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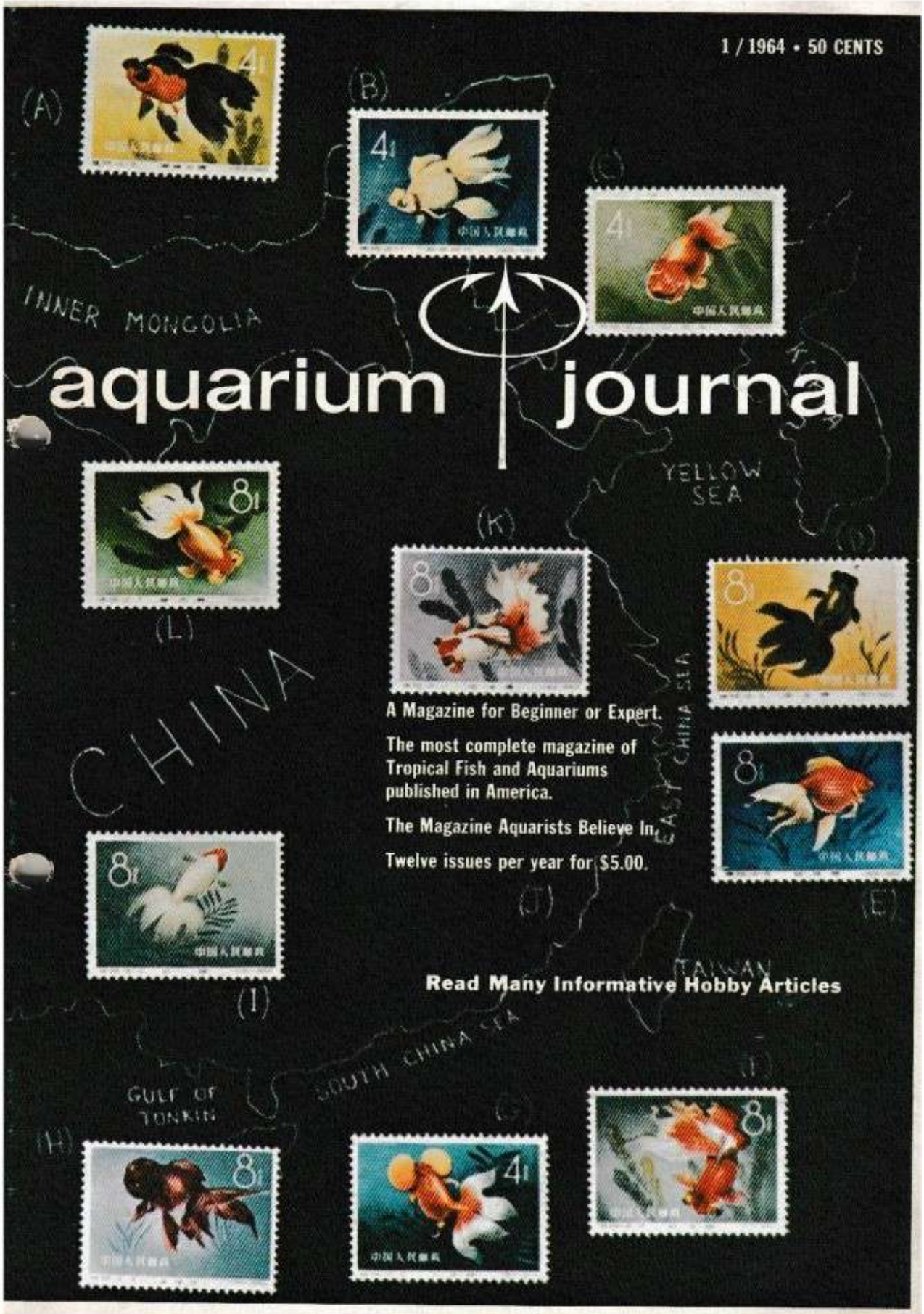

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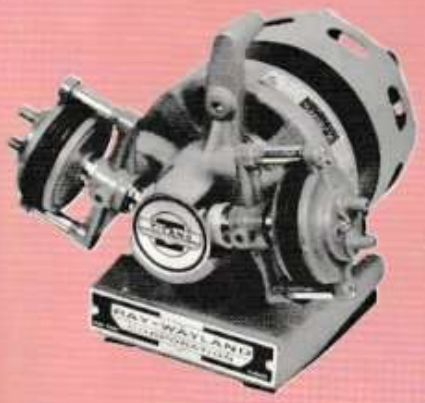

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contents

cover photograph

An issue of stamps from the Chinese mainland, shown in the background, highlighting goldfish in their natural colors. For more information about fishes and stamps, see the article by Dr. George Wistreich and Renee Wistreich beginning on Page 19 of this issue. Cover photograph by Dr. Wistreich.

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Greenberg's Everglades

Diane Schofield
Burbank, California

I'VE VISITED a lot of fish farms and frankly most of them are quite ugly. They are utilitarian, functional and not beautiful. However, when I first saw the Everglades Hatchery of Mr. Albert Greenberg at Eureka Springs, Tampa, Florida, I couldn't believe my eyes. Here was a farm of such tropical beauty that I was deeply impressed.

This love affair with nature at Eureka Springs is an inherited one, passed down in a family of nature lovers and culminating in 79 acres of natural "rainforest" and jungle. Forty nine of these belong to Mr. Greenberg and the remaining 30 are those of his firm, Everglades Aquatic Nurseries, Inc.

Not only does Mr. Greenberg have a lovely home in this area, snuggled beneath the verdant growth of Florida flora, but he also has a charming little guest house placed just a short distance away under an enormous old "grand-

Photo: Typical lush scenery at Eureka Springs near Tampa, Florida, site of the Everglades Aquatic Nurseries. All photographs in article by the author.

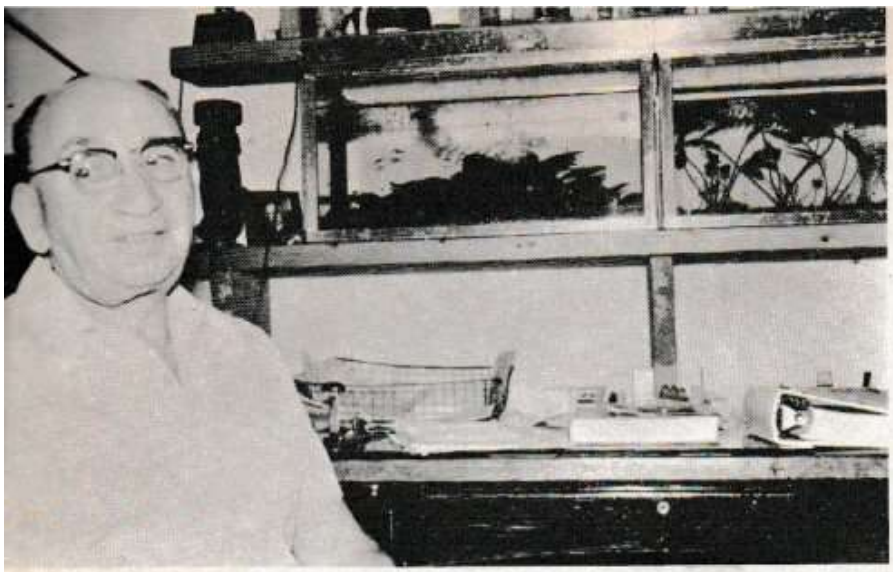


Photo: The owner of Everglades Aquatic Nurseries, Albert Greenberg, naturalist, world-traveler and aquarist extraordinary.

father" oak tree with a long flowing beard of Spanish Moss. This little pink and white guest house is modern and new and the guest book reads like a roster of all of the important names of the aquarium world.

Behind Mr. Greenberg's own house is a quiet pool that he calls his "Souvenir Pool." Into this pool goes from time to time the fish that he has brought back from his many collecting trips to all parts of the world. A seining of this pond would turn up some very interesting specimens, no doubt.

A more ideal place, in one way, couldn't be imagined for a hatchery, as the springs from which Eureka Springs takes its name flow at a temperature of 72° to 76° F. out into his rearing ponds. However in this area, every 7 to 10 years, there is hard freezing winter which sometimes deals death to both the fish and the exotic land and aquatic plants. The last such freeze came in the winter of 1962 and the heart-breaking evidences were all over Eureka Springs — the brown shriveled corpses of orchids still clinging to the branches, the upright carcasses of plants and trunks of trees. Even though the Eureka Springs properties were magnificent in the summer of 1963 when I visited them, they must have been even more gorgeous before the killing frost paid them a visit six months before. Not only were some of the terrestrial plants killed, but Mr. Greenberg also suffered losses of some of his vast collection of rare aquatic plants as well.

Spotted through these 79 acres are hundreds of pools which have been draglined out of the soil to be filled by the fine spring water. In these pools are the various live-bearers which are raised to maturity before being taken into another of the Everglades' establishments. This is the conditioning, holding and shipping department in Tampa proper.

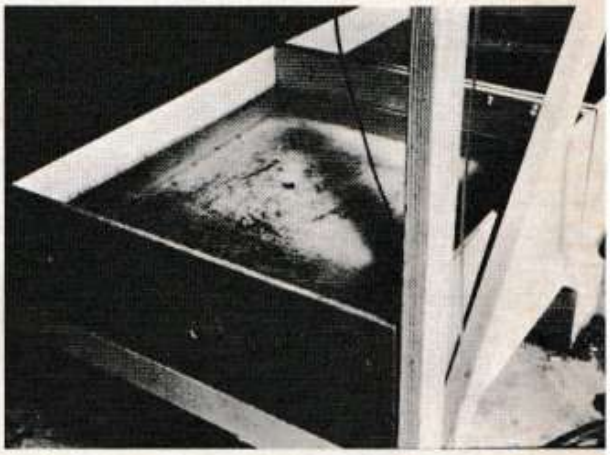
The theme song of the Tampa place could well be, "Am I Blue?" Not that anybody is unhappy there, for the aver-

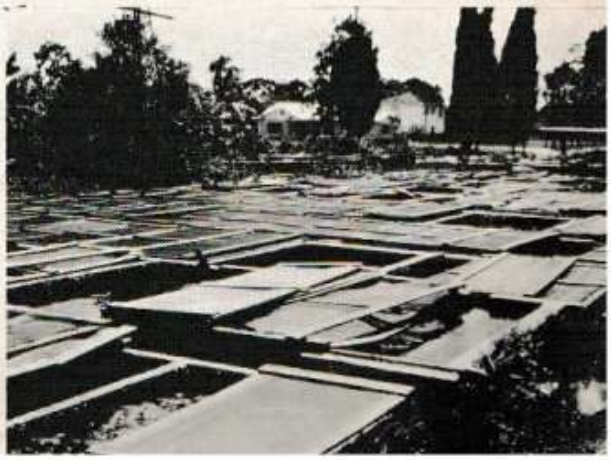
Photo: Roy Bast, breeder at Eureka Springs for 25 years.

age length of service of his employees is quite long. Most of his helpers have been with him from 18 to 30 years. Some of them have worked for no one else as they came to Everglades Aquatic Nurseries right out of school. The "blue" theme refers to the tanks that hold the fish that have been brought in from the Eureka Springs hatchery. The livebearers are put into an almost midnight blue solution of methylene blue and are conditioned there for approximately 10 days. There are two reasons for this. One is that a certain amount of bumps and bruises might be accumulated accidentally when the fish are caught from the large ponds and if any of their protective slime is disturbed, the methylene blue prohibits any bacteria or fungus from making any inroads. The second reason is that the fish can't see so well in this deep blue water and hence are more docile and easily acclimated in their change from the large area of the ponds to the much smaller confinement of the aquariums. With these careful precautions, only 5% of the fishes don't make the grade.

Probably the other essential material that is found to be indispensable there is Spanish moss, not true moss—a relative of the pineapple. Not only does it beautify everything at Eureka Springs with its long curling hair-like tendrils but it also serves two other utilitarian purposes as well. The first is that it is used in its dried form as a spawning medium for some of the egglayers and the other is that it is spread over screens to shield both fish and plants from the often severe rays of the Florida sun.

After being spawned in smaller tanks, the egglayers are either kept inside in 100-gallon tanks made of marine plywood, or else they are put outside in one





Photos: (Top) D. W. Jennings, manager of the plant department, Mr. Greenberg and John Gallo, manager of the fish department. **(2nd)** One of the marine plywood tanks used for rearing tropical fishes. **(3rd)** A gathering of the Greenberg employees — one big happy family. **(4th)** A small section of the outdoor hatcheries at Everglades.

Photo: Manuel Barrios, responsible for collecting fish and placing containers for shipping.

Photo: Large lush Lace plant held for camera by Mr. Greenberg. They grow big at Everglades!

of the 3 to 6 hundred gallon cement tanks to finish growing. Everglades is unique – it is the only hatchery to grow plants and fish together. Mr. Greenberg believes, and with good reason that the detritus is a beneficial natural fertilizer for the plants. To see the lush growth of all of his plants is enough to make an avid fancier green with envy.

Of the deceptively filmy Madagascar lace plant, Mr. Greenberg grows six separate varieties or forms. Some of these types were accumulated on a collecting trip to Madagascar through the help of one of the governors of Madagascar himself. As a planting medium for these lace plants, Mr. Greenberg uses first a layer of peat moss and then this is covered with a layer of silaceous sand.

An interesting new development that is currently being tried at Everglades is a cross between the *Aponogeton ulvaceus* and the *Aponogeton fenestralis*. The leaves of the resulting plant have all of the irregular "windows" that the old familiar lace plant had, but these openings do not go clear through. Some of this development was helped along by a lad from the Osaka area of Japan, Tetsuji Obata, who worked with Mr. Greenberg at one time. After hearing his praises sung while I was back there and feeling as if I almost knew him, a few weeks after I returned home I paid a visit to J & M Enterprises which is only about two blocks from my home. A Japanese boy waited on me with a name tag pinned onto his shirt which said "Obata." A little questioning brought out that sure enough, it was Mr. Greenberg's Obata and he was out here attending U.C.L.A. to earn his degree.

Of course, stately as they are, and admitedly the "Cadillac" of aquarium plants, the lace plants are only a small portion of the gigantic assortment of plants at Everglades. The Cryptocorynes account for a large percentage, *C. ciliata*

Photo: Part of the tropical paradise that is the Everglades Aquatic Nurseries.

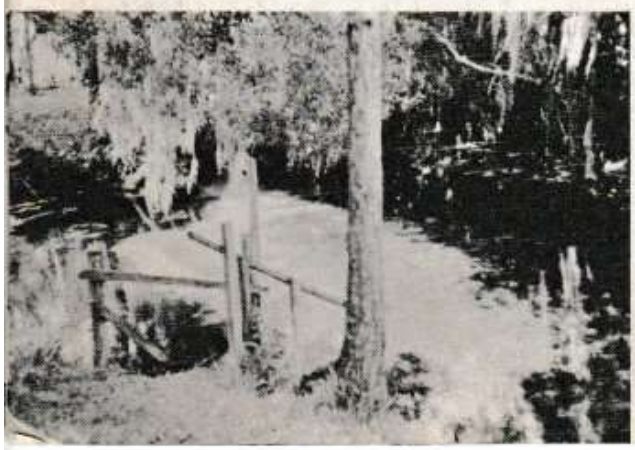


Photo: An indoor shot showing some of the large cement tanks used.

