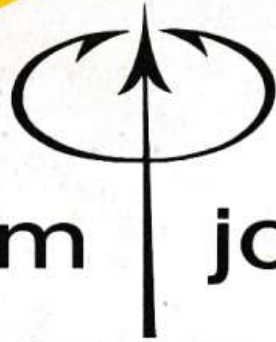


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SPAWNING OF AROWANAS



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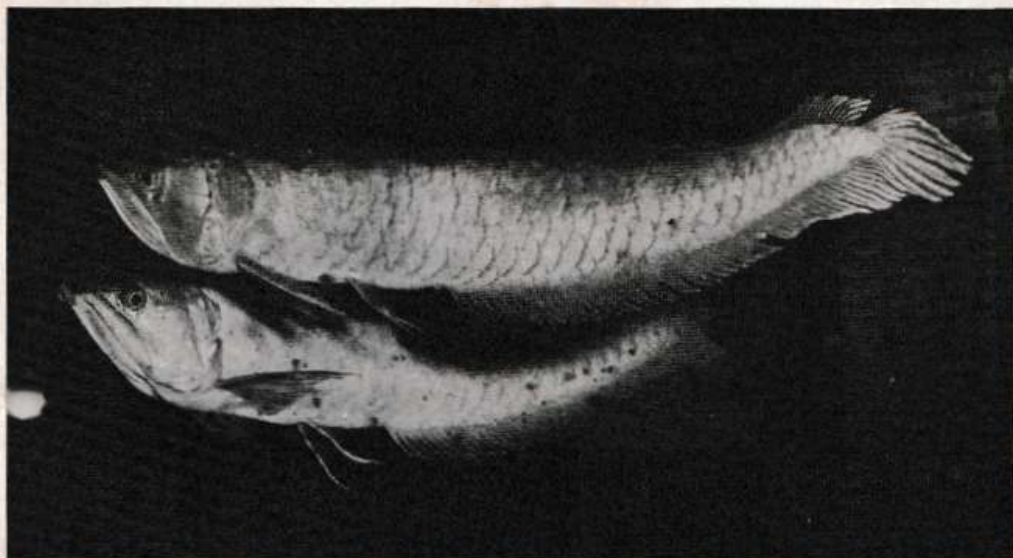
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cover photograph

Our cover this month offers some colorful marine fishes, a species of *Heniochus*, with black and white stripes, and two species of clown fishes, as photographed by Peter Tsang, Hong Kong.





They said it couldn't happen under
aquarium conditions — but it did!

Arowanas Spawned

SUNDAY MORNING, August 30, 1964, the telephone rang. "Gene, this is Tex," the familiar voice said. In somewhat awed, but proud tones he stated, "My arowanas have spawned. How about coming over and getting some pictures?" We carried on a bit more conversation so that I could learn a few details. It sounded almost too good to be true. It had never happened before under aquarium conditions. Arrangements were made and I said I'd be over shortly, cameras in hand.

After we hung up my mind started whirling a bit. Arowanas . . . arowanas, what did I really know about them? Very little, I was afraid. I did know that an entirely new species had arrived

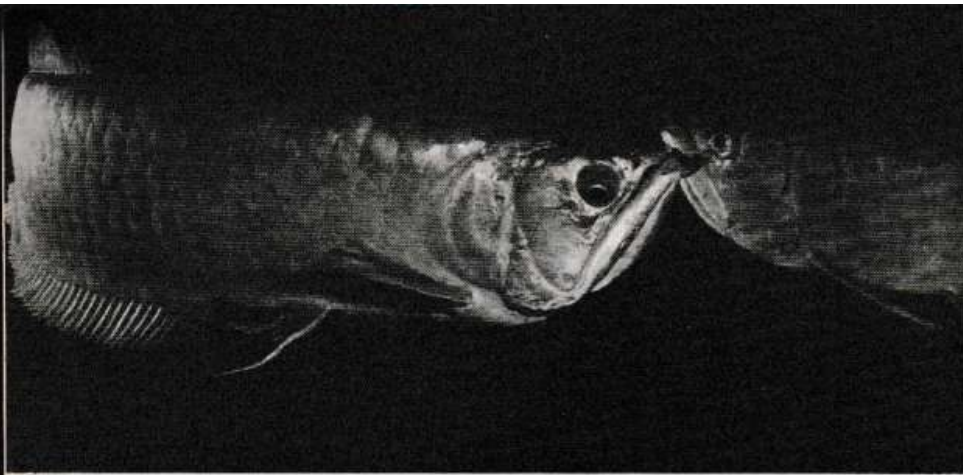
Gene Wolfsheimer, F.A.I.

Sherman Oaks, California

here recently in the Los Angeles area, of a similar shape but entirely different color and markings. The two I own have already tripled in size from their infant three inch length. This new species should prove an interesting story by itself.

The name "arowana" was reported by Eigenmann in 1912 as used by the Guiana Indians in South America. This

Photo: This is a pair of arowanas that spawned. Female is at top. A small portion of egg tube still apparent. Dark spots on fish is actually algae on glass of tank. Cleaning it not attempted because of frightening the breeders, which are real jumpers.



species appears to be known in eastern Peru as "arahuana," a Spanish rendition of the Guiana name. The full title of this species is *Osteoglossum bicirrhosum*. Illustrations included here tell far more than words can describe. Their elongate body of silvery-green hue, is compressed, being heavier dorsally and sharpening down to a fine edge at the bottom. Earl Herald, in his book, *Freshwater Fishes of the World*, classically describes the mouth as being "particularly large and prominent with the jaws angling upward at about 45 degrees, somewhat resembling the ramp on a landing barge." And a slow-moving snake-like swimming motion, dorsal and anal fins that start at about the middle of the body and run the posterior length of the fish, a small nonedcript caudal,

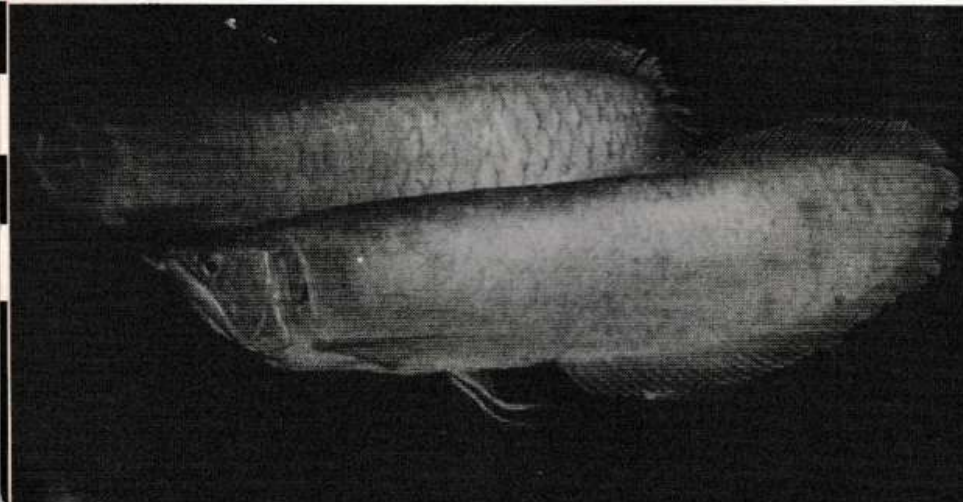
Photo: (Top) Here is a good view of the huge "ramp" of the mouth. Its storage facility is fully able to hold a quantity of eggs.

two fleshy barbels on the front end of the lower jaw, huge greyish-green scales and you have a general description of a very unusual but prominent member of the fish-keeping hobby.

The arowana belong to the family, Osteoglossidae, the bony-tongues. It includes four genera and up until the introduction recently of the new black and yellow *Osteoglossum* five species. The hobby recognizes one other osteoglossid, the huge *Arapaima gigas*.

In all instances these fishes are brought to the hobby strictly through importation. And interestingly enough, in part, these importations are comprised of young so immature as to be one step above a larva. Frequently, newly introduced arowana babies of approximately

Photo: (Below) Fleshy barbels on the end of mouth are very conspicuous here. Male in forefront is larger of pair.



three inches in size, are found swimming about with their yolk sacs still attached and partially unabsorbed. If unharmed it diminishes in time and disappears.

Both the common arowana as well as the newly-introduced form are strictly South American as is the arapaima. The former has quite an extensive range which includes Ecuador, Brazil, the Guianas, Venezuela, Peru and Columbia. The new *Osteoglossum*, with reports concurring that its source is in Columbia, quite possibly has a more extensive distribution as well.

Basic requirements for successful maintenance of the arowana are but two, namely: ample space and ample food. It should go without saying that all the usual aquarium rules pertaining to cleanliness should be observed. Infants will do quite well on a diet of mosquito larva, large *Daphnia magna* and small fishes. Attempts should be constantly made to induce the fish to eat substitute foods. With optimum conditions their growth is so rapid as to be almost astonishing. This fish can almost double its size every month or two. This rate does slow down as it reaches its maximum length of about two feet. It is reported to reach 4-5 feet in the wild. Long before this happens, such foods as the aforementioned go by unnoticed. The growing arowana graduates from these to meal worms, earthworms and finally, other fishes, especially goldfish which prove to be a fairly expensive diet. Fish are an especially good food since they are taken whole with undue mess and remain alive until eaten. This aids in the maintenance of a clean tank.

