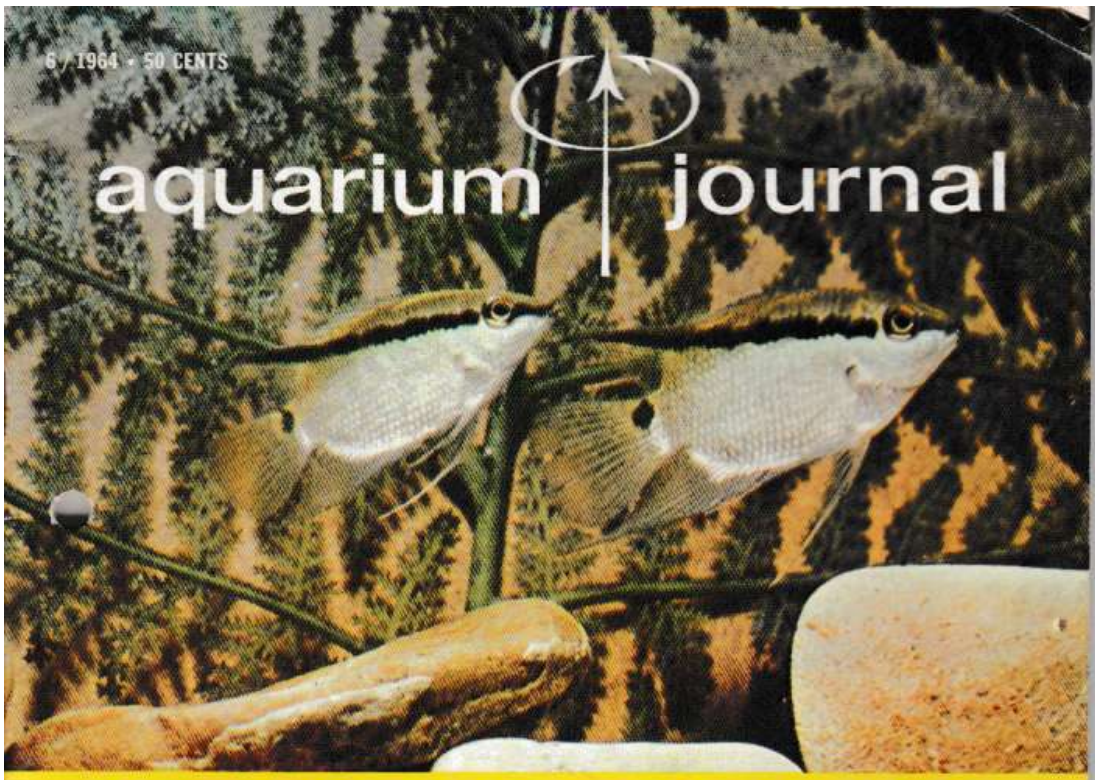
6 / 1964 • 50 CENTS

aquarium journal



PHOTOGRAPHING TROPICAL FISHES

A Magazine for Beginner or Expert.

The most complete magazine of Tropical Fish and Aquariums published in America.

The Magazine Aquarists Believe In.

Twelve issues per year for $5.00.

Read Many Informative Hobby Articles

Volume XXXV
Number 6
June 1964

aquarium journal

The Magazine Aquarists Believe In

Published by the
San Francisco Aquarium
Society, Inc.

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

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

contents

cover photograph

The June cover shows two old favorite aquarium fishes, the South Asian glass catfish Krytopterus, *and the South American cichlid,* Cichlasoma festivum, *as photographed by aquarist-author Braz Walker. Walker's home is in Waco, Texas.*

A principality of 7 sq. miles; 25,000 citizens —
ruled by the Grimaldi family for 1,000 years

Postcard from Monaco

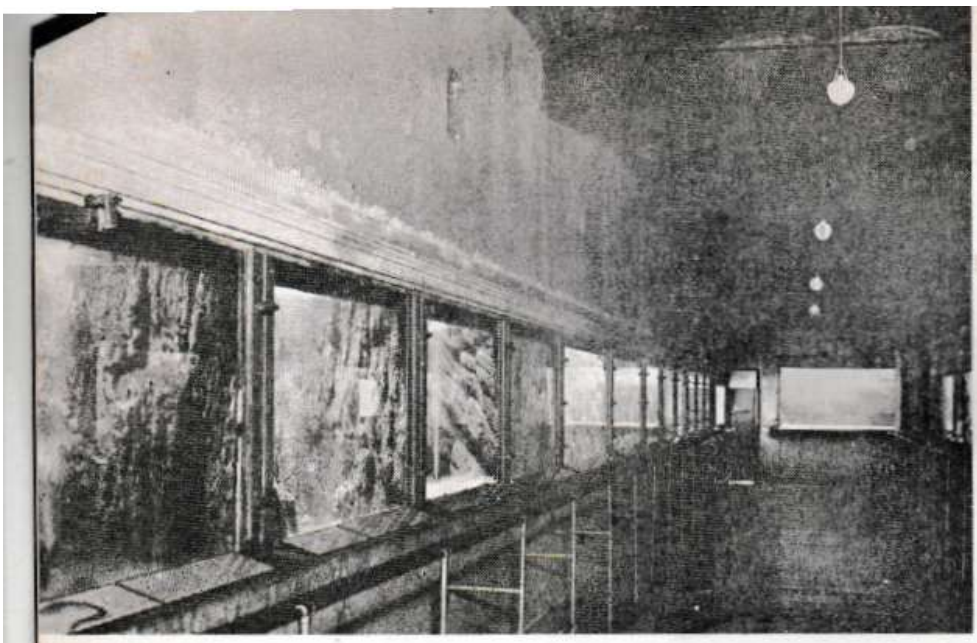
George F. Hervey
London, England

DURING the month of October I was invited by a friend to spend a fortnight at his villa at Menton on the French Riviera.

Menton is only a few miles from Monaco, and, as every aquarist will know, there is at Monaco a world-famous Oceanographic Museum containing an excellent public aquarium. Through the good offices of my friend, who is well known in the neighborhood, I was able to make contact with the curator of the Museum, and was privileged to be conducted through the building by his chief assistant, M. Garnaud.

Although Monaco appears from the map to be a part of France, in fact it is not. It is an independent principality that has been ruled by the Italian family of Grimaldi for close to 1,000 years. Al-

Photo: Postcard shows the front of Monaco's famed Oceanographic Museum, which houses the equally famous aquarium.



though surrounded on all sides (except that facing the sea) by France, Monaco is completely independent of France. It has its own flag, its own coinage, its own stamps, its own laws and police force. In short, Monaco is a typical pocketstate, that covers some 7 square miles and has a population of about 25,000 persons. The Monégasques (as the inhabitants call themselves) are very proud of their 1,000 years of independence. Nor need we wonder why, for they enjoy an ideal climate, live tax free, and have other advantages that are denied to those who live in large countries.

Members of the Grimaldi family have always taken a great interest in animals, and the reigning prince, Rainier III, has the nucleus of a zoo in the gardens of his palace. But it is his great-grandfather, Prince Albert I, who is likely to be best remembered, particularly by aquarists. He was an oceanographer of note, led many expeditions, became a recognized authority on the cetaceans (whales), and conceived the idea of building the Museum of Oceanography. He laid the foundation stone on April 25, 1899, and formally opened it to the public, dedicating it to the oceanographers of the world on March 19, 1910.

The Museum is a very handsome building. It stands on the Rock of Monaco, close to the prince's palace and faces the very beautiful Gardens of St. Martin, laid out by Prince Honoré VI in 1816 to provide work for the poor.

The galleries cover a wide field. In the Gallery of Physical and Instrumental Oceanography one sees, hanging from the ceiling, the different types of nets used by oceanographers for collecting specimens. In the show cases are instruments for determining the speed and direction of currents and instruments for determining the pressure of the water at different depths. In the Gallery of Applied Oceanography there are hanging from the ceiling various types of fishermen's nets used in different countries. In the show cases are sponges, corals, pearls, amber, fish oils, fish fats, indeed anything that comes from the sea and is used by man in art and industry. ◄

Photo: One of the galleries of tanks in the Monaco Aquarium. Note the natural backgrounds provided in each aquarium.

(Translation by Lillian Dempster)

Dr. J. Garnaud
Curator, Monaco Aquarium

Built in 1911 to house the marine collection of Prince Albert I, a founder of modern oceanography

The Monaco Aquarium

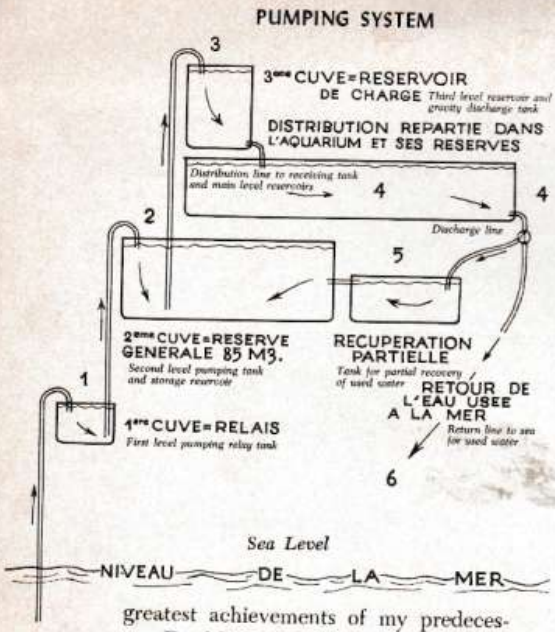
MY COLLEAGUE W. H. Brady, curator of the great "Aquarama" of Philadelphia, of whom I had requested some technical information concerning that magnificent "theater of the sea," has been kind enough to write to me that he was much interested in the Monaco Aquarium, with whose management I have been entrusted for nearly 18 years. He has thus asked me for certain information that I believe suitable for publication so that other colleagues may avail themselves of this information summarized for W. H. Brady.

