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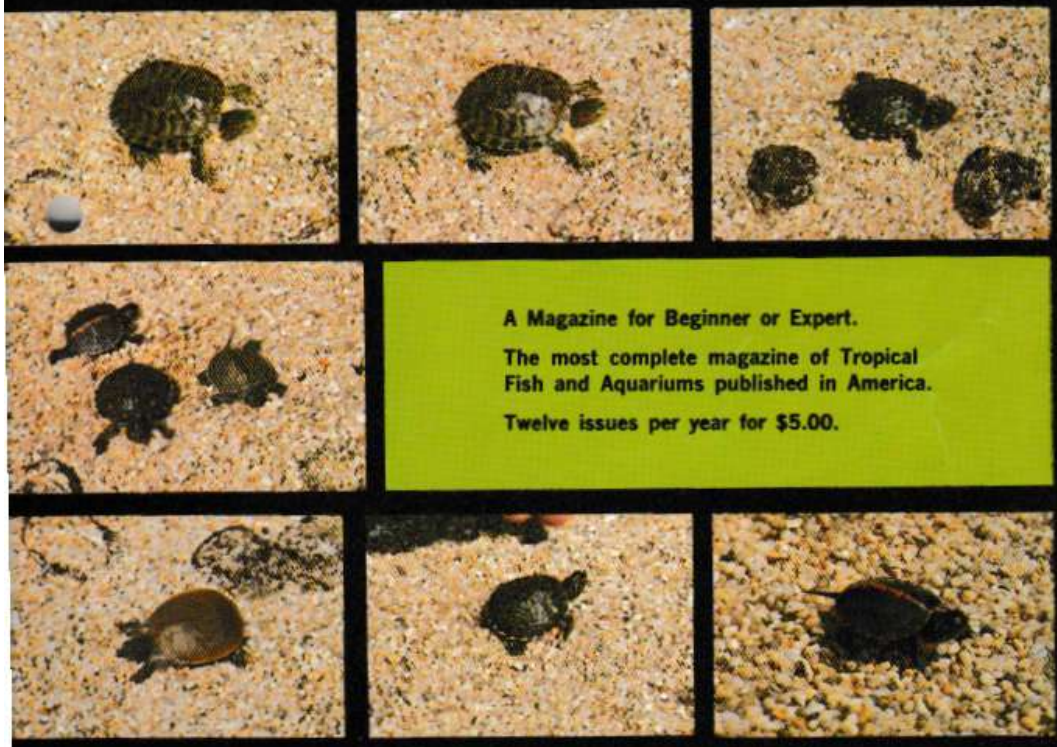
aquarium journal



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Volume XXXVI
Number 4
April 1965

aquarium journal

The Magazine Aquarists Believe In

Published by the
San Francisco Aquarium
Society, Inc.

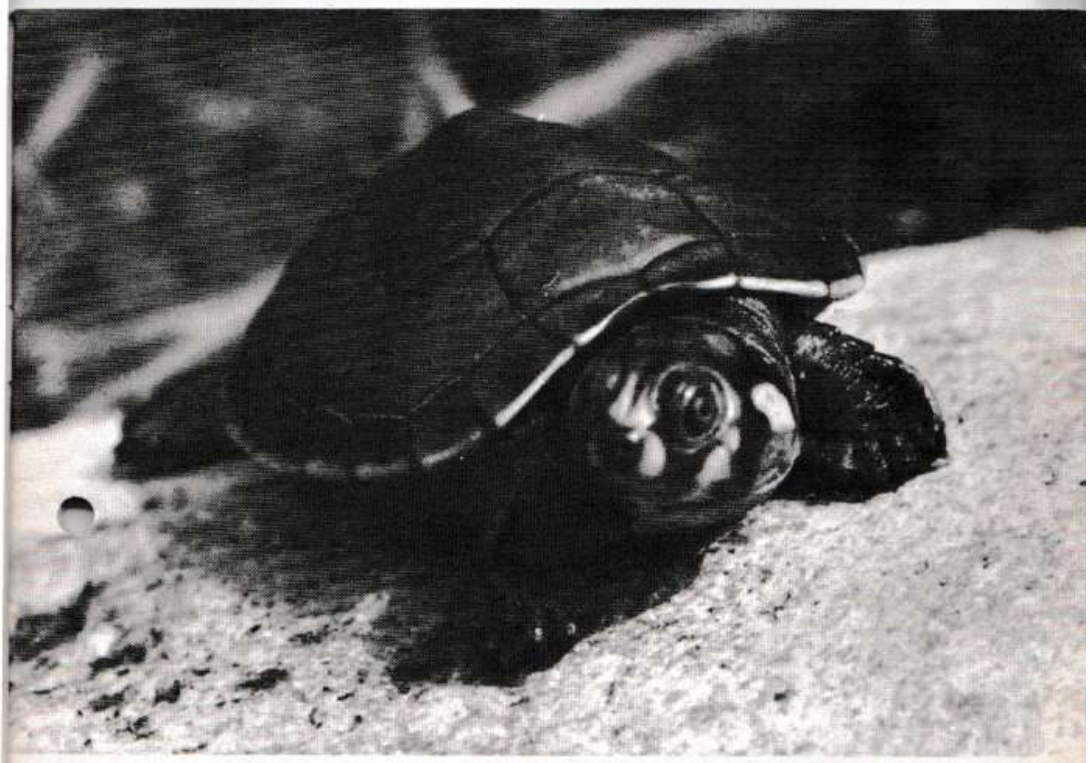
Published monthly by San Francisco Aquarium Society, Inc., Steinhart Aquarium, Golden Gate Park, San Francisco 18, California. Telephone BAyview 1-0054. **Subscription rates:** $5.00 yearly in U.S., Canada, and Latin America, elsewhere $5.50.

Entered as second-class matter February 11, 1948, at the post office at San Francisco, California, under the Act of March 3, 1879.

contents

cover photograph

These fine photographs come from the camera of Alan Mark Fletcher, and include the following species: "Red Ear"; "Florida Cooter"; "Southern Painted"; "Mississippi Sawback"; and "Southern Soft-Shell." For more about turtles and their care, turn to the article by Mr. Fletcher beginning on Page 161.



Most common cause of death is starvation — turtles require more than just dry food!

Care of Pet Turtles

Alan Mark Fletcher
Ambler, Pennsylvania

NEARLY everyone knows the fable of the tortoise and the hare. The slow tortoise won the race because he kept plodding along, while the fleet-footed hare stopped to rest. Turtles have been winning the race for life from more speedy animals for a very long time.

The fossil record tells us that turtles first appeared on the earth about 200 million years ago – before the time of the dinosaurs. They continued to thrive during the Age of Dinosaurs, and when those great monsters died out from unknown causes, turtles kept right on plodding through the ages. The turtles we have today are only slightly different than their ancient ancestors.

There are a number of reasons for the great success of turtles, but the most obvious one is the hard, tough shell, which provides a sort of instant protection for the animals. When threatened

Photo: Head-on view of an Amazon baby turtle. All photos in article by Alan Mark Fletcher.

by an enemy, other animals must depend on speed or the ability to fight or the shelter of a burrow. But not the turtle. When it is threatened, the turtle just draws its legs, head, and tail into its protective armor. Box turtles even have hinged shells that can close up completely after the soft parts have been tucked away.

But in spite of turtles' toughness, most of the millions of small turtles sold in pet stores and five-and-ten-cent stores each year die in a few months from neglect or poor care. Since turtles are living animals, anyone purchasing one should be prepared to care for it properly. Because most turtles sold are babies, the following instructions are directed toward them, but most of the information will be valid for large turtles as well.

The most common cause of death in pet turtles is starvation. People just don't know how to feed them. Dry foods purchased from a pet store or variety store are all right, but they are not enough. A turtle fed nothing but dry food will slowly starve. Since turtles can live for a long time without any food at all, it may take quite a while to starve one to death on dry food. The best way to tell whether or not a baby turtle is receiving an adequate diet is to observe its growth. A healthy, well-fed turtle will grow. (Although a turtle may live for 50 years or more, it does most of its growing in the first few years.) Any baby turtle that does not grow is slowly dying.

Fresh raw hamburger is one of the best all-round foods for most baby turtles. They accept it readily and can eat it easily. Raw chopped fish and chopped earthworms are also good. Some of the canned dog foods are acceptable. Most turtles will eat some plants; so lettuce or raw spinach should be placed with them once in a while. A little powdered calcium (calcium carbonate) from the drug store should be mixed with their

Photo: Southern softshell turtle. A baby.

meat occasionally. Calcium helps grow strong bones and shells. Turtles need not be fed every day, but they should be fed several times a week.

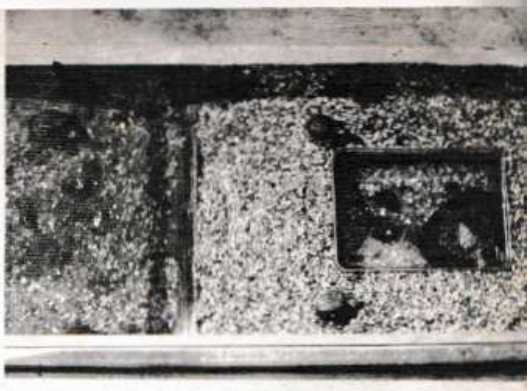
Raw meat or canned dog food can make a mess of a turtle tank. For this reason many turtle owners place their pet turtles in a pan of water for about an hour at feeding time, and this keeps rotting food from getting into their container. Incidentally, many turtles can eat only under water. There should be about an inch of water in the feeding pan.

Turtles like a lot of room. The more space you can give them, the better off they will be. A five-gallon aquarium makes an adequate home for several small turtles.

Even the most aquatic turtles like to climb out on dry land once in a while. Probably the simplest way to give turtles both water and dry land is to put about two inches of water in an aquarium. Then pile up enough clean sand at one end to make a sloping beach. Rocks and pieces of floating wood are often used for turtles to climb on, but the sloping sand beach is best, because turtles can most easily move into and out of the water.

Turtles like to sun themselves occasionally. If their home cannot be kept in a sunny window, move them to a sunny place once in a while or place a bright light near them now and then.

Whenever the water becomes dirty, remove it and replace it with clean water about the same temperature as the old water. If the temperature goes below 70 degrees, turtles are likely to become sluggish. This does them no harm, but an inactive turtle is not much of a pet. Temperatures ranging from 75 to 80 degrees are ideal for most kinds.



Photos: (Top) A simple "turtlearium" made from a 10-gal. aquarium. Water at left is about one inch deep, with fine sand bottom. Gil coarse gravel at right above water level. **(2nd)** Eastern box turtle which happens to be yawning! **(3rd)** Eastern box turtle, adult, about 6 inches long. **(4th)** Mississippi sawback turtle, baby.