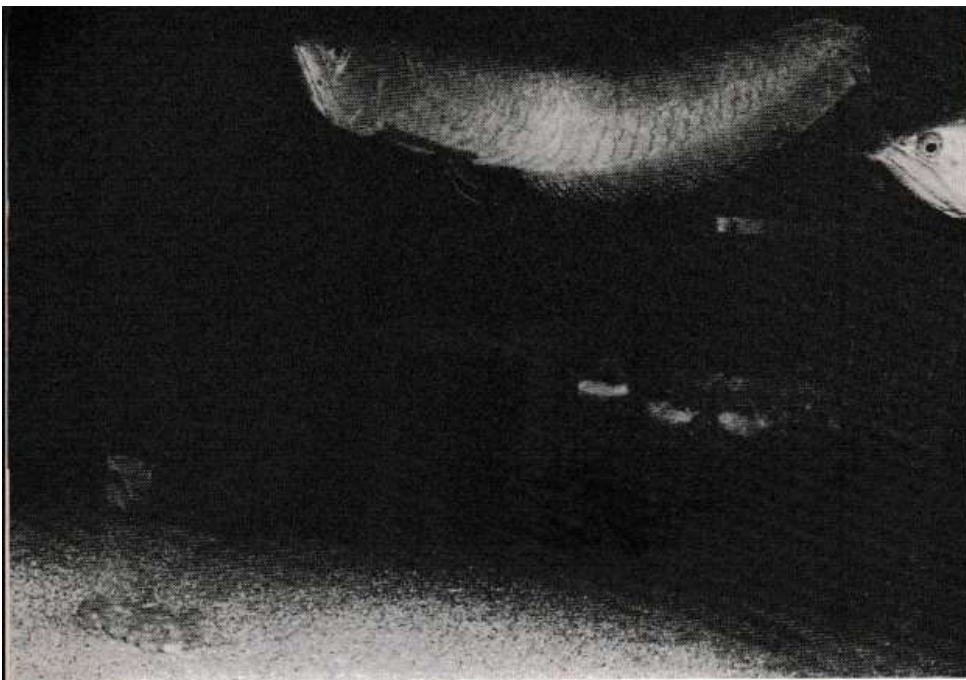
Our contemporary journals have continued to speculate as to the breeding habits of this strange fish. For the most part it is readily admitted that very

Photo: Breeder of the Arowanas, Tex Maupin. 36-gallon breeding tank is in upper left corner of photo.



little is known. Educated guesses have sustained the theory that they are mouth breeders. That is, they tend to carry their eggs in some part of their mouth cavity until incubation. There is no evidence as to which sex does this. Again, according to Earl Herald, there . . . "is the presence of a large pouchlike space between bones of the lower jaw and the fact that its Asiatic relatives, the *Scleropagus*, are known to be mouth breeders."

In a recent personal communication with Ross Socolof, a fish collector and importer in Florida, the mouth breeding theory appears to be substantiated. Mr. Socolof writes, "I am absolutely 100% positive that the arowana is a mouth breeder as this is the way so



many have come on the market in the past year. It's actually my fault that so many immature arowanas are appearing as I arranged to have the people in Brazil shoot adults and take the young from their mouths and this is the only reason why we are getting the quantities of arowanas now."

With the baby arowanas being collected in this manner it is easy to see why so many still retain a good part of their yolk sac. The removal of the young fish from the mouths of the parents is, in a sense, a form of premature birth.

Tex Maupin owns and operates a tropical fish store in Naples, California, a suburb of Long Beach. "He's been around quite awhile," as the saying goes. Tex knows fishes, and their condition, as well as the aquariums at his shop can attest to this. He's as good with marine species as the freshwater types. Possibly it helps in keeping marines to

have a shop so close to saltwater that a rock thrown from his store will almost land in a channel leading to the Pacific ocean.

Tex' shop doesn't appear too large as you walk in, but this is misleading. Probing deeper into its belly, it swells out to a good-sized hatchery and holding area in the rear. It has to be large to hold, amongst many other things, a selection of two foot arowanas that can be put together and separated until a sexed pair proves compatible.

Upon arrival at "Tex's Tropicals," my heart sank a bit. It was jammed with Sunday customers. Quantities of people are not conducive to good picture-taking. "They're in the back room," Tex shouted to me over the heads of the customers. "Take a look." Snaking my way between narrow aisles, loaded down with camera gear, I made my way to the rear room. Where were they? There were several large aquariums with individual arowanas gently gliding about, but nothing resembling a large pair of

Photo: Female hovering over her eggs, located at bottom left in photo. This was an accident having her so close to eggs, as there is no true parental protection.

breeders. Then a movement above me caught my eye. There they were!

In the largest aquarium, in the highest spot in the room, swam the breeders. I learned shortly that 360 gallons of water was sitting there on its own stand. The six inches of sand at the bottom was almost at my eye-level height. With the exception of the pair of two foot specimens and the sand, the tank contained only a small clump of plastic plants in one corner. A few goldfish swam about listlessly waiting to be swallowed by their monstrous companions.

In one corner of the aquarium was a shallow depression in the sand, about a foot across and 2-3 inches deep. Resting in it was a quantity of eggs, approximately 135. They were a brilliant orange and roughly five-eighths of an inch in diameter. I found of great interest that the orange yolk coloration in the egg was restricted to the lower three-fourths while the upper one-quarter remained crystalline clear. Here and there among the eggs, a few of notably lighter color appeared. With a single exception of one egg on top of another, each egg rested on the sand

Photo: View of the eggs resting on sand. Egg yolk appears to be in bottom $\frac{3}{4}$ ths of egg, with a very clear upper $\frac{1}{4}$ th in each egg. None of the eggs hatched. All photos by the author.

next to its neighbor, producing a flat egg mass with an irregular circumference. They had been very definitely placed in this spot, not scattered or haphazardly dropped.

The breeders had been raised by Tex from three inch, newly-imported fry some five years previously.

It took several exchanges of mates before this pair accepted one another without fighting.

The female, noticeably the prettier of the two sexes, increased in girth around the belly for a few weeks prior to the spawning.

The pair were fed copious quantities of young goldfish as well as frozen scallops which Tex had been successful in getting them to accept.

Shortly before the spawning, the female started extending an ovipositor or egg-tube. It seemed to measure at least one-half inch in diameter, possibly more. The male extended a very short pointed tube.

There were many indications of an impending spawning such as flaring of fins, the following of one another head to tail in circles and a sort of batting away at one another with the tail. An occasional trip took place down into the depths of the aquarium from their



usual swimming area of just beneath the surface.

Sometime between the closing and opening of the store, between 7:30 p.m. and 10:00 a.m., the fish spawned. A few lights are often left on in the hatchery and apparently there was enough light available. The spawning took place unobserved.

Vital statistics include a water temperature of 82° F. It was neutral, 7.0 pH and a hardness of 8DH. Sub-sand filters were in use.

A circus juggling act was needed in attempts to take pictures. Boxes, barrels and ladders were used to stand on. Passersby and Tex' daughter were inducted into the service of holding lights. The fish cooperated not at all by staying primarily in a diagonally opposite area from the eggs. They remained at the furthest end near the surface.

It was observed that at no time did the parent fish display any instincts for the preservation of their spawning. There was no guardian or hovering over them. Neither were they eaten. Although the goldfish tried unsuccessfully to pick at them, the eggs remained unharmed.

After some discussion as to what should be done with the eggs it was decided that about half should be removed. An attempt would be made to hatch them artificially as is frequently done with cichlid eggs. Tex extracted a

quantity of the eggs with a large siphon hose. The parent fish couldn't have cared less, remaining at the opposite end of the aquarium.

About a dozen of the eggs were given to me with a quantity of the water taken from the breeding tank. The remainder were set up in a thirty gallon aquarium by Tex, in water not from the breeding tank. To his eggs was added a quantity of methylene blue solution as a fungicide. Actually, its capabilities as a fungicide remain questionable.

Arriving back at my own hatchery, the eggs were put into a small aquarium using their own water. I added some acriflavine solution in preference to the methylene blue.

As the days passed I disappointedly watched the eggs turn a lighter orange and become a bit squatter in shape. The eggs had lost their turgidness, and finally, upon being gently touched, they burst. No embryological development had taken place. A telephone call to Tex proved just as disappointing. Neither the eggs kept apart nor the ones left in the breeding tank had hatched. No development had been noticed.

As a post mortem a few conjectures might be in order.

1. Is the species a mouthbreeder? Apparently so. At first we were sure this spawning had proven otherwise. It is quite probable that due to the artificial surroundings, the parents (which one we are not sure), had no inclination to pickup the eggs after they had been laid. In all recorded instances of mouth breeders, eggs are usually laid by the female first, fertilized by the male second, and then picked up in the mouth of one or the other and held, not only until hatching but usually until the free-swimming stage that follows. This is sometimes several days later.

2. There is no way of knowing whether either of the parent fish is fertile. Although it happens infrequent-

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ly, there are instances of either sex being infertile and incapable of producing young. A roe-bound female can release non-viable eggs or the male can be incapable of fertilizing the eggs properly. The facts with this first spawning indicate that the female produced normal eggs. She developed and released them within a short span of time. Either the male did not fertilize them or if he did, then the very necessary mouth care was not carried through for a successful hatching.

3. Water composition is often a valid reason for eggs not developing properly. Although I am a firm believer in the fact that if a fish will spawn in the

water, the eggs should hatch in it as well. I speak in generalities. Very occasionally this doesn't work out, apparently more so with killifish.

4. Lastly, it has been faintly hinted locally that the whole thing was a hoax. That possibly salmon eggs or something similar was used in an attempt to gain some notoriety. I can state quite flatly, this was no hoax. The eggs were far bigger than salmon eggs or any fish egg I have ever worked with in my nineteen years of continual fish breeding. The material evidence was such that I have no doubt an honest spawning of arowanas did take place in the hatchery of Tex Maupin, Naples, California. Who would have expected it? ◀

★ **IDEAS** ★

BY HOBBYISTS

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

Decorating Back of Tank

Some time ago I tried to think of a way to decorate the back of some of my tanks the way they do in public aquariums. My main concern was to find a glue that was flexible enough and would not harm the fishes. The material that I used was this: Epoxy resin (clear), catalyst and rocks, enough to cover the entire back glass of the tank. Be certain that the rocks are not too large and that you do not try to build overhangs.

First, make sure that the tank and rocks have been washed and completely dried. Next, place the tank on its side and arrange the rocks inside the tank on the side of glass that is down.

After making an arrangement to your satisfaction and adding a catalyst to the epoxy resin, pour it over the rocks and allow to flow down to the back glass. It is important that the rocks touch the glass and that the glass surface is com-

pletely covered with resin. If you don't want epoxy-covered rocks, first pour the epoxy on the glass, then place the rocks on it.

Allow 24 hours to dry and then scrub with soft brush and salt. Rinse well and the tank will be ready to set up. —G. R. Gillespie, San Leandro, California

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ALL of us who dabble in the tropical fish hobby do our dabbling in a brand new hobby. At least it is brand-new when you consider that there is another fish hobby that predates it by hundreds of years, and that is the

150 year ago these
multi-colored carp
raised by warriors!