The Monaco Aquarium is situated in the Oceanographic Museum, an impressive limestone building, built by the scientist, Prince Albert I of Monaco, one of the greatest founders of oceanography. Completed in 1911, this museum did not have any public aquarium, for it was designed to exhibit only the material from the various cruises of the Prince and to preserve it, as well as to shelter his important specialized library. Scientists the world over were to come to work in its laboratories.

There were some metal-framed study aquariums in the second basement. These were supplied with sea water and provided as for laboratory work, not exhibition.

An endowment of gold was given by Prince Albert I in 1922 to maintain the Oceanographic Museum after his death. Unfortunately, this endowment, in the course of devaluations, proved to be insufficient and it was one of the

Photo: The Oceanographic Museum of Monaco as seen from the sea, perched impressively upon a great rock.



greatest achievements of my predecessor, Dr. M. Oxner, to establish a public aquarium. He devoted himself to securing sufficient financial resources with a great deal of tenacity, and bit by bit, with the more or less reticent consent of the director, Dr. J. Richard, testamentary executor of the Prince. Dr. Richard was interested in the unaltered survival of the Museum such as it had been conceived by the Prince.

Thus a public Aquarium was created, but with difficulty and by successive stages. Unfortunately, all that resulted, in spite of laudable efforts, was a quite inadequate installation, in a not very favorable site. The hall passage of the Monaco Aquarium was narrow and winding, as the plans accompanying this article show. Neither the site nor the building were favorable for the establishment of an Aquarium, and heavy obstacles remain evidently irremediable. These are:

1. The site is much too high above a practically constant sea level. The gravity tank is about 60 meters above sea level.

2. The floors are too weak for large concrete tanks and a large number of viewing public.

3. The absence of natural light on the pools, the windows supplying only a little daylight, in the winter, behind the scenes.

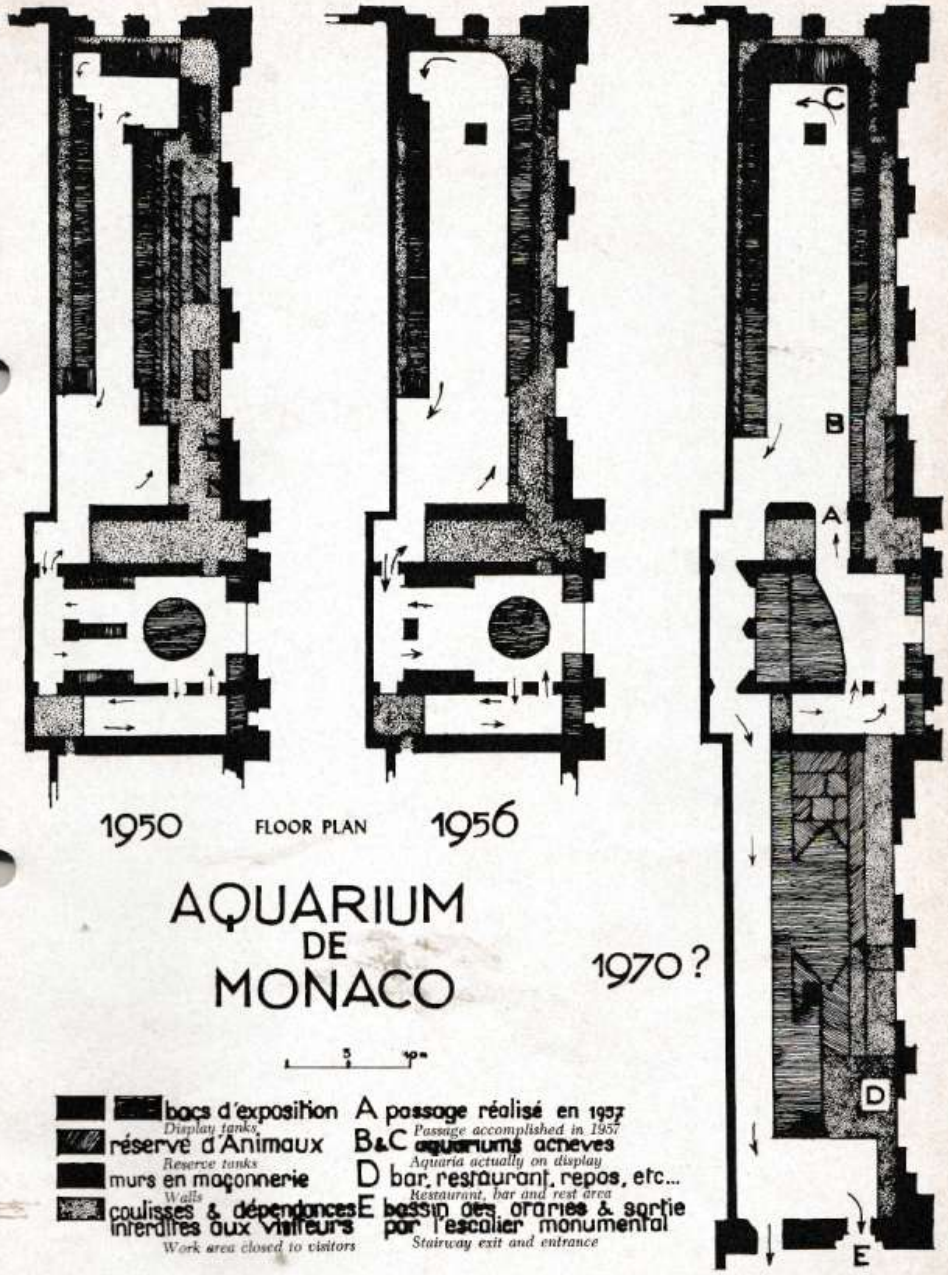
Certainly, our Mediterranean coast, eminently favorable for the erection of a marine aquarium, offers many sites where the Oceanographic Museum could have opened an Aquarium and it would be possible even today to realize it, in the best of conditions, on the Monacan coast, where vast platforms have been won from the sea.

A little before the end of the war, my predecessor, Dr. M. Oxner, of Polish and Israelite origin, and father of the Monaco Aquarium, was deported by the Germans, and has never again been heard from. The director of the museum, Captain T. Rouche, who had replaced the late Dr. J. Richard, looked for a person capable of restocking the Aquarium, almost empty at that time because of the difficulties of the war and the occupation.

This is the way that I was hired, because of the aquarium experience I had acquired, I assumed the management of the Monaco Aquarium in 1945, such as it was, and had the desire to restore it to its maximum use whatever the difficulties might be.

At that time, the first thing to do was to improve the general structure of the passage and the arrangement of the exhibition tanks. Restocking of the tanks was of course necessary, in spite of the difficulties of the time in establishing dependable liaisons by sea with the Far East for receiving fishes from the Philippines, Saigon, Singapore and Colombo. There were also very necessary modifications of the technical equipment pumps, distribution of water, heating, lighting, safety and general maintenance problems.

Most of these changes were accomplished between 1946 and 1956, thanks


C
B
A
D
E
1950
FLOOR PLAN
1956
AQUARIUM
DE
MONACO
1970?
bacs d'exposition
Display tanks
réserve d'Animaux
Reserve tanks
murs en maçonnerie
Walls
coulisses & dépendances interdites aux visiteurs
Work area closed to visitors
A passage réalisé en 1957
Passage accomplished in 1957
B&C aquariums achevés
Aquaria actually on display
D bar, restaurant, repos, etc...
Restaurant, bar and rest area
E bassin des otaries & sortie par l'escalier monumental
Stairway exit and entrance

to the understanding and help of the director of the museum, Captain J. Rouche who always gave his approval to all the successive changes and improvements. All that remained, was to open a passage in two thick walls of stone and to replace the shallow turtle pool with a cave for the sea lions.

This was done in 1957, with the approval of Commander T. Cousteau, who replaced Comdt. J. Rouche at that time.

In a word, these necessary improvements in the structure of the Monaco Aquarium have successively ended in a rectilinear and vast corridor surrounded by better equipped and more decorative tanks. The right wing especially was entirely reconstructed. But these modifications have not freed us from our technical handicaps. Be that as it may, the Aquarium could still be improved quite easily and enlarged by occupying the whole floor, which measures 100 meters (about 328 feet) in length. A very beautiful monumental stairway would assure the side exit for the visitors, as can be seen on the sketch.

The following special measures should be taken: the floors must be reinforced, as was done in 1951 and 1952 for the old part of the Aquarium. New exhibition tanks would receive a new type of structure and new systems of decoration. I have just finished a study of this and I hope to see those tanks realized some day in the new part of the building, for I think they would form an absolutely incomparable display. Likewise, the stocking of the tanks ought to be conceived in a different way, by eliminating the "trash" fish and by limiting the local fauna to the most beautiful species.