Some Kinds of Turtles You May Find in Pet Stores

Red-ear map turtle. Most of the pretty green turtles sold in pet stores and variety stores are this kind. They get their name from a bright red stripe on each side of the head. They are collected in the south-central United States. With proper care and feeding, they will be friendly pets. They grow to about six inches.

Mobile map turtle. This turtle of the southern United States is often mixed in with red-ears. You can identify it because it does not have the red patches behind the eyes. Mobiles make good pets, but they grow to nearly a foot long.

Mississippi sawback turtle. Sawbacks are easy to tell because they have brownish upper shells, and the back has a rough ridge down the middle. The dark head has several near-white lines, the largest surrounding each eye. They grow to about six inches, but they are shy and are not easy to rear.

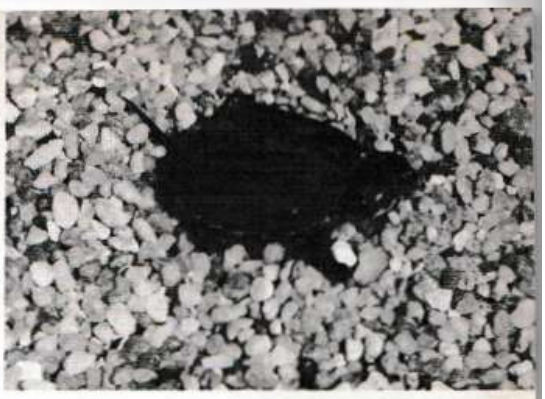
Southern painted turtle. This is one of the prettiest turtles in the world. The carapace (upper shell) is black with a reddish stripe down the middle and red marks along the edge. The plastron (lower shell) is salmon colored. It is not a large turtle, even when fully grown.

Reeves' turtle. Some turtles are imported from other countries. The little black Reeves turtle comes from Japan.

Yellow-spotted Amazon turtle. This appealing turtle comes from tropical South America. The shell is olive-gray, with light edging. Its rounded head with bold yellow markings gives it a comical panda-bear expression. When frightened, most turtles draw their heads straight back into the shell, but this one tucks its head in sideways.

Musk turtle. Many young fishermen in the United States have caught "stinkpot" turtles on their lines while fishing. They get their names from a rather strong odor given off by adults. Musk turtles are nearly black, with a few white lines on the head. The carapace is highly arched. Babies are appealing because they are so small. Musk turtles are so aquatic that grown ones often have filamentous algae growing on their backs.

Photo: Amazon turtle, side view. A baby.



Snapping turtle. Several kinds of snappers are found in the United Staes. They are appealing because they are so homely. Because of their small shells, they look as though they are popping out all over. Babies make good pets but larger ones have nasty dispositions and very strong jaws.

Soft-shell turtle. This curious turtle has lost its hard shell through the ages. Instead of a bony shell, it has a leathery olive-colored covering. The soft-shell protects itself by burying in the sand with just its head sticking out. Babies make good pets, but large ones are as nasty as snapping turtles. A pet soft-shell turtle should have fine sand to dig in.

Box turtles are well known for their hinged shells that make it possible for them to close up tightly. Babies and adults make fascinating pets. They live on land, but they go into water for short periods. Baby box turtles cannot close their shells.

Gopher tortoise. The land-dwelling tortoises are difficult to keep alive, but the baby gopher tortoise is sometimes sold by pet stores. They are yellowish, with dark brown markings. They eat mostly plants like lettuce, clover, tomatoes and bananas, and they need a drink of water once a day. They come from the southeastern United States.

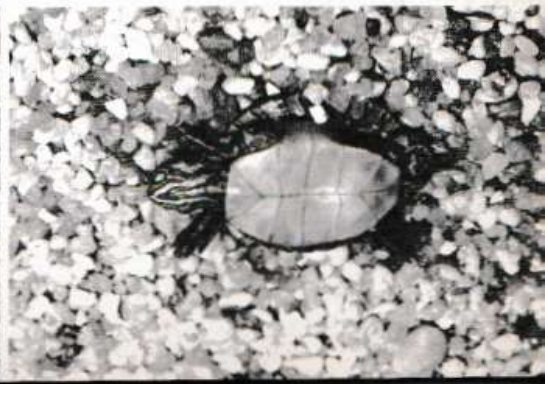
Florida cooter. Babies are marked similarly to the red-ear and the Mobile, but the cooter is not as green as the other two.

Some Interesting Facts About Turtles

- *Turtles have three eyelids — upper, lower, and a crosswise lid called a nictitating membrane.*
- *There are at least 65 kinds of turtles found in the United States. At least one kind is found in every state.*
- *The oldest living animals are turtles. Some tortoises in the Galapagos Islands (west of Ecuador) may be 400 years old.*
- *Turtles do not have teeth, but many have sharp, hard mouths and strong jaws.*
- *The turtle's head is withdrawn into its shell by bending its neck in an "S" shape.*

Photos: (Top, left) Eastern snapping turtle, a baby. **(Top, right)** Southern painted turtle, a baby.

Photos: (Below, left) Red-ear turtle. A three-incher. **(Below, right)** Southern painted turtle, underside.



• *Turtles are the only higher animals with most of their bony parts on the outside.*

• *Alligator snapping turtles weighing 140 pounds have been caught in the southern United States. Some sea turtles weigh nearly a ton.*

• *All turtles lay their eggs on land. Usually they are laid in sand or dirt in a sunny place. The female covers the clutch of eggs and leaves them to hatch by themselves several weeks later.*

• *Turtle eggs and baby turtles are eaten by birds, fishes, mammals, and man. Few baby turtles live to adulthood in the wild.* ◄

Photos: (Top) Florida cooter turtle, a baby. **(Below)** Eastern musk turtle, a baby. **(Right)** Gopher tortoise; 2-inch baby. All photos by Alan Mark Fletcher.

Crawford Resigns Editorial Position

JAMES W. CRAWFORD, Executive Editor of the *Aquarium Journal* for the past 11 years, has resigned to accept the post of Public Information Officer for the University of California San Francisco Medical Center.

He will remain active in society affairs, having been a member of the Board of Directors for the past 10 years, serving as S.F.A.S. Vice President for one year, and President for three years.

After graduating from Drake University in 1942, Crawford received his naval commission at the USNR Midshipmen's School, Northwestern University, thereafter serving in the naval amphibious forces and as skipper of a PT boat in the South Pacific during World War II.

Settling in San Francisco in 1945, Crawford entered the public relations and public information fields, serving with Lockheed Missiles and Space Company as a senior Publications Engineer in charge of publications for the Satellite Systems Test Services.

In addition he has served as public relations consultant to the Swedish Consulate in San Francisco and other clients including Bristol-Myers Products Division. ◄

PART II

Even fishes become "hooked" on morphine — and usually die when drug is withdrawn

A Fish Goes to Baylor

Braz Walker
Waco, Texas

PERHAPS most fascinating of all the experiments were those involving the use of morphine. As in the other experiments, the aquarium was divided into two unequal compartments, a buffer added to the aquarium water which brought the pH to 8.2 and EDTA administered (a water softening agent). An advantage to working with fishes is the fact that the "shot" can be injected into the aquarium water instead of into the tissue of the creature since it will subsequently be taken into the fish's bloodstream through the process of breathing. After morphine is administered to the fish a few times, the victim actually becomes "hooked" and concentrations must be increased to produce the same degree of response previously caused by the drug. As in human beings, this is thought to represent a tolerance to morphine requiring a bigger "fix" in order to make that journey to Cloud 9. Dr. Krivoy says that after the knifefish became "addicted" that they would almost try to come through the front glasses of their aquariums when they would see him coming with their daily morphine.

Nalorphine is a drug which is used to bring about immediate withdrawal

from the effects of morphine. It, too, was administered during the morphine experiments and although it did reverse the depressant effects of the previous dose of morphine, it was found that when morphine was completely withdrawn, in every instance the fish died. This indicates that they actually had built up a physical dependence upon the drug.

The gymnotid eels of South America, the mormyrids of Africa and *Gymnarchus* of Africa (a close relative of the mormyrids) are all capable of generating electrical fields which are used in navigation, in communication and also (at least in the case of *Gymnarchus*) in the identification of objects. Even among the same family (Gymnotidae) the system varies and may be either a constant frequency which varies in its intensity as in the case of *Eigenmannia*, or a base or resting frequency as with *Gymnotus* whose resting frequency is approximately 40 cycles per second (the lowest note on a bass-viol). This increases to as much as 70 cycles per second as the fish becomes more excited and many decrease to as low as 20 cycles per second when the fish is disturbed or depressed. *Eigenmannia*, on the other hand, with its constant 300 cycle per second impulse varies the strength of its signal according to conditions and when picked up and played through an amplifier and speaker system, can be heard in varying degrees of loudness although the tone is constant.

Among those who are not at all impressed by electronics there are few who would not have been completely fascinated had they been able to visit with me to the laboratory of Dr. Krivoy. After hearing of such a thing from an authority, one knows that it is true, but until he hears the signal produced by these fishes (*Gymnotus* and *Eigenmannia*) played through a speaker system, and at the same time observes the actions of the fishes which correspond to the sounds produced. The reality of it does not quite crash through just as we will never really know how quiet it is on the moon until we have been there.

Dr. Krivoy is as finicky about his fish as research scientists generally are about their laboratory animals. In fact, Dr. Krivoy does not trust the care of the fish to anyone else, but personally sees to their day-to-day well-being. Most of the

★ IDEAS ★

BY HOBBYISTS

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

Drying Aquarium Sealer

For people who need to quickly dry their tanks of moisture after cleaning them or checking them over, or to put on a coat of aquarium sealer, I have found it best to use the blower end of a vacuum cleaner. First make sure that the hose is clean of dirt particles, then start the blower at the bottom of the tank. After the bottom is dry, start from the top of the corners and work down. After the air from the vacuum cleaner gets warm it only takes about 15 or 20 minutes for the moisture in a 20-gallon tank to dry up. — *R. Christian Jones, Roanoke, Virginia.* ◄

fish in his laboratory have been happy and healthy for years.

Since the days of the cancer research of Dr. Myron Gordon utilizing the platy, *Xiphophorus maculatus*, aquarium fishes have been used more frequently in research. With the hope of Dr. Krivoy that these electrical fishes can be used effectively to find answers about mental retardation, senility and even drug addiction, there is a good chance that they can be of great service to mankind, and the fact that the learning ability of a particular fish can actually be improved by the use of drugs is very encouraging. Without the mind of man, however, acting as a catalyst these potentials would never be transformed into fulfillment. ◄

The Journal Book Review

Title: "Aquarium Plants"
Author: H. C. D. de Wit
Publisher: Blandford Press, 167 High Holborn, London, W. C. 1, England; 255 pages, British price 35 shillings ($4.90).
Reviewer: Albert J. Klee

THIS BOOK originally was published in the Dutch language in 1957-58 and is only now available to readers of English. Its author is the renowned Professor H. C. D. de Wit, of the University for Agriculture at Wageningen, Holland, an authority on water plants and a specialist in the genera *Cryptocoryne* and *Lagenandra*. One chapter devoted to algae was written by Mr. A. van de Werff, a specialist in that subject.