Samurai Fish

Diane Schofield

Burbank, California



ancient pursuit of the breeding and rearing of fancy goldfish and carp, as done by the Orientals. In passing, the words "goldfish" and "carp" are often used interchangeably by people who really should know better. Both are members of the family Cyprinidae and do superficially resemble one another. However, the common carp is *Cyprinus carpio* and the goldfish *Carassius auratus*. The colorful cultivated forms are variants, that is mutations, of the wild, dull, dingy, greenish brown Asian natives.

Immediately when reading the word, "Oriental," in the preceding paragraph, the reader is likely to substitute "Japanese" in his mind, because it seems as though the Japanese, the goldfish and the carp have been associated in the American mind for years. It's true, these

Photos: (Top) Herbert Hayashi, owner of a \$30,000 collection of carp. (Below) Arthur Christensen, who does maintenance and feeding of carp. All photos by the author unless otherwise credited.

AQUARIUM JOURNAL

names could be coupled and put down on any list that included other natural combinations such as "salt and pepper." However, while this pairing has been a natural love affair throughout many years, this is a "second marriage" for the goldfish because it was originally produced in China and introduced into Japan between 200 and 400 years ago. This was when China was at the height of prosperity during the Tang Dynasty. Unfortunately not too long after that, due to wars and upheavals in the country, the culture of the goldfish was largely suspended. It was resumed about 200 years ago when the people were once again enjoying peace.

Before long, many Japanese were keeping these glittering fish and rich people would buy one even at huge expense. Many people kept them as charms against misfortunes.

Not all of the cultivation was done on a full-scale production by the Japanese who specialized in such things. 150 years ago much of the more dedicated work was done by "hobbyists" of the warrior class of Samurai who were not supposed to be interested in making money. When not dallying around their fish, Samurais spent their



time wielding the long-curved finely-engraved swords that bear their name. As a result, in Japan today, the carp is often called the Samurai fish.

When the era that fostered these knife-wielding Japanese fell, many of them had to return to "normal" lives and the culture of goldfish and carp became the regular work for some instead of their hobby.

Photo: (Top) Pagoda hotel, owned by Mr. Hayashi.

Photo: "Satellite" in the distance "floating" over the carp lake.





As it is frequently the custom in Japan for the work and property of the father to pass down to his sons, some of the modern goldfish and carp breeders have notable ancestors.

A good thing is often hard to keep to yourself and, who wants to when by sharing it, one also adds to the family coffers? The first goldfish to find its way to America did so by sailors in ships plying to America. They did this as a side job which proved to be profitable. Now there are several million goldfish and carp being exported each year, making a husky enterprise.

Through the years, a number of professional goldfish breeders have set-up shop in the United States, but many of the most magnificent fish are still imported from Japan because there seems to be nothing like the patience of the Oriental to bring out the best in such a fish.

Another typical trait is that the Japanese refuses to do anything that he can't do really well, and it was no doubt this characteristic that was at work in Mr. Herbert Hayashi of Honolulu, Hawaii. Thus he has perhaps one of the most spectacular collections of Japanese Nishiki, or Koi (carp) in the world. This collection is insured with Lloyd's of London for more than \$30,000 and some

individual fish are worth up to \$500 apiece. Kois are the product of a cross-breeding of *Carassius auratus* and *Cyprinus carpio*. Some have barbels and some are barbelless. Some have scales, others "scaleless," although these fish do have one or more rows of over-sized scales. To acquire all of these fish, Mr. Hayashi harks back to the land of his ancestors. All of his fish come from the Nirgata section in the northern part of Japan. [Editor's note: There is a great deal of argument and confusion concerning the origin of various stocks of colored carps and goldfish. We do not at this time care to enter the arguments. Many scientific names are currently being misused and confused. Colored carps (the 'colorless') kind are also sometimes called Koi) are undoubtedly the result of a cross between the colored forms of the goldfish, *Carassius auratus*, and the "colorless" carp *Cyprinus carpio*. The hybrids are fertile and backcrosses with colored hybrids to carp have been used to bring color to the resulting more carplike offspring. Further selective breeding in the resulting colored carp has produced some remarkable specimens.]

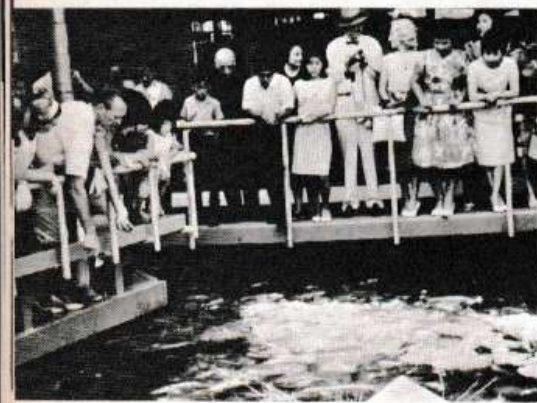
It was during one of his trips to Japan several years ago that Mr. Hayashi saw some of these multi-colored

giants. Not only was he impressed with what he calls the "kimono colors" that they sport, but there is yet another thing about these fish that endears them to the Japanese and that is what they call their "success under stress." The Japanese believe that the carp represents a dauntless courage and ceaseless determination to battle upstream (like the North American salmon). It is this indication of bravery that additionally seems to make the name of "Samurai" an appropriate name for the colored carp.

When you consider that the carp, as well as the goldfish, has long played an important symbolic role in Japanese culture, it is no wonder that Mr. Hayashi became determined to make a great many of these fish his very own. He said that he, as a business man, found great admiration for these fish through their "success through stress"

Photos: (Top) Closeup of Floating Pagoda, main building. (Middle) Overall shot of the Floating Pagoda restaurant. (Below) Closeup of one of the small "satellite" dining areas of the restaurant.





and an added incentive was their symbolic role of "good luck."

The Japanese raised the goldfish and carp to be ornamental and to enhance the garden pools. Therefore Mr. Hayashi prepared a beautiful Oriental garden to receive his prize carp. But, Mr. Hayashi is no ordinary Japanese business man. He owns two large hotels and two restaurants in Honolulu. It seemed natural when he acquired his first shipment of Kois to share their beauty with the people who ate at the restaurant in his Bishop Terrace hotel. Soon he discovered that there was a real battle being waged to get the tables closest to the windows so that the customers could have a better view of the carp when they dined. Therefore when he built his new Pagoda Hotel and opened his Floating Pagoda restaurant in May of 1964, what could be more

Photos: (Top) A section bordering on Carp Lake showing the oriental landscaping with small white pagoda. (Middle) Mr. Christensen leaning down at the left, ringing the bell that precedes feeding. (Below) Carp waiting impatiently for dinner. Maybe this is wall-to-wall carpeting?



advantageous than to arrange this restaurant in the shape of a moon with several little "satellite" dining rooms, all the better to provide viewing space for more and more people? This restaurant literally "floats" over a large carp lake.

This new restaurant did not make Mr. Hayashi's first eating establishment lose their kimono-color wearing Kois. On the contrary - in the pools directly

tropicals, by looking at them in side-view. Instead they are judged by looking at them from above. Mr. Hayashi said that this is because this is the normal viewing position of fish in outdoor ponds, while tropicals are always seen from the side in an aquarium. He pointed out first one fish and then another, giving the show points in its favor or those poor points that work against it.



surrounding this restaurant are kept his choicest prize winners. He says they are much more easily caught from this pool for showing purposes than from the larger one that surrounds the Floating Pagoda restaurant. In the reception lobby of his Bishop Terrace, on display for, all to see, are some of the glittering trophies and ribbons that the Samuzai fish have won for Mr. Hayashi as "best of show" winners in Hawaii. Many of these fish also won prizes in their native Japan before becoming Hawaiian.

Those fish which won their honors in Hawaii did so during some of the shows of the Hawaiian Goldfish and Carp Assn., of which Mr. Hayashi is a member. This is a club of 90 members who meet on the second Thursday of each month at the McKinley High School in Honolulu. Goldfish and carp are, of course, never judged as our

Mr. Hayashi is a kind gentleman with an obvious love for his fish. As we sat talking and watching the boiling mass of fish that accumulated just beneath us in the lily-padded pools of his Floating Pagoda restaurant he'd point quickly and say, "Look at that black one there - it's 38 years old, it's 30 inches long and weighs 12 pounds." When you consider that he must have over 2,000 of these brilliantly colored fish, it's nothing short of remarkable that he seems to be on a first name basis with all of them!

The feeding of the Kois is rather a startling thing in itself. They are fed on a precise schedule so that anybody who wishes to, can be on hand to watch. They are fed four times a day - at 8:00 a.m., 12:30, 4:00 and 6:30 p.m. Re-

Photo: Here are some of the trophies which Mr. Hayashi's Kois have won for him.

markably, a few minutes before the designated time, all of the Kois come to the feeding spot, mulling around and looking like a pot of multi-hued bouillabaisse. They mill over one another awaiting the call of "soup's on!" This comes in the form of a small bell that is rung above the same spot each day by Mr. Arthur Christensen, who does much of the maintenance of the pools. Then, a dry fish food is thrown into the water and the surface literally boils with gaudy fish bodies as they put a fin in the eye of their buddies trying to be first. One of the ingredients of this food is dried silkworm larvae. This is fed to many fish of all kinds in Hawaii, as well as Japan, since live food is sometimes difficult to obtain. It is put out by the Koriyaama Goldfish and Supply Company of Kobe, Japan and looks like a bag full of dark brown Wheaties. It is relatively inexpensive.

After hobnobbing with these glamorous, dashing fish for a while, they start to get under the skin of even tropical fish fanciers such as myself. Thus before long I found myself wandering into Birdland Pet Shop, one of the larger tropical fish emporiums, located in the Ala Moana shopping mall in Honolulu. There, sure enough, in a large plastic pond at the rear of the shop were the Kois. Kois that were selling for a rather staggering sum of \$30 to \$50. These fish, however, were 12 inches or more in length. Later on, I discovered some

5 inchers that were going for a mere \$1.50.

My knowledge of Kois was further heightened when I learned that Kois are broken down into varieties that are so-named because of their particular color types. These include the Akamuji, which is a vibrant, electric red; the Kohaku, a red and white type; the Asagi, a red and gray version; the Doitsu Ogon a bronze gold, plus a multitude of other types that are known only by Japanese names.

