly hued fish found in the Amazon.

While on the Guinea expeditions, he met the well known German collector and ecologist Dr. Ladiges, who was down there at that time collecting fishes for the aquarium at Hamburg. At this time, Mr. Buttner, was able to set up contacts to receive fishes for his shop without trekking down to South America himself.

Not content to just collect and sell fishes, Mr. Buttner branched out for a brief while into the publishing business and two books came out under his

auspices. One had a title that should catch any eye — "Life and Love in the Aquarium" by C. H. Peters, and the other was by F. H. Stoye, an acknowledged expert of long standing in the field "Tropical Fishes for the Home."

With the advent of the second World War, imported fishes became virtually impossible to obtain, and Mr. Buttner sold out to Paramount Aquarium. He became once again just a plain old garden variety aquarist, going back to his original occupation of machinist and moving to Oceanside, California, where he resides today.

It has often been said and once was true that the German aquarists have no peer when it comes to fishes and many people seem to feel that this is due to a type of black magic that is completely beyond most people, but after visiting Mr. Buttner and seeing his fish room, it suddenly dawned on me just why German aquarists have earned this reputation. Mr. Buttner goes about spawning his fishes with a thoroughness and preciseness similar to the most persnickity scientist. Every single tank and every single jar and container in this fishroom is labeled and when I say "labeled" I don't mean just a sloppy old label with something illegible on it. Each one is complete with data, dates, and anything else pertinent to that particular batch of fish or eggs.

When one first enters Mr. Buttner's fish room, it doesn't take more than a

minute to ascertain that killies are his first love. Almost every tank contains magnificent examples of these fishes.

Although Mr. Buttner has long since left Germany, he still has ties with it. For example he imports German peat moss, a product very successful for spawning some of the annual killies.

Another German product, willow roots, put out by the Torfin & Fasem Company, he uses as a filtering medium for acidifying water; however, Mr. Buttner puts it in containers in the tanks of his yellow gularis as a receiving bed for their eggs.

These containers are small rectangular glass dishes, approximately 5 by 4 inches and are used for both the willow roots and peat moss, according to the fish being spawned at the time. Every two weeks these are taken out, dried and stored. Each of the dates that this is done is very dutifully recorded on both the tank and the container. After

Salt Water Fishes

By Robert P. L. Straughan

Q.—What is the chief failure with artificial sea water?

A.—The fresh water used to mix the salts completely governs the end results. If you live in a large city and your fresh water goes through miles of pipes, is highly chlorinated, flouridated, sulphate treated, etc., it may prove completely unsatisfactory for making artificial sea water. In addition, many large buildings use copper pipes. Water from this source can be lethal. The safest bet when making the man made salt water is to use distilled water, rain water, soft well water or run the water through a water softener. Using water directly from the tap may sound simple but in the end it could make you give up the marine hobby and go back to guppies. ◀

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5 to 6 weeks, water is added and the resultant babies are taken out for a period of 8 days. At the end of this time, the peat moss is dried out again until it is only barely damp and stored for another 5 or 6 weeks. Each time baby fish may appear and this process can be repeated up to 3 or 4 times in a year. Some people find that their eggs don't hatch because they add water only one time and stop there. They probably could have gotten many more fry had they tried a number of times as Mr. Buttner. For example, one of Mr. Buttner's prize trios of a male and 2 female *Nothobranchius rachovii* produced a total of 1400 eggs in 8 months. Yes, Mr. Buttner also counts all of the eggs of each spawning and carefully records all of this information and makes use of it. This trio, incidentally, has lived much longer than fish of this type normally can ever be expected to live.

(To Be Continued)

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Plastic Tubing on Vacation Trips

By Robert P. L. Straughan

MOST AQUARISTS have green plants, ferns or indoor shrubs in addition to their finny inhabitants and when vacation time comes around, it is sometimes a problem to make certain that a favorite plant won't dry up completely while you are away. Plastic tubing and air stones can be used to water your most delicate plants if used in the following manner:

Take a length of plastic tubing about six feet long and attach an air stone to it. Next, fill a large waste basket, or garbage pail with water and place the container about two feet above your plant. Insert the air stone in the bottom of the container of water and start a suction in the tubing. When the water starts coming out, put an air stone on the end and place this on the soil of the plant. If the water comes out too fast, push the air stone down into the soil slightly. That's all there is to it. The water should siphon out very slowly and may take from several days to two weeks to drain the container, depending on how porous the stone is. This system could be employed to water many plants at a time. It worked very successfully for us while we were on a ten-day trip to the Smoky Mountains. We have a beautiful Australian tree fern which must be watered constantly and we were worried that it would dry up and die in the above ninety degree weather we are having here in Miami. I have used plastic tubing for many things in the past including a long range drink sipper so I thought up this idea with the two air stones and it really worked. When we got home from the smokies the tree fern was as green and damp as when we had left and there was still some water left in the plastic bucket. I was so happy about it I decided to pass on my discovery to the readers of *Aquarium Journal*. ◀

IT IS INTERESTING to note that beginners as well as some advanced aquarists frequently bypass *Nannostomus marginatus* in favor of gaudier species. This is unfortunate because this pencilfish has considerable charm and no aquarist should consider himself fully initiated until he has kept this magnificent mite.

Most references indicate that *marginatus* grows to about one and a half inches but aquarists will find their specimens usually do not surpass about one

upper half of the eye is yellow and the lower half is white.

The dorsal fin is black on the anterior edge followed by a red dot which may be restricted to the anterior base of the fin or extend over a major portion of it depending on the race and condition. The pectorals are lemon yellow while the ventral fins are frequently completely red with or without a white leading edge. The anal fin is colored in the same manner as the dorsal but may have a white edge like the ventrals. The caudal

Nannostomus marginatus — a fish with considerable charm, well worth keeping

The Magnificent Mite

inch. This pencilfish is shaped like a slightly obese cigar and it is just about as flexible. The impression one gets from this pencilfish is of a miniature submarine with a great deal to do. This droll little fish is constantly picking about the aquarium in search of morsels invisible to the aquarist. Males occupy themselves with courting the females and with harmless battles with each other.

Coloration is not gaudy but it is by no means drab. Although it is apparent that there are several geographical variations, the overall body color is a golden brown shading to white on the belly. One black stripe starts over the eye and runs to the dorsal base of the caudal fin. A second line, wider than the first, starts at the mouth, runs through the eye and to ventral base of the caudal fin. Just above this line, at a point just under the dorsal, is a short adjacent bar of red. The third stripe varies in its completeness from race to race but in its complete form runs from under the eye to the insertion of the anal fin. The

Frederick J. Kerr

Roseman, Montana

fin is colorless except for a slight extension of the first two body stripes.

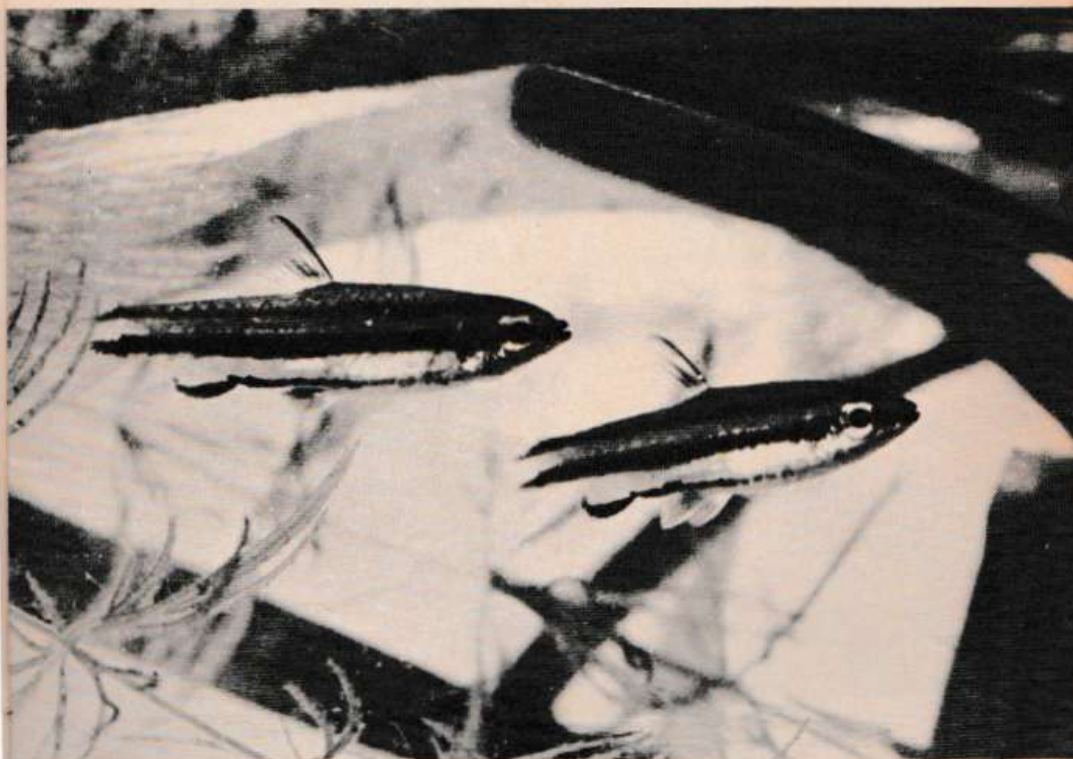
Nannostomus marginatus is certainly not a difficult fish to feed. It accepts dried food with almost the same enthusiasm as frozen and live foods. Tubifex should be chopped to prevent strangulation. Water is not a problem. Although some authors feel that this is a species which prefers cooler water, I have observed no discomfort at 85° F.