The Monaco Aquarium at present has more than 45 exhibition tanks. The capacity of each tank is very different. Some have a water volume of 700 to 800 liters (roughly, 175 to 200 gallons) only, whereas most of the tanks contain 1800 to 2400 liters (roughly 450 to 600 gallons.) A gigantic tank, at the back, with two exceptionally large heavy slabs, contains about 60,000 liters (about 15,000 gallons) of sea water. To these 45 aquariums must be added two pools viewed from the top, one for marine turtles or sharks and the other for sea lions. The whole thing occupies a surface of about 900 square meters, including behind the scenes and the reserves, situated on the same level. See the enclosed plans. Only marine animals are represented, although there may be added a freshwater tank to our public displays.

The Monaco Aquarium operates as an open circuit, the water being pumped from the sea without settling and filtering because of the exceptional location of our establishment. The used water is discharged back into the sea. Renewal takes place in an empirical manner, the quantity varying according to the season, the population and the feeding. The water circulation is very simple, as our diagram shows.

The Monaco Aquarium proper, comprising the exhibition tanks and reserve pools, is about 46 meters (about 150 feet) above the water. The gravity tank is concealed in the main building some 60 meters (almost 200 feet) above the sea. To surmount this considerable height, a first spare or relay tank is used. This is situated more than 25 meters

(about 82 feet) above the average sea level. From there the water is pumped toward a very large reserve tank for storage and brief settling. The tank contains more than 85,000 liters (about 21,050 gallons), and is situated at an elevation of 40 meters (about 132 feet). By automatic pumping, the gravity tank draws from this large tank, according to its needs. Lastly, from the gravity tank the water is distributed by gravity into all the tanks and reserve tanks situated below. Mechanical pumping units with safety systems regulate the uninterrupted circulation of sea water.

Compressed air is supplied to each exhibition tank and to the reserve tank, the latter producing a supplementary security.

The population of the tanks consists of specimens of the local fauna, fishes and invertebrates, and of warm ocean fishes from Ceylon and Singapore. The latter, much appreciated by the visitors, occupy about one third of the exhibition tanks.

Heat is assured by powerful gas heaters. Extra, between-season heating (June and October) is furnished electrically. Unfortunately, the reheated waters mix with cold incoming water of the open circuit. It would be sensible to maintain a closed circuit, which would have the advantages of facilitating the regulation of temperatures, and of increasing the efficiency of power use and greatly reducing the cost.

Refrigeration of the water which would be absolutely necessary to exhibit certain interesting forms from deep water and from cold oceans in the summer has not been installed yet. This would provide tanks with a temperature not over 20 to 22 degrees Centigrade and would also allow us to keep certain local species we cannot otherwise keep.

The Monaco Aquarium, which, on the morrow of the war, was very far from totaling 100,000 visitors annually, has seen its attendance increase regularly from year to year. Today the ceiling seems to be established around 750,000 visitors a year; a figure which could without any doubt be surpassed by increasing the drawing power of the Aquarium by a series of quite easily realizable innovations producing an incomparable display.

The price of admission to the Oceanographic Museum and to the Aquarium has been increased from 4 francs to 5 francs since June 1, 1963. Reductions in price are authorized for children, tourist groups, schools and boarding schools. Monacans and military personnel enter free.

The receipts derived from the admissions have permitted, until recent years, the Oceanographic Museum of Monaco and the Oceanographic Institute of Paris, both founded by Prince Albert I, entirely to meet the expenses of their scientific needs. However, these expenses have been increasing in such proportions that special sums will have to be granted for research.

At the end of this year, I shall leave this establishment wishing for the following things. That my successor may bring to the Aquarium of Monaco all the necessary improvements and that he may make of it one of the best installations of its kind. This, I believe, is possible. That the new plans and the systems of technical equipment that I have worked out during my career may be realized, somewhere, in the new installation, to the great profit of aquarium study. ◄

A Canadian aquarist shows how best to

Photograph Tropical Fishes

Donald Hanna
Vancouver, B.C.

ON YOUR FIRST visit to an aquarium you might be tempted, with camera in hand, to try your luck at capturing on film some of the multitudes of color and design to be found in the specimens of fish and marine life there. A few years ago I found myself in this very situation, with camera in hand and no prior experience in this kind of photography, yet quite eager to "capture some of that multitude of color and design." On looking back I feel it would have saved me much wasted film and disappointing results if I had bothered to read and learn about the proper technique for aquarium photography before undertaking this seemingly easy facet of photography. However, my experience was not a total waste since I finally did get good results, and since I can now pass on to you some of the pitfalls and errors encountered in my experience. I hope this article will save you precious film and give you the final good results that it took me much time to get through a great deal of experimentation.

Equipment

Any camera usable with flash will give you fair pictures. However, maximum results will be obtained through use of a single-lens reflex camera, since distances will usually be very critical. The equipment that I used consisted of a 35 mm. Minolta SR-2 single-lens reflex, 55 mm. lens, 135 mm. lens, bellows extension, electronic flash, tripod, and cable release.

Films and Lighting

The next choice to make is that of film and lighting. In making a choice of film one must be ready to put aside his preference for one specific type. Film unfortunately, or fortunately, is not quite as selective as the human mind,

Photo: The spectacular Moorish idol (**Zanclus**). Photo by the author.

and does not reproduce the scene viewed through water as realistically as is seen with the eye. For the sake of comparison, the following films and lighting were used by me in experimentation: Kodachrome II daylight, Ektachrome daylight, Anscochrome daylight (all used with blue flash and electronic flash); Kodachrome Type F. Ektachrome Type F, Anscochrome Tungsten, (all with clear flash); High Speed Ektachrome Type B, Super Anscochrome Tungsten, (used with exhibit floods). As can be seen a variety of films and lighting were used and to show complete technical results of all would be impossible here. Being objective and without prejudice, I found that most excellent results were obtained through the use of Ektachrome daylight (ASA 32) used with blue flashbulbs or electronic flash. High Speed Ektachrome Type B (ASA 125) used with natural light from exhibit floods also gave very good results. I shall restrict the following technical data to the use of these two films only in giving you information as to exposure, etc.

Problems

1) *Glass:* The first pitfall is that of glass and it has been a major contributor to most of my "flop" pictures. As it happened the glass was dirty, moist, or scratched. Fuzzy pictures were the end result. Glass also has the nasty quality of being very reflective and I found unwanted images of people or nearby displays, and stray light from my flash appearing on my pictures. To overcome these problems wipe the glass clean of dirt and moisture (if possible) with a cloth, and get your camera and flash as close to the glass as you can, being sure to shoot at an angle to the glass of about 45 degrees.

2) *Water:* Water, glass, and air interface together can distort images greatly. Water can diffuse light appreciably. The more murky the water the more diffusion. Most of these factors will affect your exposure. Distortion will have an effect on your subject the deeper back in the water it is. A good rule to

Photo: Betta splendens as photographed by the author. Note camera requirements on frame of 35 mm slide.

keep in mind here is: pick subjects of interest that are not more than two feet away from the glass. Diffusion of your light source in water is a matter of concern, for it ultimately affects the exposure of the picture. Since water diminishes the strength of light through diffusion, the guides given for flash distances in air will not be applicable to pictures taken through water. Also remember, the glass reflects some of the light. Variations of from 1 to 2 stops will be needed under the varying conditions. These are clearness of water, the distance of the subject back in the water, and color of your subject. As a base the following guide may be used for shots through water: Starting with the given guide number for air distances, alter your exposure for water shots by ½ stop larger for every foot of water, 1 to 1½ stops larger for darker subjects, and 1 to 1½ stops smaller than these for bright subjects. Make sure to pick the clearest water possible for all your shots for maximum efficiency in exposure.

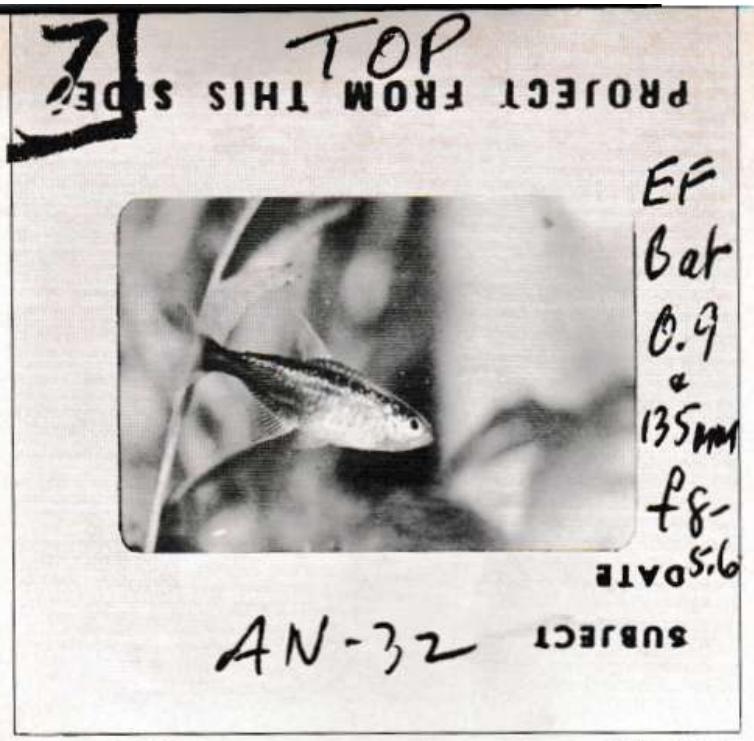
3) *Subject movement:* Fish can move irritatingly fast. Add this to camera movement and shallow depth-of-field at close distances or when using bellows and you have a big problem. Use a tripod and cable release if possible. For following moving fish I found it quite useful to use the tripod on one leg only as a "monopod." With the use of electronic flash I obtained maximum stopping power of fast moving subjects.