Yes, \$30 dollars plus may seem a bit much for some of us to spend on a fish, and a carp at that, but then what other fish can you find that is not only going to be a living object lesson to you in their "success through stress" but will possibly outlive you? ◀

CLUB NEWS

Hudson-Bergen Aquarium Society, Inc.

Hudson - Bergen Aquarium Society Inc., will hold its Eighth Annual Tropical Fish Exhibition on Saturday and Sunday, November 7th and 8th, 1964 at Kunisch's Hall, 67th Street and Kennedy Boulevard, (formerly: Hudson Boulevard), North Bergen, N.J. Mr. William Jacobs is Chairman and further information can be obtained by contacting him at 61 Blauvelt Avenue, Bergenfield, N.J., or the Co-Chairman, Mr. Richard Pasinski, at 408 Eleventh Street, Carlstadt, N.J.

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Sometimes these molds can't wait before
their hosts are deceased before taking over!

Water Mold

PART II

Few if any of the groups of organisms which are important in the ponds and streams actually escape from the attacks of the aquatic fungi. However, it is not the water mold which is the true culprit and history will show that it took a national emergency in Great Britain to find out exactly where the blame really was to lie.

Between the years 1877 and 1879, a very serious outbreak of this disease had increased to epidemic proportions in practically all of the rivers of the British Isles. Salmon which were sometimes covered from head to tail with great patches

Charles O. Masters

Walhonding, Ohio

of mold were dying by the thousands in the rivers. Immediately a commission of inquiry was set up by the Home Secretary and evidence was gathered from all sources by every person professionally engaged in fisheries research or by sportsmen. English scientists whether or not they knew anything about these particular diseases were invited to offer some suggestion as to what the disease might be and as to how it might be cured.

At once the mold was identified as *Saprolegnia* because there had been some work done previously on this mold. In 1844 Franz Unger had found carp in the botanical gardens at Gratz completely covered with the mold and described it in one of the scientific journals of his day. Fourteen years later other research workers had also described the disease as they found it in other places. A noted English biologist, Thomas Henry Huxley, concluded that a fungus which is normally saprophytic is here living as a true parasite on the fish and caused the disease. Thomas Huxley, like all the research workers of this day, considered the fungus which was found associated with the disease as the true cause of the disease whereas actually the growth of the fungus was a mere consequence of some pathologic condition which was already existing.

Twenty years later, in 1903, a bacteriologist in Glasgow, Scotland, by the

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name of Hume Patterson actually determined exactly what the causative organism of the disease was. After performing many classical experiments, Mr. Patterson was able to locate a bacillus which after obtaining entry into the small wounds of the fish prepared the skin in such a way that the mold was able to grow rapidly. The conclusions which Mr. Patterson came to were as follows: 1. The spores of the mold were universally present in the river waters and these molds were true saprophytes responsible only for a secondary stage

of the disease. 2. The wounds alone were not sufficient to allow the fungus to grow. 3. The bacillus which he isolated must definitely be present before the fish can become diseased.

These conclusions can definitely be applied to conditions as they exist in the aquarium but having the facts is certainly not going to solve the problem. Back in Great Britain an effort was immediately made to determine some remedy. Thomas Huxley suggested removing dead fish as soon as possible from the rivers but he soon realized that that would be a hopeless task and decided that it would be far cheaper to let nature take its course. True enough nature did take its course and it had a chemical means by which the fungus was kept down. Those salmon in the rivers which did not die after spawning but instead made their way back to the sea were promptly cleared of the mold. The sea saltwater was a most efficient fungicide against the water mold.

And so it is today, aquarists have found that ordinary table salt is a remarkably effective method of ridding the fish of the growth of mold. However, a better way is to paint the infected area with a suitable dye of some kind such as a 5% solution of malachite green. After heavy infestations of the mold in an aquarium it would be suggested that the water be changed and as much of the plant or rock material be removed and sterilized. ◀

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PART II

AS TO BE expected with *Aphyosemions*, the brilliance and red dots of the sides runs into the inner parts of the fins. Midway in the fins, with the exception of the tail, we find a more or less complete and broad red line. On Akure males of the yellow type, there is always an unbroken red line in the

female is "blue" or "yellow," it is very difficult to eliminate these blue males. From my breeding experiments it seems clear to me that the differences between the blue and yellow Akure male is based upon a single gene (or coupled group of genes) only, and that the yellow male is recessive to the blue or dominant form. This means that if a certain

Discovered in 1955 in Western Nigeria
and first brought to Denmark in 1957

Aphyosemion Nigerianum

anal fin whereas in blue males, there is never such a line. One may consider this system as the reason for the presence or absence of yellow coloration on the outermost parts of these fins. For a long time I thought this to be so but at present, I find this problem more complicated. Below this red line of the anal fin there is a very narrow but still visible line of greenish-blue. Then follows the conspicuous yellow edges. The red line in the dorsal fin of yellow males is more narrow and less complete in the Port Harcourt males and also (according to Clausen) in the Jos plateau populations. The pattern of the caudal fin is basically equivalent to the patterns in the dorsal and anal fins.

The blue males from the Akure populations have these typical broken red lines in the anal and dorsal fins but the tail pattern is just like that of yellow males. This is the first "proof" that the yellow coloration of fin edges is not caused (only) by the red lines seen in the dorsal and anal fins of yellow males. As I have not been interested since 1957 in the production of a pure blue stock, my personal knowledge of blue males is based upon that which results from my breeding of yellow males. As one is not able to ascertain whether a given

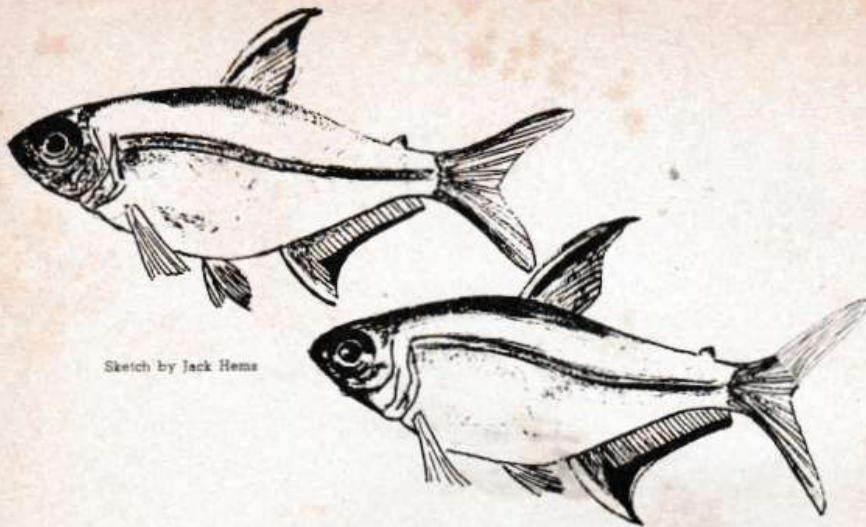
Joergen Scheel

Copenhagen, Denmark

male possesses one single gene for blue, he will not be able to mature as yellow in spite of the fact that such a male also has a gene for yellow. Yellow males have no genes for blue. Blue males may have one or two genes for this color. These simple genetics, however, are not valid for all populations of this species.

As mentioned above, the crossing of Port Harcourt and Akure stocks produced a male with more red dots on the sides and fins than seen on males from the Akure population alone. My next thought then was to produce a male of the blue type which would have a concentration of red dots such that the row of red dots inside the anal fin would merge into an unbroken red band. I did not reach this point of transformation but in crossings between *A. nigerianum* and the species from the Ndian river, I produced males which still are just as blue as ordinary blue males. Also, in the broods from the Port Harcourt and Akure cross, there was one male which was near to closing

(Continued on Page 567)



Sketch by Jack Hems

Spawning this "little brycon with the pretty fin" isn't very difficult!

The Lemon Tetra

PART I

THE LEMON TETRA is one of those delightful characins which are native to that treasure house of desirable tropical aquarium fishes, the Amazon basin. In the early 1930s, when the species was first introduced to hobbyists, it masqueraded under the erroneous designation of *Hemigrammus erythrophthalmus*. But in 1937 the late Dr. Ernst Ahl, of the Zoologisches Museum, Berlin, correctly described it as *Hyphessobrycon pulchripinnis*, which, put in everyday language, means "little *Brycon* with the pretty fin."

Most of the body of *H. pulchripinnis* is of a transparent yellowish green — in certain lights a steely blue-hue, darker on the back than the lower sides and underparts, which merge imperceptibly into silvery white. The iris of the black eye is metallic red above and shining gold below. The anterior parts of the dorsal and anal fins are startling ivory white, tinged with lemon, and backed

Jack Hems

London, England

by a solid black edging which, in the case of the showier anal fin, extends right back to the junction with the tail. There is an inconspicuous darkish smudge in the adipose fin. The rest of the fins are lemon yellow.

To see the fish's colors at their brightest (leaving out the brilliant display put on at spawning time) it should be viewed under a good top light against a densely planted, dark green background. With regard to sexing, in mature fish the males are flatter-sided than females, and their fins have more generous and brighter splashes of color. The species averages about an inch and three quarters in length.

The lemon tetra is quite adaptable.
(Continued on Page 556)

ONE OF THE MOST fascinating groups of aquarium fishes are those cichlids which are known as mouth breeders. Although there are a few species of *Geophagus* from South America in which after spawning one of the parents shelters the eggs in its mouth until

Braz Walker

Waco, TEXAS

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An African in Texas

the fry are free swimming and no longer helpless, by far the majority of the mouth breeders belong to the genus *Tilapia*, most species of which are native to tropical Africa. The African mouth breeder, *Tilapia mossambica* (Peters) is perhaps the best known species of *Tilapia* and has long been a favorite of aquarists who have large aquariums containing large fishes, since this extremely beautiful, long-lived and easy to breed fish is among the mildest mannered of any of the larger tropic fish.

Possibly the last place you might expect to see an African mouth breeder is hanging from the fish string of a South Texas fisherman. In the last few years,

however, these fish have been caught more and more frequently by sport fishermen in the waters of the San Antonio and San Marcos Rivers. The African mouth breeder is reported to be a good food fish and a scrappy fighter and reaches a weight of from two to three pounds.