Displaying *marginatus* is easily accomplished in a tank of from 5 to 10 gallons with one or two *marginatus* per gallon. The background should be a dark color, preferably black, and the sand black or dark brown. Artistic use of brown and pink stones and perhaps drift wood will contrast nicely with the green shades of *Vallisneria*, *Ceratophyllum* and *Cryptocoryne*. The purist may want to tint the water brown with peat

extract but clear water will show the fish just as well if a low wattage incandescent lamp is used in the reflector.

Suitable companions for this pencilfish might include small *Corydoras*, marbled hatchfish (*Carnegiella strigata*), head and tail light (*Hemigrammus ocellifer*) and the pulcher tetra (*Hemigrammus pulcher*). Those who do not mind mixing fish from other geographic areas

by some to be the easiest of the genus to breed and it frequently spawns in the community tank. Males and females swim into plant thickets near the surface to deposit 20 to 60 eggs which hatch in 72 hours at 78° F. Young have rounded tails and very small mouths. They should be offered infusoria and frozen or live baby brine shrimp. Females are easily determined by their



may want to use the spotted rasbora (*Rasbora maculata*) and the lampeyes (*Aplocheilichthys macrophthalmus*).

Other members of the genus *Nannostomus* such as *N. beckfordi* and *N. trifasciatus* are not suitable tank mates as they usually bully *marginatus* to extinction.

Nannostomus marginatus is considered

greater girth.

All in all, the *marginatus* pencilfish is one of the standards of our hobby. It is easily maintained, fairly easy to breed, it is colorful if not gaudy, it is interesting and inexpensive. In short, it is an ideal aquarium fish for beginner or expert. ◀

Photo: A pair of *Nannostomus marginatus*, as photographed by the author.

American Guppy News

Editor:

AND THE fellow officers of our (see signature below) association have read with interest the criticisms and suggestions voiced about the proposed A.G.A. standards and admire the democratic way in which the American aquatic press have published them.

Like Steve Stewart of Brooklyn (your October issue), we too would not have been able to read a copy of the proposed constitution only for seeing it in the magazine *Tropicals*.

Our Fancy Guppy Association is the second biggest membership in TIFAS, and the largest in Europe; on this showing you would have thought it was good policy on the part of the AGA to send us a copy, but events proved differently.

Some two years ago I exchanged correspondence with Larry Konig with a view to producing a universal standard for guppies, we agreed to adopt their new standards in international shows, despite the fact we had recently published our own, hence our interest in their new proposals, notwithstanding our membership of TIFAS.

Our main objections to the constitution have been adequately covered already by other writers, so we don't intend to repeat them, but briefly they are:

(i) *Four to six years is too long for an officer to hold office. Our officials are elected for twelve months, and if in this time they prove to be efficient, can always be re-elected.*

(ii) *The proposed new rules make a mockery of what our two countries stand for, democratic representation. The F.G.A. is divided into sections throughout Britain, each section sends members to sit on the management committee directly proportional to their individual membership, the bigger the section the bigger the say.*

If we are finally to achieve some form of universal standardization into this hobby of ours then we must look to international organizations like TIFAS to tie up all the threads, hence I think the reason so many overseas bodies flocked to their banner.

As a footnote, we have noted that most guppy columns recently have carried the paragraph "Write for your free copy of the proposed constitution, etc.," isn't this rather like putting the cart before the horse? — *James L. Kelly, Chairman and Overseas Secretary, Fancy Guppy Association of Great Britain, Manchester, England.* ◀

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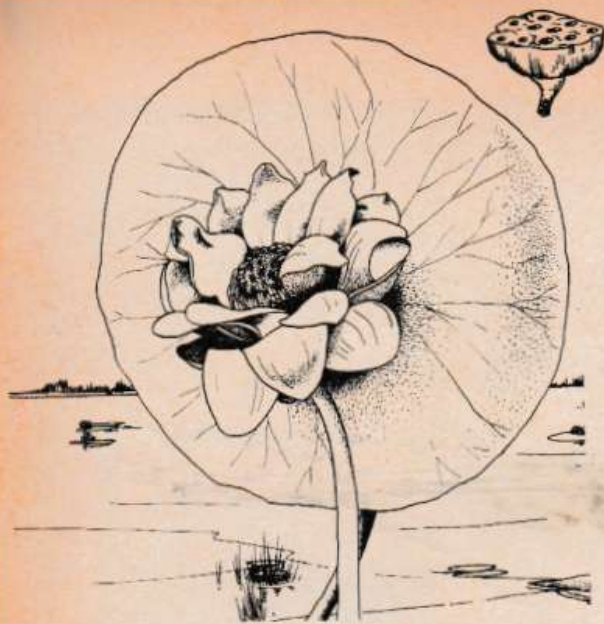
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American Lotus

Charles O. Masters

Walhonding, Ohio

THE AMERICAN LOTUS is undoubtedly the largest and probably the most stately wild-flower in America. It is found in lakes, ponds, and slow-moving streams in all of the United States east of the Mississippi River from Texas on up close to Canada. Many of the ox-bow lakes of the old Mississippi are filled with this plant.

Students of aquatic biology will always remember the plant as one of those which are found in the zone of floating hydrophytes. Other members of this zone include the various water lilies. The more shallow areas of Lake Erie and Lake Ontario are almost completely filled-in with lotus plants. In some places they have become almost exterminated because of the selfish activities of certain people. Students of the geographical distribution of these plants have come to the conclusion that in certain areas they were introduced by the Indians who used the seeds, tubers, and even the leaves for food purposes. Relatives of the lotus can be found in other parts of the world such as in various sections of the Orient, the Philippine Islands and even in Egypt.

Some botanists consider them as separate members of the sacred bean family, Nelumbonaceae, but most present-day students consider them as members of the Nymphaeaceae, or water lily family. Fassett recognizes the name *Nelumbo lutea* (Willd.) Pers. whereas Muenscher uses the scientific name *Nelumbo pentapetala* Walt. Common names are as follows: water-chinquapin, American nelumbo, water bean, the great water lily, pond nuts and duck acorn. Some of the Indian names which have been given to the plant are Yonquapin and Monocanut.

The sacred lotus of Egypt is a geographically distant relative that has been introduced and gone wild in certain parts of the United States.

The roots of the lotus are located anywhere from two to six feet below the surface of the water, well below the frost line and lie deep in the soft mud. They are large, horizontal, and tuberous and in fall are well-filled with starch. Fortunately they are well under the water and certainly not easily accessible to the seeking eyes and hands of hungry man-

Sketch: The American lotus.

kind who in some cases does much to exterminate them because of the large amount of tasty food contained within the delicious roots.