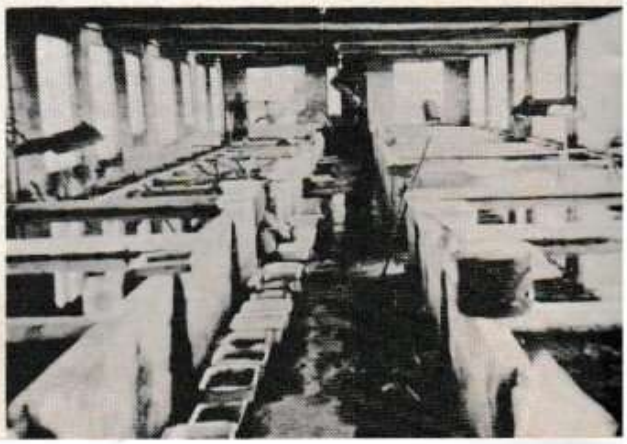


Photo: Joe Opp and Donnie Jennings sorting plants prior to shipping from Florida.

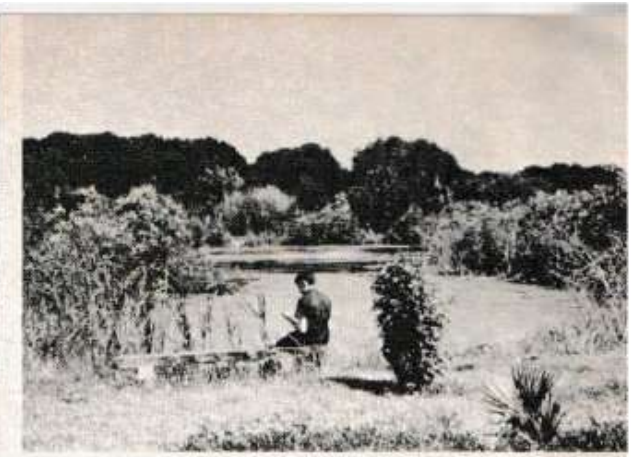


Photo: "Souvenir" pond of Mr. Greenberg's as discussed in the article.

minor, C. ciliata major, C. Griffithii, C. longicauda, C. Willisii, C. cordata, C. Hartelliana, C. Becketti, C. undulata, and *C. Somphongsi.* Where they end, the sword plants begin – wide or narrow leaf Amazon swords, dwarf chain swords, ruffled sword, and melon sword. Even this but scratches the surface of all of the plant species and varieties grown at Everglades.

As with all people who are dedicated to their work, Mr. Greenberg's penchant for fish and plants started early. At an age of 6 or 7 he was walking 10 miles to get two fishes for 5 cents. Before long fishes were on the dresser, on the bed, on the chandelier and in the bathtub, but naturally on Saturday night they had to get "bumped" from this last location.

It was a disappointment to his parents that he was so inclined for they felt that he should follow the profession of a doctor, lawyer or violinist, but with a green thumbed grandmother, plus an uncle who had a large ornamental plant nursery, it shouldn't have seemed too strange that Albert had a definite penchant for living things.

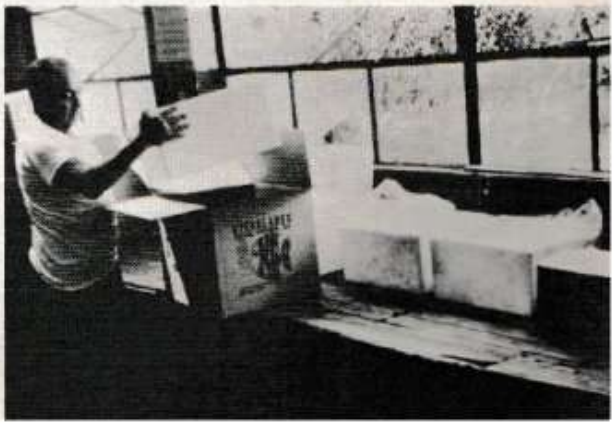
Even when he entered the Navy in the first World War at 17, and spent three years in Japan, China, and other places, he put some of this time to good advantage by gathering wild medakas and paradise fish.

After spending 12 years as a traveling man for a chemical concern, he turned to fishes and plants, and for the last 32 years he has been living his ideal life.

Although obviously his own little special area of Florida holds the greatest attraction for him, Mr. Greenberg has frequently been out and away on many collecting trips – to Mexico, Honduras, Costa Rica, Cuba, South Africa, Madagascar and Mozambique. His collection of plant and fish life at Eureka Springs is worth seeing and should be a must for any aquarist traveling to Florida. ◄

Photo: Bright and shiny guesthouse used by some of the greats in the aquarium world at Everglades.

Photo: William Mateo has toiled happily for a quarter of a century at Everglades, mostly in shipping.



THE NUMBER of articles and books written to introduce the beginner to the hobby of aquarium keeping is, to say the least, massive. The number written for the advanced fish breeder is, if anything, greater. Among this miscellany of advice and information, there is little or nothing for those of us who decide to take up the hobby again, after a prolonged absence.

James McM. Ure
Glasgow, Scotland

For those of you who want to take up the hobby again after a long absence

A New Beginning!

We feel, rightly perhaps, that beginners' books are rather beneath our dignity, but we are for the time being not ready to progress to advanced breeding techniques and the keeping of rare fishes which are of greatest interest to the experienced aquarist. Having just passed through this stage myself, I feel I am qualified to pass on a few tips to those of you who have decided to take an active interest in tropical fishes again.

When you unearth your tanks from under the rubbish accumulated over the years, do not immediately set them up in your best room. They are almost bound to leak – one of my friends set up a beautiful 30-gallon tank in his bedroom on the second floor, and awoke in the morning to find himself in the center of a miniature lake. He was lucky – only about half the water in the tank had escaped. I know of another person who had the bottom of his 60-gallon tank shatter under the weight of the water. Unfortunately, this is always a danger with an old tank. Old glass that has scratches or other flaws should be replaced. Inspect old glass carefully.

Old iron framed tanks should be carefully examined for traces of rust, before being filled. A fresh coat of paint should be given anyway, and even if it is reputed to be non-toxic, it should be carefully applied, so as to have as little as possible in contact with the water. When the paint has dried, the tank should be filled and emptied a few times over the course of about a week, to make sure there are no toxic chemicals present in it, and to check for leaks. Paint should never, under any circumstances, be used to repair leaks. If the tank leaks, remove the glass, replace the old aquarium cement with fresh, seal the glass down again, and half-fill the tank with water. Try not to leave any pockets of air between the aquarium cement and the glass, as they tend to dry it out, and can cause leaks. Be very careful never to allow glass to lie on glass, without a buffer of aquarium cement, if you want a reasonable life from your tank.

Before placing the old sand in the tank, it should be given a very thorough washing. It is not particularly expensive, and it is far better simply to buy new.

Having done all this, you can now set up your tank. You will probably find that your first attempt at a balanced display of plants will be rather awry,

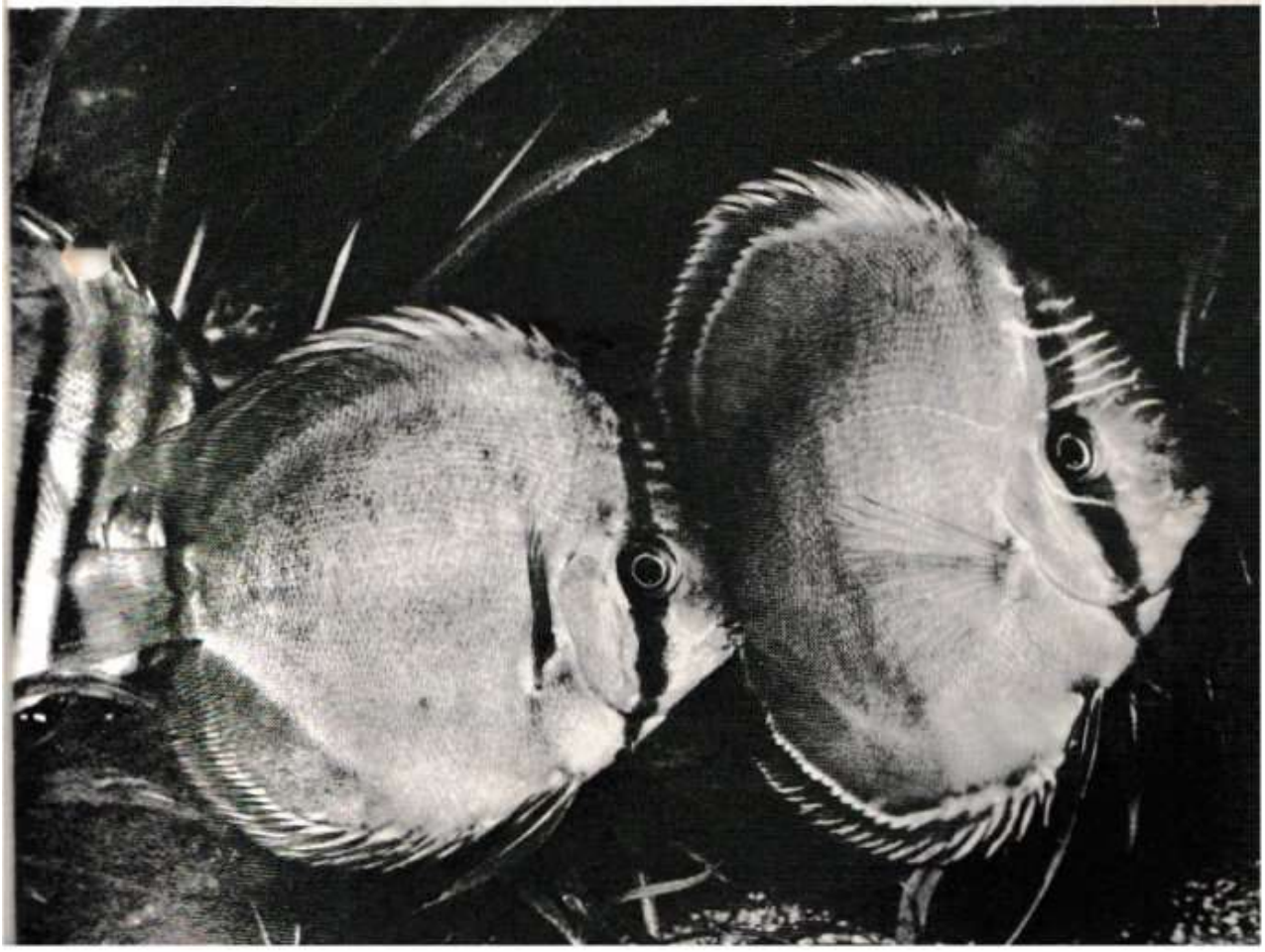
but with practice, you will soon find your old skill returning. Don't overdo the plants. Remember that you are setting up a new tank, and you do not want your plants to starve through lack of nourishment owing to the absence of fish to provide essential nutrients. If you have the patience (I didn't) it is far better to put in a layer of soil under the gravel, and allow the plants time to take root and grow, since this will give you healthier plans. [*Editor's note: This is a debatable thing to do. Soil, when used should not be of rich organic content or your tank will rapidly become foul. Clay soils are often best.*]

Before you put your fishes in, *please* check your heater and thermostat carefully. It may have worked alright when you put it away, but that was a long time ago, and it is almost certainly in need of adjustment now. Make sure you know the temperature range of the species you intend to keep, and change the setting of the thermostat accordingly.

The old dried food you found lying beside your tank may look alright, but don't use it. Its food value will be very much reduced after a long period of time, especially if it was in a junk room or garage, where it would be liable to experience extremes of temperatures and humidity. Buy new food; it will be better for your fishes. Finally, don't forget that all fishes like an occasional change of diet, such as brine shrimp. Species that are largely herbivorous will be far healthier if they are fed a little green food now and again.

The problems of running a tank, and keeping its inmates healthy is fairly simple. Having been through it all before, you should have little or no difficulty in making things run smoothly. The only fault likely to worry you is lighting – beginners tend to have their

Photo: Symphysodon discus, as photographed by Lawrence E. Perkins, F.Z.S., at the London Aquarium in England.



tanks almost floodlit, but hobbyists starting up again seem to have almost a pathological fear of giving the tank too much light, bathing in a perpetual twilight. Try to think of the natural light your fish would get in the wild, and you won't go far wrong.

The final thing to remember – BUY A GOOD MAGAZINE. It will enable you to progress with your hobby far more quickly, and will keep you in touch with the latest developments. This advice is aimed at those of you who have borrowed your copy of the *Aquarium Journal*, or who are reading it in a library. By subscribing yourself, you build up a file of information which is there for permanent reference. This is half the battle towards becoming a proficient hobbyist. ◄

Lower Water Level

When breeding danios, bettas and many other species, the water level should be lower than normal. This can be a problem, since thermostatically controlled heaters, should have water to within one inch of their top. Here's one solution: Stand a quart Mason-type jar in the tank. This can be filled and the heater placed in it. – *Fraser G. Tulk, Brooklyn, N.Y.*

° ° °

Fish Snack

This is not news, but one half of a well rinsed, cooked, and cleaned canned shrimp hung in the tank on a piece of string makes a welcome treat. It should be removed as soon as the fish loses interest in it. A piece of raw beef heart or steak can be substituted. – *R. C. Forsyth, Rochester, N.Y.*

AQUARAMA

By James A. Mason

How to Hatch Brine Shrimp Eggs

THIS ARTICLE refers only to brine shrimp eggs which are collected and processed by Brine Shrimp Sales Co., Inc., contractors for The San Francisco Aquarium Society.

The following will help overcome some of the problems which may occur when any of the standard hatching methods are used.

Low percentage of live shrimp obtained from eggs:

A. The eggs collected and processed during the 1962 and 1963 season have a delayed hatch-time. A portion of the eggs used will hatch in 24 hours, the majority in 36 and the balance within 48 hours. Therefore, if you have experienced a low yield let your hatch time run at least 48 hours.

B. *Water* – There are many variables that may occur with your water and in turn affect your hatch. Some of the most important are:

1. *Temperature* – should be 80° F. Colder temperatures will delay the hatching. Temperatures above this will reduce the oxygen content too much.

2. *Salinity* – If you have a hydrometer which is calibrated in specific gravity, the best reading would be 1.025 (approximately the same salinity as natural sea water). If your hydrometer is calibrated in per cent of saturation, your reading should be 13% sat. If you do not have a hydrometer available, the following mixture of water and table salt may be used.

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In order to **make five gallons** of salt water solution any one of the following amounts of salt may be added to give the proper salinity:

45 tablespons, or
20 ounces liquid measure or 2½ cups, or
500 cubic centimeters, or
26¼ ounces net weight
} + 5 Gallons Water = 13% saturation

EXAMPLE:
5 gals. of water + 2½ cups of salt = 13% saturation
5 gals. water + 26¼ oz. net wt. salt = 13% saturation

In order to make **one gallon** of salt water solution any one of the following amounts of salt may be added to attain the correct salinity:

9 tablespoons, or
4 ounces liquid measure, or ½ cup, or
114 cubic centimeters, or
5¼ ounces net weight
} + 1 Gallon Water = 13% saturation

EXAMPLE:
1 gal. water + 9 tablespoons of salt = 13% saturation
1 gallon of water + ½ cup of salt = 13% saturation

If a lower salinity than recommended is used the brine shrimp will hatch faster but may not live very long.