The obvious question is how did they get there? The answer is that several years ago the San Antonio Zoo received a number of these fish from the Steinhart Aquarium in San Francisco. After successfully spawning the fish the young were placed in a wire "corral" where the San Antonio River goes through

Photo: A pair of *Tilapia mossambica* (Peters) owned and photographed by Braz Walker.



the Zoo. Fed by a large artesian well the water stays at approximately 70 degrees Fahrenheit throughout the year. In 1956 a number of the fish escaped, grew tremendously, spawned successfully and now the African mouth breeder can be seen throughout the waters of the zoo along with the Texas cichlid, *Cichlasoma cyanogutatum*, and *Poecilia latipinna*, the sailfin mollie, both of which are native to Texas. [Editor's note: Recently (1963) Rosen and Bailey have published a revision of the Poeciliidae (Bull. Amer. Mus. Nat. Hist. vol. 126, art. 1) in this they consider all mollies to belong to the genus *Poecilia*. Our old familiar name *Mollienesia* is therefore not to be used, according to these authors.] The fish are also being caught in the waters of the San Marcos River into which they possibly escaped from the State Fish Hatchery or from the Aquarina (Texas' version of Silver Springs, Florida) where a number were released for display purposes.

It is of interest that this tropical aquarium fish has caught the imagination of commercial fish culturists the world over. Their interest lies not in producing fish for hobbyists but as a source of food. The ability of these fish to breed in fresh, salt or brackish water and the fact that they will eat almost anything and thrive on it, reaching an edible size in a very short time, resulted in the Food and Agriculture Organization of the United Nations shortly after the war to introduce the Mozambique mouth breeder into many of the protein starved countries of the world.

Aside from the distribution by the United Nations, the mysterious appearance of five specimens at a lagoon in Java in 1939 thousands of miles from their native home in Mozambique on the East Coast of Africa, resulted in the eventual spread of the fish throughout the islands of Indonesia, Malaya, and other far Eastern countries. "Home" to the Mozambique mouth breeder is

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now Borneo, the Philippines, Jamaica, Thailand, the Dominican Republic, Haiti, India, and numerous others, including those already mentioned.

Several of the State Game & Fish Departments in this country also have done extensive experimenting with the Mozambique mouth breeder. Aside from the obvious possibilities as a food fish which can be cultured in ponds, aquarists who have ever made the mistake of placing any of the *Tilapia* species in a well planted aquarium will not be surprised to learn that they can be successfully used to clean up ponds which have become choked with weeds and algae. An added advantage in all but the southernmost states of our country is that if a few are introduced into a pond of this type in the early spring as soon as the water is warm enough for them to live, they will multiply quickly, make short work of the excess vegetation and be quietly eliminated when winter returns, leaving no danger of their overpopulating the pond.

(To Be Continued)

Clown Barb

Jack Hems

London, England

PART II

ANOTHER point to remember is that there must be no overcrowding. If you lack the tank space to house all the fry left after the weaklings have dropped out of their brief life's adventure, then give some away to aquarist friends or, alternatively, feed some of the more attenuated looking specimens to your other grown fishes.

Under good conditions the fry will reach about an inch and a half in length — when their showier colors put in an appearance — within six to nine months

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of their existence. But full size is not attained for at least two to three years.

In its smaller sizes the clown barb makes an attractive addition to any community tank, but because of its greedy ways and rather boisterous habits it is recommended not to place it in the company of any timid or non-robust fishes. ◀

Lemon Tetra

(Continued from Page 552)

For instance, it is not "temperamental" about the quality of its aquarium water, so long as its relative hardness or softness is within reasonable (pisciculturally speaking) limits. And though I have seen it stated somewhere that the fish is a finicky feeder, in point of fact it will accept any of the regular dried and live foods, and live food substitutes, with obvious relish. It has a temperature range of roughly 68° to 85° F, but appears to flourish best in the lower to middle seventies, with a rise to 78° F for spawning. Furthermore, given proper care and attention, *H. pulchripinnis* usually proves less susceptible to disease than many of its close relatives, has a life-expectancy of upwards of five years, is almost always on the go in the middle levels of the water, schools with its own kind, is never aggressive, or given to fin-nipping, and is ideally suited to living with inoffensive fishes in a community tank.

It is a matter of opinion and, it is only truthful to say, experience whether breeding *H. pulchripinnis* in captivity is easy or not. The comparative beginner might find it difficult because the fish is an avid egg-eater, and the chief problem for some aquarists is to be on hand to separate the breeders from their spawn as soon as their procreative gambols have ended. Secondly, the aquarist has to know (by instinct and/or keen observation combined with proper timing) just when the couple is going to

spawn, because they don't go in for courtship preliminaries such as, say, anabantids or cichlids do before they start a family.

To spawn *H. pulchripinnis* it is advised to avoid a smallish tank and deep water. The regular two-footer or larger is the ideal. For in a spacious tank a couple in tip-top form will have room enough to expend their stored-up reproductive energy in a series of wild chases (with no cramping of movement), and in shallow water, say, not more than six or seven inches deep, the chances are that the eggs will drift into the protective fuzz of plants, or plant substitutes, before the fish can get around to eating them, or many of them. The egg-savers, natural or artificial, should be in dense clumps at one or both ends of the tank. As to the water itself, this should be neutral inclining to acid and crystal (sediment-free) clear.

Needless to say, the couple or trio (two males and a female) picked out for spawning should be conditioned. This means separation of the sexes for a fortnight or so during which period as much livefood as can be eaten without any left-overs to foul the water should be given. When the female swells out on the sides, and the male, or males, look sprightlier than usual, then it is time to bring the two sexes together. If this is done last thing at night you can be almost sure that they will mate sometime the following morning.

Almost every time a spirited drive brings the pursued female up to or slithering through the spawning medium she scatters some tiny, transparent eggs. Chasing and egg-scattering will continue in this way for quite a while until the fish are spawned out. Then they should be removed from the aqua-

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rium with the least possible delay. Sometimes they will start to make a meal from the eggs before they have finished spawning, in which case they should be removed before too much damage is done.

Normally the eggs hatch out within about thirty hours, and the fry become free-swimming about two days later. Ideally, fresh cultures of infusoria (microscopic pond or cultivated animalculae) should be dripped into the

aquarium at very frequent intervals for nine days or so, after which brine shrimps, microworms and so forth must be placed on the menu. But if infusoria is in short supply or unavailable, a purchased fry food can be given according to the maker's instructions.

If all goes well the fry develop quickly — extra quickly if *gentle* aeration is provided — and usually reach a length of about an inch in a matter of three or four months. ◀

DROP THE WORD, "Show" into a puddle of aquarists and immediately they will start rippling away to dust off their prize guppies and to sharpen up the leaves on their sword plant. But there is one type of show in which tropical fish and all of their accoutrements

FINNY FOLKS

By Diane Schofield

figure prominently that is "off limits" to the average aquarist, although he is, in the final analysis, the Star. The one to be wooed. The one to be sought after.

This rather ambiguous sort of exhibition is called a "trade show." There are several put on annually in the United States. During these affairs, booths are

set up by various wholesalers and distributors of all manner of living things, and manufacturers of the paraphernalia that is hopefully indispensable to the hobbyist who ultimately will own the pets. The purpose of this, of course, is to trot their goods before the eyes of the retailers who parade in and out. These interested parties often travel either the length or the breadth of the country to attend such a show. They speak in a strange tongue with phrases like, "mark up," "profit margin," and "gross."

Recently in Los Angeles a show of this type was held for the first time in the brand new International Hotel. It was not the first time for this show, of course but previously it had been held in an older hotel down in the heart of our City of the Angels. The International is located within a jet's scream of the Los Angeles International Air-



Photo: Interior shot of bar at Princess Hotel in Bermuda showing the tanks that ring it. All photos by author.

port. Any pet-minded person flying in to attend the trade show no longer needed to take the rather arduous safari into the city through the wilds of our freeway system.

The current show may have had the rather imposing alphabetical title of "The WWPSA Show" (Western Wholesalers Pet Supply Association), but it was more like "Old Home Week" to me. Once having my little badge of admittance firmly pinned on me due to the kindness of Frank Dittrich, once publisher of "All Pets" but now of "Pet Shop Management," and the man who had invited me down there, I was let loose on the show. I never did see it all. First I ran into one old buddy and then another and when these ran out I encountered people that I "knew" but that I hadn't "known." In other words, people with whom I had corresponded for one reason or another or those that I knew by their fine reputation and wanted to meet. Two of these were John W. Anderson, publisher and

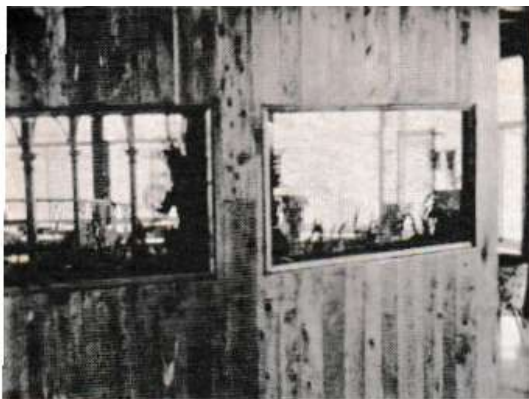


managing editor of "The Aquarium" and Henry Kaufman who writes a monthly feature called, "So you want to raise better Guppies." Few people are better qualified to tell you how. The Kaufman guppies have won over 300 trophies in competition throughout the world.

Another "Finny Folk," but this time in the feminine class, that I encountered is certainly no stranger in any sense of the word. This was Kay Ragland. Kay and I have known one another since the

Photos: (Top) Henry Kaufman, well-known guppy breeder. (Below) Kay Ragland and John Anderson of The Aquarium magazine.





"Dawn of Time," at least our time. We've run into one another at shows and at the meetings of the Los Angeles Aquarium Society when she was secretary and editor of their publication. Kay is now associated with "The Aquarium," doing public relations work for the western U.S. as well as writing her column, "The Goldfish Bowl."

Over a machine on which he was busily stamping out names on match folders

Photo: Other side of the tanks in the bar at the Princess in Bermuda. These face the lobby side.

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as a good will promotional gesture was Clyde Hutchinson, another friend of mine from way back. For many years Clyde has been busy with his Framar Mfg. Company, toiling away making the popular "Jiffy" Cleaner, among other products.