The leaves which are almost circular and vary in diameter from one to two feet are attached to the petioles near the center. They are bluish-green in color and sometimes silvery-green. If they are pushed beneath the surface of the water they are immediately shed because of the silky hairy covering which provides a waterproof coating. They are prominently veined directly from the center. An interesting characteristic of the leaf is that it is somewhat cup-shaped because the edges are higher than the middle and consequently form a depression in the center. During the night and very early morning hours dew condenses on the surface of the leaf and tends to fill the center with an ounce or two of water that looks like mercury. Small river birds sometimes come over and drink or even bathe in these glistening pools of water. Some of the leaves float on the surface of the water as do most of those of various water lilies but many of them are held high above.

Flowers are anywhere from four to ten inches in diameter and have numerous petals and stamens. The blossoming period is during the months of July and August. They are held high above the

water by means of thick stems which are sometimes actually six to seven feet in length. They are quite fragrant!

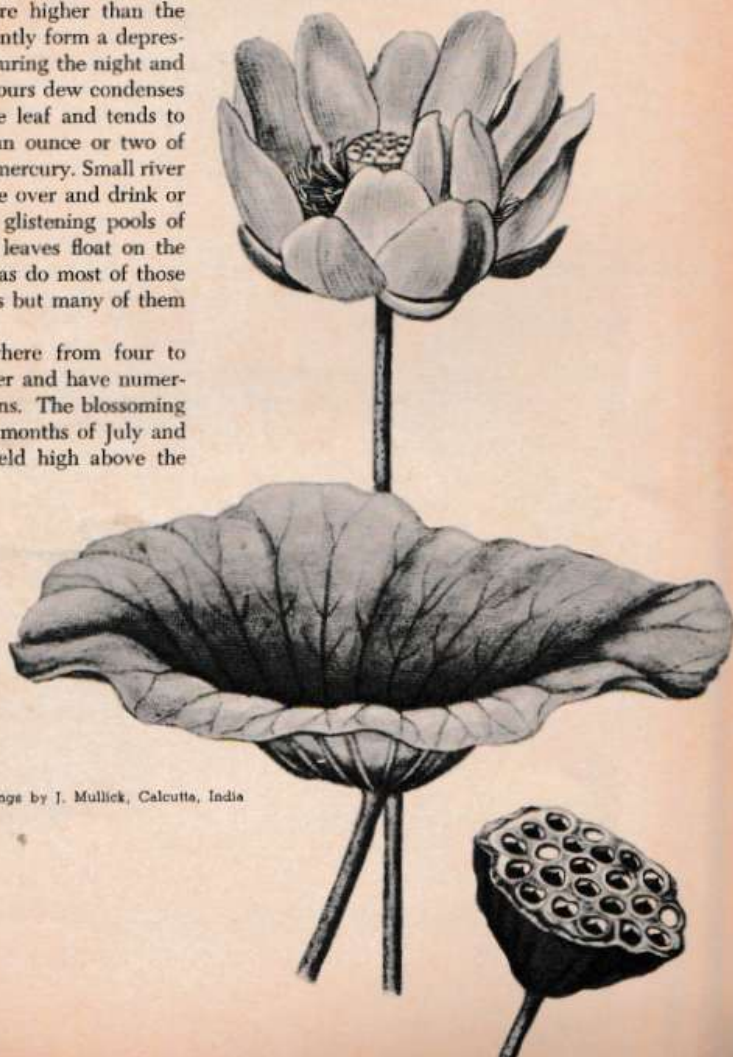
For many botanists the seeds have proved to be the most interesting feature of the plant. They are relatively large being about the size of the common garden pea or slightly larger. It is interesting to compare them with other seeds which are found among the water plants. They are about 400,000 times as heavy as the seeds of the common bladderwort. This is based on the fact that in a single pound there are 175,000,000 seeds of bladderwort whereas there are certainly

(Continued on Page 552)

Sketch: Various stages of the prolific American lotus.

Drawings by J. Mullick, Calcutta, India

DECEMBER, 1963



no more than 500 seeds of the American lotus.

Research workers in trying to determine how long seeds can survive have come to the conclusion that the record seems to be held by a seed of a species of a lotus plant. In any event, a few seeds of the sacred or Indian lotus, *Nelumbo nucifera*, were germinated in the British Museum, London, in 1940. Apparently these seeds were approximately 250 years of age.

After the blossoms drop away from the plant, a receptacle containing the

★ **I D E A S** ★

BY HOBBYISTS

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Filter Splashing

There are a number of high speed outside filters on the market which circulate the water very rapidly and are almost indispensable in large aquaria which are heavily fed. With most of them, however, the water re-enters the aquarium at such a high rate of speed that considerable splashing takes place. The inside of a reflector will often become very wet, including the wiring and switches. This could present a dangerous shock hazard.

To stop the splashing, take a small plastic bag such as those used by fish dealers and with a pair of scissors cut off the closed end so that both ends will be open. With a rubber band, attach one end of this bag to the end of the air lift tube where water re-enters, allowing the other end to hang loosely in the water. When the filter is started, the bag will float loosely on the surface allowing the air to bubble out and the water to re-enter without splashing.

—Braz Walker, Waco, Texas

seeds is formed. It is a flat-topped fruit with numerous circular openings in its top so that it resembles a large salt shaker. The seeds are imbedded in pits within this hard receptacle and rattle about when dried. They are dark brown in color and nearly round. In many ways they resemble a common acorn except that they are only about a half-inch or less in diameter. They will not germinate when dropped on moist ground but require complete submersion in water and mud to a depth of from two to six feet.

The plants are well adapted for dispersal by means of floating on the surface of water. Both the whole fruit and the seed is so adapted and in this manner they may travel for long distances and eventually germinate in entirely new localities.

Housewives today use these dried seed vessels as part of dried bouquets of flowers. They last well and are consequently much sought after. However, Indians had a much different use for the plant. The starchy tuberous roots which sometimes weigh approximately a half pound, have a sweet-potato flavor and were greatly appreciated by Indians. Occasionally these were dried for winter use with such items as boiled corn, meat, or hominy. The seeds are very pleasant tasting resembling boiled chestnuts but not quite as sweet. Even the leaves were eaten!

Indians also believed that the American lotus had certain mystic powers and so for this reason kept tubers about their dwellings as protection against evil spirits. In many parts of the world relatives of this lotus are still part of the folk lore of the local inhabitants.

The Wild Flower Preservation Society, Washington, D.C., has placed the American lotus on its protection list stating that it is one of the plants which may be picked in moderation if the roots are not disturbed and if plenty of flowers are left to go to seed. ◀

James B. Wong
San Francisco, California

There's more to it
than hobbyists think

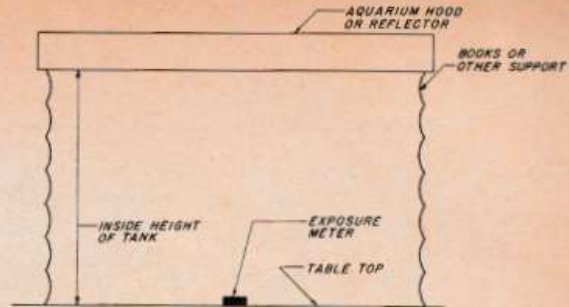


Figure 1

Lighting Your Tank

FOR MANY YEARS anyone reading the literature of aquarium keeping has read many vague (and a very few not so vague) references to the lighting of aquarium tanks. The amount of light

would be very satisfying to the fish regardless of the amount of light in the tank.

It must be realized that the amount of light put over an aquarium tank will



Aquarium Journal

"Looks like something went a little wrong with your order for a vial of brine shrimp!"

specified to keep fishes and plants in good health was often worded in phrases like weak, medium, medium strong, moderately strong, or strong light.

In this article we will try to set up a standard for measuring the intensity of light in aquariums. This applies only to the raising of plants in the aquarium since we do not know enough about the effect of artificial light on fishes. It might be safe to say that a well planted tank with the plants healthy and growing

ordinarily not equal the light naturally falling on a pond outdoors (except of course those in dense forests), but since the light over a tank can be better regulated as to time and intensity it will be easier to work with.

Light may be measured in several kinds of units, but here we will worry only about one, the foot-candle. A foot-candle is a certain amount of light falling on a flat surface. Specifically it is the amount of light from a "standard candle"

$$\text{Light Intensity (in foot-candles)} \times \text{TIME} + \text{Water Hardness} + \text{Water pH} + \text{Water Chemistry}$$

Figure 2

falling on a surface one foot square at a distance of one foot from a light source. To measure light we use an electrical instrument called a foot-candle meter. However, due to the cost of this meter we will have to devise a less expensive method and one within the means of the average hobbyist to measure light.