Technical Data

The most critical factors for judging exposure for water shots are, the distance of your subject away from the glass, the color of your subject, and the amount of illumination from exhibit floods. With small unadjustable cameras the best advice I can give is: stay as close to the glass as possible, shoot at an angle to the glass, and pick a subject that is close to the glass as possible. With an adjustable camera the following guide will serve as a basic starting point:

Assuming you use Ektachrome daylight film (ASA 32), and you are using either M2B, AG-1B, or electronic flash**, then your basic exposure number will be f/11. Now with this exposure you will do well only if camera and flash are as close to the window as possible and your subject is within one foot of the glass and is of a "normal" color. For a light subject use f/16, for a dark subject use f/8, and for any "depth" of your subject beyond one foot, give ½ stop larger open-

**Note – *The guide given for electronic flash assumes a watt-second rating of between 50 and 100.*



ing for every foot back.

Assuming you use High Speed Ektachrome Type B film (ASA 125), and no flash, your basic exposure will be: (1) Brightly lit exhibit – 1/15 or 1/8 sec. at f/1.8; (2) Average lit exhibit–¼ or ½ sec. at f/1.8; (3) Poorly lit exhibit – 1 or 2 sec. at f/1.8. Since flash is not being used, distance between camera and subject matters little here, but *clearness of water and subject color* does matter so use the same rules regarding f stops as above for color of subject. Slow speeds will necessitate use of a tripod and picking those subjects which are not moving.

For example, if you use one of the flash units noted above, and shoot a dark red fish, about three feet back in the water in a fairly well lit exhibit, and if you have your flash and camera as close as possible to the glass, your basic exposure is f/11 for a normal subject at one foot of "depth" in the water. To this you would add one stop larger for a dark subject and one stop larger for a two-foot distance or "depth." This would give you a lens stop of f/5.6. Quite a difference from the original setting of f/11.

I would like to say that this information can only serve as a guide and much experimentation will be necessary, but the guides should save you much precious time, wasted film, and disappointing results. The end rewards for you will be the satisfaction in having learned a new facet of photography, and pleasure in having captured on film some of the richness of color and form of aquatic life. ◄

CLUB NEWS

Midwestern Aquarist Club
(Omaha, Nebraska)

The M. A. C. will hold its Sixth Annual Tropical Fish Show on June 6 through 10, in the party room of the Commercial Savings & Loan Association, 30th & Ames Avenue, Omaha, Nebraska, according to Leola Petersen, Secretary of the Show Committee. ◄

Photo: A neon tetra as photographed by Donald Hanna. Note camera requirement on frame of slide.

Albert J. Klee

looks

• Under the Cover Glass

"Sam finally has the problem of that leaky tank in his basement solved!"

UNDOUBTEDLY, one of the more remarkable organizations within our hobby in this country is the Aquarium Research & Experimental Institute of Milwaukee, Wisconsin. To say that it is unique is to understate. It represents a group of talented aquarists who take their hobby seriously, and consequently their investment in both time and money is considerable. Now this is not to suggest that the organization doesn't have fun; on the contrary, it thoroughly enjoys what it does, for in the final analysis all of us must derive some pleasure from the hobby otherwise we would be collecting stamps, bird watching or involved in some such alternative activity.

The Institute was started about 15 years ago by seven aquarists who were dissatisfied with run-of-the-mill aquarium societies. These seven decided to pool their resources and shortly afterwards, rented a 5-room house (sharing all expenses). Here, they came and went as they saw fit and experimented in many different areas of the hobby. Other aquarists learned of this group and desired affiliation; consequently, the Aquarium Research & Experimental Society (a subsidiary of AREI) was formed. Because of the publication of ARES Reports, it is this latter organization that is somewhat better known throughout the hobby, however.

ARES has a rather formidable organizational structure when compared to an ordinary aquarium society. There are quite definite job descriptions and job titles. For example, one member is known as the "data correlator"; there are "laboratory directors" (the organization has several labs) and there are "instructors" for the numerous courses in aquatic biology offered. All experiments per-

formed, for instance, are numbered and written up, and the more promising are published in ARES Reports. Other publications include Project Reports, Lab Reports and the Catalyst, the last-named a commentary on material appearing in exchange publications, commercial aquarium magazines and the hobby in general.

The experiments performed by ARES are most interesting. One involved the effect of temperature on spinal deformation in a strain of guppies prone to that affliction (conclusion: guppies kept at 72° F produced 5% deformed specimens, guppies kept at 82° F. produced 26% deformed specimens). Another dealt with the use of the proprietary Alka Seltzer in the treatment of *Ichthyophthirius* (conclusion: the tablets were a trifle more effective than Quinine sulfate). At times, theoretical developments are made also. One such analysis concerned the computation of filtration effectiveness which took the hobbyist one step beyond the patently incorrect computation of simply dividing the tank volume by the filtration rate to obtain the time needed to filter an aquarium.

The organization has come a long way since its inception until today, drawings are already made for a third laboratory which is to be a 35′ x 60′ cement block building (the land is already paid for). Because of its unique nature, ARES understandably must be somewhat selective in its membership but aquarists interested in its work may subscribe to ARES Reports (charter subscription $3, first year; $1 annual renewal) by writing to ARES Reports, Box 5142, Milwaukee, Wisconsin, 53204.

Another interesting organization is the British Ichthyological Society, designed for the study of amateur ichthyology by anglers and by aquarists. This also is not an ordinary aquarium society by any means for it is devoted to a very board-spectrum study of fishes. One very interesting activity of the Society is its Correspondence Course in the study of fishes. To date, this consists of six parts as follows: Part I – Introductory, Part II – Indigenous Fishes (British Isles, of course), Part III – Whales and related animals, Part IV – Sharks and related animals, Part V – Aquarium fishes and related topics and Part VI – Selected topics in ichthyology (limnology, ecology, etc.). The Society publishes a very excellent bimonthly (The British Ichthyological Journal) which brings together interests shared by anglers and aquarists. Membership in the British Ichthyological Society is $3.00 and application should be made to: Mr. Amil Dillinger, P.O. Box 288, Cassville, Missouri, 65625.

Another organization is of interest to serious aquarists north of the border, the Canadian Aquatic Research Institute. This is a recently formed subsidiary of the Canadian Association of Aquarium Clubs (this is a sort of TIFAS

(Continued on Page 282)

★ IDEAS ★
BY HOBBYISTS

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

New Use for Old Tanks

After watching my husband's methods in the fish hatchery, I have noticed a considerable number of "shortcuts" that he uses. I am confident that some could be useful for many other hobbyists:

Did you ever wonder what to do with an old leaking aquarium? I found that it makes a very good white worm box. It not only can be cleaned easily, but also prevents silverfish or mice from doing any damage. To facilitate drainage, you only have to crack the bottom glass. – *Ingrid Campbell, Toronto 19, Ontario*

(Continued from Page 280)
although Canadian clubs are likely to be members of both organizations). The CARI was actually prompted by the success of ARES and the enthusiasm of one of the latter's members, well-known Gene Krys of Milwaukee. Canadians have been quite active organizationally in the hobby recently and even an informal national killifish group has been formed.

Aquarists should take note of several changes in fish nomenclature that affect the hobby significantly. Drs. Donn E. Rosen (American Museum of Natural History) and Reeve M. Bailey (Museum of Zoology, University of Michigan) in their recent monumental treatise revising the livebearers ("The Poeciliid Fishes (Cyprinodontiformes), Their Structure, Zoogeography and Systematics," Bull. of the Amer. Mus. of Nat. Hist., Vol. 126, Article 1, 1963) have transferred the guppy, most mollies, the limias and *Micropoecilia* to the genus *Poecilia* (pronounced, PEE-SILL'-EE-AH). Actually, these changes came as no surprise to American ichthyologists since on more than one occasion in the past, the guppy, mollies., etc., were lumped under *Poecilia* in articles appearing in Copeia, the official publication of the American Society of Ichthyologists & Herpetologists. The new classification makes those occasional guppy x molly crosses more understandable but I imagine that it will be a while before the new nomenclature is mastered by aquarists. Incidentally, the guppy becomes *Poecilia reticulata*, the ending of the trivial name being slightly altered to agree in gender with *Poecilia*, which is feminine.

Speaking of nomenclature, this columnist had an amusing incident along these lines recently. In collaboration with Bruce Turner of New York City, we completed an article on our experiences with a new (to the hobby) killifish for this Journal and duly sent it off to the editorial offices. Some preserved specimens which we thought represented a population from an extreme portion of its range, were sent off to Europe for more detailed examination. Just as the article went to press, we learned that the fish was being transferred to a different genus. Frantically, we recalled the article just in the nick of time. After making the necessary alterations, the article *(see Page 286 for article)* was resubmitted. Afterwards we learned that the preserved specimens sent to Europe represented an entirely new species (which is now being described)! Fearing remarks such as, "Why don't you fellas tie a rubber band to this article?", we elected to present this additional information to the editor in the form of a postscript to our already revised article. However, one more name change and Bruce and I will switch to ants as a hobby! ◄

★ IDEAS ★
BY HOBBYISTS

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

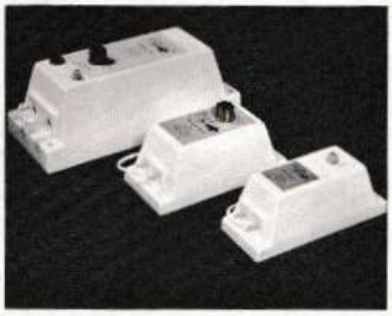
Bridal Veil for Algae!