Aside from a chapter on general remarks, the book is arranged not by family as is Wendt's famous work, "Aquarien Pflanzen in Wort und Bild," nor by genus as in Roe's "A Manual of Aquarium Plants," but rather by their outward appearance as aquarium plants. For example, the chapter titles are as follows: Algae in the Aquarium; Floating Plants; Submerged Plants; Rooting Rosettes with Filiform, Linear or Ribbon-shaped Leaves; Leaf Rosettes on the Bottom; Plants Rooting Below with Floating Leaves; Creeping Stems with Erect Leaves; and Erect Leafy Stems. As Prof. de Wit states, in order to profit from a taxonomic arrangement, one really has to be a botanist. Therefore, his arrangement is very sensible and will be welcomed by the great majority of aquarists.

Although there are many line drawings in this book and some photographs, it is under-illustrated for the purpose of using it as a guide to identification. Further, since it was written some seven or eight years ago, the newer aquarium plants such as the temple plant, the new cryptocorynes and the new swordplants are not described. Some genera such as *Aglaonema* and *Alternanthera* are not treated at all. In addition, the nomenclature used is dated and I cite *Acorus* as one example. Consequently, I urge that this book be used in conjunction with Roe's, "A Manual of Aquarium Plants," the latter to provide assistance in identification and correct nomenclature.

If this is done, then I recommend highly that aquarists obtain Prof. de Wit's book for here we have the most complete

(Continued on Page 194)

Richard Stratton
San Diego, California

Many of the lesser-known cichlids are more colorful than the common species

Pelmatochromis taeniatus

MOST AQUARISTS who have become reasonably familiar with cichlids are aware that there are almost countless species within this large and remarkable family. Many of these have bright colors – some of them comparable to coral fishes – or some other feature which makes them spectacular in appearance. I wonder, though, how many aquarists are aware that many of the lesser-known cichlids are more colorful than most of the relatively common species. Examples would be African cichlids such as *Lamprologus leleupi* and *Julidochromis ornatus*, as well as many others from Africa. And just recently, the new species of *Cichlasoma* imported from Lake Nicaragua have made quite an impact on the aquarium world. These are large in size – and price! – and are an overall orange to bright-red color with black markings. The specimens have been tentatively identified as *Cichlasoma citronella* and *C. erythrueum*. It is hoped that these fishes will spawn in captivity, and thus become available to the general public.

Just how many colorful cichlids can occur in a single genus was demonstrated several months ago in the Los Angeles area by the importation of numerous species of the African genus *Pelmatochromis*. Nearly all these species were colorful – many of them more colorful

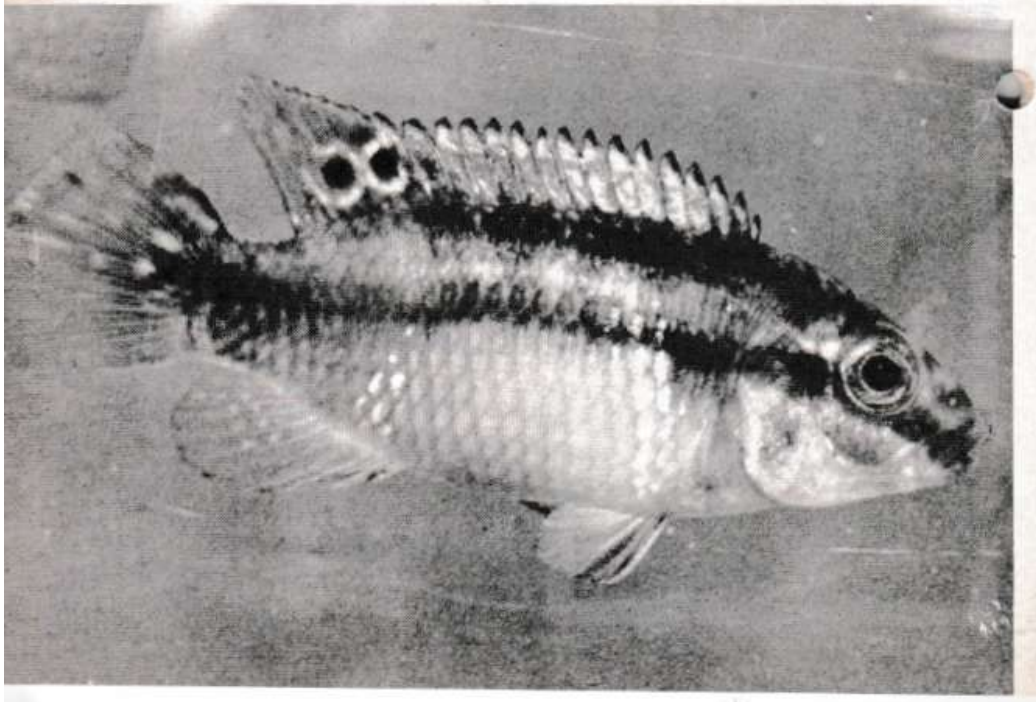
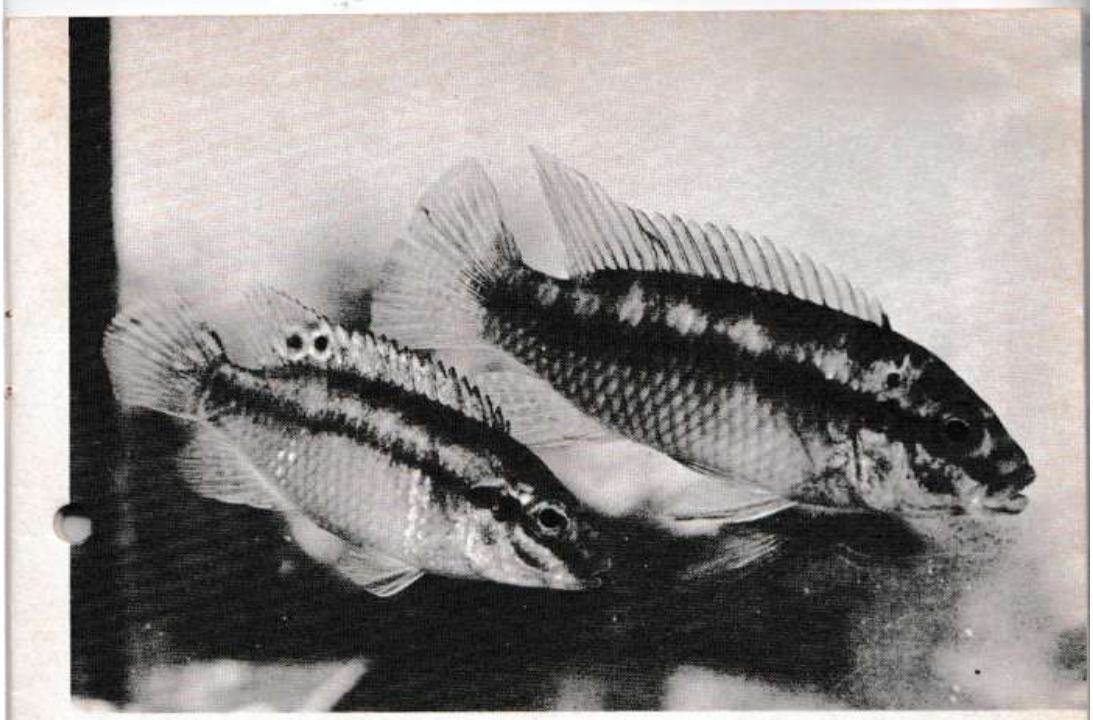


Photo: Pelmatochromis taeniatus, female. Red-purple color extends up to the pink dorsal fin. Photo by Dave Tohir.



than the best-known representative of the genus, the "Krib" (*Pelmatochromis kribensis*). The species imported were: *Pelmatochromis annectens, P. arnoldi, P. pulcher, P. subocellatus,* and *P. taeniatus.* One of the most colorful of all was a species I believe to be *Pelmatochromis taeniatus.* They do not look like any of the pictures published of live *taeniatus* in respect to color, but this may be because the specimens photographed were immature or faded from the fright of being put into a photographing tank. Cichlids, of course, are well known for their tendency to fade in color when frightened.

I obtained one pair of *Pelmatochromis taeniatus,* and put them into a breeding tank of eight gallons capacity. Since these fish came from Africa, and I could find no authentic information about the water quality of their native waters (some African waters are soft and acid, others are quite hard and alkaline), I decided to use regular tap water, and I kept the temperature at 78 degrees. The tap water in Southern California is rather hard and alkaline, but I have found that hardness and pH are not as important to most dwarf cichlids as is a fairly frequent partial change of water.

Whatever the exact water conditions of this species' native habitat, my particular specimens were soon in good color and seemingly flourishing in San Diego tap water. The male was an overall bright golden color, and the female, on a background of gold, had fusia-colored flanks. The color was brighter than the spawning-red color in *kribensis,* and it extended all the way up to the pink dorsal. I had provided a flower pot as a cave for the pair, and when the female emerged from the cave, instead of her usual gold body color, she was always jet black with her flanks glowing brighter than ever. The male had no red coloration at any time, but I rate these fish as more impressive than *kribensis* because of the brighter color of the female and more pleasing body shape of both male and female.

Photo: A pair of **P. taeniatus,** with the male on top; female below. Photo by Dave Tohir.

(They lack the bug-eyed pot-bellied impression of *kribensis*.)

Spawning took place a few weeks after I got the fish, and the spawning behavior was quite similar to that of *kribensis* and descriptions of *Pelmatochromis dimidiatus*. An interesting behavior which I have never observed in *P. kribensis* was that the female courted the male by placing herself in front of the male and swimming backward to him, waving her tail wildly. She seemed to concentrate on keeping the male's eye on the red glow of her flanks. If this stimulated the male, he certainly did not show it; however, as I say, a spawning *did* take place.

The first sign of spawning recognized by me was the male guarding the entrance to the "cave" and the female only occasionally poking her head out but never swimming completely out of the flowerpot. (They guarded the flowerpot frequently before the spawning, but both fish swam in and out freely.) The male's golden color was even more enhanced now, and the female stayed jet black all the time with the red on her flanks seeming to glow with its own light.