Prancing happily along with a little beanie on his head because he said he was in his second childhood was my old friend, Jimmy Ellis. Jimmy is one of the truly "nice" people of the aquarium world. A little Santa Claus of a man who can growl ferociously under his non-existent beard when the occasion warrants, but there are few more generous people than "Grit" Ellis. This is a nickname that Jimmy earned when he had a company that produced grit for chickens. Now this same company turns out "Sun-Glo" gravel. He has never been interested alone in giving tanks just a gritty wall to call carpeting—in the past he owned a large commercial hatchery and was one of the first to develop both the black lace and the black angel-fish.

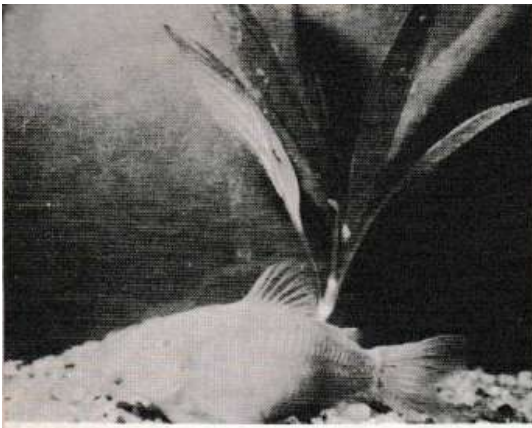
Yes, all in all, it was quite a show, not only fishwise, but where else are you going to see a display that featured topless bathing suits for poodles?

. . .

Fishes have feelings too. Recently when I visited Dorothy Stimson, who does a sterling job of editing "Tropical Topics," the bulletin of the Aquarium Hobby Club of Indianapolis, I took some shots of her fishes. Thinking that she might like to have some of these pictures to remember them by, I sent her duplicates. They got there just in time for one of their meetings and since her club was having a slide program anyway she ran them in along with the Hoosier transparencies.

Now one of these photographs was of a very recalcitrant albino female *Corydoras aeneus* which was obviously

AQUARIUM JOURNAL



one of those "Mañana" types. Every day for months Dorothy had been mentioning to her that it would be nice if she were to get on with the spawning, but she'd just mutter something about "Tomorrow, maybe." As a result she looked as if somebody was filling her up like an over-extended balloon.

As soon as the shot of this fat female cat was thrown on the screen all of the

Photo: Dorothy Stimson's reluctant albino she-cat, as we talked about in "Finny Folks."

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members howled at the silly expression on her face, as she sat there bulging away, her pectoral fins unable to even touch the sand on either side. Dorothy hung her head in vicarious shame for her pale excuse of a catfish. When she got home, she passed along the word to her, telling of the laughs of derision, before she went upstairs to bed.

This apparently mortified this poor pink feline almost to tears. As a result, when Dorothy came down in the morning, there slathered over every possible flat surface, were one little clutch of eggs after another and the triumphant little catfish was in the process of laying even more as she went about her duties with a smug expression of success on her whiskery little face.

It doesn't pay to make sport of a girl, even if she *is* a catfish.

• • •

In Bermuda there is what might be termed an aquarist's nightmare. After fighting one tank that insists, as soon as your back is turned for a moment, of aping the color and consistency of split pea soup, did you ever thrash around at night dreaming of having a whole room of such tanks all working just as hard doing their color changing act? You'd no sooner get one tank looking like a piece of planted crystal quartz before another would begin looking like a box of chlorophyll.

If so, pity Robert Doe of Bob's Aquarium in Hamilton, Bermuda. When the new Princess Hotel opened in April of 1964 he was commissioned to stock and maintain their tanks, which sounds like rather a snap on the surface. However, the place where these tanks are located is in the very large bar area that is called "The Gazebo." Now Senor Webster defines a gazebo thusly — "A structure commanding a wide view, such as a summerhouse." And this is what "The Gazebo" looks like, one of the old fashioned circular summerhouses that used

to stand behind one of the ginger-breaded, fret-worked, monstrosities of yesteryear. But the one belonging to The Princess Hotel is a delight, as one can view the harbor and small islands of Bermuda from every window.

There are two words in this last sentence that would strike hollow laughter from Robert Doe — these are "windows" and "delight." You see, because there is nothing but windows on all sides, coupled with the fact that all of the tanks ringing the bar also open onto the cedar-paneled lobby side, the phrase, "Let there be light!" could well be taken as their motto. This makes all of the small algae cells grow and divide, and

divide, and multiply and divide etc. *ad nauseum.*

Odd, now that I think of it, Mr. Doe did mention that green wasn't his favorite color. ◀

CLUB NEWS

South Jersey Tropical Fish Association

Starting in November, the S.J.T.F.A. will meet on the third Wednesday of each month (except July and August) in the meeting room of the Cherry Hill Mall, Route 38 and Haddonfield Rd., Cherry Hill, N.J., at 8:00 p.m., according to John Olsen, secretary.

WANT ADS-\$2

Hobbyists, breeders, and dealers (only) may now place Want Ads in *The Journal*. An opportunity to contact other hobbyists for wanted fishes or equipment, or sell same in a Journal Want Ad! The cost is nominal: \$2.00 for 20 words, plus 10 cents each additional word. Send your ad along with payment today!

FOR SALE

Salt Water Fish—coral, sea horses; not cheap, but fish are all healthy and disease free! Coral Reef Exhibits, P.O. Box 59-2214, Miami (AMF BR.), Florida.

100% dehydrated worms—for aquarium fishes. 12 grams, \$1.75, 8 grams, \$1.20, 4 grams, 65c, postpaid. Coarse, medium or fine. Lake Sawyer Worm Gardens, Route 1, Box 979-A, Kent, Washington.

Live cultures—Dwarf white worms, \$1.50. Microworms, \$1.25, including instructions. Airmail 50c additional. Add sales tax where applicable. Blue Lagoon Aquarium, 1644 Irving St., San Francisco 22.

Green Mollies—Ancestors of our present day black mollies, 50c each; Mosquitofish 20c each, Midget Live Bearers, 75c each. Information upon request. Contact Gene Yoes III, Box 159, Norco, Louisiana.

Exotic Marine Specimens—Aquarium supplies, illustrated catalog. Write Box 626-116, Dania, Florida.

Live Cultures—Tropical red worms, \$1.25; white worms, \$1.25; micro-worms, \$1.25. Any two for \$2.25. All three for \$3.00. Generous cultures. Shipped postage prepaid. Instructions included. Air mail 50c additional. Culture Gardens, 454 Leonard, N.E., Grand Rapids 5, Michigan.

Champion Guppies—stock from international guppy show Berlin 1960, 1962, 1963. Choose from greens, reds (females have bright red tails), blues, blacks, Belgium sunsets (\$2.50 each), Albinos (\$5.00), Lavenders (\$4), "The Texan" (\$7.50), which produces 65% "Texans," 15% Albinos, 10% gold and 10% "copper bodies" with huge tails. Limited sales. Only young fish shipped. 1515 W. Myrtle, Fort Worth, Texas.

Hobbyists—We have over 65 reasonably priced varieties of aquatic plants. Send for our price list. Elm Aquatic Supply, Box 35, Elmwood Park, Ill.

Special—Delta-tail guppy babies valued full grown at \$8.00, yours for only \$2.00; limited supply. Get them while they last. All colors: reds, orange blues, purple yellows. Send today. Peter D. Barrett, 952A Flatbush Ave., Brooklyn 26, N. Y.

Marine Fishes from Philippines—Exporters. Conditioned, various colorful species. Inquire direct: Tropical Pet Shop, 1008 Ongpin Street, Manila, Philippines.

Forest Fish Farm—is now digging live tubifex worms, and furnishes reliable weekly deliveries to stores in the New York, New Jersey and Philadelphia area. Wholesale only; dealer inquiries welcome. Forest Fish Farm, R.D. 4, Box 358, Freehold, New Jersey; 201-462-2977.

BOOK REVIEW

BOOK REVIEW: "The Captive Sea"

AUTHOR: Craig Phillips

PUBLISHER: Chilton Company, 1964;
Price \$6.50

REVIEWER: Albert J. Klee

FROM his experiences as Assistant Collector at the pioneering Marine Studios in Marineland, Florida, through his position as Curator of the Miami Seaquarium, right down to his current service as Staff Specialist for the planned National Aquarium in Washington, D.C., Craig Phillips is a professional aquarist *par excellence*. Furthermore, he has the rare ability in his writings to communicate successfully with the layman, and must be considered as an effective popularizer of the science of marine ichthyology. Although I personally have not been active in the marine end of the hobby for some years now (limited time, not limited interest!), I found it difficult to lay down "The Captive Sea" once I had picked it up.

Certainly, Chapter 3 ("The Prefabricated Hydroseal Tank") will prove to be of interest to any aquarist, especially those who are involved in the construction of large aquaria. The discussion of the "Diorama," a new concept in exhibiting fishes, is food for thought (and action) all by itself. The remainder of the book is devoted to the natural (and "unnatural," if we can term the aquarium facet so) history of sea creatures and some fresh-water as well, but I found the numerous personal experiences to be the most delightful, e.g.: "In certain places along the Florida coast and elsewhere in the tropics these latter roots will become heavily encrusted with oysters as they grow beneath the water surface. I recall occasions during my boyhood days when I

would chop such an oyster-laden root loose with a machete, carry it ashore like a bunch of bananas on a stalk, and pile dry brush on top of it. Burned down to embers, this would provide as delicious an oyster roast as anyone could imagine. Thus along the Florida coast it may literally be said that oysters grow on trees."

Mr. Phillips points out that there are two types of mammals, one correctly termed "dolphin" and the other, "porpoise." I had known about the confusion between the fish "dolphin" and the mammal "dolphin" before, but this was news to me. Apparently dolphins tend to have more elongated, beaklike snouts whereas porpoises have blunt snouts (there are other differences, also). Actually, what the average aquarist calls a "porpoise" is really a dolphin!

Chapter 12 ("Pink Piranhas and Problem Pets") is especially absorbing to read (and reference material for the freshwater aquarist to boot). At one time Mr. Phillips experimented with soaking the fillets used to feed his piranhas in the dye, alizarin red. The

(Continued on Page 566)

★ IDEAS ★

BY HOBBYISTS

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

Light and Food

Owners of small aquariums have probably noticed that when the reflector light is switched on, even in a lighted room some species of fish dash aimlessly from one corner of the aquarium to another. Try putting a little food in the feeding ring each time you switch the light on or off. It will help dull this frenzied reaction in many fishes.—Wilbur L. Hanford, New Britain, Connecticut.