If a higher salinity than suggested is needed, it will slow down the hatching procedure.

3. *Aged Water* – We do not recommend the use of aquarium water in making the brine solution. If you mix a large quantity of brine solution in advance of its actual use, do not let it get too old. We do not let our water go past 3 weeks. Also be sure not to allow dust to collect on the surface of your brine solution. The dust will not allow the eggs to spread evenly over the surface of the water when the hatching tray method is used.

C. *Too Many Eggs:* It is very important not to use too many eggs. The shrimp may hatch but will die for lack of oxygen if they are too crowded. The newly-hatched nauplii are very susceptible to accumulate CO_2 even though there may be a sufficient O_2 concentration available to their environment. In a crowded condition a carbon dioxide buildup can kill the nauplii. This is especially true when the tray method is used. For this method we recommend ¼ to ½ teaspoon of eggs per one quart of brine water.

D. *Old Artemia Eggs:* Artemia eggs will remain in good condition for many years provided they are in a closed container where moisture and insects cannot destroy them. We positively do not recommend storing brine shrimp eggs in a "fish room." The humidity is much too high. Any contact with water or moisture will start the hatching procedure.

In closing we would like to point out that no matter what container size is used to package brine shrimp eggs—vials, half-pints, quarts or gallons – the same standard of quality is maintained.

The quality of the eggs is based on a minimum yield of 3½cc of live shrimp per ¼ teaspoon of eggs, hatched over a maximum period of 48 hours. ◄

° ° °

Clogged Filters

Is your outside filter still acting sluggish even though it is clean and sufficient air is available? Poke a piece of wire through the point where the air bubbles enter the water return. Often a calcium deposit will build up here and slowly choke off the air supply until it is completely blocked. This is also one of the reasons why an airstone becomes useless after a number of months. Calcium and other minerals build up and block the tiny air passages. Sometimes bacteria will clog them too. They can often be cleaned with a mild acid such as acetic acid or dilute hydrochloric acid. – *R. C. Forsyth, Rochester, N.Y.*

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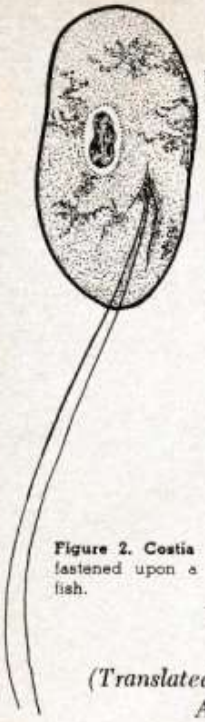

Figure 1. Costia necatrix in swimming position. (After Schaperclaus)

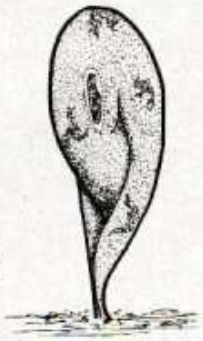

Figure 2. Costia fastened upon a fish.

Skin of tropical fish — most sensitive, yet resistant area

Dermal Destruction

Alex Bartsch
Berlin, Germany

(Translated from the German by Albert J. Klee)

ONE OF THE MOST sensitive yet at the same time most resistant of all the organs of a fish, is its skin. Sensitive because it is easily damaged . . . resistant because in spite of extensive damage, it rebuilds itself within a comparatively short time. In the skin we find numerous mucous cells, giving to the fish its well-known "slippery" characteristic. These cells are noted in great quantities, especially in those fishes having either few or no scales.

Mucous cells originate in the generating layer of the epidermis in the vicinity of the basal membrane. They provide the surface of the skin with a mucous coating which wears well. True, the outer layer of mucous is worn off by the relentless rubbing of water against the skin, but new material is provided to replace the worn layer. Through this constant casting-off process, bacteria and external parasites are removed as well.

Often, however, the necessity for new mucous cells exceeds the capability to provide them. The cells are then quickly used up and the surface of the skin lays exposed. These are times when fish are especially susceptible to external parasites. We find a varied assortment of different animals (and even plants) which lay claim as skin parasites of fishes. Among the most dangerous skin parasites are representatives of the Protozia; some of them causing great destruction even in limited numbers. This group also contains the "milieu" parasite which takes its toll only when concentrated in numbers on a restricted area of an already-weakened host. Both types are found in numbers in aquaria. In unclean tanks containing decaying food and plant debris, with improper nutrition adding to the general debility of its inhabitants, it is not infrequent then to be visited by an epidemic of these skin-destroying parasites. The aquarist is not the only sufferer, fish hatcheries are also plagued. The end is usually fatal should the aquarist not intercede and take countermeasures. It is not enough merely to provide our fishes with food . . . constant surveillance is also required.

Certain subtle alterations may take place in the skin of weakened fish and the omnipresent bacteria on the skin can

be stimulated by these changes. In turn, the increased bacterial growth prompts increased mucous production and further changes take place. Then, other parasites arrive and even more mucous production is necessary. For the newcomers, the combination of bacteria and partially-destroyed skin cells form a very favorable environment, conducive to their rapid multiplication. It is not known for sure whether some of these parasites feed on the bacteria or on the surface skin cells, but it is sufficient mischief that an excess of mucous production results. As the destruction of the skin proceeds, the parasites enjoy better food and reproductive possibilities; and the cycle only comes to an end when the host dies. It is strange to muse upon, but in well-cared-for aquaria, which always contain these creatures, things never come to epidemic proportions.

Costia Infection

Probably one of the most common skin diseases in the aquarium is characterized by a bluish-white, hazy film or clouding of the skin itself. This is caused by the color of a mass of parasites and by the paling of the dying skin cells of the surface layer. The parasite in question is *Costia necatrix* Lequerce. It is comparatively small and reaches a length of only 10 to 12 microns, a width of 6 to 8 microns, and is shaped somewhat like a bean. Two very distinctive flagella, about 9 to 18 microns long, are present near the indentation of the mouth region. A shorter, second pair of flagella may also be noted. The centrally located nucleus is surrounded by a clear vacuole (figure 1). Reproduction is by division of the parent cell. When large numbers of specimens are observed, it is apparent that "daughter" cells are larger and wider than other individuals and therefore, represent a transitional stage in the life of this parasite.

By rolling up its edges and bending its hinderparts of its body towards the front, the parasite forms a sort of a pipe-shaped channel, and by a sucking

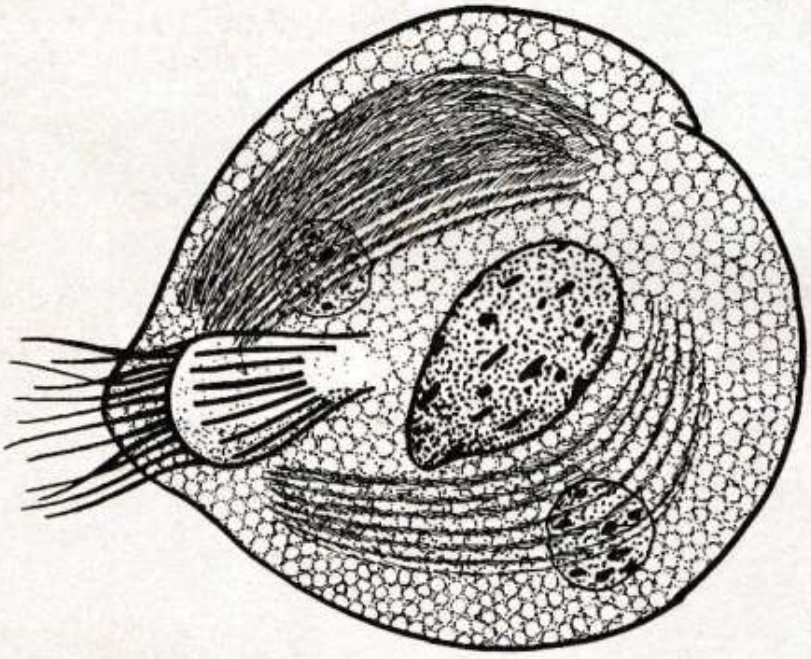

Figure 3.

Figure 3. Chilodonella cyprini. (after Jara).

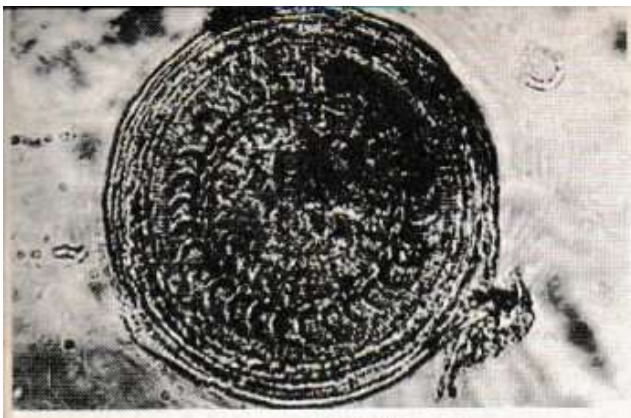

Figure 4.

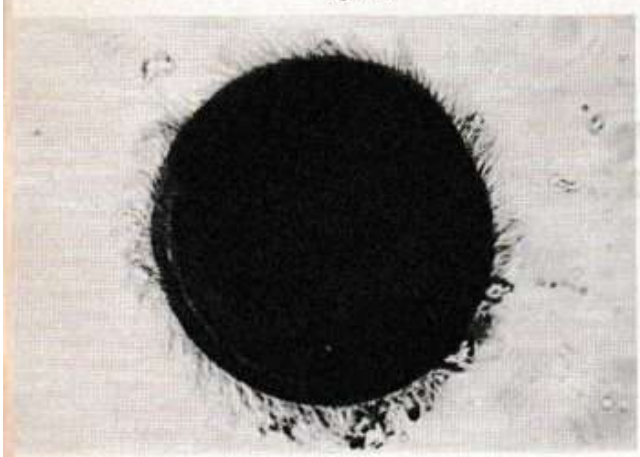

Figure 5.

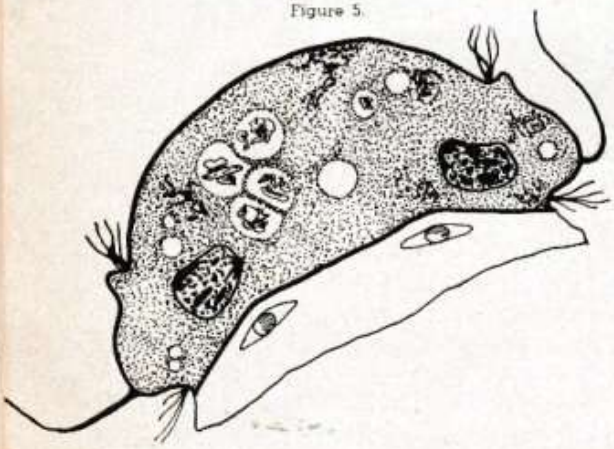

Figure 6.

Figure 7.

kind of action, clings fast to the skin of its host. The flagella are not used to hold fast to the fish. Thus, the parasites stand vertically to the host's skin, appearing as tiny pear-shaped objects (figure 2).

An hour to an hour and a half after leaving the host, *Costia* drops to the bottom where it transforms into a more spherical form. This is a dormant form, tenacious of life. Even on dead fishes, Costia parasites remain for days. They spread from one host to another in small, overpopulated aquaria, with extraordinary rapidity. In severe attacks, it is not only the skin which is infected but gills as well and in fish with large, soft fins (e.g., bettas), these too, are invaded, losing their beautiful form as a consequence. Young fishes are susceptible to *Costia* infestations, of course, their resistance being less than that of adults. Infected fishes try to free themselves of the parasites by rubbing their bodies in the aquarium gravel or against some solid object. It is to be concluded, therefore, that fishes are able to feel the effects of the parasites upon them.

Chilodonella

Quite similar in its effects is the heart-shaped ciliate, *Chilodonella cyprini* Moroff. This little monster perfers the back of the fish, between head and dorsal fin. In such places, it builds whitish pox marks, the skin peeling off in shreds as a consequence of the malignant course of the disease. This parasite may also infest the gills. *Chilonodella* are about 58 microns long and approximately 45 microns in width (through the middle).

As with all ciliates, *Chilodonella* are characterized by a deliberate, rather smooth motion, being propelled by cilia located on the undersides of the body.

(Continued on Page 24)

Figure 4. Cyclochaeta domerguei, showing underside with its many small hooks. Magnified 120 times. **Figure 5. Cyclochaeta** stained with methylene blue to bring out cilia on border. Magnified 120 times. **Figure 6.** Cross-section through **Cyclochaeta.** (After Schaperclaus). **Figure 7.** Tail fin of **Blicca bjorkna** destroyed by **Cyclochaeta.** All photos by the author.

(See Cover Photo)

MOST STAMP COLLECTORS are aware of the fact that the first postage stamp was printed in 1840 by England. However, not very many collectors are aware of the fact that the first stamp picturing a fish appeared some seventy-eight years later in 1918. The fish depicted was the skipping goby or mud skipper *(Periophthalmus* sp.) described by J. L. Tupper

Out of all the myriad stamp issues since 1840, only 185 depict fishes!

Around the World - Fishes and Stamps

Dr. George A. Wistreich and Renee S. Wistreich
Los Angeles, California

Jr. in an earlier *Aquarium Journal* article as "a beautifully-ugly fish which sits on rocks or logs out of the water and winks at you."

Since the advent of the first postage stamp thousands upon thousands of stamps have been printed, picturing as subjects famous men and women, historical events, numericals, alphabets, various forms of biological life, etc. Very few stamps of the world portray fishes. In all the total comes to approximately 185, few of which depict aquarium species.

Recently (1960), a set of stamps honoring goldfish were issued by the Chinese mainland *(see cover photo)*. This was the second issue of stamps representing goldfish. The first was by Japan in 1956. It is interesting to note that despite the interest in the keeping and cultivation of goldfish by young and old all over the world only two countries, namely, Japan and China, have exhibited them on stamps. This, may possibly be related to the goldfish's origin in China (Smith, H.M., 1909), and its subsequent importation into Japan, in approximately 1500, where the development and cultivation of goldfish varieties has since occupied a prominent role in Japanese culture.

All goldfish, regardless of the variety, have stemmed from the same parent stock and bear the scientific name of *Carassius auratus,* which literally means the golden or gilded karass. The particular varieties chosen as subjects for the stamp issue are shown in figure 1. These are as follows: [It should be noted that the names used here are Japanese and English and do not conform to those used by the Chinese. The later use a somewhat different classification to which we do not have complete access. — *Editor*]

A — Demekin (popeye goldfish or telescope-fish): This variety is well known throughout the world. It was originally developed in China and subsequently, further improved after importation into Japan in 1895. The major improvement is a long, flowing, caudal fin, while the special feature of the fish is

its "protruding eyes," which is apparently controlled by age. One form of coloration which is characteristic for the variety, namely, a pale red body with irregular black areas and black fins with pale red bases is shown on the stamp.