I wanted to save this first spawning, so to be absolutely safe, I took out the parents and hatched the eggs artificially using an air stone and methylene blue. The eggs had been scattered all over the inside of the flowerpot, but the majority of them had been placed on the "ceiling" of the "cave." I wanted to be able to watch the development of the eggs, so I turned the flower pot over so that it was right side up. This turned out to be a mistake. Apparently, the eggs of *P. taeniatus* — from years of being laid and hatched in caves — are very susceptible to light, so in spite of the heavy concentration of methylene blue, a large percentage of the eggs fungused. As a matter of fact, only 15 eggs hatched, and by the time the fry were free swimming, there were only ten left. Since there were so few offspring, and I did not have any other spawnings going on at the time, I did not bother with hatching brine shrimp. I fed one of the German brands of dry food and occasional frozen shrimp. All ten youngsters survived, and at this time are about an inch and a half long and thriving! (I had often raised larger cichlid fry on dry food alone, but I was

★ IDEAS ★
BY HOBBYISTS

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

Feeding Micro-Worms

GET A VERY fine mesh, small nylon net. When your culture is well started, pour the worms into the net. Do not worry about including pablum or serevim. Now place the net into a small glass of water, keeping the edge of the net above the water so the big pieces of culture don't get into the glass. Let the net stay in the glass for five minutes. Now take the net out and wash well.

Now pour all of the water and worms in the glass, into the net. Carefully rinse the net under the faucet. All that you have in the net now are clean micro-worms. The next step is to dip the net into the aquarium so the worms fall off. You see, the micro-worms can swim right through the net if it is still, but if they are being washed under the tap they cannot get through quickly. — *Kent Kurtz, Millbrae, California.* ◄

not optimistic about using it for this species. I still do not recommend the practice. Live newly-hatched brine shrimp is an ideal first food for all cichlid fry except *Apistogramma ramirezi* which needs a smaller food for the first few days of free swimming.)

In the meantime, I had placed the parents in a 20-gallon tank with six adult specimens of *Pelmatochromis guentheri*, which is one of the larger and rougher species of the genus – and incidentally, it is a mouth breeder. There was lots of cover and concealment in the tank, so I was reasonably sure that my *taeniatus* would not be bullied to death. Not only did they survive, but they promptly produced another spawning! I removed all the fish (this time I had to put all the fish into a 40-gallon tank with an ever larger cichlid species!), and put in the same concentration of methylene blue as before, but this time I left the eggs in their cave – that is, I did not turn over the flowerpot. The result was a much more respectable hatch (about 70 free-swimming fry). These youngsters grew very fast on a diet of newly-hatched shrimp and dry food, and at this writing, they are the same size as their brothers and sisters from the first spawning.

I have told about aquarium practices that I hate to admit, but they demonstrate that *Pelmatochromis taeniatus* is just as hardy as it is lovely. ◄

Catalog Review

THE serious aquarist may be interested in a catalog just received entitled "Water Analysis Catalog of Portable Testing Equipment," produced by the Hach Chemical Co. Aquarists who like to control and/or closely watch the chemical properties of their aquaria or experiment with these factors in breeding attempts will find this catalog an excellent source of testing equipment. Considering the usual high cost of good chemical testing equipment, the aquarist will find that the prices in this catalog are usually not beyond reach although none of the equipment is cheap or of poor quality. The equipment is produced for field use by fishery biologist or others interested in freshwater biology and/or polution control. For the aquarist there are testing kits for alkalinity, calcium hardness, carbon dioxide, chloride, copper, detergents, hardness, hydrogen sulfide, iron, oxygen, pH, phosphate, tannin and several others. There are also kits designed to test for several factors. One, model AL-36P, tests for carbon dioxide, dissolved oxygen, alkalinity, hardness and pH. This kit weighs 8 pounds, is sold in a wood carrying case measuring 12x6x8 inches and costs $47.95. This is not expensive considering the variety of tests possible. The pH testing kits come in a variety of forms. One, model 17, is a wide range set covering a pH range of 4.0 to 10.0 in 0.5 steps. It costs about $23.00 and weighs 3 pounds. For more close work in any given pH range there are narrow range sets. For example there is a cresol red set covering in more accurate detail the pH range between 7.0-8.2 All in all we believe the experimentally inclined aquarist will find much of interest here. The catalog may be obtained from the Hach Chemical Company, P.O. Box 907, Ames, Iowa or P.O. Box 477, Laguna Beach, California. ◄

Tranquilizer pills meant for elephants
keep frayed nerves calm over the Andes!

"Little Orphan Andes"

PART IV

Albert J. Klee
West Chester, Ohio

OUR LUCK was running true to form for immediately upon arrival at Tocumen Airport, the ancient cab that brought us broke down! The four of us, Jerry, Win, Zeke and myself, went out to the plane but found that Panamanian Customs had sealed the aircraft, and the others were nowhere to be found. Thoughts of sacking out in the plane were discarded and we proceeded to the airport lounge. My evaluation of the situation went something like this. We had about two hours before scheduled takeoff and it was clear that a man had to be either crazy or drunk to get back into that airplane. We decided on the latter course and ordered Panamanian beer as a starter. It was obvious that Win was quite concerned (but no more than the rest of us) so Zeke offered him a tranquilizer tablet. The tablet looked like a small basketball but Win swallowed it post haste. "This is going to be interesting," sez Zeke. "Why?" sez Win. "Because that was a pill that we give to elephants at the Cincinnati Zoo to tranquilize them before giving them shots," sez Zeke. "What!", sez Win. "It was the only thing I had," sez Zeke. "Have you ever tried one yourself?", sez Win. "No," sez Zeke. At this point, Win stopped worrying about the B-25 and concentrated on the effect of elephant tranquilizer on Man. As for the

Photo: Taking a look at the cockpit while over the Andes. All photographs by the author.

Photos: (Right) A typical Indian village, Tournavista. Notice the lack of vehicular traffic. **(Below)** The Pachitea River, taken from the cockpit of the B-25. Photos by Albert J. Klee.

rest of us, we concentrated on "Operation Juiced" and we were feeling no pain when Jon, Bill, Felix, Jim and Dick showed up. Jon was just about to join us in "Operation Juiced" when we remembered that he was flying so it was strictly coffee for him. The next leg of the journey was to Talara, located in the northwestern corner of Peru . . . a trip of some 5¼ hours flying time. At midnight we refueled, passed through customs and took our positions in the plane. This time, Jerry and I went with Win and Zeke in the tail portion. We closed up the rear hatch and promptly fell fast asleep. I don't know whether Win was tranquilized or just asleep but in any event, he wasn't making much noise. The next thing we knew, the old B-25 was coming in for a landing at Talara.

Talara is a small town located on the Pacific Ocean that serves as an oil de-

pot in northwestern Peru, not too far from the border with Ecuador. The airport itself is located on a level several hundred feet above the town and without doubt, it is the most desolate spot I have ever visited in my life. The coast of Peru is, surprisingly, nothing but desert . . . sand, sand and more sand. The wind blows in from the Pacific Ocean and bends the little vegetation that there is until the palms nearly touch the ground. A good many of the smaller windows at the airport terminal building had blown out and had not been replaced, so the wind blew in quantities of sand continuously. No sooner would a Peruvian sweep the sand up in the lobby, then a fresh layer would take its place! This was ridiculous! Just below the equator and on the Pacific Ocean . . . and we were in cold, windy desert!

There was no point in going into town. Firstly, it looked as desolate as the sand dunes themselves and secondly, we had no time. A few hundred feet from the airport we found a clapboard shack that housed a sort of restaurant run by a Peruvian farmer. The farmer's pistys were located right next door but the wind, fortunately, was blowing in the right direction. Breakfast consisted of greasy eggs, stale rolls and cold coffee. We were to find out later that this was a banquet in comparison to things we would be eating in the jungle! The farmer and his wife were quite nice, however, and I had a chance to listen to some real Peruvian Spanish being spoken. It was obvious that my high school Spanish left much to be desired.

Photos: (Top) Residential area, Tournavista. — **(Middle)** Winds bending palm trees at Talara, Peru.—**(Left)** the mighty Andes. Spinner of our propeller can be seen at the lower left.

Now we were ready for the most dangerous part of our trip . . . the flight across the Andes mountains, and then over the jungle. Prior to this, we flew either over the U.S. or over water and if trouble occurred over the former, we could have landed almost anywhere, and if over the latter (as it did over the Caribbean), we had the ocean in which to ditch. If trouble occurred over the Andes, however, we would have had it, for there wasn't a parachute in the plane. If trouble occurred over the jungle, our chances wouldn't be much better . . . trees are almost as hard as mountains! Furthermore, from now on we had no outside navigational aids, i.e., no radio contact, radar, radio beacon, etc. We were looking for a needle in the haystack, i.e., a tiny settlement in the thick jungles of Peru. After breakfast, we refueled once again and readied for takeoff. The Talara airport is not used for commercial purposes. It serves mainly for the Peruvian Air Force and Peruvian jet fighters were streaking by like mosquitoes. Although we had clearance to take off, evidently the jets didn't hear about it for one nearly landed right into us while we were taxiing! After a 15 minute delay, and looking in all directions, we took off. Our estimated time to Tournavista, our destination, was 3½ hours; 2 hours over the Andes and 1½ hours over the jungle.

This time I took a place immediately behind the pilot for I had some pictures to take! The desert below was impressive but then, the Andes came in sight and we had to gain altitude. There was no bottled oxygen aboard the plane except for one tiny container to be used by pilot and copilot. Consequently, we could fly no higher than 17,000 feet . . . any higher and we would die from lack of oxygen. Unfortunately, the Andes were over 20,000 feet high at the point at which we desired to cross, and a lit-

Photo: Freezing in the tropics! Left to right: Zeke, Dick, Felix, Win and Jerry. Photo by author.

tle arithmetic indicates that we had a slight problem! Our strategy was to fly between peaks and it was a jim-dandy strategy except for one thing, i.e., clouds. We never knew exactly what was waiting for us whenever we entered a cloud. Furthermore, once inside a cloud it was a frightening experience not to be able to see what lay ahead of us. All we could do was to trust our maps and to hope that what we saw out of our window was the same thing we were pointing to on our maps. Later on, we learned that some months previous to our arrival, a Peruvian airliner crashed into a mountain because it was marked on the maps as 5,000 feet, when it really was 10,000 feet!

It was cold in the plane and I nearly froze. However, the Andes were magnificent and my camera clicked away. We flew very close to the mountains . . . a cameraman's delight! The high altitude gave me a warm, cozy feeling after a while, and if I didn't move around too much, I could breathe although with great difficulty. Win, who suffered from asthma, also rode in the mid-compartment with me so that he could use the pilot's oxygen bottle if needed. However, the oxygen bottle was soon exhausted and Bill, our copilot, nearly passed out a while later. In the rear compartment, Dick Stone was having an especially bad time of it due to the lack of oxygen.