PRODUCT NEWS

Kwik-Kristal

A unique, heat-motion display accents the decorative appeal of Kwik-Kristal, a different approach to aquarium backings. Kwik-Kristal is an embossed vinyl sheet, translucent, with a pressure-sensitive adhesive especially created for glass.

Available in five colors and in all popular aquarium back sizes, Kwik-Kristal is sold only through pet dealers. An assortment of best-selling sizes and counter display is offered to dealers by Texas Trading Company, Indianapolis, Indiana. ◀

Douglass Filtration

Worried about eggs that fungus and produce little or no hatches? The Douglass Filtration Systems, Inc. has developed a series of filters that produce "miracle" results in the prevention of fungus forming on fertile eggs. The units have been under test by leading



professional aquarists and pronounced a "first."

None of the models use glass wool or charcoal. Units now in production employ the conventional air pump. Other models soon to come off the assembly line use water pumps varying in capacity from 50 to 100 gallons per hour. Water remains crystal clear under the most adverse conditions. Recommendation of the filter firm is that the air pump models are for use in tanks up to 15 gallons in

(Continued on Page 566)



Elgin Aquarium Society

The E.A.S. held a tropical fish show with the Swedish Days Festival at Geneva, Ill. in June, according to Ron Samuel, publicity chairman. Shown in the photo are two visitors from Sweden for the event. ◀

New Salt Water Magazine Published by Straughan

Robert P. L. Straughan, well-known authority in the field of marine fish collecting, with headquarters in Miami, Florida, will publish a magazine devoted to the saltwater fish hobby, he announced recently.

Name of the magazine is *Salt Water Aquarium*, and the first issue will be out at an early date, Straughan said. The magazine will be devoted exclusively to salt water fish and marine aquariums. Monthly features will keep abreast of the very newest findings in the salt water hobby.

Subscriptions are priced at \$4.00 per year, \$7.00 for two years. For information, write: *Salt Water Aquarium*, P.O. Box 59-2214, Airport Mail Facility, Miami, Florida 33159. ◀

PRODUCT NEWS

(Continued from Page 565)

volume while the water pump models should be employed for those tanks of from 15 to 500 gallons capacity.

Bill Sternke, internationally famous breeder and judge of prize winning guppies, has this to say of the various systems: "The filters produced by the Douglass Filtration Systems give results that are little short of amazing! This is the first time that any filter can lay true claim to being effective in the treatment of disease. I recommend these filters in the very highest terms."

Prices of the units are easily within reach of the "young fry" aquarists. Parents appreciate the odor removing qualities of the cartridges. Dealers are at last able to offer a simple uncomplicated package that eliminates glass wool and charcoal, keeps water crystal clear and is a powerful aid in the treatment of fungus diseases. ◀

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566

Book Review

(Continued from Page 564)

dye was harmless when swallowed but gave the effect of blood when the fillets were fed. The reason for all of this "monkey business" was that the public was a bit dubious about seeing the legendary piranhas gobble at anything but raw beefsteak. With the dye added, the performance at feeding time was spectacular and the viewers were finally convinced. However, after use of the dye had continued for a time, the piranhas started to turn pink! The use of the dye was discontinued and the fish faded to their old colors, none the worse for the experience. (Old-time aquarists know that the effect of paprika is somewhat similar).

There is a lot of humor in this book also, and I present as partial evidence Mr. Phillip's recipe for "Octopus Experimentale", to be prepared in the average laboratory:

Lab Equipment	Ingredients
1000 ml beaker	1 octopus
Bunsen burner with ringstand	Seawater
Asbestos screen	Salt
Beaker forceps	Pepper
Shears	Bay leaves
Aluminum foil	Butter

"Procedure: Remove arms from octopus, place in seawater with bay leaves in beaker. Set on asbestos screen on ring stand over Bunsen burner. Light burner, adjust collar so that blue flame is produced. Bring to boil, then turn to low flame, allow to simmer for 20 minutes. Remove beaker with forceps, drain, allow to cool, cut arms into short sections with shears. Wrap pieces individually in aluminum foil, place on asbestos screen under low flame, bake for approximately 10 minutes. Cool, unwrap, season with salt, pepper and butter. Octopus may be eaten with fingers or fork as desired".

Mr. Phillips is, in addition, quite an artist and his delightful drawings (over 125 in all) illustrate his points as he goes along. He slips up only occasionally as, for example, in his figure of Car-

AQUARIUM JOURNAL

negiella on page 154 which shows an adipose fin when it shouldn't, and no ventral fins when it should. I was hard put to locate any text errors and all but gave up until I found *saxatilis* pronounced as "sak-sattle-liss" instead of the correct, "SAKS-AY-TI-LIS" (but even so, Mr. Phillips will know that I am grasping at straws!). There is only one other point over which I have a bone to pick with the author and that is, during supper one evening I chanced to be reading Mr. Phillip's detailed account of the gastrointestinal troubles of stranded pilot whales. The description of the bilious-looking fluid that these unfortunate creatures "belch up" came at a time when my wife put a new, sort of soupy-looking French dish on the table. I have not been able to square things with her yet.

The money spent on this book is well worth it to any aquarist and the book itself would serve as an excellent award or prize at any aquarium function. As a bonus, it is the type of book that will be enjoyed by the hobbyist's family, as well. ◀

Scheel

(Continued from Page 550)

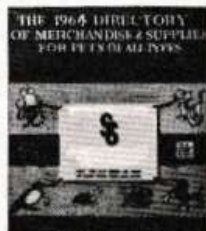
the red line in the anal fin; also, this male was as blue as males of this cross ever turn out.

On the back of male *A. nigerianum* the red dots tend to form red scale edges just as we find in many species of *Epiplatys* and *Aphyosemion*. This tendency is weakly developed with the latter and strongly developed within *Nothobranchius*. *Epiplatys* are intermediate as both kinds of red pigmentation occur.

Yellow pigments are present in all males. In yellow males they form the conspicuous yellow fin edges. As I am not working on pure blue stocks, I do not know with certainty how yellow

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pigments develop on these males during growth. My blue males all had a single gene for yellow as only yellow males were used for spawnings. When young, such blue males take on a glaring lemon color at the fin edges. Old mature males from the Akure population lose this color normally. The blue males of the Harcourt/Akure cross may keep this lemon color their whole life. But this is not the only departure from the simple laws of heredity within *A. nigerianum*. The next generation of the cross produced a male which was yellow in all fins but the anal (which was blue). There was no trace of yellow in that fin or the normal warm yellow (not lemon) in other fins. Hybrids from the Ndiar river species cross may show a tendency towards yellow coloration in their dorsal fins but not in their anal fins. These tests show that the problem of yellow and blue is not a simple one when more than one population of fishes is considered.

From many crossings within the genus *Aphyosemion*, I have learned that it is most likely that the gene which produces yellow is not different in different species. As you may know, there is also a blue and a yellow variety in *Aphyosemion cognatum*. However, in this species it is very difficult to distinguish between the two as there is no red separation line, and because of the many red dots which cover the fins. Crossing both blue and yellow *A. nigerianum*

males to the same *cognatum* female produced the following results. From the blue male only, many blue hybrids were produced. From the yellow male I obtained only two male fishes. One hybrid was typical yellow and the other was typical blue. The number of red dots was somewhat higher than in *A. nigerianum* but by far, less than on *A. cognatum*. No red line separation was formed on any male, not even a trace in the middle of the anal fin. From the cross of *A. filamentosum* to *A. arnoldi*, just the opposite occurred. Here the separation line dominated.

The mature yellow *A. nigerianum* male is a very conspicuous fish indeed, in particular, if he stretches his fins. This will occur if he spots a female or another male. During the first phase of fighting or spawning, the male will not only spread his fins, but he will also fold them close to his body. Just after the folding, which is linked to heavy movements of the body, he suddenly will unfold his fins, and these and the gillcovers (which have much red pigment) are spread as much as possible. Then again follows a folding of the fins, etc. These "scissor" movements are very typical of *A. nigerianum* and others of the genus as well. In my opinion, these movements are likely to be linked to the presence of yellow fin edges as such patterns produce the highest, glaring contrast of colors when the male folds and unfolds his fins. (To Be Continued)

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★ IDEAS ★

BY HOBBYISTS

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Feeding Brine Shrimp

Most of us in the Bay Area that raise fishes are fortunate enough to be able to buy adult brine shrimp every week. But close to the end of the week, most of the shrimp are dead and if one does not freeze them they should be thrown away. This can be costly. Brine shrimp are not that inexpensive. Also, if there are some left over come time for delivery again, it is best to freeze healthy live shrimp than the dead ones. How can one have live shrimp at the end of the week? We don't use aeration. The day of delivery, feed your shrimp. They have voracious appetites. They will eat any wheat cereal such as pablum or even oatmeal. Just put it in dry. The third day after delivery, change their water completely. They have used all of the oxygen by then, no amount of artificial aeration will replace it and the water is foul. However, if you change the water, come delivery day again, no dead brine shrimp. What you have left will be still swimming. Net, rinse and freeze these for the day that "the man" calls and says, "sorry, the weather was too bad. We could not make any catch this week. Sound familiar?—*Margarita A. Reuting, Alameda, California.*

Pomona Valley Aquarium Society

Residents in the area surrounding Pomona, Calif., are invited to join the P.V.-A.S. which meets the second Tuesday of each month at the Washington Park Clubhouse, Grand Ave., just off Towne Ave., Pomona, according to Mrs. Allan LaForge, publicity chairman. Time of meeting is 7:30 p.m.

NOVEMBER, 1964

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From: Ian Derrick
Gold Coast City, Australia

My name and that of Blossom will be well known to you via the pages of "Finchat." Especially our old friend Albert J. Klee. Some time back we left the frozen city of Melbourne and now reside in the tourist sunshine of Gold Coast City of which Surfers Paradise has become world famous.