B — Albino Oranda Shishigashira (Dutch lion-head): According to Smith (1909) there is a tendency toward albinism in the group of fishes of the carp family related to the goldfish. Furthermore, the parent stock, which gave rise to the varieties, was albino or partial albino. The form shown on the stamp (B) is apparently rare. The Dutch lion-head, even though the name implies a connection with Holland, was first bred in 1840 in Japan. The variety was obtained by crossing the Ranchu (Holland worm or Korean goldfish) with the Ryukin (fringetail goldfish). The characteristic features of the parent strains, namely, the warty mass or "excrescence" located on the head and the graceful and delicate nature of the caudal fin are combined in this favorite variety.

C — Ranchu or Maruko (Holland "worm" or Korean goldfish): The literal translation of Ranchu is Holland "worm." The association of the name with Holland arose from the fact that during the years before and shortly after the turn of the current century any new or strange form of life was considered to be of Dutch origin. The Maruko or round fish as it is now called is short, possesses a broad head which develops a warty mass after 2-3 years, and is without a dorsal fin. Because of its peculiar anatomical arrangement (no dorsal fin) the fish appears quite clumsy and can hardly swim. Smith (1909) also noted that the fish can lose its ability to maintain a normal position and as a consequence, often swims upside down.

D — Black Moor-goldfish: Some forms of this variety possess the nodular mass, characteristic of the lion-head, and long, flowing fins.

E — Pearl-scaled Ryukin: The Ryukin is believed to have originated in a group of islands lying between Formosa and Japan. Generally speaking, its features of note include a shortened body with a rounded, bulging abdomen, and long, flowing fins. Usually, the fish exhibits several colors, vermilion always being present. The particular form shown on the stamp is a recent development known as the pearl-scaled fantail. The pearl scale form itself apparently originated in China.

F — Demekin (telescope fish): In addition to the features previously mentioned for the Demekin, it is interesting

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BY HOBBYISTS

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Stainless Steel Razor Blades

If you are tired of changing blades in your aquarium scraper every time you clean the inside of your tanks, because the old one has rusted, then give this idea a try. Use one of the stainless steel razor blades which are now being produced. They cost a little more, but will save you money, time, and trouble because they don't rust and can be used for several months without changing.— *Gene Tompkins, Brooksville, Kentucky*

to note that by virtue of its abnormal eye arrangement this variety is unable to compensate for the deformity. Consequently, the fish are apt to swim against hard objects, thereby causing permanent injury to their eyes.

G – Bubbled-eyed Demekin: This is another recent development in the breeding of selected fishes.

H – Bronze-scaled Oranda Shishigashira: This form represents a variation of the Dutch lion-head.

I – Shukin (longtail Ranchu or autumn goldfish): This particular variety was produced by the mating of the Ranchu with the Oranda Shishigashira in 1897. The literal translation of Shukin is "autumn brocade." The name was suggested, because the red coloration of the variety resembled that of autumn foliage of Japanese maples (Smith, 1909). The Shukin, is another variety that doesn't possess a dorsal fin and consequently, swims with difficulty. However, it is important to note that its swimming ability is superior to that of the Ranchu because of its fin development.

J – This stamp was not available.

K – Telescope Oranda Shishigashira:

L – Deme-Ranchu (celestial goldfish): Due to the fact that the designation of the goldfish varieties were not listed by stamp publications, the true identification of the variety shown is dubious. In general, it resembles the Deme-Ranchu, except for the presence of a warty mass on the head and bubble-eyes.

Although it is not shown, mention should be made of the Wakin or Japanese goldfish, from which all other varieties have been either directly or indirectly obtained. This form is the largest, hardiest and easiest to breed. The Wakin is quite similar, if not identical, to the wild species. However, differences do exist, especially in relation to scale size and coloration. According to Smith (1909), the Shubukin or common goldfish was obtained from the mating of the Wakin and Demekin varieties in 1900.

Carassius auratus has offered and continues to offer a challenge to those interested in development of new varieties; it has served as an excellent research tool in investigations concerned with the effects of irradiation, immunity and genetics; and it has been and still remains a delight of many in various parts of the world. Therefore, it is only fitting that the goldfish take its place among the few aquarium species represented on stamps. ◄

REFERENCE

Smith, H. M. 1900. Japanese goldfish, their varieties and cultivation. W. F. Roberts Comp., Washington, D.C.

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Stretching Plastic Tubing

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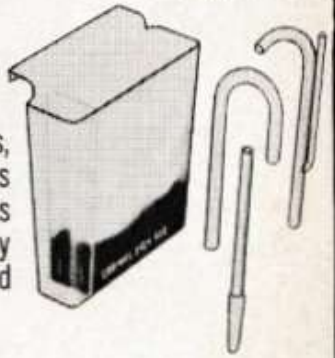

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Bartsch

(Continued from Page 18)

In normal configuration, its body is heart-shaped at its hind end, and somewhat pointed at the front. On the belly side, we find 8 parallel rows of cilia (like eyelashes!) on the left and 15 rows on the right. The middle and the borders are cilia-free. By the mouth opening, we find several extra large cilia and a grid apparatus consisting of 14 to 20 straight, small rods. This contrivance is situated at the forward end of the centrally-located nucleus (figure 3). In severe attacks, the body of the fish may be plastered with these parasites. Reproduction takes place as the host's body is consumed; should the host die, the parasites leave quickly.

Cyclochaeta

In contrast to the two proceeding forms is *Cyclochaeta domerguei*, an inhabitant of open waters and a member of the group of one-celled animals. *Cyclochaeta* find the skin of fishes especially suitable for feeding. Accordingly, they also find it conducive to its reproduction. The form in which it is found in almost all instances, is rather circular. Under slight magnification, a wreath of hooks can be seen on the underside of the body, which serves the parasite in holding fast to the host (figure 4).

Cyclochaeta have a diameter of from 45 to 60 microns and in the case of *C. domerguei* at least, possess from 25 to 32 "hooks." The diameter size and the number of hooks are of great significance in determining the species of *Cyclochaeta* involved. The border cilia are brought out clearly after staining with methylene blue; however, the nucleus is obscured by this procedure and is difficult to see (figure 5).

As with other skin infections, *Cyclochaeta* induce accelerated slime production which, in conjunction with the destruction of the surface layer of the skin, causes a cloudy film. The irritated epithelial cells then grow rapidly. Often, fins are attacked and destroyed completely (figure 7). This sometimes is confused with non-parasitic action which also affects the skin. Through low pH values and hardness values lower than 5.5 DH (pure rainwater or strong peat water), occasioned by the mismanagement of ill-informed aquarists, the skin first appears somewhat brighter (according to the degree of these conditions)

(Continued on Page 48)

★ IDEAS ★

BY HOBBYISTS

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Egg Floater

When I started hatching baby Brine Shrimp I had one big problem. The eggs would cover the surface of the water, and when I removed the live shrimp the eggs would get caught in the net. I solved this problem by putting the eggs in a floating fish feeder, attaching the feeder to one side of the container holding the salt water. — *Bruce Newman, San Francisco, California*

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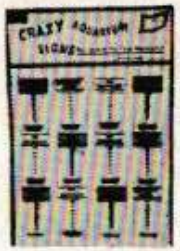

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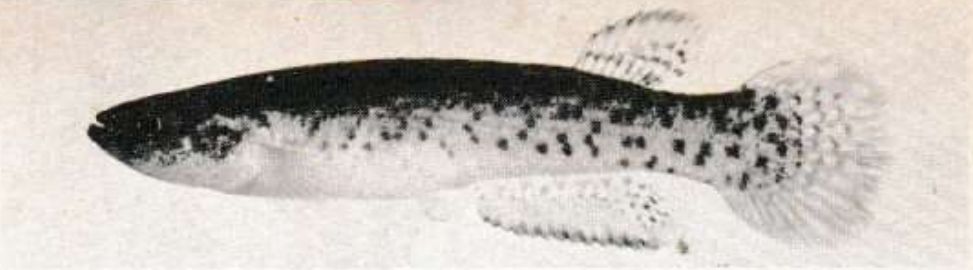


Figure 1. Rivulus peruanus, a male. Photos by the author.

Albert J. Klee

looks

• Under the Cover Glass

THOSE READERS familiar with the "most unforgettable character" vignettes that appear regularly in the Reader's Digest, doubtless have likely candidates of their own to endorse for such honor. One of my personal nominees, however, would be Jon Krause of Columbus, Ohio. Jon is owner of Verco Tropicals Fisheries, one of the few importing firms not located either on the West or East coasts, or in Florida. I first met him in 1952, shortly after he had purchased an old greenhouse with a view towards converting it to a fish hatchery. At that time, it was obvious that Jon had years of work ahead of him before he could convert all of his dream into reality.

One of those dreams recently did become reality, however. This summer, Jon flew to Peru in his own airplane (a converted B-25 which he pilots himself) and set up a fish collecting compound in Tournavista, a small town in the heart of the Peruvian Amazon located at an altitude of about 800 feet and not too far from the Andes in Central Peru. For some time previous to this, he regularly flew four missions a year to Leticia in Colombia, and Iquitos in Peru, picking up aquarium fishes collected by professionals. Now, however, he adds one more stop . . . Tournavista.

Tournavista is, of course, located in a rainforest area. It is a settlement along the Pachitea River, not too far from its junction with the Ucayali, the latter an impressive stream traversing the length of Peru. Also nearby is Lake Caymito and a bit farther north, the town of Pucullapa and the Rio Aguaytia. Jon uses a craft known locally as a "peki-peki," a sort of hollowed-out tree canoe equipped with 9 horsepower Briggs & Stratton engines, for his collecting trips and, of course, is assisted by his native staff.

Since Jon is a quiet, modest man, he is somewhat difficult to "pump" for some more exciting adventures. As with all collectors, he must beware of or fight "alligators," piranha, candirus, gnats and various types of infection. According to Jon, the insects pose the greatest prob-

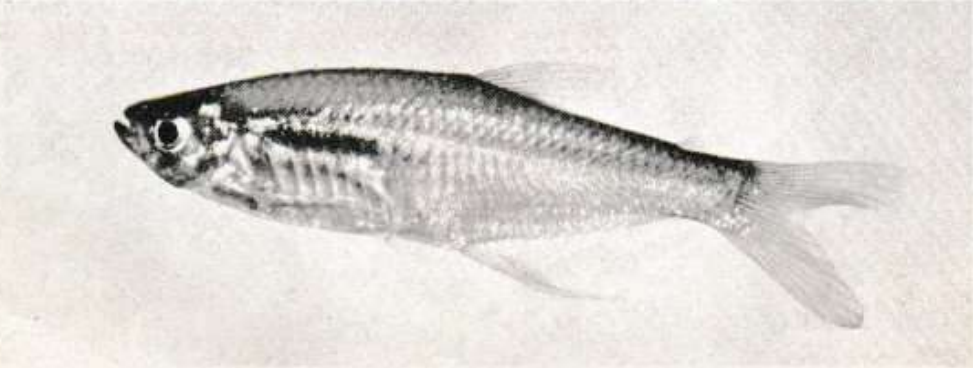


Figure 2. The "sticklefin characin." Apparently **Prionobrama filigera.**

lem. A more serious situation, however, developed on his last trip. During a collecting foray, a sudden tropical deluge occurred and he sought refuge in an abandoned jungle hut, of a type built on stilts. Unfortunately, the rain was so strong that the hut collapsed and Jon was injured, so much so that he could not safely fly his plane out of Tournavista! After some weeks of recuperation, however, all was well again.

The fishing in this area is very fruitful for aquarists. Right behind Jon's compound in Tournavsita is a ditch loaded with killies. All that needs to be done is to scoop them out! The fish in question appears to be *Rivulus peruanus* and marks the first time this fish has ever been imported for aquarium purposes (see figure 1). It is a large, beautiful fish, basically a bright blue with dark red markings all over its body. More will be said about this fish in a future article.

Among other fishes that I have seen for the first time at Jon's establishment includes a new characin . . . one I call the "sicklefin characin" (see figure 2). It is also large, a greenish-blue irridescent beauty with a prominent bronze spot behind its gill plate. This is truly a show fish in every sense of the term and accordingly, I have sent specimens to my friend Rosario LaCorte, the noted specialist for breeding characins (among other selected groups of fishes), with the hope that he will be able to spawn them. [*Editor's note: This fish appears to be* Prionobrama filigera *a characin often confused with the giant bloodfin* Aphyocharax alburnus, *itself often confused with the bloodfin* Aphyocharax rubripinnis.] Another interesting fish is a new *Aequidens* species (see figure 3) a chocolate colored fish characterized by a line that continues from the eye right up into the dorsal fin!

Flying to South America is quite an experience. After talking to Harold Edmonds, one of Jon's key employees and who also assisted with the wiring of the B-25 for instrument landings, I learned that in general, one flies into the wilder parts of northwestern South America only in the mornings. The reason for this is that storms occur in the afternoons and few of the airstrips involved have facilities for instrument landings which would be, of course, the only way to land under such weather conditions. Heading home, the situation is different for the airports along the way have such facilities and takeoffs can be made almost anytime.