After two hours, we crossed the Andes and came over the jungle. Consequently, we were able to reduce altitude, and the strain of low-oxygen flying was over for the moment. Our problem now was to find the tiny settlement of Tournavista in all that jungle. We did this by flying very low, looking for the telltale Pachitea River on which the settlement is located. The jungle looked dense and among the predominantly green treetops would appear at times, isolated yellow or red trees. It was quite a sight. Then, we found the river. It wound across the jungle like a tremendous hairpin, and it looked as if 10 miles on the river would be equivalent to 1 mile as the crow flies. We were all looking hard for Tournavista, however. To miss it would spell disaster.

Then . . . there it was! A tiny area hacked out of the jungle, its roads exposing raw earth to give it a naked look, it perched on the eastern bank of

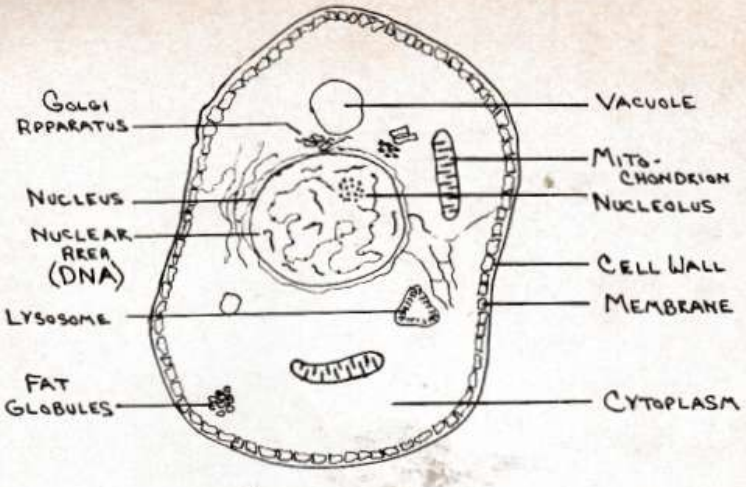
(Continued on Page 195)

CLUB NEWS

Midwest Aquarist Club

The M.A.C. will hold its Seventh Annual Tropical Fish Show June 16 through 23 in the community room of the Commercial Savings & Loan Association, 30th & Ames Sts., Omaha, Nebraska, according to Miss Leola Petersen, secretary.

Inquiries about the show should be addressed to Miss Petersen, at 3164 Meredith Avenue, Omaha, Nebraska. ◄



GENERALIZED ANIMAL CELL

Amateurs are equal to professionals when creating new varieties — luck plays a part!

Atomic Age Guppies

PART II

Charles O. Masters
Walhonding, Ohio

MATTHIAS SCHLEIDEN, a German botany professor, in 1839, first advanced the idea that the cell was the basic functioning unit of all living things and at the same time, *Theodor Schwann*, a German zoologist, having the same idea, studied the organization and development of tissues from egg cells. So it was that from these two men came the cell theory which was as indispensable to biologists as the acceptance of atoms and molecules was to chemists.

From the illustration, it is apparent that the interior of all cells is composed of many very complex chemical substances. It may be true that three-fourths of living things consist of water and much of the entire remainder consists of five kinds of substances but their complexities are stupendous to say the least. Proteins which, next to water, make up the largest part of cells are made up of amino acids and are very large molecules of about five thousand atoms. Much of the chemical activity of the cell is accomplished by some special proteins known as enzymes which bring about the combining or separating of cellular substances. Many biologists feel that the action of genes is principally the initiation of enzyme production and this is their contribution to the hereditary process. The concept that enzymes are protein molecules that accelerate specific chemical transformations within the cell still stands.

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A pair of hobbyists try to solve the fry food problem!

Brine Shrimp Hatcher

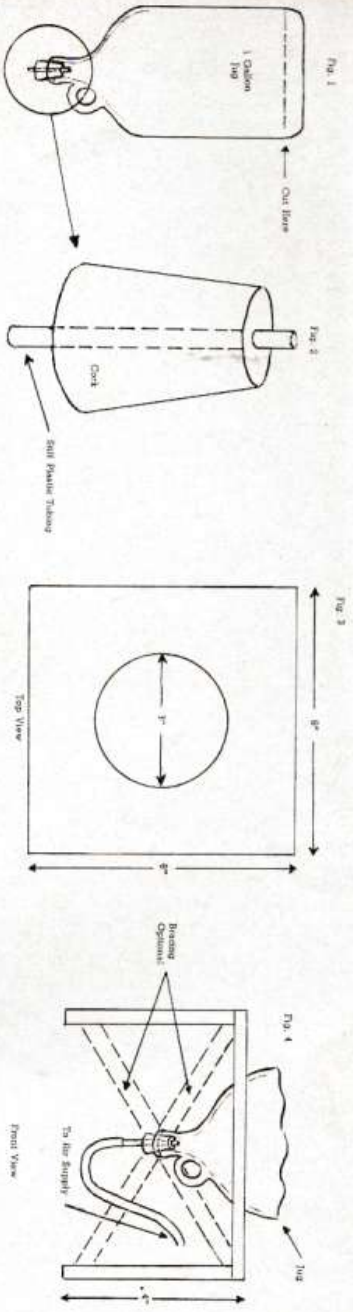
Jerry Currier & Marty Smith

San Francisco, California

QUITE OFTEN after spending much time and energy in conditioning fishes and their water, hobbyists who have had a fish spawn for them find that they cannot raise the young. Very frequently this is due to the problem of supplying the ravenous fry with enough live food.

Most authorities agree that baby brine shrimp is an excellent live food, and recommend it for raising young fish. However, the problem of getting enough baby shrimp, when needed, and not getting the unhatched eggs leads to quite a bit of frustration. Trays work well, but require siphoning or netting to get the baby shrimp. This latter method usually results in a large quantity of eggs being netted at the same time. Some fry can handle the eggs without any trouble, but in many species the eggs can cause an intestinal blockage which will lead to death. Trays, however, will not produce as many shrimp as an aerated hatcher for the same volume of water.

After struggling with this problem for some time we chanced to mention our



woes at "Ye Friendly Neighborhood Fishe Shoppe."

A nod of understanding greeted our tale. Then supplying us with a cup of coffee (strong enough to curl the whiskers of a walrus) and made to sit down and rest our problem, we were given the details of making a brine shrimp hatcher that revolutionized brine shrimp feeding for us. Flora Scott (fish breeder extraordinary and maker of coffee for walrus permanent waves) suggested this recipe:

INGREDIENTS

1 – glass jug (1 gallon capacity)
1 – piece of knitting yarn (any color)
Lighter Fluid (as needed)
1 – match
1 – fine tooth file
1 – pan of COLD water
1 – cork (to fit mouth of jug)
1 – short piece (about 3 inches) of HARD plastic tubing
1 – length (as needed) of flexible plastic tubing

To make this concoction into a brine shrimp hatcher do the following:

(1) Remove the BOTTOM of the jug by tying the knitting yarn around the jug about 1 inch up from the base. (Figure 1)

(2) Soak the yarn with lighter fluid, BE CAREFUL, DO NOT LET FLUID GET ON ANY PART OF THE JUG EXCEPT THE SURFACE THAT IS IN CONTACT WITH THE YARN.

(3) Strike the match and holding the jug, with the bottom UP, light the yarn. Let burn until it starts to go out.

(4) Plunge the jug (bottom first) into a pan of very cold water, the bottom should fall off. Careful NOW, the edge around the cut is sharp, you may file this lightly to remove the rough edge. [Editor's note: A knife sharpening stone will do a better job of making cut glass edges safe. This is true for aquarium tops too.]

(5) Now punch a hole through the center of the cork and insert the stiff tubing until it is flush with the end of the cork to be inserted in the jug. (Figure 2)

(6) Push the cork into the neck of the jug (at this point you may seal the cork with aquarium cement if you wish). [Editor's note: Silastic is an excellent product for this.]

(7) Attach the flexible tubing to the portion of the stiff tubing which extends from the cork. The last thing to do is to devise a stand for your jug.

A simple solution is to take a piece of wood about 14" long and 6" wide, cut off 2 pieces 4" x 6" and put aside. Take the remaining piece which, is 6" x 6" and cut a 3" diameter hole in the center. (Figure 3) Attach the two 4" x 6" pieces to each end to serve as legs. (When finished it should resemble Grandpa's outdoor plumbing). Place the jug, neck down, thru the hole and

CLUB NEWS

San Francisco Aquarium Society, Inc.

The next meeting of the S.F.A.S. will be Thursday, April 1, 1965, at Steinhart Aquarium, California Academy of Sciences, according to Frank Tufo, president.

Program of the evening will be a talk about the Brine Shrimp by a well-known authority on the subject, Dr. Sarane T. Bowen, Associate Professor of biology at San Francisco State College, according to Jim Crawford, program chairman.

A report of 1964 Society activities will be given at this meeting.

Fish of the Month for the April meeting: (1) Swordtails, (2) Barbs, and (3) Loaches, Labeos and similar varieties, Charles Bange, chairman, announced.

The usual goodies with plenty of milk and coffee will be available, Joe Zins, chairman, announced. There will also be an ample supply of door prizes for the meeting. ◄

attach the length of flexible tubing to an air supply. (Figure 4)

At this juncture we had been forced (on pain of swimming in a tank full of starved piranhas) to swallow another cup of instant Toni, and settle back to read a treatise published by Encyclopedia Britannica on the hatching of brine shrimp eggs. After careful perusal and much calculation (facilitated by removing everyone's shoe for counting purposes) we arrived at this brew, which strangely enough, seems to increase the hatch over any given period, as compared to using salt only:

Fill the jug with 3 quarts of dechlorinated water (once this level is measured you may mark it on the outside of the jug with a piece of tape)

ADD:

1/3 – cup (heaping) aquarium rock salt

1½ – teaspoon Epsom Salts
½ – teaspoon Sodium Bicarbonate
1 – teaspoon (level) Brine Shrimp Eggs. Turn on the air until GENTLE aeration is maintained.

(Incidentally, this solution has a specific gravity of 1.025, which brine shrimp seem to thrive in.)

If the temperature is 80° F or slightly higher you should have a good crop of baby brine shrimp in 14 hours.

To collect the shrimp – turn off the air and let settle for about 15 minutes; by that time the neck of the jug will be full of baby shrimp. The eggs and egg cases will float to the surface of the water.

Now all you have to do is disconnect the tubing from the air source and let the water and shrimp run into a FINE net.