These days we run a small aquarium business and as part of the Currumbin Bird Sanctuary operate a small but still the largest fresh water public aquarium

P.S.
From: Ian Derrick
Gold Coast City, Australia

Gold Coast City sits in the State of Queensland just over the New South Wales border. Some thirty miles long, one mile wide with Pacific Ocean and golden sand on one side, a mountain playground at the rear. Enjoying an average 73 F. temperature, understandably the main industry is tourism. Each year sees an increasing traffic in American tourists some of whom having fallen for its magic charm have returned here to

Letters to The Journal

of its kind in Australia. For the display aquaria and also for our own private marine collection we are interested in the "Gro-Lux" or similar make of tube. At present "Gro-Lux" is the only brand available out here and a 24-inch tube without fittings costs approximately \$3.50 U.S. wholesale. When you require several hundred this is quite expensive, especially when an ordinary fluoro costs approximately \$1.00 U.S.

We would be more than interested to hear from a San Francisco exporter of these tubes if such should exist. Further, there have been some local reports that continued exposure to these tubes produces a type of cancer in the fish. Can you advise on this point? Should any of your members intend to visit Australia please let me know. It is a must that visitors to Australia look in on the Gold Coast and we would do everything possible to make their visit a happy one.

REPLY: As to any exporter of tubes residing in San Francisco, I certainly don't know of any. As to your second question so far as I know there is no valid evidence for this and I doubt that the light could produce any such effect.

live. Looking around they might very well think they never left. The stamp of America is well imprinted into the local signs. Such places as Miami Keys, Florida Gardens and New Orleans are all part of the Gold Coast. Quite apart from the bikinis and surf there is an increasing development on the aquarium scene; in fact if all the present proposals bear fruit Gold Coast City for its size could become the greatest concentration of aquaria per head of population of any city in the world. At the southern end we have the "pet porpoise pool" a rectangular building containing three large pools. One contains a seal, another anything from butterfly cod to sharks and 300-odd pounds grouper. The main pool contains performing dolphins where it is claimed to be the only pool in the world where the general public is allowed to feed the dolphins. On the northern end of the coast an architect's model has been completed of a planned sea aquarium which subject to government approval is to be built at Main Beach. A much larger enterprise it will feature sea lions, trained dolphins, seals, a shark channel, large marines and up to 100 tanks of small marine aquaria.

Half-way along the coast is the new world famous Currumbin Bird Sanctuary, where twice a day thousands of colorful wild birds fly in from the nearby mountains to be fed by tourists supplied with plates full of bread mixed with watered honey. The sanctuary contains many other attractions included in which is our own public aquarium display. Small by world standards yet in a country strangely devoid of public aquaria it would be the largest public display of its kind in Australia. The very design of the building is quite unique for aquaria. An octagonal building of the same design as nearby bird houses it rises to a central peak dome made of semi transparent fibre glass. All tanks are individually heated and lit from above by single 24-inch fluorescent tubes. The central dome also allows equal distribution of natural light inside the building. Whilst some of the tanks contain fish still regarded as rare in Australia in the main

Photo: Mr. Derrick relaxing in his unusual tropical fish shop.

the accent is on interive aquaria design plus fish more suitable to the taste of the general public. In a subtle way we try to impress on the public that the world of fishkeeping is well within the range and pocket of everyone rather than present them with rows of rare exotic difficult to keep species. After all, the aquarists make up a very small percentage of the viewing public. So in an area so devoted on selling sunshine and sand it would appear that we may well soon become known for our concentration of display aquaria. According to T.V. nearly all Americans are rolling in dollars so next time you give up working we hope to see you "down-under." Remember, if our fish do not impress you the bikinis are guaranteed.

• • •

*From: Carolyn Lewis
San Francisco, California*

My husband and I found a small fish, which we think is a "goby" of some kind while on vacation at Clear Lake, Cali-



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9. Paragraphs 7 and 8 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner. Names and addresses of individuals who are stockholders of a corporation which itself is a stockholder or holder of bonds, mortgages or other securities are equivalent to 1 percent or more of the total amount of the stock or securities of the publishing corporation.

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D. Total No. of copies distributed. (Sum of lines B1, B2 and C)	7,710	7,783

I certify that the statements made by me above are correct and complete.

JAMES W. CRAWFORD, Editor

formia. We have been trying to find information about the "goby" so that we might identify our new fish. We have looked in encyclopedias and fish books but we have found little information. Since we subscribe to the *Journal* we felt you might be able to give us some information on this fish or tell us how we might go about learning more about this fish. By any chance has the *Journal* ever had an article about the "goby"? We would appreciate any help you might be able to give us on this problem.

REPLY: Your fish is probably a small sculpin of the genus Cottus. Members of this genus occur in many streams and lakes of California and are not usually kept as aquarium fishes because they lack color. I have kept them a few times. They usually seem to require live food and may eventually reach a length of four or more inches in aquaria. So

CLUB NEWS

San Francisco Aquarium Society, Inc.

The next meeting of the S.F.A.S. will be held Thursday November 5, 1964, at Steinhart Aquarium, California Academy of Sciences, at 8:00 p.m., according to Robert P. Dempster, president.

Program for the evening includes a tour of Steinhart Aquarium, Frank Tufo, program chairman, announced. Fish of the Month competition for November meeting: (1) Native American fish, (2) Albino fish, (3) Cichlids (except angels) and dwarf cichlids, according to Charles P. Bange, chairman.

Nominations for the 1965 board of directors will be held again at this meeting. Nominating forms may be obtained from Percy Bell, chairman of the Nominating Committee.

The library will be open one-half hour before the meeting for the convenience of members, especially those with overdue books. ◀

far as I am aware, not much has been written about keeping these fishes. Incidentally they have several intertidal relatives along our Pacific Coast and a number of these have bright colors. Unfortunately these colors usually fade away in aquaria.

From: David Smith
Pacifica, California

Do you know if it is harmful to raise tropical water lily plants, varieties suited to tub culture of course, in a redwood tub? I vaguely recollect that someone told me it was. Perhaps it was cedar. Anyway, I would like to use redwood tubs as they are readily available. If redwood is harmful, what wood should the tub be? And where might I get such a tub?

REPLY: Redwood tubs are not suitable for plants or fishes unless they have been aged for a long time. Even then they can be a bad bet. The compounds that preserve redwood so well leach out into the water and kill fishes and many plants. As a matter of fact, all wooden tubs should be used with caution and only after leaching for a month or more. After such treatment many are perfectly safe. Redwood and other wooden tubs can be rendered safe by painting the inside with an epoxy resin.

From: Chris Bailey
Palos Verdes, California

About a year ago my brother and I obtained a pair of beautiful fish sold under the name *Notropis*. But they soon died and we have been looking for another pair ever since. Recently I visited a store near me that was advertised in the *Journal* and found a pair of them. Unfortunately they did not have as much color as the ones before. But I bought them anyway in hopes of producing some more colorful tank bred specimens. We looked and we looked but were unsuccessful in finding any information on how they are bred or even who they are related to. I hoped

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: \$15. For information: Coral Reef Exhibits, P.O. Box 59-2214 Miami 59, Florida.

"Story of the Brine Shrimp," a 30-min. color and sound 16 mm film that also covers the tropical fish hobby. Rental: \$10. For information: San Francisco Aquarium Society, California Academy of Sciences, San Francisco 18, Calif.

"Fascinating Marinelife of the Pacific Northwest," a visit to the Seattle Marine Aquarium. 30 color slides 35 mm. Rental: \$5.00 plus postage. For information: Eric Friese, 105 NW 49th Street, Seattle, Washington 98107.

"Diane Schofield's Color Slides," a selection of different programs of color slides complete with commentary by Miss Schofield. Each program rents for \$5.00. Sample programs: "Familiar and Strange Fishy Little Faces," "Fish of India," "Fish of Hawaii," "Marineland of the Pacific," "Seeing the Seaquarium," etc. For more titles and information, write Diane Schofield, 739 E. Valencia St., Burbank, Calif.

"Killifishes," a slide-tape program created by Al Klee, Franz Werner, Richard Blanc and George Maier. The program is available for aquarium societies on the West Coast by contacting Alan Markis, 2607 Bryant St., Palo Alto, Calif. Midwestern and East Coast societies may obtain it from George Maier, 802 Belmont Ave., Chicago, Ill.

"Aquarist Adventures in Southern California," an educational tour of aquatic topics. Local fishes, field trips, fish shows, shops, hatcheries and Marineland with society programming in mind. 50 color slides 35mm. incl. 50 narrative "read cards." Directions. Rental: \$15.00 ppd. one way. For information: Gene Wolfsheimer, 4549 Tobias Ave., Sherman Oaks, Calif.

that you could tell me. Since I am writing to you anyway, I was wondering if you could answer a question I have been thinking about ever since I started the hobby. Do fish sleep at night?

REPLY: There are many species of Notropis. Some beautiful, especially when spawning, some not so beautiful. For the most part they are native to the eastern and central United States with some species in Mexico. Some indeed are extremely beautiful but few if any of these are available to aquarists on the West Coast. Species of Notropis ordinarily are not sold to aquarists for several reasons. Some require special spawning sites such as riffles, not easily created in aquaria. Most would not show their colors in the dealer's tanks and therefore could not be sold. Some are delicate and do not transport well. Finally and unfortunately, being natives, they are overlooked, even by aquarists, who could collect them out of their back door. They are true minnows (family Cyprinidae) related to goldfishes, barb, white clouds and danios. Yes, many fishes "sleep." Of course they cannot close their eyes, no lids. Nevertheless, they do enter what appears to be a state of torpor at night, or in the day if they are nocturnal as many catfishes are. The fishes undoubtedly rest at this time and their state could be called sleeping. ◀

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Pump Shelf

Small pump and filter sets that are sold for about \$6.00 are very popular these days. However, keep in mind it is best to have the pump above the level of the tank. I took an old soap dish, painted it, and cemented a heavy piece of cardboard to its top. Then I screwed the bracket to the wall in back of the tank, and it makes a very neat looking pump shelf. —Wilbur L. Hanford, New Britain, Connecticut.

CLUB NEWS

Green Water Aquarist Society

The G.W.A.S. held installation of officers at their October meeting, according to Eleanore Mass, secretary. Installed were Ernest Mass, president; John Prekop, vice president; John McMahon, treasurer; Mrs. Mass as secretary and Jerry Lou Ehrmeyer, recording secretary. The group meets at the Bedford Park Community Bldg., 66th and Archer Ave., Bedford Park, Ill., the third Tuesday of each month at 7:30 p.m.

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