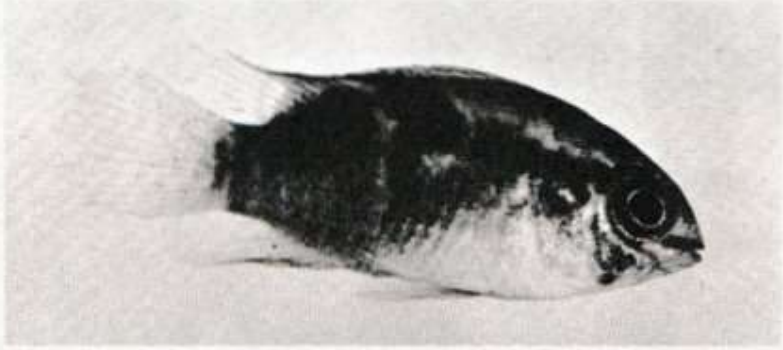
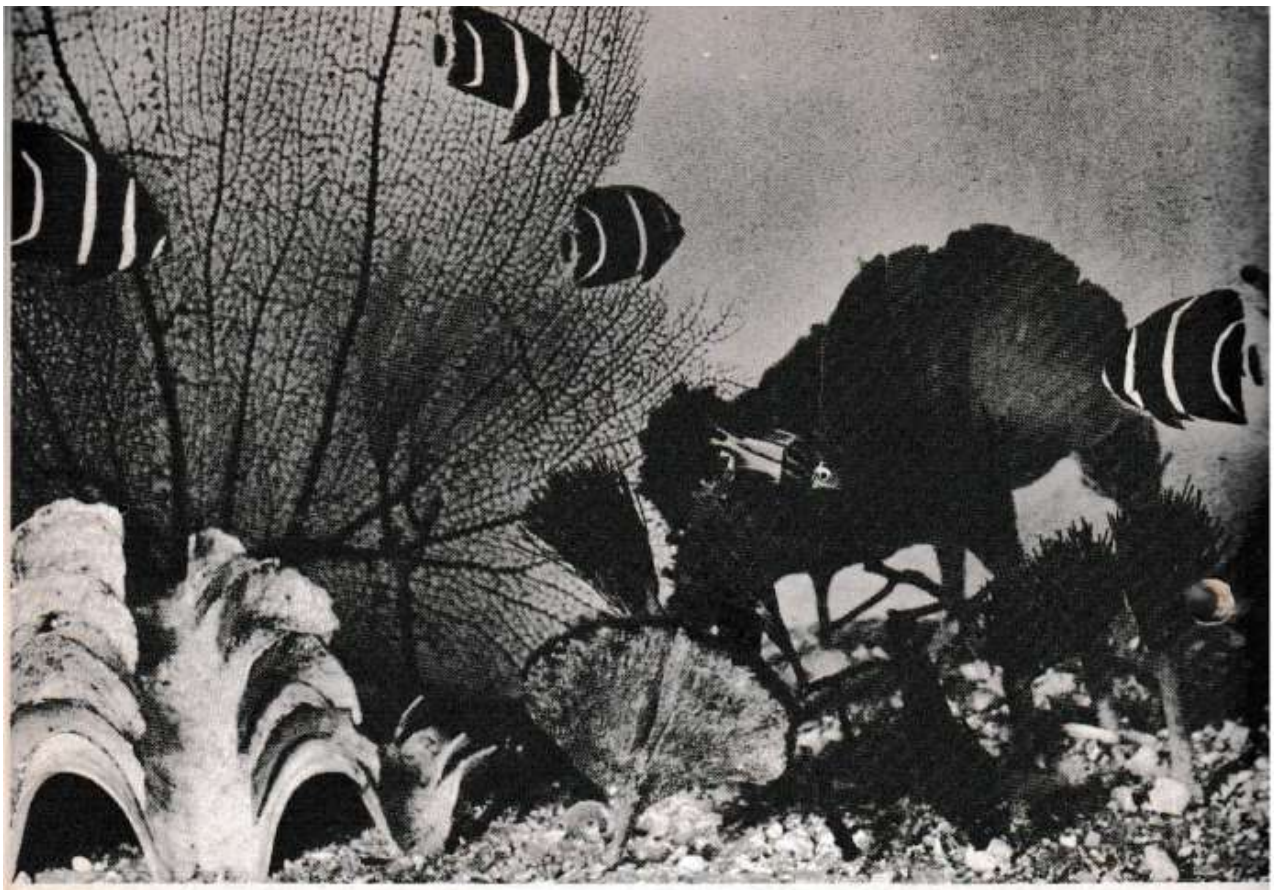


Figure 3. A new **Aequidens** species from Colombia-Peru.

During my last visit to Jon's hatchery, I met Carlos Beya, a Peruvian national who was staying with Jon for a few months, to return on the next flight to the compound in Tournavista. He de-

(Continued on Page 49)



A new system for keeping marine fishes that may prove a boon to the hobby

How to Succeed with Saltwater Aquariums

Robert P. L. Straughan
Marine Collector
Coconut Grove, Florida

HOBBYISTS or dealers who were unsuccessful with their first salt water aquarium may wish to give it a try again with a new system that almost guarantees success with the very first try. The new system is being promoted by the author for those who have had little or no success in the marine field. I believe it is virtually foolproof. The main requisite is pure, fresh sea water and this is what makes the new approach, a much simpler and sure fire system.

After corresponding with thousands of hobbyists and dealers throughout the world, the author has come to the conclusion that those who used natural sea water have had much more success with their marine fishes than those who used the man-made product. The main reason is the simplicity of using sea water. With the real product, there is no guess work as to salinity, pH or mineral con-

Photo: Saltwater angelfish and other species comfortably at home in sparkling marine aquarium. Photo by author.

Supplement to the *Aquarium Journal* – Issue of January 1964

AQUARIUM JOURNAL

SAN FRANCISCO, CALIFORNIA

Index to Vol. XXXIV, January through December 1963, inclusive

(Four-Page Removable Insert)

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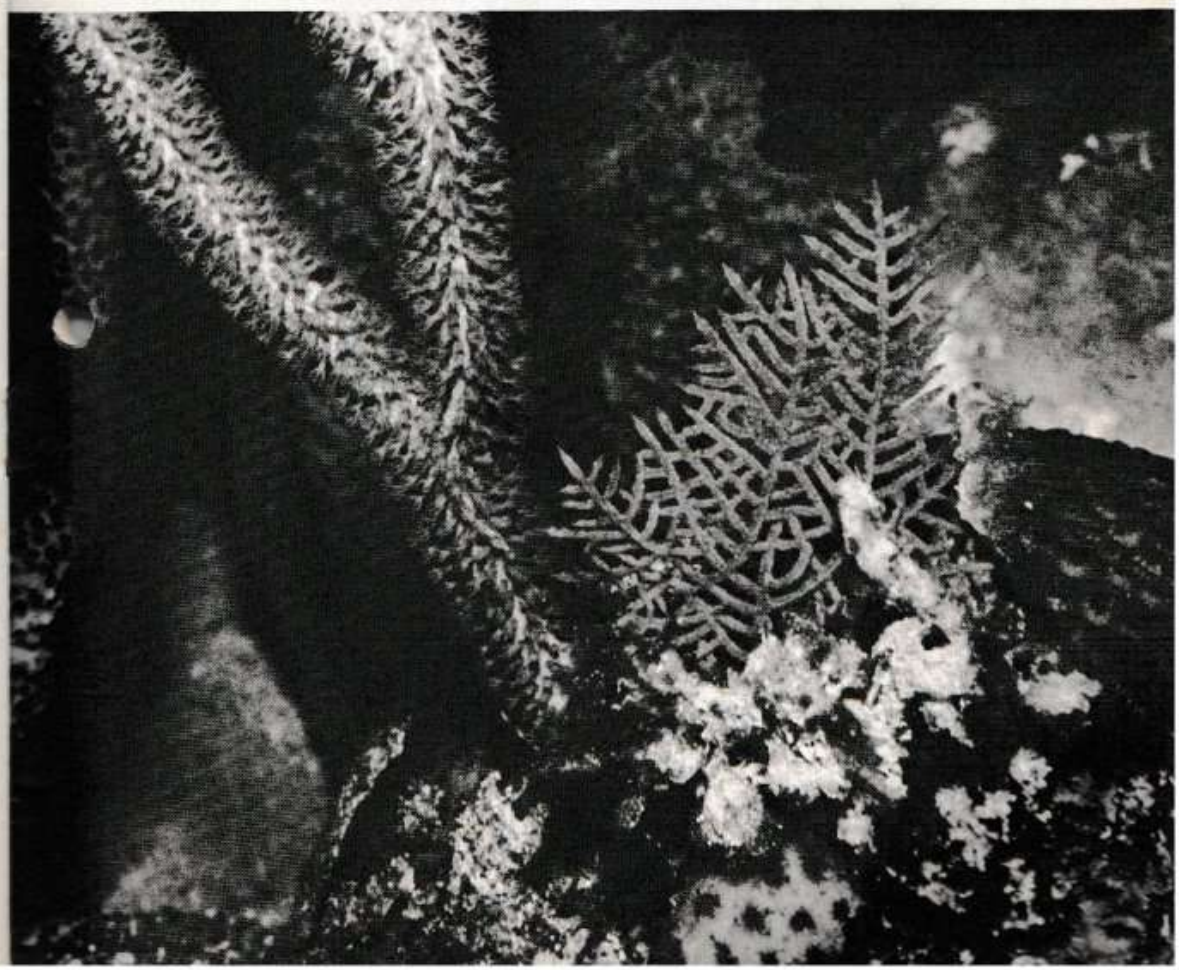
tent. You simply fill your aquarium and add the fish. Artificial sea water is no doubt a tremendous boon to the salt water hobby but the fact that it is not completely successful is evident when one notes that few aquarium stores carry marine fishes on a regular basis. In some areas, the artificial product may work fine when mixed with ordinary tap water but in other areas, particularly cities, where the water contains an abundance of chemicals and where the water goes through hundreds of miles of pipes, it is difficult or impossible to keep marine fish in man-made sea water. Of course the hobbyist or dealer can use distilled water or spring water but many fail to do so and use their water from the tap, often with bad results. Pure, fresh sea water on the other hand is always good and it takes much of the guesswork out of the marine hobby. If there was some way to get the natural sea water to the hobbyist at low cost, the marine hobby would be a big hobby today. But at present, natural sea water is not out of the reach of the inland aquarist who wants to keep a beautiful marine aquarium. With natural sea water, the hobbyist can keep the wondrous corals, feather-like gorgonians and fascinating tube worms or "Disappearing worms" as they are often called, all in with his selection of breathtaking coral fishes. This can be done in the artificial solution also but it is much simpler and more practical to use nature's pure product.

A practical basis for a natural sea water aquarium is to limit the size of the tank to ten or fifteen gallons. This way the cost of having the sea-water shipped to you is not prohibitive. A ten-gallon tank actually holds about eight gallons of water by the time you add the sand, filter and coral. Also you never fill a tank to the top, but rather, you should just fill it to the lower edge of the metal rim at

Photo: Some of the healthy plant growth now possible in saltwater aquariums at home. Photo by author.



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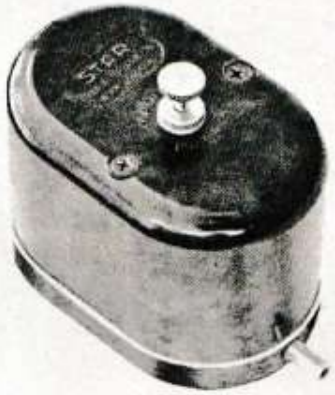

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the top. A fifteen-gallon tank actually requires about twelve gallons of sea water. The large size, plastic tank only needs seven gallons of water to fill it to the desired level. So, when we consider that a single shipment of salt water fishes is usually shipped in either three or six gallons of water, by simply ordering another box of water, the dealer or hobbyist can have enough pure, fresh sea water to fill a ten or fifteen-gallon aquarium.

Pure sea water is packed six gallons to the box and is shipped by air freight just like the fish. Some airlines will give a reduced rate for the salt water if it contains no fish as it is actually a salt solution and comes under chemicals. They charge $8.00 per hundred (which is about twelve gallons) to cities like Philadelphia, New York, Chicago, Atlanta, etc. This way, a dealer or hobbyist can order his fish and extra sea water at one time and the cost would not be prohibitive if he uses the above recommended size aquariums.

Large aquariums are actually very impractical for salt water, even if you live right near the ocean, for the most colorful, fishes are small and a fantastic assortment can easily be kept in a ten or fifteen-gallon aquarium. The best all around size is a fifteen-gallon tank measuring twenty-four inches long, by fourteen high by ten and a half inches wide. Two eight or ten-gallon tanks are far more useful and practical than one big 25 or 50-gallon aquarium.

Natural sea water can be kept in good condition for a year or more by filtering it with *aged* activated carbon, in addition to under gravel filtration wth silica sand. Activated carbon is one of the most powerful and effective filtering mediums for aquarium use and it will remove all trace of color, odor and gas from the sea water and keep it sparkling clear month after month. If sulfathiazole sodium or other medication is used, the carbon will remove all traces of color from the tank so that the fish will be healed and yet the water will remain snow-white clear. I have used and recommended this amazing filtering material for salt water for about fifteen years.

Aquarists near the ocean can get by without it because if their water goes bad, they can just go out and get some more. But the inland aquarist must treat his water like liquid gold. Activated carbon is made by the Scattergood Filter Company and their product is pure and uniform in quality. There are no doubt other good carbons on the market, but the author recommends this brand as it is especially pure and suitable for marine use. WARNING: *The carbon cannot be used fresh from the bag, even the label*

CLUB NEWS

San Francisco Aquarium Society, Inc.

The next regular meeting of the S.F.A.S. will be held Thursday, January 2, 1964, at Steinhart Aquarium, California Academy of Sciences.

Program for the meeting will be announced later.

Fish of the Month for the January meeting: (1) Male guppies, (2) Characins, except tetras *(Hyphessobrycon* and *Hemigrammus)*.

Gary Meltzer was re-elected to the S.F.A.S. Board of Directors at the general meeting on December 5th. All incumbents from 1963 were re-elected also.

tells you that. You must wash the carbon very well to remove all dust, then soak it for a week in a gallon of sea water to age it. Use about a quarter pound for each five gallons of water in the aquarium. Best results are obtained if the carbon is placed in an outside or inside filter when the aquarium is first set up so that the fish will get used to it from the beginning.

It is difficult and sometimes disastrous to use the carbon on a tank that has been in operation for six months or more but the aged carbon can still be used by simply placing a teaspoonful in the filter each week until the desired amount is added. Once the carbon is well aged, it can be used with complete freedom from worry and contrary to popular belief, it will retain its filtering capacity for years. In fact, it becomes better with age. All you have to do is wash it once a month or when it gets dirty and return it to the filter. If it has a strong odor when you wash it, place it out in the sun and let it dry thoroughly before use. We have become so convinced of the importance of activated carbon that we have considered cleaning and aging the carbon ourselves and shipping it to our customers along with their fish. It will keep the precious sea water in perfect condition and the water will stay as clear looking as when it was taken from the Gulf Stream.

Another important factor in using real sea water for your marine aquarium is that you can keep entire pieces of live coral or gorgonians and anemones in your aquarium. Not only are these creatures intensely interesting, but they also furnish extra food for the fish so that angelfish and butterflyfish in particular will stay in perfect color and health. With live coral in the tank, I have been able to raise some tiny, delicate Pacific angelfish to good size and with little effort. The fish simply nibble at the coral when they need this type of food.

We only ship small pieces of live coral as we have found that it is more practical and that a small piece is more likely to survive a plane trip. Live gorgonians are also a big demand and these must be carefully selected as to species and water depth. They do well in the aquarium and give it a natural look that is hard to beat. Sea anemones do so well in natural sea water that they have babies and the babies grow right up to adults.

Contrary to popular belief, good natural sea water does not go bad in a few weeks nor does it contain an abundance of harmful bacteria. I think this opinion originated up in the northern area where a few hobbyists collected sea water near shore. In this instance, the water would

(Continued on Page 46)

★ IDEAS ★

BY HOBBYISTS

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

Live Food Substitute

When you find your newly purchased discus large sea horses sticklers for live food, they can be tricked into eating frozen brine shrimp which is cheaper and more convenient. First feed the fish a small amount of live brine shrimp. While doing this, thaw out some frozen brine shrimp in a glass of warm water. Pour the now separated frozen shrimps among the live ones. The current will animate the frozen shrimps and the fish will eat them not knowing the difference between the live shrimps or the frozen ones. After one or two tries your fish will usually accept frozen brine shrimp as their staple food. If not, repeat the process for several days. Your fish will soon get the idea and your basic feeding problem is solved. — *Marc Weiss, Howard Beach, New York.* ◄

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WATER DISCOLORS	YES	YES	YES	YES	NO

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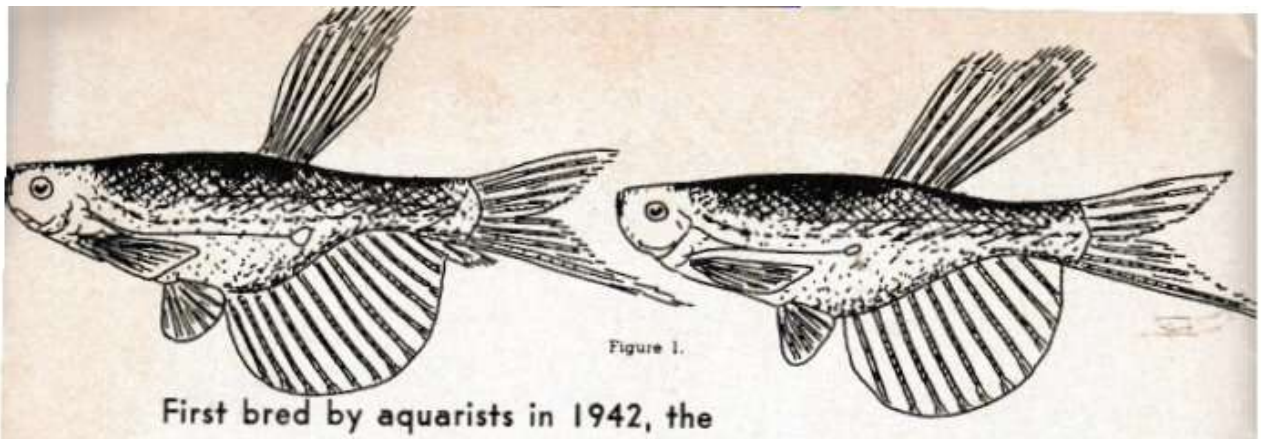

Figure 1.