You may find that placing a 15 watt light bulb under the stand after turning the air off, will cause more shrimp to settle to the bottom.

You may wish to construct two hatchers and use them in rotation, if you are feeding many fry. SET up one in the morning and the other in the evening. This will insure a CONSTANT, plentiful source of shrimp.

By now it was closing time and we were tossed out, coffee sloshing and visions of millions of brine shrimp dancing in our heads, and went our way. ◄

CLUB NEWS

Cleveland Betta Associates

The C.B.A. is presently engaged in preparation of the show rules and judging standards for the betta show which will be held during the T.I.F.A.S. Convention at Cleveland, July 31, 1965, according to Gerald S. Vinarcik, show chairman.

Inquiries about the show should be addressed to: Mrs. Jane Vogelsang, 5273 E. 126th St., Garfield Heights, Ohio.

FINNY FOLKS

By Diane Schofield

IF ANYBODY would like a perfectly jolly idea for a new "product" that would sell like five dollar bills for $4, just look me up. The market is, of course, limited. The people who would be interested are the editors of the various aquarium society bulletins. I even have a name picked out for this very handy gadget. It's called a "Zane Scobey." Wouldn't you *too* like to have a Zane Scobey for your very own? One that you could depend upon each and every month to write an information laced column called "Fish of the Month" for your publication?

There is, of course, only one Zane, more's the pity, and he belongs strictly to the Green Water Aquarist Society of Illinois. He more than just belongs. He was one of the people wielding a trowel when the corner stone was laid for this club back in 1957. During the years since then, he has held tightly onto the reins as president for three years and has been on the Board of Directors for another two. As a matter of fact, he is *still* on the Board of Directors, as well as being in charge of their Hobbyist of the Year records.

When you meet Zane, you just know that he couldn't be anything but an ex-marine. This great gentle bear of a man began his dallying with tropical fish 12 years ago after ending an 8 year stint with the boys who have earned the rather rustic monicker of "Leathernecks." These eight years saw him scuttling from San Diego to Australia to China to the battle of Okinawa. A small aside to feminine readers, that I'm sure

Photos: (Top) Ernie and Eleanor Mass of the Green Water Aquarists Society with their pet dogs. Photo by the Masses. **(2nd)** Zane Scobey of the G.W.A.S. **(3rd)** Robert Senecal, active member of the group. **(4th)** Charles McAdams, prime guppy breeder. All photos by the author unless otherwise specified.

ex-Buck Sergeant Scobey of the U. S. Marines won't appreciate in the least. You'll have to trilly a long way to find longer eyelashes or more beautiful big eyes on a man than Zane sports. Of course, all of this has absolutely nothing to do with the tropical fish hobby, but do you think that even the most avid girl-aquarist sits around thinking about guppy dorsals all the time?

Recently Zane Scobey shot a rather startling innovation into the field of aquarium publications. This is a new column that is to be on a "roving" basis, or perhaps one might say that it is on the same principle of the game that we used to play as children called "Hot Potato." Remember? You would throw something quickly to another player as if it were a hot potato. Then this new patsy would have to get rid of it just as quickly.

Zane was kind enough to credit me with breathing life into the germ that finally hatched into this idea. One night after a fish show we were all sitting around working the hobby over verbally, as all aquarists are wont to do. It seems that I gave out with one of those "I wish" things, to the effect that it would be nice if there could be a convention held just for the editors of the various aquarium society bulletins.

After returning home to Illinois once again, this idea took hold in Zane's fertile mind and knowing that such a feat would be completely impossible, he came up with an idea that was much more feasible. Why not write a column called, "Let's Link Our Ideas"? The gist of this column would be that editors would pass on information, such as promotion of articles, experiences that succeed or fail, and helpful hints in aquarium equipment. Zane fired the opening shot with a suggestion that very little really had ever been written about the right type of aquarium stand for a specific purpose and ended this column with, "Now let's see some articles about building or purchasing aquarium stands from all the fine clubs all over the country."

The final filip was to pass the "hot potato" (column) over to the next editor for her suggestions and so on. It will be

Photos: (Top, left) A portion of trophies and ribbons won by Charles McAdams. **(Top, right)** Some of the 145 tanks owned by McAdams. Photos by Charles McAdams.

Photos: (Below, left) Another shot of Charles McAdams 145-tank fish house. Photo by Charles McAdams. **(Below, right)** Bowl Show winners and Hobbyist of Year winners, 1964, of the G.W.A.S.

most interesting to see if, like a chain letter, no editor will break the chain and as a result we all end up with workable ideas and suggestions from all over the country.

I wonder? If we all follow through to the end, is there a chance we would all end up with a genuine "Zane Scobey" for our own particular club?

• • •

It is usually the parents who leave a legacy to the offspring, but there is one instance where this situation was just flipped over to the reverse side of the coin.

Eleanore and Ernest Mass, who are also of the Green Water Aquarist Society, had absolutely no interest at all in tropical fishes until their only son, Ronald, started to college and left his parents in charge of his fish. Fish are contagious little creatures, you know. Almost as bad as germs. Mr. and Mrs. Mass became badly infected and remain stricken to this day.

A thing like this can go from bad to worse. Before long, their house broke out in twenties, fifteens, tens, fives, twos and even one fifty. Not that it wasn't bad enough to buy all of these tanks, but the fifty gallon tank is a wooden one that Ernest Mass made himself!

Soon the garden variety of fish, such as fancy guppies, bettas, hi-fin swords, and angels got a little tame and the Masses went in for something rather recent. They have been able to keep the new pink Congos successfully, and also they have made the grade in getting them to spawn.

Of course, one doesn't like to "suffer" along with the tropical fish fever either. Soon the Masses had joined The Green Water Aquarist Society—not only joined it, but now Ernest has progressed from Recording Secretary to being President. With most people prexy is plenty. With Ernie, prexy is just a start. He is also editor of "The Informer," the green-covered (you expected another color perhaps?) fish-filled bulletin of The GWAS. When the spirit moves him, he also is the cartoonist and he does the addressing. Test him. Mail one of your exchanges to him at 8400 W. 132nd St., Palos Park, Illinois, and he'll address a copy of "The Informer" right back to your club.

Eleanore Mass is every bit as much of an asset to The Green Water Aquarist Society as is her husband. She helps Ernest with the layout of the bulletin, does the typing and is now on her second year as Corresponding Secretary. Her duties further include writing the exchange column that is called, "News From Other Societies."

• • •

Most of the members of The Green Water Aquarist Society seem to wear many hats. Bob Senecal, another of the stalwart souls of this group, has quite a few hanging in his closet. First there is the one that says, "CUSAC and TIFAS Representative" over the visor. Then

Photo: Ernest Mass receiving a 20-gal. tank in appreciation for the work he did in publishing "The Informer." Presented by the society.

there is the rather dashing little number that has this legend over the snap brim, "Auctioneer for the Auction of the GWAS" and on that hook over there hangs the homburg with the chaste title, "Chairman of the Annual Tropical Fish Show of the GWAS." A Stetson also is marked, "Bagger and Labeller for all the Fish and Plants for the Auctions of the GWAS." There is one chapeau in the corner that has been retired from active service. This is the one that Bob wore for two years when he served as vice-president of the club.

When Bob is not busy trying to decide which hat to put on next, he is dancing attendance on his fish, learning about them first hand. As Bob stated, "I read all I can about fish but find there is nothing like doing it yourself."

As do most aquarists in time, after five years in the hobby, he has found that he leans decidedly toward certain fish. Bob says, "There are several fish that I enjoy more than any other. They are black sail-fin mollies, silver dollars and cardinal tetras. I am always looking for good black sail-fin mollies."

With some of these fish, he entered a number of the larger shows in the mid-west and started right in at the top by winning first place in the first year. He also copped the trophy for having the most points in The Green Water Aquarist Society's bowl show for 1963.

* * *

Travel around the circuit of aquarium shows in the mid-west, and before you've romped in through the door of the second one, you'll be almost sure to encounter the beaming countenance of jovial Charles McAdams. Charles and his darkly handsome son, Paul, "do the rounds" of most of the shows that are handily accessible to their home in Union, Ohio. Of course, one of the requirements of these shows has to be that they do have a guppy division, since this is what Charles and Paul specialize in in their shop, "County-Line Guppies." This shop is rather a remarkable spot—it has 140 tanks in it with absolutely nothing but guppies in any of them!

The whole thing can be blamed on Nina, who also goes under the name of Mrs. Charles McAdams. She worked as a bookkeeper in a tropical fish store—now she doesn't need to keep books for a "foreign" shop, she has her own.

For 10 years, not only has Charles been interested in fish for the sake of fish, but he is also a busy boy with various club activities. He is associated with the Greater Dayton Aquarium Society, the Lima Aquarium Society, and the Guppy Associates of Chicago. He has also been president of the Miami Valley Chapter of Ohio of the Guppy Associates. In addition, he is a member of the AGA and AKA (how did killies get in there?) and is on the Honors Committee of TIFAS, plus being a representative for CUSAC.

Tromping around to fish shows would be almost a total loss if one didn't also bring a few "friends" with which to enter. These "friends," who have a definite penchant for water, have won for

Photo: Eleanore Mass receiving a decorated bowl aquarium with cover and light, presented by the membership for her work on "The Informer."

Charles in 1963 alone, 23 trophies and 30 ribbons. In 1964 he placed 4th in the Guppy Man of the Year Contest. He isn't content, moreover, to just enter shows that he and Paul can reach easily either. The McAdams' guppies are world travelers. They have been shown in such spots as Berlin and Hawaii. In Berlin they won at least one trophy—obviously there is one strain of the McAdams' guppies that will have to learn to speak Deutsch. ◄

BOOK REVIEW

(Continued from Page 170)

treatment on a per plant basis, of any reference to aquarium plants in the English language. Each entry contains the plant's scientific name, date of original description plus the reference containing the original description, physical description, biology and cultivation and frequently some miscellaneous notes regarding identification and aquarium importation. Within the chapters, the plants are presented alphabetically by genus, then alphabetically by species, much in the manner of Roe. There is a short discussion of each genus before species are presented.

The information presented is quite fascinating. For example, Prof. de Wit states that the puckering of the leaves of *Cryptocoryne affinis* (= "*C. haerteliana*") can be repressed since it is dependent upon the amount of light, age of the leaf and depth of the water. He also mentions that previously plants of *Elodea canadensis* with male flowers were regarded as a separate species (shades of *Cynolebias bellottii*!). Apparently, only female plants are found in the aquarium, however. An interesting bit of information is that in Indonesia, water fern (*Ceratopterus*) is sometimes eaten, mixed with other vegetables! But the really important information as far as aquarists are concerned is

supplied as well. This book will answer many questions commonly posed by the hobbyist. It is not the perfect aquarium plant book by any means, but if you are really interested in aquarium plants, it is worth the money.