Most of us have a camera and usually an instrument to determine exposure time called a photo-electric exposure meter. Modern exposure meters have a photo-electric cell to measure the intensity of light and a sort of slide-rule calculator to enable us to determine correct exposure of photographic film to light. We can also use this meter to help us measure light intensity in our tanks.

The best meters for our purpose are

★ IDEAS ★
BY HOBBYISTS

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Preventing Hydra

Hydra are a pest in the aquarium. They get into our tanks with live food, such as daphnia and untreated aquatic plants. I have treated hydra with salt and with good success. Hydra die more rapidly in a salt solution. I feed daphnia to my fishes, I scoop daphnia in a small net and dip the whole into some sea water for about a minute before feeding them to the fishes. By doing so, I never have any trouble with hydra.

—Peter Tsang, Hong Kong

those that measure incident light and have a selenium cell. Incident light is light falling directly on an object instead of being reflected by it. We use a selenium cell because of its wide response to colors of the spectrum. The newer cadmium sulphide or CDS meters are limited in their spectral response. Meters of the kind called reflected light meters do not have a foot-candle scale as most of them are of the direct reading type. Good examples of incident light meters are the Sekonic L-28, Norwood Super Director, and Spectra S-500. If in doubt about your meter, read the instruction book or consult the manufacturer or distributor of your meter.

To begin, we must put the aquarium reflector on a table top supported on books or by some other suitable support at the ends (see figure I). The distance from the reflector to the table top should be the inside height of the tank without any gravel. The exposure meter should be centered under the reflector with the selenium cell pointing towards the reflector. Turn on the reflector lights and read the intensity of light (in foot-candles) on the exposure meter scale.

The reason for measuring the intensity of light at the bottom of the tank is because the intensity of light decreases as its distance from the source. If we were to measure the light at a distance of 12 inches from the source we could read 100 foot-candles, at 24 inches it would be 25 foot-candles, and at 36 inches we would read 11.1 foot-candles. For this reason we must begin somewhere to standardize our system of light measurement. Since the majority of aquarium tanks in this country are made in two

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heights (12 and 16 inches) it would simplify things a lot to give the foot-candle reading and the height of the tank when we are talking about the intensity of light in our tanks although we are only concerned with the amount reaching the bottom of the tank. Someday we might have a formula like figure 2 for successfully raising fish and plants.

Incandescent lamps and fluorescent lamps of the white and warm white types provide light very nearly resembling sunlight in their effect. The range of most incandescent lamps approximate the time of day from 30 to 40 minutes after sunrise which is reddish in color. Incandescent lamps grow hotter and give off more heat, but the spectral energy distribution range of the filament lamps seem to provide a good growth pattern for fishes and plants.

Of the fluorescent lamps the two standouts would be the Home-Line (DeLuxe Warm White) and the DeLuxe Cool

White. The Home-Line (DeLuxe Warm White) is probably easier to obtain than any other type of fluorescent lamp in retail outlets. The Home-Line (DeLuxe Warm White) has a warm light output similar to filament lamps. Colors seen under this lamp are rendered much as they are under filament lamps, its light emphasizes red, orange, yellow and brown, blues are grayed. The DeLuxe Cool White type of fluorescent lamp has a light output more nearly resembling natural daylight; it is a little on the cool side compared to the Home-Line type. All colors are emphasized about equally under this light and objects have a more natural appearance. Both types supply more red and green light which is beneficial to plant growth than other fluorescent lamps.

Not enough is known about the effects of the new Gro-Lux lamps to include them in this discussion.

This is a fertile field for some experimenter to explore.

[Editor's note: The Sylvania Gro-Lux Lamps are excellent for growing a wide variety of aquarium plants and incidentally suspended green algae. The color of these lamps is objectionable to some people but does not seem to bother many if any species of fishes. Also remember the amount of light you measure as suggested in this article is greater than the amount that will actually reach the bottom of your aquarium. Some will be reflected by and a small amount absorbed by the glass top. Also the water's surface will reflect some light.]

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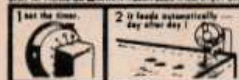
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of sand. Sylvain pointed to where it stopped and then began digging until the shell was uncovered: a beautiful cone shell. I decided there was more than one reason why Sylvain used a rake instead of his hand. In an hour's time, Sylvain must have collected twenty five or thirty shells.

Before I left the island Sylvain gave me a whole set of cone shells and his wife gave me a very rare juvenile chambered nautilus shell only an inch and a half in diameter. The chambered nautilus like the Coelacanth, is a living fossil. New Caledonia happens to be one of the few areas in the world where the animal is relatively abundant. The Noumea Aquarium, owned by Dr. and Mme. Rene Catala, actually exhibits living specimens of the nautilus that are collected in traps at depths of several hundred feet. The traps are placed in the deep water just outside the barrier reef, not far from Amédée light. Although I saw living specimens exhibited

at the Aquarium, I never had an opportunity to see a nautilus collected. Nevertheless, I was very fortunate to dive with Dr. Merlet who collects for the Aquarium in his free time.

During most of my stay in New Caledonia there had been a lot of wind which made the water too rough for diving outside the barrier reef. Shortly before I was to leave for Hawaii the wind subsided for several days. My opportunity had arrived. Dr. Merlet was going deep diving to re-stock the Aquarium's glowing coral gallery. The morning we set out for the reef the sky was overcast but the water was like glass. As we skimmed across the bay the sky began to clear. By the time we reached the reef, there wasn't a cloud in sight. The day was perfect. Dr. Merlet headed the boat through the pass. Once outside, we ran parallel to the reef for several hundred yards and then dropped anchor in about seventy feet of water. I looked over the side and could barely make out forms below. The water was crystal clear but the reef dropped off very quickly and the unreflecting deep lent a darkness to the shallower waters. Only when we were on our way down was the ultimate clarity of the water discernible. When I reached the anchor I turned and looked up. The boat seemed suspended rather than floating. I turned back and kicked off, going down. I had an utterly free

(Continued on Page 564)

★ IDEAS ★
BY HOBBYISTS

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Feeding Frozen Foods

When feeding frozen foods, I break off the desired amount (learned by trial and error), and place it in an ordinary water glass. Then, add about one-half inch of the hottest tap water available. Swish this mixture around until the food has completely thawed. Next, fill the glass with cold tap water. This stabilizes the food and water temperature between 70 and 80° F, just right for feeding. My fish thrive on this diet alternated with dried foods, and it is readily and immediately accepted.—
Richard E. Radcliff, Dover, New Jersey.

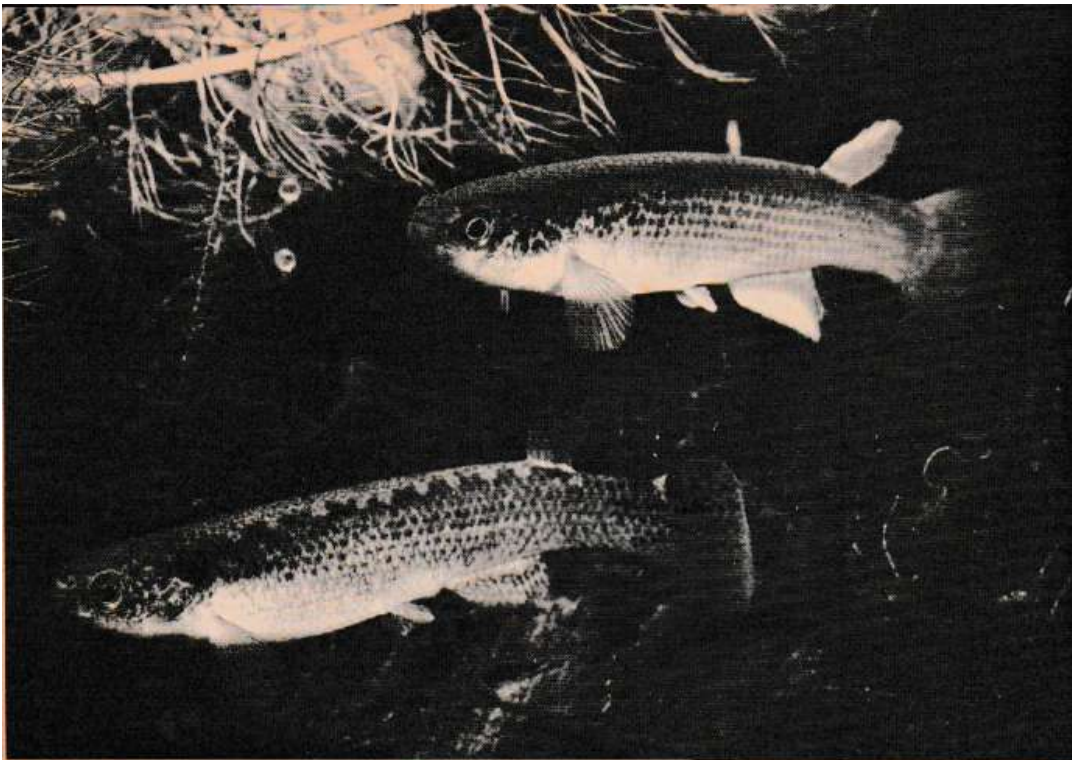
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Here's a chance to look into a really
"underdeveloped area" in aquarium circles