First bred by aquarists in 1942, the swordtail characin is author's profile

A Thirty-one-Year-Old Aquarium Mystery Solved

PART I

THE swordtail characin, *Corynopoma riisei* (illustrated along with its very rare cousin, *Corynopoma aliata*, in figure 1) was first bred by aquarists in 1942 and to this day, this native of Venezuela, Columbia and Trinidad has remained a popular aquarium fish, favored by beginners and "old hands" alike. Although basically a silvery fish and hence precluding fame as a brilliant beauty, the swordtail characin is graceful of form and motion, unassuming, easy to keep and to breed, and peaceful with both other fishes and oftentimes, even with fry. The lower lobe of the male fish is elongated in the form of a sword, thus giving rise to its popular name. Furthermore, the gill cover of the male fish bears a filamentous process which resembles a paddle (*Corynopoma* means "gill cover with club"). These last two features

Albert J. Klee
Cincinnati, Ohio

make the swordtail characin a very unique fish in the aquarium world.

Contributing to this privileged position, however, is the additional fact that in the swordtail characin, fertilization is internal, a characteristic it shares with several other members of the family, Characidae. In other words, the male need not be present at the time the female lays fertilized eggs. It would be helpful at this point to review the spawning act in this fish but in considerably more detail than has appeared in the aquarium literature to date. Courting commences with the male swimming round and round the female, both above and below her. The net result is a rather constant pursuit of the female. At certain intervals, the male darts at his partner much as if the intention was to grasp the lower lobe of her caudal fin. Usually, however, when he comes within an inch above the female the male turns and approaches her at an

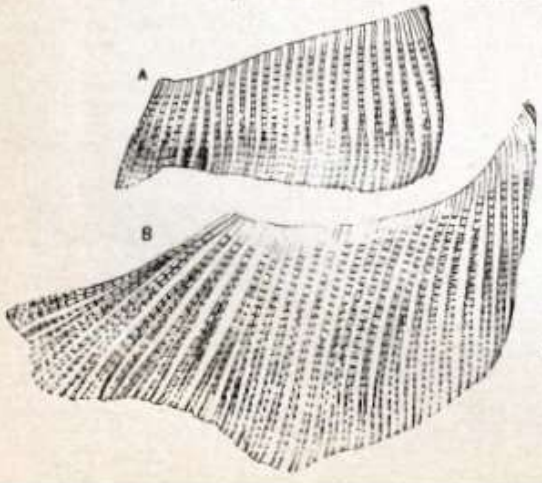

Figure 3.

Figure 1. Left, **Corynopoma aliata.** Right, **Corynopoma riisei.** Sketch by the author.
Figure 3. The anal fin of **Corynopoma.** (A) Female, (B) Male. (After Kutagil).

angle, rapidly at first, then slowing down. Simultaneously and together with his other unpaired fins (dorsal, tail fins), he quickly spreads his anal fin with a quivering, trembling movement. Following this, the male then bends his anal fin and rubs it or jabs it against the female. At the same time, he folds the bottom lobe of his tail fin towards her. This approach is quite similar to that used by male *Nothobranchius* towards their females (e.g., *Nothobranchius guentheri*). If males are isolated from females for any considerable amount of time prior to bringing them together for spawning purposes (say from 10 days to 3 or more months), then the males will intensify their courtship displays. As a matter of fact, they may even court with other males.

The female swordtail characin usually responds in either of two ways; (a) she remains motionless for a short while and then swims away or (b), she swims in the same direction as the male. In most instances, if the female is in good condition, the male induces her to the latter course and they swim away parallel to each other. An interesting point is, however, that she undertakes this parallel swimming in a manner that suggests readiness to attack the paddle nearest to her. She is attracted, thusly, by the movements of the male. At times, she may turn and face the male ventrally, trembling. On rare occasions, the female may even follow the male, thrusting at him. Then, by swimming away, she forces the male to follow.

Eggs may be released at any time. All that is needed for females that have been impregnated to lay eggs frequently and in large quantities, is a spacious aquarium, well-planted. *Ceratophyllum, Elodea, Riccia,* etc., are all quite good. Individual females may lay as many as 10 to 35 times a year with at least 15 and often as many as 30 to 60 eggs at a time. These eggs are released one by one in

Figure 2. The gillcover appendage of **Corynopoma.** (After Kutaygil).

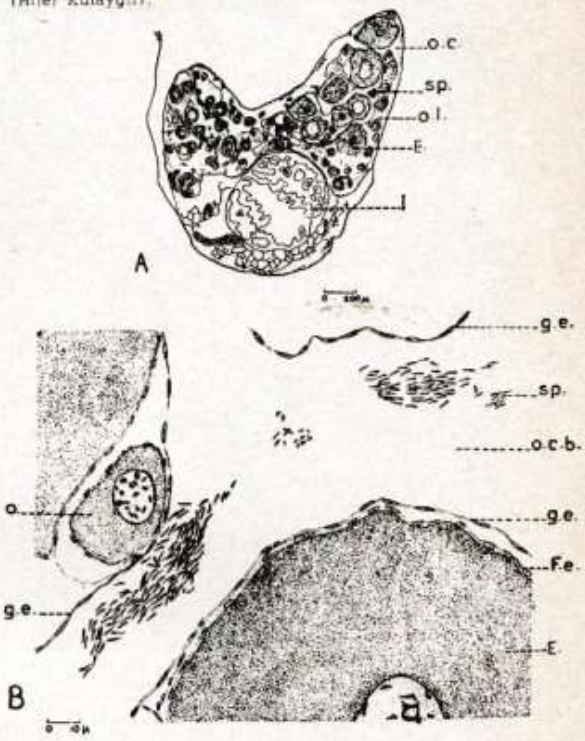

Figure 4. (A) Cross section of gonad of inseminated female **Corynopoma.** (B) Magnification of same. Note the sperm are clearly seen.
Code: o.c. = ovarian cavity
sp. = spermatozoa
o.l. = ovarian lobe
E = egg
I = intestine
g.e. = germ epithelium
o.c.b. = ovarian cavity branch
F.e. = follicle epithelium
o. = oocyte (after Kutaygil).

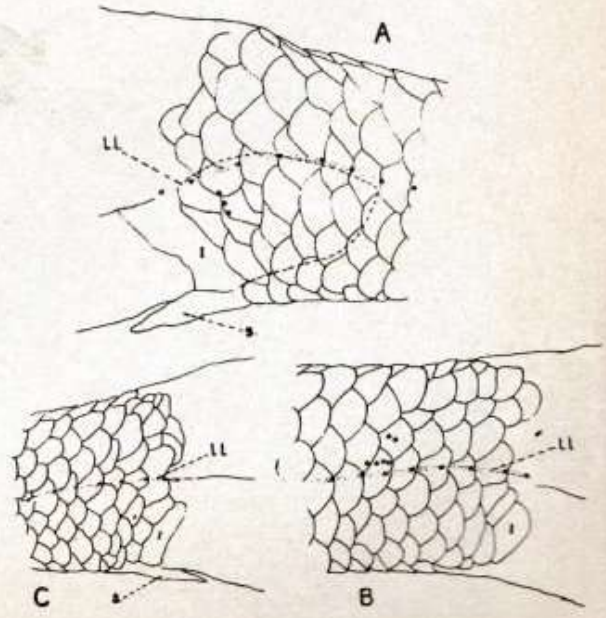

Figure 5. (A) Base of tail in mature male **Corynopoma.** (B) Same of mature female. (C) Same of immature male (gland not developed yet). Code: LL = lateral line; s = spur (after Kutaygil).

rows of from 5 to 15, preferably on plants but also on rocks or even on the gravel.

This account of the spawning of the swordtail characin leaves, however, two very basic questions unanswered:

1. How does insemination take place?
2. Of what use are the gill cover paddles of the male, and how do they relate to the spawning act?

These questions form the basis of an aquarium mystery that has puzzled aquarists for 31 years. Although the author has made previous contributions towards the solution of this mystery (see reference), he has only recently learned that it has now been solved in its entirety by a Turkish scientist. Before presenting the solution, however, additional background information must be considered.

The gill cover of the male ends in an appendage, as was stated previously, which lies on either side of the body. It is rather thin and ends in a spoon-shaped tip (figure 2). The gill cover of the female, on the other hand, terminates in but a very slight projection. It has long been known that males use these paddles to attract the attention of the female. When approaching a female during courting, one or more of these paddles is turned at an angle towards the female. The female approaches this "lure" and thus proximity of male to female is assured. If, for example, one of the paddles is amputated, the male will court with the other. Amputated paddles are regenerated with time but with each reamputation, the regenerated organ becomes smaller and shorter. The paddles do not appear in the males until the fish has attained a length of approximately one inch, and the paddles (the complete organ, stalk plus spoon) themselves reach a length of about three-fourths inch when the males reach a length of about one and a half inches.

It is well known that in many fishes in which internal fertilization takes place (e.g., our familiar aquarium livebearers), the anal fin is often modified into an organ of insemination (gonopodia). In the swordtail characin, however, no such modification is apparent. The anal fin of the male is considerably higher than that of the female, and its posterior edge is convex (figure 3). Under magnification, very tiny hooks can be seen on rays numbers 3 through 10, said hooks pointing towards the base of the fin. Frequently, these hooks catch in the netting when capturing the fish.

To answer the questions posed previously, Dr. Nebia Kutaygil of the Zoologi-

★ IDEAS ★

BY HOBBYISTS

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

Collecting Rainwater

For soft water, clean rainwater is hard to beat. But putting a tank in the rain is a very slow procedure. The run-off from a roof is likely to be contaminated. So why not use an old bedsheet? Attach the two long sides of the sheet with clothespins to the clotheslines. Place in the center of the sheet a clean rock, weighing one or two pounds. This will form a depression. Under it place your tank or enameled pail.—*Robert J. Wyndham, Upland, California*

cal Department of the University of Istanbul (Turkey) conducted a series of brilliant experiments (see reference). To examine females for presence or absence of sperm, either of two techniques were used: *(a) dissection, (b) injection of a NaCl solution into the oviduct with a fine pipette (micropipette), and withdrawal of this solution for examination of the products thus obtained.* To examine males, two techniques were also used: *(a) dissection, (b) squeezing the body and subsequently examining the products thus obtained.*

The first series of experiments involved amputation of both paddles plus the anal fin of the male. As a result, the males had great difficulty in putting on a courtship display. A male would spread his dorsal and tail nervously and thrust at the female with the lower lobe of his tail fin. As if it had not been removed, he would attempt to bend the part where his anal fin had been before amputation. The results of this series of experiments are shown in Table I.

Table I (after Kutaygil)
Results using males with both paddles plus anal fin amputated, and virgin females.

Exp. No.	Time the pair were together	Results
1	10 days	Dissection revealed female received no sperm
2	20 days	"
3	25 days	"
4	3 months	"
5	10 months	Eggs did not develop. No sperm found in micropipette examination of female
6	15 months	"

In all experiments in this series, females failed to become impregnated. Over long periods, both paddles and anal fin regenerated but they were reamputated every 7 to 10 days (as soon as their initial reappearance). Clearly, either paddles, anal fin or both were necessary for sperm transfer and successful breeding.

In the second series of experiments, only the paddles (both of them) were amputated. These results are shown in Table II.

Table II (after Kutaygil)
Results using males with only both paddles amputated, and virgin females.

Exp. No.	Time together	Results
1	10 days	Eggs dropped by female developed
2	13 days	"
3	21 days	"
4	55 days	"
5	3 months	Dissection of female revealed sperm in ovarial cavity and oviduct
6	6 months	Eggs dropped by female developed

In this case, sperm transfer was effected in every instance. Next, experiments were conducted with only the anal fin amputated, the results appearing in Table III.

Table III (after Kutaygil)
Results using males with only the anal fin amputated, and virgin females.

Exp. No.	Time together	Results
1	20 days	Dissection of female revealed no sperm
2	20 days	"
3	20 days	"
4	30 days	"
5	40 days	"
6	45 days	"
7	73 days	"
8	1 year	Eggs did not develop. Micropipette examination revealed no sperm

(To Be Continued)

★ IDEAS ★

BY HOBBYISTS

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Baby Fish Net

A small rectangular plastic box without its top and with a coat hanger wire handle makes an excellent net to catch baby fish from square-cornered filters or tanks. Drill small holes in the box to allow the water to pass through it, but keep the lowest corner of the box free of holes so the babies can be leisurely transferred still in ample water. — *Lee Shenk, Oakland, California*

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PART II

THE WIRE rarely frightens the fish and in fact many times a fish will fight back if it wants to stay in its newly-found corner. When this occurs, prodding is usually necessary. If the fish is particularly bold, and some are, a few light finger taps on the glass behind the fish will do the trick. Eventually the fish

How To Photograph Marine Tropicals

will get the idea that it's easier jumping through the photographic hoop in the center of the aquarium than fighting the coat hanger in the corner.

In any event, getting an image on film is easy; getting the picture you want, if you want anything more than an image, is not quite so easy. For myself, I don't feel I have what I want until I've taken at least five or six "I got it" pictures along with a dozen or more near misses, all of which usually take at least two hours of watching, prodding, brow moppings and swearing. My "decisive moment" occurs when the fish is swimming in a natural position in just the right relationship to the coral. I know what I want even before starting to take the picture, and I might add, even when collecting the fishes and corals which are selected with a certain end result in mind.

Douglas Faulkner
Summit, New Jersey

When photographing I usually use front lighting to show as accurately as possible the fish's color. However there are times when I like to use a more imaginative lighting. When using one flash head, I have found there are two alternatives: side lighting and top lighting. Side lighting creates an eerie effect, producing lights and shadows with a feeling of depth. I rarely use it because it is too theatrical for my taste. When I don't feel compelled to be "scientifically accurate," top lighting is my first choice. The modeling quality of the light is very natural. Shrimps and other animals with transparent bodies are rendered much more photogenic. A shrimp's body and appendages will transmit the light rays and glow throughout like a plastic rod when a light is held at one end.