Who isn't plagued with that pest, algae, once in awhile? My tanks were beginning to look like green stained glass windows when I tried something my mother uses to wash dishes. All that is required is a small piece of netting – the kind used for bridal veils. Wad it up in the palm of your hand, wipe, and watch the algae literally disappear! It takes no "elbow grease" even for the thickest patch of algae, and soon the tank looks like new! — *James H. Gladstone, Marshall. Mich.*

PRODUCT NEWS

The Sander Ozonizer

Triton Aquatics announces the American introduction of the Sander Ozonizer, a small, noiseless, vibration-free apparatus that is said to help the importer,



Sander Ozonizer

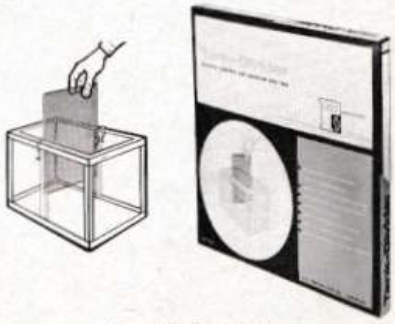
large scale breeder, dealer and advanced fancier to reduce fish mortality drastically. The Sander Ozonizer is claimed to generate a highly reactive form of oxygen known as ozone that has long been used for the purification of drinking water. When used as directed, the Sander Ozonizer is claimed to prevent most epidemic diseases from ever starting, or to cure them rapidly if already begun. The product has been in actual use in Germany for over a year. An illustrated pamphlet on the three models available may be had free from Triton Aquatics Inc., Haines Road & Route 13, Levittown, Pennsylvania 19057, or To-JoVe, 225 W. Montecito St., Santa Barbara, Calif.

• • •

Penn-Plax Tank Divider

Penn-Plax Plastics, the creators of the 3-D Aquarium Backgrounds, have developed a new product that is the answer to an age-old fish hobbyist's problem: a simple, inexpensive and safe method of separating an aquarium into two or more areas, a tank divider. It provides a separate area for baby fishes or breeding compartments, separates "rough" fishes from a peaceful community and protects expensive plants from algae-eating fishes.

The key feature of the Tank Divider is the exclusive "flo-through" plastic separator with hundreds of tiny perforations to allow for unrestricted filtration and heat circulation within the separated aquarium. The hobbyist can now operate the two or more sections of his tank with the same heater and filter – with no added expense for extra equipment. The Tank Divider is available in three sizes, from 2½ to 20 gallons. For



Penn-Plax Tank Divider

information write: Penn-Plax Plastics, Inc., 9809 Foster Ave., Brooklyn 36, N. Y.

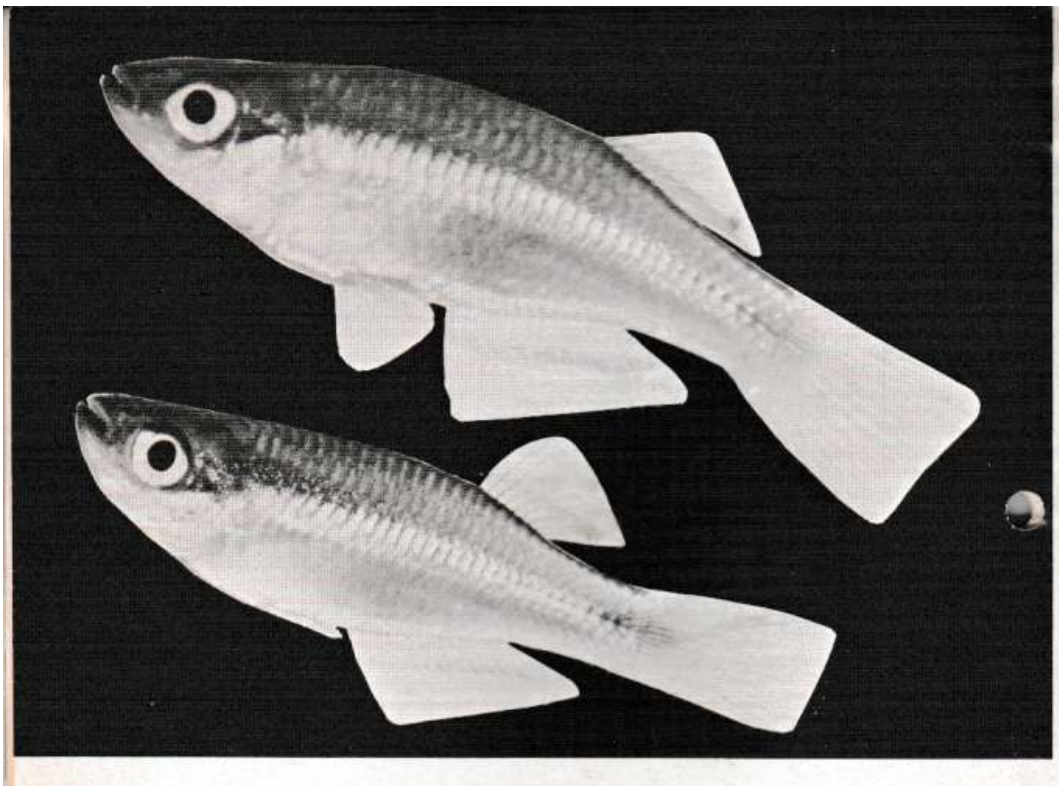
• • •

New Tropical Fish Store Opens

"Aquatiki Tropicals" is now open for business at the corner of Irving Street and 8th Avenue, 535 Irving Street, San Francisco, Calif., according to Bob Warner, owner of the shop, who emphasizes that the policy of Aquatiki Tropicals is hardy and healthy tropical fishes.

The South Sea Island decorating theme at Aquatiki Tropicals lends a comfortable and relaxed atmosphere, conducive to leisurely inspection of the many species of tropical fishes on display.

Hours of the shop: Monday thru Friday, 10 a.m. to 8 p.m. Saturdays, 10 a.m. to 6 p.m., and closed on Sundays. Telephone number of Aquatiki Tropicals: LOmbard 6-1449. ◄



Almost 60 years after its discovery, the authors rediscover an African beauty!

A Congo Jewel

Albert J. Klee and Bruce J. Turner

IN THE BEGINNING of the 1900's, Dr. W. J. Ansorge collected a number of robust, square-tailed lampeyes from the Lucola River near Cabinda, the capital of the Portuguese Congo (an Angolian enclave of about 3000 square miles and like its capital city, also named Cabinda). In 1911, the great ichthyologist, George Albert Boulenger, described the fish as *"Haplocheilus cabindae"* (pronounced KA-BIN'-DEE). Then, during his Chiloango and Congo expeditions of 1920-1922, Dr. H. Schouteden discovered a lampeye from the Lombo River, an affluent stream of the Loeme of Gabon. In 1924, this fish was described as *"Haplocheilus loemensis"* (pronounced LOW-EH-MEN'-SIS), by the French ichthyologist, Dr. Jacques Pellegrin. These events then, were to set the background for our own experiences almost 60 years later.

Figure 1. Plataplocheilus cabindae. Male above, female below. Photo by A. J. Klee.

In mid-January of 1963, the authors were indeed fortunate in acquiring through the kind cooperation of Paramount Aquarium of Ardsley, New York, five rather exotic species of killifishes imported by that firm from the "Congo" area (in quotes because, as we shall see, there are many "Congos"!). The first four were quickly identified by the authors as *Aphyosemion labarrei, Aphyosemion striatum, Epiplatys duboisi* and *Epiplatys macrostigma*. The fifth, however, was new and remained for a while, without a name. Because of the relatively high placement of its pectoral fins, however, there was no doubt that it belonged to that subfamily of killifishes known to aquarists as "lampeyes." Shortly afterwards, a careful examination of the scientific literature indicated that our fish was *Micropanchax cabindae*, an identification later confirmed for us by Mon. Jacques Lambert, the noted Belgian specialist in Congo fishes. However, Mon. Lambert has just informed us that *cabindae* actually belongs to the genus *Plataplocheilus* (pronounced PLATA-PO-KYE'-LUS), a conclusion concurred in by the well-known Danish zoologist, Stenholt Clausen. He (Mon. Lambert) arrived at this conclusion after comparing this species with syntypes of *Plataplocheilus ngaensis* and two new species (i.e., *P. chalcopyrus* and *P. miltotaenia*) which he discovered in Gabon. In preparation is a new definition of the genus since presently, it is rather ill-defined. Perhaps we may say more about this in a future article.

There is no doubt that the Cabinda lampeye is a beautiful fish. Furthermore, it is a large enough fish so that aquarists do not have to strain their eyes to appreciate its beauty, i.e., about 2 inches total length for males at maturity (females slightly less). As with most lampeyes, however, they should be viewed using oblique lighting for maximum effect. Such fishes do not rely upon pigments for their beautiful coloration, but upon irridiophores which impart color by refraction. The basic body coloration of the male is a nondescript gray but on its sides, it displays an electric-blue sheen, concentrated along the lateral line into a particularly intense effect. A very thin line of electric-blue also runs along the ventral keel. Both the lateral and the ventral lines continue into the caudal fin, the former moving up, the latter down, so as to follow the configuration of this fin to act as submarginal borders.