Rivulus urophthalmus

(Translated from the Dutch by
Albert J. Klee)

IT IS A CURIOUS thing that the *Rivulus* group apparently must be reckoned as more or less an "underdeveloped area" in aquarium circles. This may be a strange analogy but in general, few aquarists have heard of these fishes, let alone having seen them. Whenever one speaks of *Rivulus cylindraceus* there is some nodding of heads in recognition but as soon as *Rivulus agilae*, *Rivulus xanthonotus* or *Rivulus urophthalmus* is brought into the spotlight, puzzled looks appear instead for it is not known what to make then of these names! Perhaps

A. Van Den Nieuwenhuizen

Heemstede, Holland

things are different in America than here in Netherlands. [Translator's note: No, not very different!] for the fish originates from the Guianas farther on down to Brazil with São Paulo as its approximate southern border. This indicates, of course, that the fish is also to be found in the Amazon basin and the tributaries of the Orinoco. The fishes from these regions appear, naturally enough, more

Figure 1. A pair of *Rivulus urophthalmus* in the breeding tank. The female is the lower fish.

often in America than in Europe and in spite of the fact that the first importation of *Rivulus urophthalmus* was from Maranhão (north Brazil) to Germany, the fish is seldom seen here. Even in the tanks of AIR FISH in Amsterdam (a famous Dutch import firm), a firm noted for bringing in many fishes from these regions to Europe, alas! . . . only occasionally is this beautiful fish found. The killifish fancier is quite conversant with each nuance of a particular species but the average hobbyist often overlooks much and so, in this article, we shall pay rather painstaking attention to our subject.

In nature, *Rivulus urophthalmus* mainly inhabits flowing waters, not very surprising considering its elongated body shape. As a consequence of its enormous range, it is likewise no additional surprise to learn that this species occurs in different color varieties. One encounters, for example, basically greenish varieties, those predominantly brownish, an almost all-blue type and very well known is the orange-red variety (a derivative of the yellow-gold form which is incorrectly offered under the name, "*Rivulus hartii*"). On the body of the male we find a number of longitudinal rows of reddish-brown to pure red stippling. The pectoral fins are virtually transparent but do tend towards yellowish at their base with a bluish haze in the middle and a reddish tint at their tips. The small ventral fins are yellow-orange; the dorsal fin is variable in coloration; mostly greenish right at its base and yellow-orange in the upper portion of the fin. Reddish dots cover the base of the dorsal, turning into fine, vertical stripes at the rear, uppermost portion. The anal fin likewise has three zones: at its base, a narrow bluish border; then a narrow greenish zone which grades into yellow, bordered in orange. The tail fin is more or less colorless but the fin-rays themselves are tinted faintly in red.

Figure 4. Then the male approaches closely with a shaking motion, staying near to her even with the slightest change in her position. Similar behavior is noticed in many *Epiplatys* species. As the male approaches the female he presses her towards the future spawning site, in this case, the bushy strands of *Myriophyllum* growing on the surface.



Figure 2. After observing the spawning behavior of these fishes for a while, we see the remarkable manner in which the male courts the female. The conduct of this species is very similar to that of *Rivulus holmiae*, and their pairing runs about the same. One of the phases involves the male revolving about the female in small circles, as the latter selects a particular site. During this time, the male glides by the ventral area of the female. This occurs not only in this circling stage but also many times in the following phase.



Figure 3. It may happen, however, that the female apparently has no interest in the male's advances, and so the latter intensifies his courtship dance. As a rule, we can observe the male assuming a more or less vertical position, his body trembling violently. After the fish separate for a while, courtship may often commence again even at a distance as much as 8 inches away.

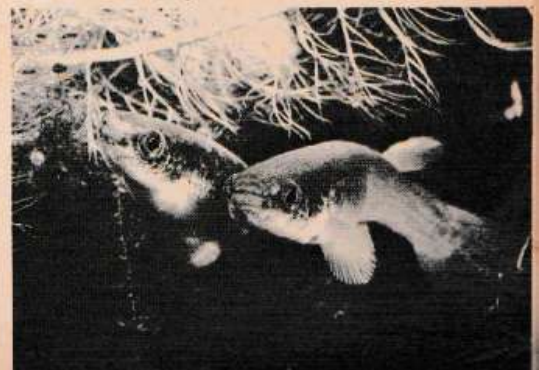




Figure 5. Spawning frequently takes place right under the surface. Both fishes assume an S-shaped form, the high point of spawning. They separate from one another with a short jerk and directly afterwards, the female lays her eggs. She will most likely remain while the male swims away to return shortly to renew the nuptial play.

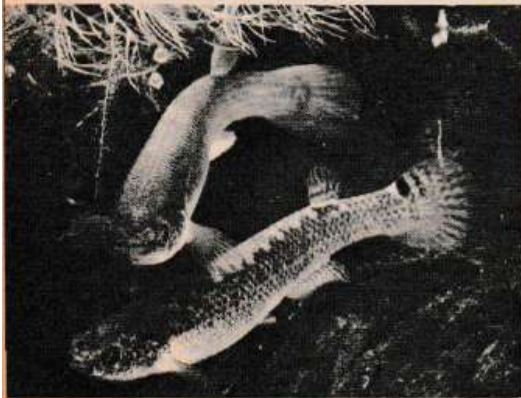


Figure 6. In some instances the female remains in one place at the beginning of the spawning but later on seeks out other places, the male following his partner. He swims mostly behind and above her, repeatedly applying pressure to her head with the underside of his snout. Ultimately, it is almost always the female who seeks out the places for the next pairing. She is, however, not too fussy in her choice.



Figure 7. The eggs are laid on fine-leaved plants but also between the stems of *Vallisneria* and the leaves of *Cryptocoryne*, on the bottom in the peat, against wood, in the corners of the breeding tank, in gaps in the aquarium cement, between stones and in short, no place is overlooked.



Figure 8. Towards the conclusion of the spawning, the female retreats to a point of safety. On the first day together in the breeding tank, the male can react quite roughly to the female and give her no rest. He may press her in all sorts of ways with, however, the result that she will jump out of the water. It is necessary, therefore, always to keep the aquarium well covered. In the breeding tank it is a good idea to supply *Riccia*, which floats upon the surface, for these fish do not seek out their eggs to eat them. The female will not only eagerly spawn in this medium but will, upon occasion, utilize it as a resting place.

Naturally, this color description is of fishes in my own possession. The dorsal portion of the male's body is olive-brown, the flanks partly a gleaming-green, tending towards blue near the belly. In brief, the males are quite beautiful. The females are much less colorful. They are basically olive-brown. There are also a number of scarcely visible, longitudinal rows of red dots, but their color is so

weak as to avoid notice and thus appear to be absent. The back is more or less marmorated; this characteristic being clearly shown in some of the accompanying photographs. A spot appears at the root of the tail before the base of the caudal fin . . . a black "rivulus spot" preceded by a golden spot.

In spite of the fact that I have presented but a partial color description of

this fish, one should come off with the impression that here we have a really beautiful fish and at the same time, I express my own personal opinion that most *Rivulus* are similarly, quite pretty. Among these beauties are *Rivulus agilae* and *R. xanthonotus* as you too will find out when the opportunity arises to purchase them. And with such purchase comes the question of what sort of aquarium conditions should be offered in order to keep them at their best.