The camera angle, like the lighting, may also be varied to include low-and-side angles or even straight-on when the lens shade is against the glass. Low and side angles are just a variation of the down angle. The important rule to remember is to keep the flash with the camera. If you have a single-lens reflex

Salt Water Fishes

By Robert P. L. Straughan

SEA ANEMONE

Q.: ***How long will the color last if an anemone is dyed with food coloring?***

A.: *Usually not very long, anywhere from a few days to a month or two at most.*

camera with closeup lens and you can't quite visualize the problem, try this simple experiment. First, get a mirror, preferably one the size of the front glass of the aquarium you will use. Then draw an "X" in the center of the mirror with a grease pencil and stand it up the way an aquarium would be placed on the edge of the table. Put your camera on a tripod and try to photograph the "X" from various angles and distances within a twelve-inch range. Concern yourself only with what you can see through the viewfinder, particularly the camera and the flash. You will see why the camera must be at an angle to the aquarium glass and why the flash should be kept with the camera. In applying this knowledge to the aquarium, you needn't be concerned with the tripod nor with distant objects that may be visible in the viewfinder. Remember the room light should be subdued and the exposure is only for the subject under direct illumination. Neither the black tripod nor the distant objects will register on the film. If by now you are completely confused, don't worry, after you make your first mistake you'll see the light.

I exposed my first roll of film purely by feel. My sense of feel wasn't very good that first time. Fortunately, one picture on the roll was almost what I wanted. My second attempt produced much better results. This is the exposure chart I am passing on to you. I photograph only in color. You may want to photograph in black and white. I deliberately underexpose to attain a richer saturation of colors. You may prefer to expose "normally" and use a chart. I still work by feel. The light output of my speedlight has a color guide number of 35. Yet, even if you're a mathematician, you will still need to experiment. The two films I use are Ektachrome and Kodachrome II. Ektachrome, though it is much grainier that Kodachrome II, is an excellent film for photographing fishes that are red or orange in color. Kodachrome II is my standard film for outdoor work but the main reason I use it for photographing fishes is its sharpness. I expose Kodachrome II and Ektachrome the same. My exposure is 1/50

PRODUCT NEWS

Tropicals Research

Tablet sizes of its well-known tropical fish remedies—Bacticide and Tri-Sulfa—have just been marketed by Tropicals Research, 1366 N. Dearborn, Chicago, Ill. Packaged in beautiful three-color display cards, 8 tablets per card, the cards retail for 79 cents each.

Both Bacticide and Tri-Sulfa are used in preventing and combatting diseases of tropical fish and goldfish. Bacticide is a gram-positive, gram-negative antibiotic combination; and Tri-Sulfa is a combination of three pure sulfas.

TR distributors throughout the U.S. are already stocked with these new 8-tablet cards. Price list and name of nearest stocking TR distributor will be airmailed to dealers upon request to the firm. ◄

DEALER'S DIRECTORY

Unless otherwise noted, first listed are Retailers in aquarium fishes, tanks and appliances. W=Wholesale only. W-R=Wholesale and Retail.

CANOGA PARK, CALIF.

JUS' FISH (W-R)—22716 Enadia Way—Mon. thru Fri. 4-10; Sat. 8-7; Sun. 1-6 p.m.—348-6370 or 346-0085.

CHICAGO, ILL.

ACTIVE AQUARIA PET SUPPLY (W-R) — 1551 Milwaukee Ave. (at Damen and North Aves.) — Daily 10-6; Open M. & Thu. to 8:30 p.m.—HUmboldt 6-2112.

DECATUR, ILL.

TEMPEL'S TROPICAL FISH (W-R) — 1504½ N. Union Tues-Sun. 1-8, Cl. Mon. — Telephone 422-2378.

DETROIT, MICH.

A.A.A. BIRD STORE (R)—15022 Grand River—Mon. Th. Fri. Sat. 9-9; Tues. & Wed. 9-6:30; Sun. 12-5 — VE 6-3474.

FORT WAYNE, IND.

RHINEHART AQUARIUM CO.(W)—4222 Indiana Ave.. Aquarium equipment, wholesale.

GLENDALE, CALIF.

J & M PET SHOP (W-R)—1942 W. Glenoaks Blvd.—Daily incl. Sun. 10 a.m. to 9 p.m. — 849-6611.

HIALEAH, FLORIDA

EXOTIC MARINE TROPICALS — Marine Fish — P.O. Box 505 — TUxedo 7-5534 (24 hrs.)

HONOLULU, HAWAII

MARINE TROPICALS HAWAII (W-R) — P. O. Box 835, Kailua, Hawaii 96734. Phone 267464.

LOS ANGELES, CALIF.

CATALINA BIRD & TROPICAL FISH FARM (W-R) — 8900 S. Western Ave. — M-Th. 9-7; F. 9-9; Sat. 9-6; Sun. 10-5 — PL 1-1231.

MONROVIA, CALIF.

SANTA ANITA TROPICAL FISH HATCHERY (W)—560 W. Duarte Rd. — M-F. 7:30-4; Cl. Sat. & Sun. — EL 8-8822.

MOUNTAIN VIEW, CALIF.

TROPICAL FISH CENTER (R)—1758 Miramonte Ave. — T., W., Th., Sat., 10-6; F. 10-9; Sun. 12-5; Cl. Mon. — YOrkshire 7-9366.

NAPA, CALIF.

HOUSE OF PETS (W-R)—1600 Main St.—M.-Th. 9-6; Fri., 9-9; Sun. 1-4 — BAldwin 6-6854.

NORTH HOLLYWOOD, CALIF.

PACIFIC AQUATICS TROPICAL FISH HATCHERY(W) 10554 Victory Blvd. — Daily 11:00 a.m. to 9:00 p.m. POplar 2-2840.

OAKLAND, CALIF.

CAMPE'S GARDEN & PET SUPPLY (R) — 9634 East 14th St. — Daily 8-6; Sun. 9-1 — NE 2-0800.

JONES-STANLEY (W-R) — 2533-35 Broadway — M-F 9:30-9; Sat. 9:30-5; Sun. 12-5 — TEmplebar 4-3644.

PORTLAND, OREGON

PATTERSON'S (W)—14055 NE Eugene Ct.—1 p.m. to 11 p.m. daily (incl. Sun.); Cl. Thurs.

WHITE'S AQUARIUM (W-R) — 215 S.E. 127th Ave. 6 p.m. to 10 p.m. daily; 2 p.m. to 10 p.m. Sat. & Sun. — 254-0148.

RUSKIN, FLORIDA

RICE'S TROPICAL FISH FARM (W)— P. O. Box 515 — Mon. thru Fri. 8-12; 1-5; Cl. Sat. & Sun. — Tampa 47-3321.

SACRAMENTO, CALIF.

CAPITOL AQUARIUM (R) — 2001 Capitol Ave. — M. F, 10-9; T. W. Th. S, 10-5:30 — GI 8-9951.

FIN N'PEN (R) — 5048 Franklin Blvd. — Daily 9 to 9; Sun. 10-5 —GL 1-3686.

SAN ANSELMO, CALIF.

ANSELMO AQUARIUM (R)—90 Greenfield Ave. — Daily 9-6, Sun. 10-2 — GLenwood 3-8858

SAN CARLOS, CALIF.

MEL'S RAINBOW AQUARIUM (R) — 1768 El Camino Real—T. W. F, S, 10-6; Th. 10-6; 8-10; Sun. 12-6. Cl. Mon. — LYtell 3-4170.

SAN DIEGO, CALIF.

CYPHERTS AQUARIUM (W-R) — 4243 Park Blvd. — Daily 10-6; M. F 'til 9 — CY 5-8137.

SAN FRANCISCO, CALIF.

B & H TROPICAL FISH (R) — 3277 Mission St., near 29th Street — Weekdays 9-8:30; Sat. 9-7; Sun. 10-6; VA 6-2233.

BLUE LAGOON AQUARIUM (R) — 1644 Irving Street — Mon. thru Sat., 12 noon to 8 p.m.; Cl. Sun. — LOmbard 4-2320.

BUKER'S PET STORE (R) — 1170 Market St. — Mon.-Sat. 9:30-6:30; Cl. Sun. — KL 2-0656.

DELLBROOK TROPICALS (R) — 1930 Lawton Street near 26th Ave. — 10-9 Daily and Sun.—LOmbard 4-2330

KILBRETH FISH HATCHERY (W)—389 Teddy Ave.— Fish. Wholesale only. — Daily 9:00-12:00 noon. — JUniper 5-2477.

PACO TICO'S EL AQUARIO (W-R) — 2111 Clement St. — Daily 10-10; Sun., 12-7 — SK 2-0865.

SAN FRANCISCO PET & AQUATICS (R) — 925 Cortland Ave. — M.-F. 9-8; Sat. 9-9; Sun. 12-6 — VAlencia 4-9841.

THE PETS — 638 Pacific Ave. — Daily: 10-6:30. Cl. Sun. — EXbrook 2-2020.

SAN JOSE, CALIF.

BANGKOK AQUARIUM TROPICALS (R) — 916 South Bascom Ave. — Daily, 12:00 noon to 9:30 p.m. — Phone: 264-3539.

TROPICAL FISH CO. (W-R)—2842 S. Bascom Ave. — Daily 10-7, Sun. 12-6 — ES 7-4107.

SAN MARCOS, TEXAS

TEXAS AQUATIC PLANTS CO. (W-R) — P.O. Box 866 — 7 a.m. to 5 p.m. six days a week—Ex 2-4919.

SAN MATEO, CALIF.

PENINSULA TROPICAL FISH CO. (R)—1933 South El Camino Real — Mon. thru Thurs. 10-6; Fri. 12-8; Sat. 10-6. Cl. Sun. — FIreside 5-9807.

SANTA BARBARA, CALIF.

TOJOVE ENTERPRISES (W-R)— 1270 Dover Lane — Marine Fish, Custom Tanks — By Appointment Only — WOodland 5-4869.

UNION CITY, N. J.

M & G AQUARIUM (W) — 704-706 New York Ave., Wholesale only. — UNion 6-0813.

second at f/22 for subjects with a light background such as white or bleached coral. Darker backgrounds, such as colored or live coral will need one-half to one stop more exposure. A full stop will be necessary only if the paper background behind the coral is very dark. It is important to remember that these exposures only work when the flash head is very close to the aquarium (usually six inches or less). If the flash head were held a few feet away the light intensity would be several stops less.

Some of the easiest marine animals to photograph are the bottom or coral dwellers such as the sea urchins, starfishes, shrimps, crabs and shell fishes. These animals will usually remain motionless for long periods of time and can easily be prodded or placed in the position you want.

Slightly more difficult to photograph are such creatures as nudibranchs, scorpionfish, seahorses, blennies, eels and gobies. Relatively speaking, this group is fairly sedentary. The nudibranchs crawl very slowly along the bottom or up a coral branch. Seahorses cling to coral branches or other objects. Blennies and gobies will sit in one place on the coral for short periods of time. What makes the group a little more difficult is that they are unpredictable. For instance, a goby will remain motionless long enough for you to focus and then move an inch or two. You see what happened, move the camera, re-focus and the goby moves another inch. Playing this game for an hour or more can become more nerve racking than photographing a continuously swimming fish. In fact, I'm not certain why I think a goby is easy to photograph. It's probably only because it looks easy – like a two-foot putt before it's missed.

The next and largest group is the free swimmers which include such species as the butterflies, angels, tangs, damsels, squirrels and cardinals. These fishes swim about the aquarium, yet their movements can be controlled by the coral arrangement. They do not normally rest on the sand or coral, but some of them, particularly the cardinals and squirrel fishes will remain motionless in the water for brief periods of time. A little prodding with the coat hanger wire can be great help at times when you want the fish to take a five minute break in front of your camera.

This last group of fishes could be thought of as the beatnik's of their world; the unpredictable free swimmers. Fortunately for the photographer, they have few followers. Among them are boxfishes and wrasses. The boxfishes, especially the juveniles, will swim near the surface when excited. They usually get excited when they're having pictures taken. If you wait five or ten minutes and pretend you're not the least concerned, they may calm down and decide one or two publicity pictures wouldn't do them any harm. If you prefer not to

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1. To term subscribers by mail, carrier delivery or by other means	3,626	3,667
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C. Free distribution (including samples) by mail, carrier delivery, or by other means	124	155
D. Total No. of copies distributed. (Sum of lines B1, B2 and C)	6,291	6,344

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

JAMES W. CRAWFORD, Editor

wait, you can always resort to a glass partition. Then there are the wrasses. The adults prefer passive resistance when being photographed. If they get excited, tired or frightened, they'll lean against the coral or bury themselves in the sand. Consequently, I've taken up photographing the speedier, younger generation which judging from its non-stop attitude, couldn't be anything else but passive by the time it reaches adulthood. When using coral as a channeling device, it's difficult to keep the coral from looking more like a maze than a background. Using a glass partition would be unsportsmanlike. It's either a maze or nothing and the one time I used nothing, I shot three rolls of film to get the picture I wanted.

In such a general attempt, as this article obviously is, it is very difficult to know what and what not to stress.

SUGGESTED READING:

Living Fishes of the World by Earl S. Herald; Doubleday & Company Inc.

The Salt Water Aquarium in the Home by Robert P. L. Straughan; A. S. Barnes and Company

The Aquarium Magazine (article) — "Collecting Marine Tropicals" by Douglas Faulkner, April, 1962

The Fishes by S. D. Ommanney; Life Nature Library; Time Inc.

Straughan

(Continued from Page 34)

be highly contaminated and dirty. The water down here in Florida is very clean and can be taken directly from the sea and placed in an aquarium without filtering. If it is filtered properly it will last for a year to five years or more, depending on aquarium conditions.

One thing is certain though, if you have had no success with salt water fishes, you should try a natural sea water aquarium before you go back to your guppies. You may find that in the long run, these salt water fishes are actually easier to keep than your fresh water fishes. ◄

PART II

A German Aquarist

Diane Schofield
Burbank, California

ALL of his killie fry are fed on newly hatched brine shrimp; however, Mr. Buttner never lets any shells or unhatched brine shrimp eggs get into the fish tank. To prevent this, he uses a double arrangement of cloth through which he siphons the shrimp. Put across the top of a gallon jug are 2 pieces of fabric fastened on the lip of the jar with rubber bands. The first is made of nylon organdy which catches the shells and the second is a type of nylon net or more firmly woven material. This shrimp is supplemented by micro worms, which are grown in a mixture of 4 or 5 times as much Pablum as Brewer's yeast.

The killies, as well as the remainder of Mr. Buttner's fish, get one feeding a day of his own batch of food and that food is composed of strained liver baby food, a dry shrimp food which he imports from Germany and pablum. All of this is mixed up into a very stiff dough and then put through a device of his own invention. This looks like a large press that a housewife buys to crush garlic, but Mr. Buttner being a machinist whipped it out for himself. The commercially sold garlic press proved to be too fragile for use in squeezing the firm dough. He puts a walnut-size piece of this hard dough in this device, presses down on the handle and immediately dozens of little worm-like "squeezings" appear. This

breaks up the food so that even small fish can handle it nicely and they seem to be wild about it. The other feeding each day is of some sort of live food, usually brine shrimp or daphnia. Mr. Buttner takes a dim view of tubifex unless it has been in running water at least a week. He attributes "boils" and popeye of some of his prize yellow gularis to heavy feedings of dirty tubifex.