Readers frequently ask how to obtain books not published in this country. The answer is simple . . . contact your local book seller! He will obtain the books for you, leaving you free from correspondence, postage calculations, international money exchange, etc. This is how I obtained my copy of "Aquarium Plants" and I suggest that readers do likewise. Contrary to opinions held in some quarters, book sellers do not bite! On the contrary, they are anxious to serve you. ◄

Klee

(Continued from Page 183)

the Pachitea River, a hundred miles from the mountains. We lost altitude and started our approach. The final turn was right over the river, skimming but 200 feet over it. The old B-25 creaked and groaned as it settled down on the gravel strip. The wheels and propstream kicked up large chunks of rock, some of which hit the plane. One rock broke off a piece from one of the left propeller blades, and another cracked the copilot's windshield! But we were safely down in the jungle at last, our destination achieved. We didn't have to worry about flying in our old plane for two more weeks. Deus Miseratur!

The jungle air hit us with a choked feeling but it smelled wonderfully fragrant nevertheless. A reception committee was waiting for us as we got out. It consisted mainly of the wives of the non-Peruvians who lived in Tournavista, but also included Peruvian customs for we had much missionary cargo on board. We each grabbed a small handbag containing personal things and leaving Jon, Bill and Felix to argue with Customs, the rest of us piled into a truck and

drove to the communal dining hall. Here we had a good solid lunch consisting mostly of steak and papaya, but we mainly were interested in quaffing large quantities of iced tea and fruit juices! I don't think that we were ever able to quench our thirsts all the time we were in Peru!

After lunch we took a quick tour around the settlement. There were about 20 wooden houses for the non-Peruvian (mostly American) families plus general store, machine shop and lumber mill. A diesel generator supplied electricity to the settlement. Then there were about 40 or so thatched huts comprising what was known as the "Indian village," and here lived the Campa indians who worked in Tournavista. Finally, a school rounded out the complement of Tournavista's buildings. Tournavista is the headquarters of the El Tourneau del Peru Company, an American company with a mandate from the Peruvian government to develop 1,000,000 acres of jungle for future settlement. To date, the Company has worked on building a road across the Andes, linking Lima (the Capital of the country) with Pucallpa (the largest port on the Ucayali River, the major river of Peru), the latter some 60 miles from Tournavista. The Company is also working to establish a cattle ranch in the jungle and at present, has a 5,000 head herd. The elevation of Tournavista is 800 feet and the site was selected because of its healthful climate. However, it is isolated as we were soon to find out. ◄

(To Be Continued)

Masters

(Continued from Page 184)

Another two of the five basic substances of the cell are relatively new chemical names to most people but are rapidly becoming quite common in the

present fast-moving scientific age. They are deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). In a sense DNA is the beginning, or better basic, substance of all living things, guppies and man included. In oversimplified terms, it occurs in the genes of chromosomes within the germ cell. They occur in the chromosomes of all somatic cells too. They are the largest molecules within the cell and may well contain over a million atoms. It is this material which carries the heredity information of the living cell. DNA is the blueprint substance of the cell with all the plans for its activity and development. Indeed it carries the blueprints for the entire development of the body in the germ cell. The smaller units of which it is composed are known as nucleotides. RNA is much the same as DNA, being composed of nucleotides functioning in many ways within the cell but significantly it carries DNA information to the rest of the cell.

Lipids, substance number four of the cell, are fat-like molecules used to build membranes which are very necessary in cellular structure. Of course lipids also are stored in special fat cells and fat is used as a source of energy.

Molecules of carbohydrates, the fifth substance, are made up of sugars and allied compounds and are used to store energy as well as in the construction of cell walls.

In the drawing of the generalized cell, vacuoles are storage units which may contain food substances or waste materials. The mitochondrion contains most of the enzymes used in the production of energy. The nucleolus transmits RNA from the genes to the cytoplasm of the cell. Cell walls are generally hard outer coverings whereas cell membranes inside the wall are softer, being made up largely of lipids and proteins. Membranes surround the protoplasm of all cells. Cytoplasm is a name for protoplasm within the cell but outside the nucleus. Lysosomes contain digestive enzymes which break down the large molecules of proteins, fats, and nucleic acids into smaller products. The golgi apparatus contains fatty substances and is involved in the production of complex materials within the cell. Within the nucleus of the cell is the hereditary substance of the species, the DNA, genes, and chromosomes.

The chromosomes which are made up of a large number of DNA molecules linked together like beads on a string, direct operations of the cell from within the nucleus. DNA is the "planner," the "architect," whereas RNA is the "contractor" or the substance which carries out the plans. In any species there is a fixed number of chromosomes in the cell nucleus, always constant, and existing in pairs. Man has 21 pairs and guppies 23 pairs. It was the Japanese nat-

uralist *Iriki*, who first determined that guppies had 45 chromosomes. Chromosomes are believed by some to be the actual carriers of genes from one generation to the next. Credit for the first knowledge of chromosomes must be given to two men, *Theodor Boveri*, a German cytologist, and *Walter S. Sutton*, an American biologist, who independently, in 1903, published papers describing the role of chromosomes in heredity.

Outstanding recent studies have shown that DNA is able to reproduce itself while RNA within the entire cell lines up amino acids so as to produce molecules of proteins which are characteristic of the species. Certainly the process of sexual reproduction allows the combining of the physical substances which contain the hereditary blueprints and plans for the organism, including the guppy. It is in these substances that the records of individual traits are kept and which may result in a new variety. It is the DNA molecules, which contain the trait of an organism. One molecule may be solely responsible for pattern, or color, or size, and many would make up the entire hereditary blueprint for the offspring. Actually, the guppy is a giant compared with the infinitesimal speck which controls its destiny.

Some traits are passed on by two or more DNA molecules linked together and thereby inherited together. Also during the division of the cell, chromosomes may be broken apart and rejoined with the broken strands of others to cause gene crossovers so well known to students of heredity. A patient observer, over many years, could thereby determine the approximate positions of certain traits on the chromosomes of guppies. The exact mechanism of these processes is not too well understood so that there is still much left for the student of genetics.

The field of genetics was first opened

in 1865 by the Abbot Mendel in Europe at Brunn, later known as Czeckoslovakia, when he published the results of his garden experiments. For a while nothing came of it but eventually he was recognized as the father of genetics and his findings became required reading for biologists from that time on. Biologists have certainly extended his basic principles a long way since then and in the last generation tremendous strides have been made. It is now known that the range of possible combinations of genes is practically limitless by means of three basic functions: 1. Gene interdependence, 2. Group transfer, and 3. Crossover.

As stated previously, a single gene may be responsible for a single trait but often this is not entirely so. For example, it is possible that two genes may determine a single color, one supplying the color base and the other activating the color gene. In other words, it takes two to produce a color which is gene interdependence. A knowledge of this for guppies would be very helpful in selecting parents.

It is now known that genes are not passed on from generation to generation as individual units but rather as groups. When the chromosome is inherited, it carries with it many genes as a group. This is group transfer. Any one or more genes may be paired with other genes expressing another trait, as color with size. For example, certain characteristics exhibit themselves along with others during the breeding of guppies. The combination of gold coloring and small tails is well known. The author knows that it has been said many times before, but it is surely too bad that one can't tell very readily the characteristics carried by the genes of the female guppy.

The function of crossover was mentioned previously in which there is a reduction division cutting in half the

number of chromosomes within the cell nucleus. During this division, chromosomes coil around each other, break and rejoin, sometimes with different partners so that the combination of resulting variations may be astronomical. Gold guppies with huge flowing tails is a rare example which breeds true after careful inbreeding of the variety.

With these functions operating constantly as guppies breed, it is easy to understand how genetic varieties would occur in a species. Man can be quite successful then, through the careful selecting of desirable varieties and crossbreeding them with others having similar different variations, in the creating of new guppies.

Actually, nature has always used this method of "weeding out the unfit" or "survival of the fittest" by permitting only those animals and plants best adjusted to their environment to survive and the poorly adapted ones to become extinct. Farmers aren't taking chances that the best meat-type hogs will evolve by this "natural selection" so they are actively carrying out on-the-farm research to get the best meat-type animal possible. Here work is aimed at developing strains that exhibit significant superiority. Careful records are kept and each characteristic is recorded and analyzed.

This is the type of thing guppy breeders should do more of. It is neither complicated nor technical. He should write down a description of the kind of fish he would like to have and then select and breed toward that goal, always choosing generation after generation (remember patience!) the fish best approaching the goal and rejecting all others. A casual glance in a tank full of guppies may indicate that all are alike but actually no two fish are the same. Some variations are present in all — some may be great — some small. Pick out the fish having the desirable trait and breed it to the mother

so as to fix that particular strain. Breeding several generations of this trait will establish it more surely. Keep records! Do not trust to memory! ◄

★ IDEAS ★

BY HOBBYISTS

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

Argyrol for Eye Fungus

One of the first diseases we came in contact with as beginning aquarists was eye fungus. We had noticed an opaqueness similar to a cataract on one of our silver dollar's eyes and this became more thick and cottony until we finally realized what was wrong. When our pharmacist warned us of the dangers in using silver nitrate we decided to experiment. At his suggestion, we bought a 10% solution of Argyrol, which is a mild silver protein used in newborn babies' eyes. Twice a day we netted the silver dollar and put a few drops of Argyrol directly on the infected eye, just enough to completely color it with the solution. After letting it set about 10 seconds, we dropped the fish back in his aquarium. We could see some improvement the second day and his recovery after that was quite rapid. We continued treatment until the eye was completely clear. Since then we've used Argyrol on fin rot with dramatic results. We also use it as a preventative on wounded fish, and it prevents fungus from forming on sores. In all cases, we find we have much better results with netting the fish and applying the Argyrol directly to the infected area rather than putting it in the aquarium. It has no detrimental affect on plants, etc., but doesn't work well when so drastically diluted. — *Mrs. K. Bauer, Omaha, Nebraska.* ◄

PRODUCT NEWS

New Fishfood Products

Two new food products for freshwater tropical fish fry are now available from TetraKraftWerke, the internationally known West German formulator of fish foods.

According to Maurice Rakowicz, president of Kordon Corporation, U. S. repre-

sentative of the TetraKraftWerke line, both are in tiny powder-flake form. Baby fish eat this new product with the same enthusiasm as adult fish eat other Tetra-Kraft foods.

Baby Fish Food "L" is for livebearers and Baby Fish Food "E" for egglayers, he said. Rakowicz described them as scientifically formulated by the West German processor from fish food ingredients, high in guaranteed protein analysis. The new products are designed to promote the rapid growth of first fry, and each is packed in a half-ounce, unbreakable plastic can. ◄

PRODUCT NEWS

New Conde Pump

In answer to the demand for a top quality, dependable, long-lasting aquarium pump for the hobbyist and small pet shop, Conde announces the newest addition to their quality line of Dri-Air Pumps —the Model O.