Figure 9. This photograph shows the greater part of the spawn of one female on the first day of breeding, 32 eggs being visible and thus the conclusion being that a full-grown female was used. One can see entire strings of eggs on the stems of these fine-leaved plants. These eggs are laid, one after the other. The photo also shows when the female moved and when she didn't. In the latter case, the eggs are in a group one after the other, from start to end of a stem.



Clearly, all indications are of a surface fish, and such fishes do best in large tanks. Deviations from conventional shapes, however, are not entirely without merit. On the contrary, I have for a long time now kept such fishes in a 28" x 20" x 12" tank. This tank's depth is only 12" so that its surface area was quite large. At the time, this aquarium was filled with soft, slightly acid water. On the bottom lay a peat mulm of very finely shredded peat. The planting consisted only of *Myriophyllum* and *Cryptocoryne Nevillii*. The *Myriophyllum* grew long strands upon the water surface, between rafts of drifting *Riccia*. This tank contained my *Rivulus* collection and in it, they all felt quite at home. A constant, brisk-running filter not only kept the water crystal-clear, but imparted some movement as well.

With this tank, I had nothing more to do than to periodically net out the young. I never raised the temperature but merely held it between 72° and 77° F. For feeding, mostly midget larva were supplied . . . later fruitflies and other water insects, and for the young fish, daphnia.

Now I will not pretend that soft water is entirely necessary for the care of this fish. On the contrary, they are easily accustomed to hard water, thus simplifying raising them to maturity. If the intention is, however, to raise the greatest possible number of young, then the simplest method is to utilize a tank of about 13" x 8" x 8". It can be accomplished using smaller tanks but I am no advocate of them because I favor giving my fishes plenty of room. I myself always use tanks of 16" x 10" x 10". These breeding tanks are, for all killi-



Figure 10. These young are deformed by use of too high a temperature in the hatching container.

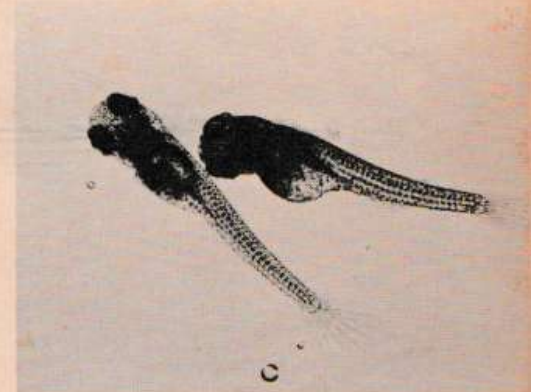


Figure 11. Normal fry of *Rivulus urophthalmus*. They are approximately 4 mm long. It is significant to note that they still carry a small yolk sac. When this is absorbed, they then seek for food. On the first day, brine shrimp are fed and infusorians of like size; after a week they can eat full-grown girdel worms and sifted daphnia. Growth is rapid. With good care they will be about 2½ inches in a half year and fully capable of breeding.

fishes, filled only to a depth of 3 to 4 inches. Before breeding, the sexes are separated. One must take care with *Riculus urophthalmus* to see that the females are not allowed to become too heavy with eggs; otherwise, they will drop them in a pseudospawning without the presence of the male. As soon as the females are full enough, they are placed in the breeding tank in a ratio of 2 females to each male. The fish may be fed while in the breeding tank but naturally, this must be watched carefully since decaying food can quickly foul the water.

If the fish are in good condition and fullgrown, the first day's harvest of eggs may total 20 or 25 per female, two females, of course, resulting in about 50 eggs. This number decreases rapidly until shortly, one is content with a daily harvest of about 20 eggs. It will no doubt be observed that a portion of the eggs will turn bad. Therefore, a few drops of an acriflavine solution in the dishes in which the eggs are stored will prevent bad eggs from affecting good eggs next to them. The shallow egg storage containers should be kept in a darkened location, the best storage temperature being about 73° F. At this temperature, the young hatch out in about 12 to 15 days. Frequently, the newly-hatched young cannot discard their egg membrane from about their head. In such cases, we may draw the fry up through a pipette of suitable diameter and in passing through the opening of the pipette, the "hull" or membrane will drop off and the fry may be transferred to a rearing tank. Higher temperatures during egg development may be fatal. At temperatures between 81°-82° F, embryonic development is significantly retarded. Frequently, such embryos die before development is completed. Those that do survive are often deformed.

The breeding period can extend over a long period of time. When using two females to one male, one or two days'

rest may be given per week. The lengthening or shortening of this rest period is self-learned through experience. Only the speed of recovery of the female is the guiding factor. Rearing of the fry is easily accomplished and they take brine shrimp (*Artemia*) from the start. It is best to place the newly-hatched young in a shallow container. After about a week, one can begin to raise the level of the water with fresh water. This greatly stimulates growth.

With the yellow-gold variety of *Riculus urophthalmus*, we often get the impression that the first generation of young is almost all red colored. This is a consequence of its basic coloration overlaid with intensely red dots. With age, about at a length of 2 inches, these spots fade somewhat, resulting in an exceptionally beautiful fish.

Concerning the length of this species, textbooks give this as 2 to 2½ inches. Perhaps, however, this measurement does not include the tail for actually, full-grown *urophthalmus* easily reach 3¼ inches. ◀

Diver's Paradise

(Continued from Page 559)

sense of flight. The canyons rose out of the darkness. Hills and valleys of coral assumed shape and distinctness. Fishes were completely different, brilliant with blues and yellows. I aimed my camera, the flash was dull but for an instant the corals became pinks or vermilions. All was delicateness, motion in silence, fishes. In the twilight the water and valleys were deliberate. Flash: the cone of light was absorbed by the darkness. Out of our drunkenness like butterflies or frolicking fishes, down and up, sideways or over the corals, down the mountain we swam. There! I pointed to a glowing coral. Dr. Merlet swam

over and pried it loose. Soon his collecting bag was full and we were heading up the canyon walks, over the corals to the anchor, then away from the bottom to the surface.

It was a wild flight and returning to the surface was like stopping to catch our breath. But in reality it was finished, just as my trip to Amédée Light had to have a finish. The reef and the lighthouse were bound together like a world apart. Perhaps, if I were in Sylvain's place the beauty of his world would have become lost in routine. I can't say. All I knew was that the very time limit

made his world all the more precious to me.

Sylvain had been on duty at the lighthouse all night so he went to bed after he finished collecting shells. I continued diving and photographing all that day. In the evening I walked along the beach and photographed the gulls in flight. The next morning Sylvain came to tell me the pilot boat had arrived. He helped take my equipment aboard. Said our goodbyes and I departed. ◀

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PART II

**W**ATER is no problem, as these fishes are adaptable to all save the hardest water. As our Los Angeles tap water can be more readily described as "liquid nails," I condition my water and keep my fish in a mixture of one part tap water to one part deionized water. To this mixture is added ten drops of a ten

## The Dwarf Cichlids

**Paul Loielle**

La Mirada, California

percent solution of tannic acid per gallon. I use an acidic cation exchange resin, which requires recharging with a dilute solution of hydrochloric acid. The water conditioned by this resin is very soft, but also has a pH of about 3.5. Needless to say, no fish can live in this. Thus the necessity of cutting it down with tap water. The tannic acid does next to nothing about lowering the pH. But it appears helpful in keeping the bacterial count of the water down, and the fish look better when it is added to their water. NEVER ADD A SOLUTION OF TANNIC ACID DIRECTLY TO THE TANK! [Ed. note: *This point cannot be over emphasized. Tannic acid can kill fishes.*] Always add it to the water used for replacement and allow that mixture to set for an hour or so. By the time I have finished

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AQUARIUM JOURNAL



my mixing, the water has a pH of 6.8 and a hardness of 60 ppm.