There is an orange basal stripe in the dorsal fin, and another in the anal except that the orange stripe in the latter is not quite basal, being not only ob-

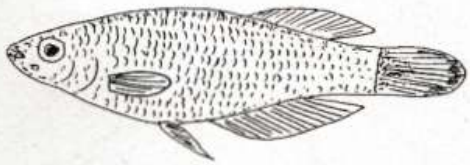


Figure 2. Micropanchax loemensis.
(After Pellegrin)

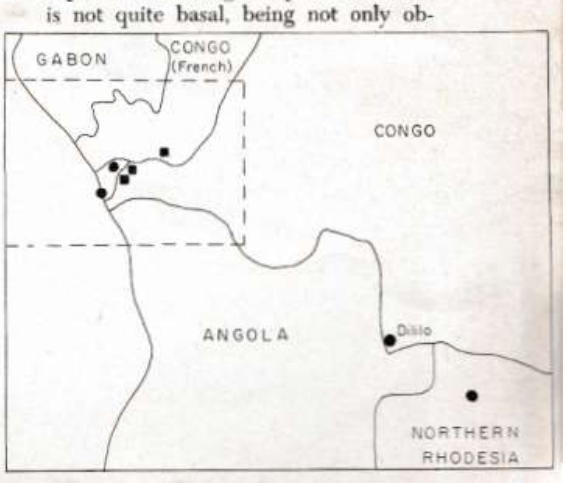


Figure 3. Localities of **Plataplocheilus cabindae** (circles) and **Micropanchax loemensis** (squares).

lique but separated from the base of the fin by a band of the same electric-blue found on its sides (figure 1). Females, although they display the bluish coloration (but much less intensely), do not have these orange bands in the dorsal or anal fins.

Besides being a large, deep-bodied member of the genus (and in these characteristics it is similar to *Aplocheilichthys spilauchen*), *P. cabindae* has a very truncated tail fin. It is, therefore, easily distinguished from its close relatives and in particular, from *M. loemensis*. It is necessary now to digress for the moment to consider this last-named fish for it has, more than once, been confused with *P. cabindae*.

Micropanchax loemensis is essentially almost identical in pattern and coloration to *P. cabindae*. It is, however, different in a number of ways. For one thing, *P. cabindae* is generally somewhat deeper-bodied than *N. loemensis*. Unfortunately, some specimens of *cabindae* are more elongate than others so this is not a reliable indicator unless taken with other facts as well. It is found that the area on the back from the head to the dorsal fin is very much straighter in *cabindae* than it is in *loemensis*. In *loemensis*, the back starts in a convex curve right behind the head (figure 2). The tailfin in *cabindae* is always more truncated than in *loemensis*. In the former, it is either straight or even slightly concave; in the latter it is always nearly rounded although sometimes a solitary specimen may carry nearly straight tails but even then, the tail will still be slightly convex. Finally, these two species differ in dorsal fin count and on 56 specimens of *P. cabindae* from the Tissala River and from an area between Pointe Oire and Sundra, and on 7 specimens of *M. loemensis* from Mindouli, Mon. Lambert found the following:

TABLE I
Dorsal Ray Frequencies

	Plataplocheilus cabindae			Micropanchax loemensis		
Number of rays	8	9	10	11	12	13
Frequency	2	33	21	1	4	2

Since the counts do not overlap, they are an excellent means of distinguishing between the two species (our specimens had counts of from 9 to 10 rays).

Figures 3 and 4 show some of the habitat localities for both *P. cabindae* and *M. loemensis* (figure 4 is an en-

CLUB NEWS

Guppy Associates of Milwaukee

This new group was formed in association with the Guppy Associates of Chicago. Aim of the Guppy Associates of Milwaukee is to promote the breeding and showing of good guppies both in and beyond the boundaries of the group, according to George H. Buckner, publicity chairman. Mr. Buckner's address is 2446 South 12th Street, Milwaukee 15, Wisconsin. ◄

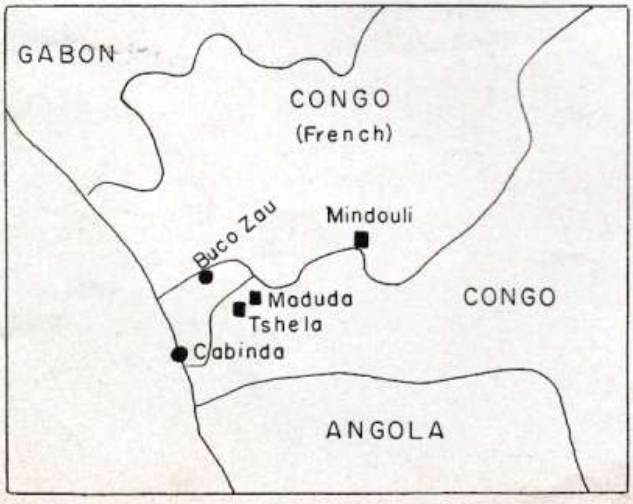


Figure 4. Enlargement of dotted area of Figure 3. **P. cabindae** (circles) and **Micropanchax loemensis** (squares) distribution shown.

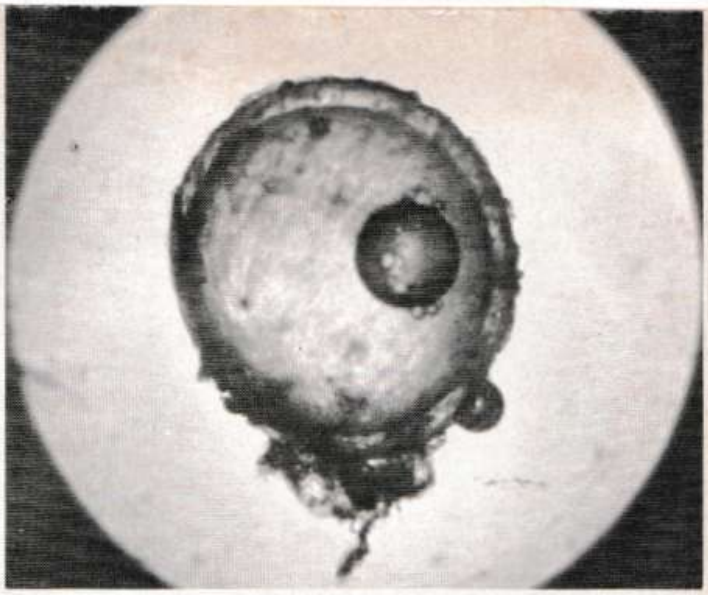


Figure 5. Egg of **Plataplocheilus cabindae.** Photo by R. J. Klee.

largement of a selected portion of figure 3). From these, it can be seen that both species are concentrated in the French, Belgian and Portuguese Congos. In these western areas, however, *M. loemensis* is frequently found somewhat farther inland. Unlike *loemensis, cabindae* is relatively widely distributed throughout Africa. Not only has it been described from Dililo in the Belgian Congo and Angola (see figure 3), but we have received preserved specimens from Dr. R. A. Jubb of the Albany Museum in Grahamstown, South Africa, of *cabindae* taken by Mr. Bell-Cross from the headwaters of the Upper Zambesi River (where it shares a watershed with the Congo system) in Northern Rhodesia!

In the Northern Rhodesian area, the biotope of *P. cabindae* is one of high summer rainfall, tropical, and consists of what is locally called "sponges." Sponges are swampy areas, frequently the source of a river, sited on a plateau. During the dry season, these swamps may at places suffer from lack of oxygen due to rotting vegetation, but during the rains they again become fresh with a reasonably high oxygen content, and empty down both sides of the plateau. If the plateau happens to be a watershed, these swamps become a link between two major drainage basins and small fishes reaching the plateau can pass from one basin to the other. Lake Dililo, in northeastern Angola, lies on the watershed between the Congo and the Zambesi, and most assuredly forms an interesting spot as a link between the two systems, to which the wide distribution of *cabindae* attests.

Concerning the biotope of *M. loemensis*, Mon. Lambert has kindly supplied the authors with the following information:

"*. . . the fish is generally found in fast-running, clear waters, with a bottom*

* * *

English-German Dictionary

Don Cook comes up with the following daffy definitions in the March issue of *Aquatic Net* (CIAC Bulletin):

Beginning aquarist –
Lookenbuyertankenstuffer

One-year aquarist –
Lookenbuyertankenstuffernailishbiter

Advanced aquarist –
Lookenbuyertankenstuffernailishbiter, mit fry geladen

Expert aquarist –
Lookenbuyertankenstuffernailishbiter, mit fry geladen, unt fish gesellin

of sand and pebbles. These waters are slightly acid but in the Loeme itself, the water is also clear and fast-running, though much darker and probably more acid (no measurements were taken). This species was also caught in an estuarine lagoon in which there is a constant stream of freshwater coming from the Loeme but where a certain mixture of seawater may occur at high tide. In this lagoon, true estuarine forms such as Aplocheilichthys spilauchen, Batanga lebretoni *and* Dorichthys aculeatus *are found with* M. loemensis. *I would not consider the last-named as an estuarine fish but rather take its presence in the lagoon as "accidental," merely showing that as long as it gets clear, running water, this fish seems rather tolerant of a wide pH range."*

In the aquarium, *P. cabindae* is quite active, even for a lampeye, and does not "pose" as do many killies. Indeed, its activity is scarcely less than that of the common *Danio* species. Thus, it can be appreciated that this species does better on the whole in aerated aquaria. An inside filter in their aquarium is sufficient to make them quite comfortable. It has been our experience in general that briskly-moving lampeye species fare better as aquarium specimens in more elongate aquaria, and this thesis is certainly applicable to *P. cabindae*. It appreciates adequate room to swim in and is constantly moving about, searching for food. Surprisingly, *P. cabindae* seems to inhabit equally, all levels of the aquarium, having no preference for the top stratum as do other types of lampeyes. There are no rigid temperature requirements in the ordinary sense for this species nor is it by any means delicate as long as provided with moving water. It has been our experience that, if housed in a small aquarium without aeration, the fish will shortly be seen to gasp for air at the surface. Evidently then, its oxygen requirements are fairly high. Also, the colors of the male seem to increase in intensity with an increase in motion of the water.