Designed to supply ample air for multiple installation of 5 gal. to 26 gal. size tanks, the Model O Pump has the superior construction features of Conde's larger pumps.

Long life and quiet operation are assured by interior surfaces that are ground to low micro finish plus carbon rotor and vanes. There are no pistons, no diaphragms, no oil. The pump is designed to be easily serviced in the field. Anyone can replace all renewable pump parts in 2 minutes with only a screwdriver. Unique filters furnished on intake and exhaust connections. Cushion mounted unit has 1/20 h.p. motor direct-connected to pump rotor. Motor is Sea-Mist Green finish. Pump is highly polished metal. Heavy duty cord 6 ft. long with 3-prong plug and adapter are furnished. Motor well grounded. Complete unit is 4½" x 5" x ¾" and weighs approx. 7 lbs. ◄

CLUB NEWS

Aquarium Society of Eastern Connecticut, Inc.

The A.S.E.C. presented its 14th Annual Competitive Exotic Fish Show on Saturday and Sunday, March 27 and 28, Ocean Beach Park, New London, Conn., according to Mrs. Andre Bouchard, show secretary. The show, open to the public, drew most worthwhile crowds. In 1964, the show hosted some 12,000 persons, Mrs. Bouchard said.

Join the S.F.A.S.

Aqua ★ Quotes

By Albert J. Klee

1. *Dirt automatically expands to fill the size of the filter alloted to the aquarium.*
2. *If anything can go wrong in the aquarium, it will.*
3. *Nothing in this hobby is ever as simple as it seems.*
4. *If one aquarium is good, two must be twice as good.*
5. *Everything in the hobby costs more money than you have.*
6. *If you can name a fish disease, then you know what it is.*
7. *If you fool around with a tank long enough, it will eventually break.*
8. *If you try to please every fish in the tank at feeding time, someone is not going to like it.*
9. *If everything is going well in your aquarium society, you are probably overlooking something.*
10. *It is a fundamental law of aquarium experimentation that nothing ever quite works out.*
11. *It is easier to get into the hobby than it is to get out of it.*
12. *If you explain something so clearly that no hobbyist can misunderstand, someone will.*
13. *Whatever you want to do in your fishroom, you have to do something else first.*

—Reprinted from the Tropical Breeze

★ IDEAS ★
BY HOBBYISTS

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"Darling, I accidentally mixed the virgin females with the young male guppies today...I hope you're not angry..."

Fish on the Rocks

Most aquarists face the problem of having their tanks overheat. I have found a successful way to take the temperature down without changing the water, or letting the fish and plants cook. Fill plastic food bags with ice cubes, tie their tops and put the bags in the aquarium. This cools the tank without adding any excess water to the tank. This idea works very well for me. — *John Slater, Oakland, California.* ◄

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.*

"Living Fishes," 16mm color sound film. The SCIENCE IN ACTION cameras visit the exotic fishes in the Steinhart Aquarium. A 21-minute tour of the colorful and fascinating underwater inhabitants, conducted by Dr. Earl S. Herald, SCIENCE IN ACTION program host and curator of the Aquarium. Rental: $15.00. For information: Television and Motion Picture Department, California Academy of Sciences, Golden Gate Park, San Francisco 18, Calif.

"Corydoras Genus," includes color slide set of 15 species and a section on breeding Aneas. 53 slides together with a tape recording of the manuscript. Also a written manuscript is included to indicate when to change slide. Rental $10.00. For information: Earle Hamilton, Box 427, Route 1, Lansing, Michigan.

"Sea of Cortez," 16mm color sound film. Members of a scientific expedition explore the beautiful underwater kingdom of the Gulf of California. This SCIENCE IN ACTION program offers a rare glimpse of the marine life in the waters first sailed by Cortez four centuries ago. Dr. Earl S. Herald is host and narrator. 21 minutes. Rental: $15.00. For information: Television and Motion Picture Dept., California Academy of Sciences, Golden Gate Park, San Francisco 18, Calif.

"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.

★ IDEAS ★

BY HOBBYISTS

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Checking Fungus

I have found a very easy way of checking my fish for ich, fungus, or any other external disease, and that is by turning off all the lights in the room, including the tank light (at night of course), and shining a flashlight into the tank from the front. Any fungus or anything on the bodies of the fish shows up plainly, enabling me to treat any disease in its early stages. I also find this very helpful when trying to catch baby fish, as I can spot them and net them before my angelfish make a meal out of them. It may be imagination, but it looks to me as though some of the fish, especially the zebras enjoy swimming back and forth through the rays from the flashlight. I enjoy watching them, and shine the light in the tank just to watch them frolic in its beam. — *Bruce Lingley, Somerset, Mass.* ◄

CLUB NEWS

Devon Aquarium Society

The D.A.S. hosted a meeting of the Northeast Council of Aquarium Societies, Inc., on March 7, in West Haven, Conn., accorping to Beverly Jorgensen, corresponding secretary.

"Parasites of Freshwater Fish," is a 60-slide (35mm) program with written commentary. Rental: $6.00, postage-paid. For information, write: Fred Howard, Aqua Engineers, Box 1, Ortonville, Michigan; or Box 97, St. Basile le Grand, Quebec, Canada.

Letters to The Journal

From: Kitten Correa
Pacifica, California

I know that some metals, aluminum, copper, brass and iron, are harmful to fishes if the metal is allowed to remain in the water for any legnth of time. Here are some questions in this regard.

1. I like to use large, decorative rocks in "seascaping" my aquaria. Would it not be equally as harmful to allow a rock which contained the raw elements of these metals to remain in the water?
2. Would they cause the same reactions or is the damage done only when there is actual corrosion?
3. Is it possible that some rocks, if left for a long time, would result in harmful pH changes?
4. What method may I use to learn if the gravel I use has a high concentrate of lime? The water in my tanks is extremely hard and there are no shells of any kind present. Partial changes of water bring only a temporary correction.

Thank you very much for any information you can give me.

REPLY: 1. Yes, harm can result, especially from rocks containing copper and zinc ores. However, many rocks have some iron compounds in them and are completely harmless. Also aluminum in various forms is common in clay and rocks and is harmless in this state. Brass of course is an alloy of copper and zinc and perhaps some other metals, for example bronze contains about 87 percent copper, 8 percent tin, 4 percent lead and 1 percent zinc. Brass and bronze are extremely dangerous to fishes but do not occur "native in rocks." In general, ore containing rocks should be left out of the aquarium. Limestone rocks are fine for fishes that can take or need hard water. However, I prefer rocks of a granite or quartz nature. Jasper is usually very fine and in Marin County, California, there occurs a bright red jasper that is harmless and makes a very fine accent rock. It is possible to find native rocks of many colors suitable for the aquarium but they should be tested on cheap plants and fish in a small aquarium first. 2. Any time that metallic ions of harmful metals such as copper enter the water, whether by corrosion, or simple dissolving (as dissolving copper sulfate), your fishes and plants are in danger. Any ore-bearing rock that "gives up" poisonous metallic ions to solution is dangerous. 3. Some rocks, for example limestone or dolomite, can alter the pH. Limestone is a fine buffer and its role and that of carbon dioxide is of extreme importance in maintaining a stable pH in most natural waters. In the aquarium, it can be harmful to fishes that came from acid environments, where limestone is absent. However, it is not harmful to many fishes. Quartz and granite affect the pH very little, allowing you to control the pH in your aquarium very easily. A limestone rock (or piece of concrete also) will control the pH in your aquarium for you, and indeed you will not be able to "acidify" a tank containing these materials for very long. 4. Of course limestone ("lime") in addition to producing an alkaline pH does "harden" the water. To test for the presence of limestone, or broken mollusk (snail) shells, take a half and half mixture of hydrochloric acid and water and pour over your sand that is in a glass container. Be extremely careful with hydrochloric acid, it emits strong vapors and is extremely corrosive, causing severe burns. If the sand bubbles, there are limestone or hardness producing substances present. These may be

removed by allowing the hydrochloric acid to work until no more bubbles are produced by a fresh solution of acid and water. Rinse the sand several times in fresh water before using in an aquarium.

* * *

From: John La Plante
5104 E. Grant
Vancouver, Washington

I am interested in buying a couple of really nice guppies. I have looked in all of the pet stores and aquariums in the area, but have not been able to find any really nice ones. Do any of your readers have any for sale? If so, would they please contact me at this address?

* * *

From: K. De Neise
San Jose, California

We have had a successful spawning of *Brachygobius xanthonozus*, bumble bee fish. I have recorded data on my fish for some time now and our tropical fish dealer, Mr. and Mrs. William Foote of Bangkok Aquarium, tell us this is a rare experience. In pouring through many, many fish books, I cannot find any information on these fishes. We are hoping other fish fanciers may be interested. May we hear from you soon?

REPLY: Brachygobius nunus, *as they apparently should be called, have spawned many times; the rare event is to raise the young. This was first done many years ago by a San Francisco Aquarium Society member and past president, Frank Janov. Bumble bee fish are gobies and all gobies are hard to rear in aquaria. The young are very tiny and require very fine live food. Some people claim success with green water but I have had no experience with this. I have raised a few young in a "dirty" tank. This is a tank without snails, full of plants, receiving about 4 hours of sunlight a day and fed to the point of growth of micro-organisms but not fouling up the water. This is a "delicate" balance to hit, requires some experience and is best done in a large (at least 25 gallon) tank.*

* * *

From: Paul L. Flynn, Jr.
New York, N. Y.

In regard to your story of May 1962 in the Journal I am interested in knowing what thickness of GLASS you would use for the following dimensions – 46" long x 22" high x 26" wide x 1½° x 1½ x 3/16" thick angle iron. Could you please let me know what you think about this? I would appreciate your opinion.

Answered by
Albert J. Klee

In general, I cannot recommend ¼" plate glass for anything over 18" unsupported height. For example, one tank I built was 22" high x 6 feet long x 26" wide. However, 2" angle iron was used so the 22" height really had an unsupported height of 18". Consequently, ¼" plate was used.

In you case, the unsupported height is 22" less twice 1½" or 19", and I will not recommend ¼" plate. You may very well get away with ¼" plate but don't say I told you to do so! The size I would recommend, is 3/8" plate. Better still, if you haven't fabricated the frame yet, try 2" angle rather than 1½". Then you can safely use ¼" glass. I would also use a 1" thick piece of plywood underneath the tank to provide overall support, to absorb stresses and to prevent leaking due to a non-flat support surface.

Hope this helps! ◄