I have never tried to keep rams in Los Angeles water, but as they are fond of a rather hard, alkaline water, they would probably thrive. [But see editorial note page 568. — S.W.] The two species of *Nannacara*, are also "fond" of slightly alkaline water, but as I have never seen them offered for sale out here, I have not been able to try them in our local water. Of all the dwarfs I have bred, these fishes were the most prolific. I am in doubt as to whether I ought to say "this" or "these," since to this day I am not sure whether my "*N. taenia*" were merely more strongly striped *N. anomala*. The only difference between the males of these basically green-scaled species is a tendency towards a permanent set of short horizontal bars across the after portion on the body and a violet throat in "*N. taenia*." Both species flash a metallic green fire found in few other fish, and

both possess large fins attractively marked in orange and dusky black. The females of both species are a warm brown, with a dark bar through the eye and a horizontal line running from the mouth to the caudal peduncle. Running parallel and just above and below this center stripe are two narrower lines that originate just back of the opercular region. The females have darker throats, and a more pronounced pattern in their shorter fins. Come breeding time, the females assume a checker-board pattern of black on orange-yellow as several short vertical bars are added to the horizontal markings.

Despite a stormy period of courtship, these fishes spawn readily, and are quite prolific. I have had clutches of up to two hundred eggs from female *N. anomala*. The female is usually an excellent parent, but young females will on occasion devour their spawn. This fish is sudden death upon scavengers of any sort as spawning time approaches, biting

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off whiskers and gouging out eyes with diabolical precision. The eggs of this species are not especially hard to hatch artificially, and the young are large enough to take newly hatched brine shrimp as they become free-swimming. Growth is rapid, and in three weeks the young have assumed a mottled lead pattern. After five weeks, the female dismisses her offspring, dumping them in the lap of their father if he is still around. For his own sake, he had better not be in evidence prior to this time, as the female has no use for him once his paternal duties are over.

I have kept *Apistogramma ramirezi* many times, and do not hesitate to place it among my favorites. However, I have never attempted to raise any young, despite the fact that several pairs have proved quite willing to spawn for me. The reasons are simple. First of all, the ram is not a long-lived fish. I have never kept a pair longer than eighteen months. They simply refused to eat and passed away, much like *Nothobranchius rachovii* the only annual killie I have ever kept. Secondly, young rams are prone to sixty-million or so complaints, all of which strike without warning, and all of which terminate fatally with a rapidity that would do credit to the Black Plague. So though I have raised pairs of this fish from infancy to a glorious maturity, it is not the easiest of tasks I can think of. And lastly, the ram is not easily spawned. True, some pairs are quite willing to

spawn (and quite as many are not), but they either devour their eggs immediately, or else polish off the fry once they hatch. What is more, the eggs are sensitive to bacteria and very difficult to hatch artificially. A loss of up to eighty percent is not uncommon. If breeders are kept by themselves, they are wild and retiring; if kept with other fish, nervous and retiring, and eat their spawn to boot. So while I enjoy a pair of rams in my community tank, I leave their rearing to other with more time, more tank space, and a good deal more patience than I. [Editor's note: I have found "rams" more easy than described here when they are kept in soft acid water, pH 5.5-6.0 and a hardness of 10-20 ppm.—S.W.]

Similar reasons have also prevented me from raising any *kribensis*. Whenever I have had cooperative breeders, I also had more pressing demands upon my available space, and my *kribensis* had to take what was available. It is my honest belief that *kribensis* does not belong among the dwarf cichlids. [Editor's note: From the standpoint of classification I'll certainly agree with this. They evolved from a different group of cichlids and are only placed with dwarf cichlids by aquarist, because they are believed by many to be rather small.—S.W.] First of all, every male I have ever kept or seen grew to a length of over four inches. This is a good deal more than the three inches usually accepted as a limit by aquarists. Secondly, the genus *Pelmatochromis* contains a goodly number of members that are far larger than four inches in length. If one still insists upon calling the *kribensis* a dwarf in spite of this, then such fishes as *Eetroplus maculatus*, *Aequidens curvicaeps* and *Haplochromis multicolor* also deserve the title.

Whenever my *kribensis* did spawn, they took excellent care of their eggs.  
(Continued on Page 572)

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#### THE AQUARIUM JOURNAL

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## PRODUCT NEWS

### B & H Tropicals

An attractive new tropical fish store is now open for business at 3277 Mission Street, near 29th Street, in San Francisco. Owners are Bill and Helen Stracener. The store recently doubled its size, and now features over 130 tanks of tropical fishes for Bay Area hobbyists. Telephone number: VAlencia 6-2233.

### Mei Lan's

Bill and Kay Jue, owners of Mei Lan's in Oakland, California, announce that they are once again stocking marine fishes. Bill and Kay recently returned from the Orient where they found many fine specimens for marine hobbyists.

### Aquariums, Inc.

Aquariums Incorporated experienced moderate sales growth of approximately 3 per cent for the three months ended September 30, 1963, the first quarter of the company's fiscal year.

Harding Willinger, president, told shareholders at the firm's first annual meeting at the Hotel Commodore, New York City, that the first quarter, which includes the vacation period, is traditionally the "quietest" of the year. The outlook for the balance of the fiscal year, he continued, is favorable with increases expected in both sales and earnings.

For the fiscal year ended June 30, 1963, Aquariums Incorporated reported net sales of \$3,674,156 compared with sales of \$3,495,415 in fiscal 1962. Net income for the twelve months ended June 30, 1963 amounted to \$77,586 or 24c per share of common stock outstanding compared with \$137,262 or 43c per share in the preceding year.

Mr. Willinger said that substantial expenses involved in the move to the new plant and subsequent starting up ex-

penses plus the consolidation of six previously separate production facilities contributed to the reduced earnings. Also, he noted that increased price competition from both foreign and domestic manufacturers resulted in an industry-wide revision of price structures on many of the company's products.

He also told shareholders that Aquariums Incorporated is now beginning to realize the benefits of increased production and better operating efficiency in the new plant. In addition, he noted the important growth of the company's facility in Mountain View, California. This facility, he said, has more than doubled its sales since its acquisition in October, 1961. He recognized that the west coast represents a dynamically growing area for the company's products which, in future years, will add to profits. ◀

## ★ IDEAS ★

### BY HOBBYISTS

The Journal will pay \$5.00 for original ideas published. Keep less than 200 words. Send your idea today!

### Net Your Own Specimens

If you are interested in catching fish for your tank locally, try using a G.I. surplus mosquito net.

Visit your local army surplus store and buy a standard cot size mosquito net. If he does not have one, he can order one for you out of season. Cut off all the cloth hem of the netting. Buy some lead weights and cork floats from your fishing supply store, such as is used by commercial fishermen on their casting nets. Sew in a light weight clothesline rope around all four edges, leaving four 15-inch lines from the four corners to attach wood poles. Attach the lead weights along the bottom side, and the floats on the top side of the net.

The net can be used by two men, but

better results are obtained with three men. Two men guide and hold the net on either side by the wood poles, while the third man drives the fish into the net. Half the fun of an aquarium is in catching your own inmates. This method of "fishing" is suitable for tide pools, small streams, drainage and irrigation ditches, and ponds. It is also excellent for catching mosquito larva and brine shrimp in quantity during the season. Better find out about your local fish and game regulations before getting into trouble. — *R. F. Black, San Francisco, California.*

#### One More Use for a Food Baster

When spawning goldfish, zebras and other very small egglayers the young of which cling to the side of the aquarium glass the first day of hatching can present quite a problem if you want to remove the babies instead of the parents. I have found when using a net they can be injured, but if a food baster is used there is not any injury to the baby fish. The baster will also work in an outside filter that occasionally "capture" babies. With a net it is almost impossible to remove the babies. The baster fits in without any difficulty. — *Ann Nichols, San Leandro, California*

### CLUB NEWS

#### Tri-City Aquarium Society

Ten members of this group exhibited at the Los Angeles County Fair and received a total of seven first place ribbons; two second place; two third, one fourth, plus eight individual trophies and a society trophy.

Give the AJ for Xmas!

#### San Francisco Aquarium Society, Inc.

The next regular meeting of the S.F.A.S. is Thursday, December 5, 1963, Steinhart Aquarium, California Academy of Sciences, at 8:00 p.m., according to Robert P. Dempster, President.

Elections for the 1964 S.F.A.S. Board of Directors will be held. A Christmas party loaded with surprises will be held instead of a formal meeting, according to Frank Tufo, Program Chairman. Members are invited to bring "exchange" gifts priced under \$1.00. Each member who brings one will get one in return.