P. cabindae is neither rambunctious nor given to displays of "temperament." Two or three males will occasionally appear to nip one another in what may seem to be an aquatic free-for-all, but little or no damage is done in these encounters. In general, one quickly gets the impression that this species is "too busy" moving about to be pugnacious. Females make motions towards one another but again, no damage is done. In short, torn or ragged finnage in groups of these fish are hardly ever observed. As far as feeding is concerned, *P. cabindae* readily takes frozen adult brine shrimp, beef liver and chopped beef, as well as live foods such as tubifex worms

CLUB NEWS

Golden Gate Guppy Group

(San Francisco, California)

The next meeting of the G.G.G.G. will be June 16, 1964, at 8 p.m. at the Visitacion Valley Community Center, 66 Raymond Avenue, San Francisco. Meetings are held the third Tuesday of each month. The public is invited; there is no admission charge. Coffee and cake are served, according to Virginia Masters, secretary of the group. She added that the G.G.G.G. recently joined the San Francisco Aquarium Society. ◄

and brine shrimp. They will even pick up such foods from the bottom of the aquarium.

The spawning act follows the usual lampeye procedure, adhesive eggs being laid on nylon mops after the prenuptial play consisting of circling and close contact between the sexes. Although one of the authors obtained eggs from all strata, the other found that they laid their eggs predominantly on the upper portions of the mop. Furthermore, when given a choice between light-green and dark-green mops, they invariably selected the latter! The ways of fishes are indeed strange at times, making it difficult to write about them in generalities.

The sexes may be left together without danger at all times, and this holds true of course for spawning as well. Two males to five females is ideal but trios

are excellent also. There appears to be no decided tendency to consume the eggs but for the sake of efficiency, the eggs should be removed and hatched separately. The eggs, which possess a particularly sticky thread bundle, are large, averaging about 1.8 mm in diameter (see figure 5). In this, they are about the same size as the smaller *Micropanchax pumilus* and *M. katangae*. We note that a good deal of nonsense has been written about the egg size of *Micropanchax*, and for that matter, about lampeyes in general. When newly-laid, the eggs are quite yellowish, an indication that in nature, such eggs are liable to a degree of exposure to sunlight. The yellow coloration filters out the bluish rays of the spectrum, a band which is especially lethal to fish eggs.

The fry hatch in 12 to 16 days and immediately are able to take brine shrimp nauplii. They are easily raised, moderately slow-growing and attain maturity in from 8 to 12 months of age.

In our article, we have attempted to discuss *Plataplocheilus cabindae* and related topics with some thoroughness. However, it is not to be denied that fishes are adaptable animals and that their behavior patterns are not always rigid. Furthermore, there is still a great deal to be learned about the Cabinda lampeye, both from the aquarium and the scientific points of view. Finally, there is no doubt that we can, with excellent justification, recommend *P. cabindae* to all aquarists whether their first love be killifishes or not.

ACKNOWLEDGMENTS

The authors would like to express their appreciation to Mon. Jacques Lambert, Roulers, Belgium, for his invaluable assistance in confirming our identification of P. cabindae, *and for supplying original meristic and ecological observations. Also, we would like to thank Dr. R. A. Jubb, Grahamstown, South Africa, for his kindness in supplying preserved specimens and ecological notes pertinent to Northern Rhodesia forms. Finally, we wish to thank the Paramount Aquarium of Ardsley, New York, for making available to us, our original specimens.*

ADDENDUM

Some time after we completed our article, preserved specimens of the Rhodesian forms were sent to Mon. Lambert for his examination since they appeared to possess certain unique qualities. We have just received his reply and, much to our surprise, these Rhodesian forms appear to be of a brand new species and will be described by Mon. Lambert in a professional journal. When available, this information will be passed on to aquarists. In the meanwhile, the reader should understand that Plataplocheilus cabindae, *although widely distributed, is therefore not known from Rhodesia and that the information furnished in regard to this form pertains to this new species only.* – The Authors ◄

★ IDEAS ★

BY HOBBYISTS

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

Saran Wrap for Bubblenests!

When breeding bettas in a completely bare tank, the bubblenest often disintegrates. To overcome this, I always place a 2-inch square of Saran Wrap on top of the first few bubbles the male blows. This does not inhibit the process of nest building by the male and the nest usually holds together firmly until the young are free-swimming. – *Douglas Campbell, Toronto 19, Ontario*

PROGRAMS

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

"Saltwater Aquarium in the Home," a new 16mm film in color. Running time, 25 min. Rental: $15. For information: Coral Reef Exhibits, P.O. Box 59-2214 Miami 59, Florida.

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

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

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

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

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

Used to make foods, drinks — even medicines; cultivated in Japan, Scotland and Ireland

Seaweed Means Business!

P. F. Capon
Essex, England

PART II

Pharmaceutical Uses

THE ANCIENT Chinese used sea-weeds in various concoctions as specifics against various diseases but the few cures were attributed to supernatural powers and not to the weeds. They also used, incidentally, mixtures containing such things as cockroaches, dried snakes, and beetles. After being given these charming medicines it is a wonder that any patients survived at all!

Sea-weeds contain appreciable quantities of iodine and the use of sea-weeds in the diet is a help in the treatment of goiter, although it is more normal in Western countries to use iodized table salt or other iodine compounds to combat this affliction. Sea-weeds have in the past been suggested as cures for syphilis, tuberculosis, cancer, and gallstones amongst many other ills, but their effectiveness is most doubtful and their use is ridiculous.

Normally in the West only the extracts of sea-weed such as agar-agar and the alginates are used in medicines, usually

as ointment and pill bases, but arsenic and morphine mixture with agar-agar are sometimes used as convenient ways of administering these drugs. There is also a kind of "cat-gut" made from alginates which is particularly useful as it is slowly assimilated by the body and so when it is used to sew wounds after surgery does not have to be removed after the wound has healed.

Miscellaneous Uses

Agar-agar is perhaps the best known sea-weed product, the exact method of manufacture need not concern us here except to note that the repeated freezing-thawing process used in its manufacture was discovered accidentally by a Japanese inn-keeper who left some jellies made from sea-weed outside during frosty weather. Agar-agar is used in the manufacture of table jellies and is widely used as a stabilizer in ice cream. It is also used in chocolate and malt drinks as it prevents the formation of a sediment, and in cakes because of its moisture holding properties, to keep them fresh. Agar-agar also finds its way into many other products such as canned meat and fish, and toothpaste. Of course its best known use is as a support medium for bacteria cultures.

Algin or alginic acid and its derivatives, the alginates, are extracted from sea-weed by the act of boiling soda solutions, in Europe it is usually made from species *Laminaria*. Alginic acid can replace agar-agar in many instances, and it is also used as a stabilizer in emulsion paints, and its salts used to remove impurities from beet sugar. Fibres made from alginic acid are also used for special applications in the textile industry; these fibres tend to be soluble in soda and soap solutions but it is just this property that makes them useful. For instance hosiery can be knitted in con-

tinuous lengths using these fibres at the points where two socks join, then when the socks are given a wash in soap the socks part cleanly without any tedious hand cutting.

At one time the burning of sea-weed was an important industry in the British Isles. The burnt sea-weed known as kelp was used to supply iodine and its salts and crude soda for the glass and early chemical industry.

Sea-weeds are also beginning to be used as perfumery materials; perfumers describe their odor as "interesting" and useful in combination with various natural and synthetic perfumery substances. The most favored way of using the weeds is to make an extract of them with benzole, and then to evaporate off the benzole. The resulting extract is a greenish-brown semi-solid with a powerful smell of fish accompanied by an "after-smell" comparable to linseed oil which is also slightly mushroom-like. It may seem strange to use such an unpleasant smelling material in perfumes, but another sea product ambergris derived from whales' intestines is a highly valued perfumery material which although it is rather revolting to smell in the raw state produces some of the most fragrant perfumes when in combination with other substances.

So you can see that sea-weed is a very important raw material for many different products. Next time you are on the beach you may care to think as you gaze at the piles of weed that the ice-cream that you are eating may quite well owe its smooth texture to seaweed! Sea-weed is indeed a wonderful plant, its uses and potential uses are far greater than one would imagine from just its appearance. ◄

S.F.A.S. Tidepool Picnic Slated for Sunday, June 14

The Annual Tidepool Picnic Outing is slated for Sunday June 14, 1964, at Moss Beach, south of San Francisco and near Half Moon Bay, according to Fred Jenne, 1964 Picnic Chairman.