Mr. Buttner has tapped rather a handy source of small containers which he uses for hatching the eggs of annuals. He uses the bottom portions of various sized bottles and jugs, such as the old familiar gallon jug. To dispense with the unneeded top half, he places a wheel-type small glass cutter in a vice with the wheel pointed horizontally to the table at the right height on the jug. Then he merely turns the jug around until a neat line is cut on the side of it. He whips it to a device that he has rigged up himself that has a bare wire that he wraps around exactly on this scratched portion and plugs it in. When the wire gets red hot, he takes a screw driver and applies water here and there until the jar cracks. He then merely removes the unwanted top portion, throws it away, takes out a carborundum stone to smooth down the cut edge and lo and behold, he has a neat little container just right for any number of things that go on around a fish room.

As many aquarists, not only is Mr. Buttner not content to keep fish in a fish room, he also has an outside pool. In this 2-foot deep pool are kept some of the most beautiful and brilliantly colored *platy variatus* that I've ever seen. I'm afraid that I was guilty of prying some out of him for my own pool. These are kept outside at temperatures which sometimes range down to 56° F. in spite of the fact that he has a screen-like arrangement with which he covers them at night during the winter. As the plants in this pool are thick and luxurious, netting any platys out would be quite a problem, so he merely sinks a gallon jug, puts some of his liver, shrimp and pablum mixture into it, hauls it up in a few minutes literally full to overflowing with platies.

So once again, as it has occurred to me countless times before, there is no such thing as "dumb blind luck" in fish keeping, spawning, and rearing. It is all due to the concentrated efforts and hard, diligent work which go into making this "luck" possible. ◄

Bartsch

(Continued from Page 24)

but finally going over into a cloudy transition. In the end, thickened layers of skin slough off. An addition of calcium to the aquarium, ends these difficulties immediately.

In order to find out whether such symptoms are a result of parasites or non-parasitic action, it is necessary to

★ IDEAS ★

BY HOBBYISTS

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

An Aquarium Background the Easy Way

The background of a tank can add much to its beauty. Any do-it-yourselfer can make an attractive background with little effort at small cost. Take a piece of plywood, any thickness, as large as the length and height of your tank. Then cover it with small pieces of tree bark, using household cement. By selecting "rough" pieces of two or three species, the effect will be surprisingly pleasing. When ready, place the plywood against the *outside* of the rear of your tank. — *Robert J. Wyndham, Upland, California*

take a skin scraping (be sure to use the proverbial "blunt instrument")! It goes without saying that excess pressure should be avoided. The motion of scraping should follow the natural lay of the scales, from front to rear. Then, with microscopic examination (staining with methylene blue), the typical form and motion of the parasite can be observed. Should the presence of these parasites be detected, it is necessary to prepare immediately curative baths to eliminate them from their hosts.

The use of table salt is probably the simplest. Dissolve 10 to 15 grams of salt in 1 quart of water which is at the same temperature of the aquarium in question. This 1 to 1½% solution kills with no question, both *Chilodonella* and *Cyclochaeta;* with *Costia* it is questionable. The duration of immersion is 20 minutes. An effective bath against *Costia* is 0.2cc of propriatary formalin in 1 quart of water. The maximum time a fish may be kept in such a bath is 1 hour. Such a treatment is also effective against bacteria, and other organisms as well. Finally, a very convenient bath in which fishes may be left indefinitely, is acriflavine in a concentration of 1 gram dissolved per 25 gallons of water. ◄

Klee

(Continued from Page 27)

scribed the natives of the Tournavista region, e.g., the Champas, Campas and the Chapebas, all of which derived their living from hunting. However, the most interesting thing I learned from Senor Beya was that in his home town, the city of Lima, Peru, the citizens there consider the keeping of live fish in the home to bring bad luck. Aquarium societies in our own country usually have a rough row to hoe but imagine the extra hurdle our Peruvian friends must overcome! ◄

PRODUCT NEWS

Super Glass Wool

The newest aquarium aid from Longlife Fish Food Products is super refined Glass Wool. Longlife, maker of the "World's Finest Fish Products" for over thirty-five years, now offers a splinterproof, extra soft virgin fibre for use in aquarium filters. It is the finest fibre available, scientifically processed to guarantee maximum filtering action.

A generous portion of Longlife Glass Wool is placed over charcoal in the filter. From time to time, as debris accumulates, the used Glass Wool is simply removed and a fresh portion is slipped into the filter.

Longlife super refined Glass Wool is available in regular 23-gram size for 25c . . . and the 2-oz. (56-gram) economy size for only 49 cents. ◄

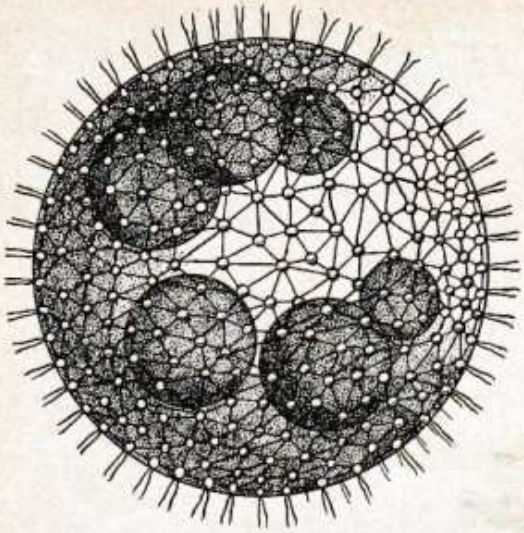
PROGRAMS

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

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

"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.



Botanists called it a plant; zoologists considered it an animal!

Volvox

Charles O. Masters
Walhonding, Ohio

EVEN though the average aquarist may not be a Charles Darwin or even the equivalent of a high school graduate biologist, he, at least, is usually able to tell the difference between the plant occupants of his fish tanks and the animals which swim or crawl about.

However, there are some organisms such as *Volvox* which have even the experts stumped and occasionally these too can be found swimming about aquaria. They sometimes are as large as a tenth of an inch in diameter, spherical in shape, green in color, and enter the tanks along with daphnia or some other living food from a close-by pool.

Because they're green, botanists very definitely consider *Volvox* as plants but because they are able to move about so readily zoologists have placed them among the animals. This wasn't always the case however. For years zoologists placed all single-celled, or colonial, organisms possessing a whip-like structure for movement (flagellum) among the protozoa (single-celled animals), and botanists rarely questioned this practice. But finally the city of Leipzig produced two biologists who very strongly did! In 1851 A. Braun started calling *Volvox an algae* (of some kind) and in 1865 L. Rabenhorst classified the organisms as being part of a group of grass-green algae known as *Chlorophyllaceae*. From this time on no one has been able to say for sure where they belong.

	Botanically	**Zoologically**
Phylum:	Chlorophyta	Protozoa
Class:	Chlorophyceae	Mastigophora
Order:	Volvocales	Phytomonadina
Family:	Volvocaceae	Volvocidae
Genus:	Volvox	Volvox

In any case there are approximately 18 recognized species of the genus with about half commonly found in the United States. *V. globator* and *V. aureus* seem to be most common. Wherever *Volvox* are found outdoors whether it be in fresh water ponds, lakes, or temporary pools, they are usually quite abundant tinting the water a bright green.

In the spring, during a "bloom" of these organisms, while the water teems with them, fish-fry grow fat. Daphnia ponds are sometimes filled with *Volvox* so that a collector is indeed fortunate who recognizes this and manages to take home both in his buckets. They can be seen as tiny green balls that roll smoothly through the water. If you can collect

Sketch: Greatly magnified drawing of Volvox. Illustration by Charles O. Masters.

rotifers in the spring you can collect *Volvox!*

Their movements by means of waving flagella located around the outside of the cell is not a haphazard one but, instead, is rather well directed. The beating of thousands of these flagella protruding outward from the surface of this gelatinous ball is a well-coordinated one so that the movement is strong and properly guided. Careful study reveals that there are tiny strands connecting each flagellum and meeting somewhere in the complex colonial organization. In many respects *Volvox* therefore suggests a possible transition to multicellular organization from a uni-cellular one. With a magnifying glass, look for them in your daphnia pool next spring. ◄

★ IDEAS ★

Saving New Fishes

To lose fewer fishes bought from dealers, try this. Ask the dealer for a larger, two-quart plastic bag to put the fish in. Buy also (the first time) a one-gallon plastic tank. Then, each time you buy fish, pour the contents of the two-quart bag into the plastic tank, gently, fish and all. Each day afterwards for a week, add a glass of water from the tank into which you will eventually put the new fish, and your one-gallon tank will then be full. From then on every day for another week, take a glass of water out of the plastic tank before adding one from the other one.

If you often buy large fish – or too many fish for a one-gallon tank, even with aeration – use a larger, glass tank, and ask for an even larger plastic bag.

The point is, there is more to saving new fish than isolating them for a time and equalizing the temperature before their transfer into their new home. A difference in hardness, pH, amount of fish waste products in the water, and probably many other factors kill more new fish than temperature differences. This method gradually "equalizes" *everything*. This gives you a chance to watch for diseases while the fishes are still in isolation. – *Ted Bear, Chateauroux, France.* ◄

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

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.

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.

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.

Live Cultures — (with instructions) USA only. Drosophila (wingless) $1.75. White Worms $1.50. Tropi-White Worms $1.50. Dwarf White Worms $1.50. Micro Worms $1.00. Daphnia (pulex) $2.00. (Food different for each culture $1.00 per box.) Live delivery guaranteed. Postage prepaid. George Hansen, Box 414J, St. James, N.Y.

WANTED

New members in the British Ichthyological Society. Provides aquarists a means of communication with other persons interested in the hobby. For dealers, traders and hobbyists. For more information write to: Circulation Agent, P.O. Box 288, Cassville, Missouri, 65625.

Letters to The Journal

From: Robert E. Blanc
Skokie, Illinois

Today I am going to set up a 50 gallon salt water display tank. The aquarium will contain fish and a bottom covered with living rock imported from the Indo-Pacific area. The rock contains numerous plants and animals all seeming to be in excellent condition.

Before setting this aquarium up I referred to all the articles written that I could find dealing with the so called "Natural System" salt water aquarium. Recently, I came across an article that you translated from the Scandinavian aquarium magazine *Akvariet*, by Jorgen Scheel. The article covers the subject of blowing tanks with carbon dioxide.

Do you think that such an experiment would prove beneficial to the plant life in my marine tank? What effects do you think this would have on the fish? Have similar experiments been previously conducted?

I would appreciate hearing from you regarding this matter, as it could be of great help in making my display a successful one.

In the article it does not state whether the normal bubbling of air through the aquarium should be discontinued when the CO_2 is being introduced. Can this be maintained? I wish to thank you for any assistance which you might offer.

REPLY: (Mr. Blanc's letter has been answered by Associate Editor Albert J. Klee):

Thank you for you letter. Col. Scheel's technique of blowing tanks with CO_2 is based upon the observation that for a plant to utilize nitrogen by turning it into some organic tissue (i.e., new plant

material), the plant must also have its other "building blocks," principally carbon. As nitrogen builds up in the form of nitrates (as it will ultimately), there is not sufficient carbon to unite with the nitrogen in the ratio proper to the plant material being formed. Col. Scheel supplies this needed carbon in the form of CO_2.

In the salt water aquarium, however, there are many more chemicals present, and in larger quantities. One of the essential ions in marine water is the bicarbonate ion. Marine aquarists know that when this ion is depleted, the buffering it affords is destroyed. The addition of CO_2 to a marine tank would only assist in the destruction of this buffering.

As a matter of fact, Col. Scheel intended his CO_2 technique primarily for what he calls the "rainforest tank," a type we would refer to as the soft, acid-water tank. He did not emphasize that it would work in hard, alkaline waters, although he did suggest that under certain circumstances, it might work. Marine water is, of course, hard and alkaline.

My suggestion is to forget about the use of this technique in marine water. It is a technique best used with aquaria populated with egglayers doing well in soft, acid water.

P.S — When CO_2 is being introduced, aeration is temporarily discontinued.

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From: Mr. Delma C. Blinson
Clayton, North Carolina

As a frequent reader of your monthly publication I inquire of you to help a group of Aquarium owners in our area. We have encountered immense difficulties in obtaining the proper supplies necessary to maintain a good aquarium. We live in a small town in which a complete pet store would not be profitable. It is extremely inconvenient and expensive to drive to the nearest city frequently to obtain the necessary supplies. I have decided to try and do something about this situation. Herein your help would be greatly appreciated. I would like to find out the name, address of companies which would serve us by mail. If no company will sell to individuals or are wholesale distributors I can remedy this by buying the supplies through the proper facilities. All I would like to know is who will send me a catalog from which we can order the few supplies we need. I hope you can understand our position in that it is impossible to open a complete line of aquarium supplies but we do need a better method than we have at present. I hope you will be kind enough to assist us and you may rest assured we will greatly appreciate any information or help you might extend.

REPLY: The Aquarium Stock Co., Inc., 31 Warren St., New York, N.Y. or Beverly Blvd., Los Angeles 48, California, Everglades Aquatic Nurseries, Inc., P.O. Box 587, Tampa 1, Florida, Beldt's Aquarium, Inc., Hazelwood 7, Missouri are all old established firms that have been selling by mail to aquarists for many years. They all have catalogs.

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From: Mr. G. Fleischman
Chicago, Illinois

I have been feeding my baby fishes baby brine shrimp. I would like to know if I could raise the shrimp to feed my large fishes. What would I feed them to have them grow a little larger? Would they need plant life in their tank? And air stone too?

REPLY: Get our Brine Shrimp booklet. It tells how this may be done. In general, however, it often is not too practical or easy to raise brine shrimp and the frozen product is cheaper and easier in the long run. Growing brine shrimp feed on suspended organisms such as suspended algae. These can be

raised in salt water outdoors in the sun and slow aeration is necessary in raising shrimp.

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From: Carol Brooks
Tucson, Arizona

I am especially interested in salt water aquaria, so I would like to know if your magazine deals with this particular field at all. Also, if you know of any publications concerning the marine aquarium or marine fishes, I wish you would mention them to me.

REPLY: Yes, we often run an article on salt water fishes. Not as many as we would like but we do publish them when they are sent to us. There are a few publications currently available on marine aquaria, two of which we can recommend: "Salt water fishes for the home aquarium" by Helen Simkatis, price $6.00 from the Aquarium Publishing Co., P.O. Box 832, Norristown, Pa., 19404, and the "Salt water Aquarium in the home" by Robert P. L. Straughan available for $7.50 from Coral Reef Exhibits, P.O. Box 59-2214 Miami International Airport, Miami 59, Florida. I am not sure, but the latter may be currently out of print. In any case a new edition is scheduled to be published soon. A good general book, both pictures and text, on all fish groups, with a lot in it on marine fishes is "Living fishes of the world" by Dr. Earl S. Herald, curator of Steinhart Aquarium. ◄

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Plastic Tank

If you have a place to keep a large plastic garbage can above the level of your tanks, you will find it very handy for aging and storing water. A long syphon, weighted at the end in the can will make aged water available instantly at any of your tanks. If you use a piece of garden hose with a plastic nozzle, it will be even more convenient. — *R. C. Forsyth, Rochester, N.Y.*

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