Due to the Christmas party, there will be no Fish of the Month competition at the December meeting, according to Ted Steinhauer, chairman.

Color slides of the 1963 S.F.A.S. Luau banquet will be shown. ◀

## PROGRAMS

*Readers and societies are invited to submit ideas to The Journal for Aquarium Society meeting programs, including lectures, slides, films, demonstrations, etc. There is no charge for these listings.*

"Saltwater Aquarium in the Home," a new 16mm film in color. Running time, 25 min. Rental, \$25. For information: Coral Reef Exhibits, P.O. Box 59-2214 Miami 59, Florida.

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## Dwarf Cichlids

(Continued from Page 568)

in a manner reminiscent of the larger, South American cichlids. But alas, the free swimming fry proved to be too much of a temptation, and that was the end of that. The labors that those fish went through to create a spawning site suitable to their tastes bordered on the heroic. Considering the effort involved, one would think that the fish could exercise more self-control with their young. But fish do not "think" like humans. *Pelmatochromis kribensis* are very sensitive to old water, and unless I replaced a quarter of their tank's water every three weeks, they began to scratch themselves against solid objects and to breathe very laboriously. The addition of about twenty drops of ten percent tannic acid per gallon to the water of their tank about three days before they are introduced adds to their well-being and enhances their colors. A peat filter is mandatory with these fishes. Incidentally, do not try to keep rams and *kribensis* in the same tank. Rams prefer moderately hard, alkaline water, while *kribensis* like theirs very soft and acid. The two, needless to say, do not mix. [But note the different experience of the editor.]

To one who is used to the hoary old ages attained by many of the larger cichlids, the short life spans of most of the dwarfs may come as something of a shock. *A. ramirezi* is, I am sure, an annual fish, or a biennial one at best. The other *Apistogramma* and *Nannacara* are old at three years, though I have had specimens of the later genus live for four years. *Pelmatochromis kribensis* undoubtedly has a longer span, but as I have always sold or traded pairs after two years I am in no position to judge on the matter. Lest these

gloomy actuarial forecasts discourage the novice to these fishes, let him remember that no other group of fishes packs so much excitement and activity into such a span of time as the dwarf cichlids.

I have one more observation to make before I close this series of reminiscences. The dwarf cichlids are not happy living in pairs. While it is true that these fishes are territorial, it is also true that they are social as well, and often feel retiring unless kept in groups. The myriad squabbles that are day to day occurrences among them are as much a part of their lives as feeding, courting and breeding. Fish which are not permitted to live a complete life are seldom good breeders and make poor show fishes. They are also, I feel, more susceptible to disease. So if the aquarist wishes to keep these fishes successfully, let him invest in more than one pair. The pleasure he will gain from watching these elves of the aquarium living a full and normal life will be adequate repayment indeed. ◀

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**LETTERS**

*From: William Overes  
Lethbridge, Alberta, Canada*

My problem is this. I have been hatching those shrimp eggs and fed my fish with them once a day, but all those shells are still in the water which is hard to filter all the time. Then I read the directions on the container some more and it said to write for free information. I would like to know mostly how many times to feed the fish. Please send me all the information for successful feeding and breeding. Thank you.

*REPLY: We are sending you a copy of our Brine Shrimp booklet on how to care for brine shrimp. There are many methods for separating eggs from the shrimp. The simplest is to hatch the shrimp in enamel or glass trays. Put a stick tightly across the surface of the tray so that the surface area only is separated into two parts. Place the eggs on one side of the stick after the salt-water, the tray and the stick are all arranged and prepared and the water is quiet, not moving. Now cover the side of the tray with the eggs with an opaque object such as a flat board. When the shrimps hatch they are attracted to the light side and will swim to the uncovered, egg free side where they may be sucked up by a syringe, squirted into a fine net (handkerchief material is excellent) and washed in fresh water. They are then ready for feeding. How many times a day to feed your fish is a somewhat complicated problem. Young, fast growing fishes should be fed three or four times a day. Older, mature fishes which are small enough to take adult brine shrimp, such as Rasbora maculata and various species of Nannostomus do best when fed twice a day. Experience and judgment are needed in feeding.*

From: J. E. Riley  
Buena Park, California

I would like to start a salt water aquarium. Could you tell me the best kind of tank to use, kind of fish to start with? I live by the ocean so I can use all the water I need. What size tank is best? I have fresh water fish now and would like just a few salt-water for a change. What is the best kind of set up to use as what to put in tank like gravel, etc.? Do you have to feed them food from the ocean or what? Thank you.

REPLY: Start with a small tank, say five to ten gallons and try one or two sculpins from the higher tide pools. Use well washed aquarium sand or beach sand in your area. Go slow and experiment with the native marine fishes. Most of the sculpins can be trained to eat pieces of liver, bits of fish and shrimp. Some of the little elongate blennies are very hardy, tough in fact and make fine pets. Others (and usually the more colorful ones) are delicate and difficult to keep.

From: Mrs. W. Forbes  
N. Billerica, Mass.

I have heard that clam or egg shells will turn water alkaline. If you have a tank with fish and plants in it, and the tank has turned acid, would it be possible to put in one of the above mentioned to correct this? I also have heard that a copper penny placed in a tank would cure some illnesses. Would you further describe the illnesses and results?

REPLY: Eggs shells, clam shells and aquarium snail shells all contain calcium carbonate, a good buffer. Simply put, this chemical combines with the acid or hydrogen ions present in an aquarium, decreasing the amount of acidity. Usually it completely neutralizes a tank, turning it somewhat alkaline. It is therefore quite effective in removing the acidity of your tank. However, at the same time, the calcium ions released will turn the water in your tank hard. This is

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fine for a lot of your fishes but not so good for others. A copper penny will often cure velvet. However it will almost as often kill your fishes and plants, especially if your tank water is soft and acid. Avoid copper and its compounds such as copper sulfate, unless you know how much copper is necessary to kill velvet and not kill plants and fishes. To know this you also need to know the hardness of your tank and to understand the reaction between copper and the hardness producing chemicals present. This rather complicates things. Copper in any form is best left out of aquaria unless you know exactly what you are doing.

**From: B. Edwin**  
**Uxbridge, Canada**

After two years' trial, I have had no success in breeding the pearl gourami or the black tetra. The water softening is done by the Industrial Zeolite process. Subject - Pearl Gourami. Size - Large male brightly colored. Plants - Sagittaria and smaller plants. Tank size - 20 gallons imp. Water - clear, pH 6.5-7. Hardness 2 by soap test. Temperature - 80-85 degrees. Part water change occasionally. Food - Tetramin and some live daphnia. Adults - separated by glass at times. Does the addition of epsom salts aid breeding?

**REPLY:** Sorry to hear of your trouble. The black tetras should be kept cooler, 74-76 degrees. Try 80 degrees F. for the gourami. Your water may be too soft. I have bred both these fishes in moderately soft water and have seen black tetras lay eggs that hatched in very hard water. I also suggest you change their diet. Other than this, nothing seems wrong, providing you are following good aquarium practice such as conditioning your breeders well and

carefully watching them for spawning activity.

**From: A. Kressler**  
**New York, New York**

In regard to black mollies how much salt should be used per gallon? And should any amount be replaced? I have a 10-gallon tank and filtration is about 30 gallons per hour for about 12 hours. I have read a number of books, and some state you must use salt, others say you don't, some say 1 teaspoon per gallon, others 2 per gallon plus 1 teaspoon of Epsom Salts. I would appreciate your reply as you see I am quite confused about the matter.

**REPLY:** Your confusion is well grounded and has my full sympathy. As a matter of fact, no set rule can be applied and I never have seen any controlled experiments pointing out how much salt black mollies actually require. However, assuming they do better with some salt present, your question is how much. First mollies can live in sea water or fresh water and anything in between, and seem to do well. Soft, acid water without sodium chloride does seem to harm them and should be avoided. The problem of how much salt is not dependent on the mollies. It depends on two other things, how much your fresh water aquatic plants will tolerate and second, how much salt is present in your water supply (this varies greatly from locality to locality). Plants cannot take a lot of salt and in general anything over a teaspoon to the gallon should be avoided. Even this much may slow the growth of some plants. If your source of water already has the equivalent to a teaspoon of salt you may be in for a bit of trouble if you add more. Usually however, you can add this much without noticeable trouble. ◀

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