Low tide is at 10:00 a.m. – so for the best collecting, it is suggested that members arrive by that time. A whopping good picnic lunch will be served free to members and their guests, which will be supersived by Velma Echeverria. Also beverages will be available free.

Bring plenty of clothes, because there's no telling what the weather will be like. "Musts" are rubber-soled shoes (for climbing over the slippery reefs) and PLASTIC containers or buckets for keeping specimens. NO glass containers allowed!

All sorts of activities are planned for the kiddies – including a balloon game, sack races, etc. Prizes will be awarded the winners of these contests, Jenne said.

A brochure describing the Picnic and a map showing how to get there will be mailed to members in plenty of time before the big day. ◄

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

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

Far East Tropical Fish — Write for price list today for the high quality fish with the most reasonable price: Larsens Aquarium, Prakanong P.O., Box 125, Bangkok, Thailand.

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.

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

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.

Albino veiltail guppies—cream bodies, red fins with aqua highlights. Young breeders. C. Basil Jordan, Moore, Texas 78057.

Microworm Cultures — only $1.00. Instructions and extra food included. Airmail 50c extra. Postage prepaid. Microworm Cultures, 8 Hamilton Road, Wakefield, Mass.

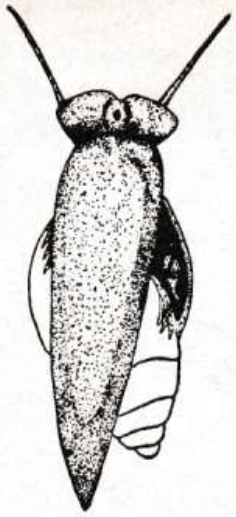
Serious? — Then feed fish **live** food! Directions (we pay postage): Wingless fruitflies ($1.75), Microworms ($1.25), Whiteworms ($1.50.) Sudden service! Airmail .30c extra. Special delivery .30c extra. Aqua Engineers, Box 1-B, Ortonville, Michigan; or Box 97, St. Basile le Grand, Quebec, Canada.

Aquarium Show Plants—greenhouse grown — Includes one Amazon Sword; 4 Crypts; and at least 8 other varieties. Satisfaction guaranteed. $5.50 pp in U. S. Westerleigh Aquarium, Box 11, Staten Island 10314, New York.

Japanese Carp — Any size, any color. Shipments anywhere in U.S. Prices upon request. G. R. Gillespie, 15388 Churchill Street, San Leandro, Calif. Phone (Day) 357-8280; (Night) 638-0008.

WANTED

Oscars — Five inches and over. G. R. Gillespie, 15388 Churchill St., San Leandro, Calif. Phone: (day) 357-8280; (night) 638-0008.



Identified because of its left-hand coil, it outlasts fish and plants!

Tadpole Snail

Charles O. Masters
Walhonding, Ohio

DURING the last forty years biologists have reported the finding of *Physa gyrina* Say, the tadpole snail, in waters throughout most of the United States but confined chiefly to those of the North and parts of Canada. It's probably true that the snail has appeared at some time or other in aquaria, even if only accidentally, in every state in the country.

It is possible, too, that many of the snails collected were mistakenly identified and were really of the species *Physa heterostropha* Say, which is quite similar but distributed over much of the entire world. In fact, since 1929, this latter species has become well established in the greenhouses of aquatic nurseries in Germany and is being shipped out on aquarium plants to multiply rapidly in the fish tanks of that part of Europe.

In the out-of-doors the snail populations rise and fall drastically at intervals which has caused enough concern so that rather comprehensive studies have been made to determine the related factors. It is possible that the heavy infestations of larval trematodes (flatworms) within the snail have much to do with these fluctuations, but to date, the presence of these numerous worms within the aquarium snail is of no public health significance.

There are several species of *Physa* distributed over the United States but the two mentioned previously are those most commonly found in aquaria. They are of the phylum, Mollusca; class, Gastropoda; order, Basommatophora (Pulmonata); and family, Physidae. The genus, *Physa,* was so named in 1801 by Droparnaud. Other common names are, the bladder snail, the lung snail, and the pouch snail.

They are small snails rarely reaching an over-all length of three-fourths of an inch with a body yellowish gray or darker which is dotted with lighter spots. The antennae are threadlike and often difficult to see.

Sketch: The tadpole snail as sketched by the author.

The tadpole snail should be remembered as the snail with the left-hand "thread" and is thereby easily identified. The shell has only a few (up to six) spiral turns, the last of which is relatively large, and is colored brown or black.

The snail is found wherever submerged aquatic vegetation grows profusely, in all kinds of water, even in some rather badly polluted areas where fishes would find it impossible to exist. *Tubifex* and chironomid larvae (blood worms) which are found where the free oxygen of water is scarce, are sometimes the only associates the snails have. In the winter of 1930, and again in 1931, *Physa gyrina* was found thriving in an Illinois ditch filled with the effluent wastes of a corn products plant where the temperature of the water very often reached 95 degrees F. and the free oxygen was practically nil.

After the snails are once introduced into an aquarium, they very often outlast every other living thing including the plants. The author well remembers

The tadpole snail

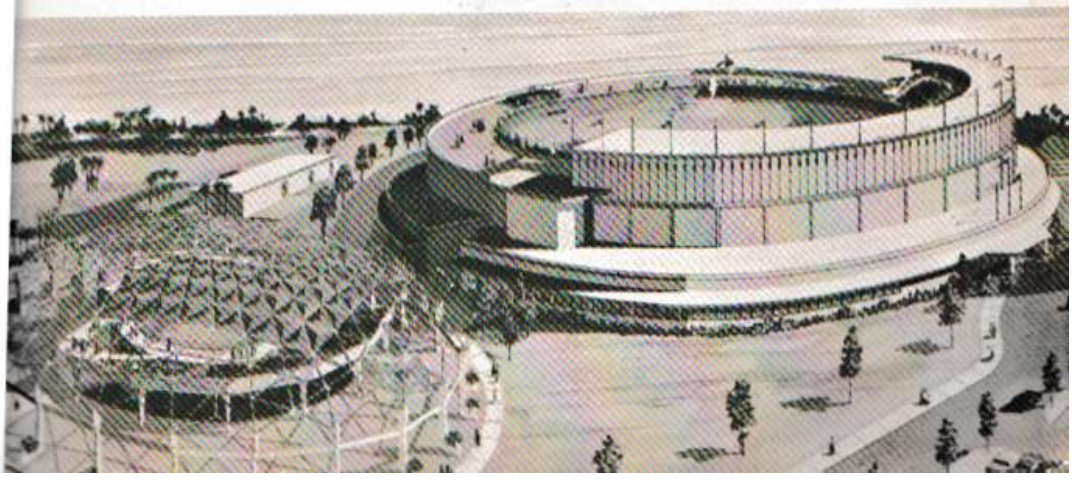
cleaning out a tank with nothing left in it but gravel, snail shells, and living tadpole snails. In spite of the fact that they sometimes grow too well, aquarists very often consider them ideal.

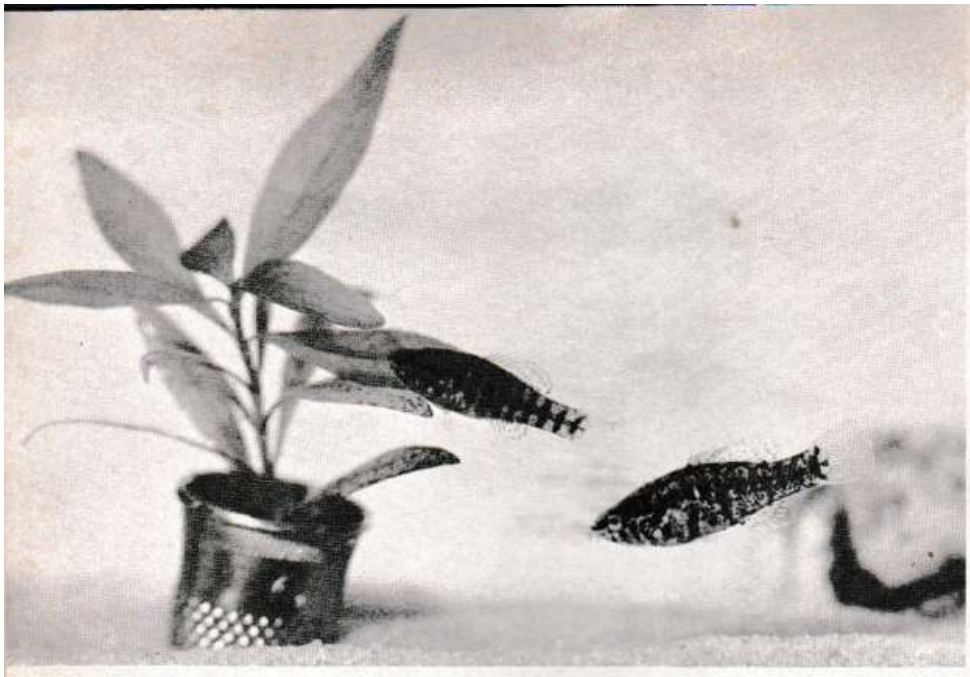
Their small size enables them to get about the vegetation quite easily in search of algal food and into places

(Continued on Page 306)

"Aquatarium" Opens in St. Petersburg, Florida

Located on the Gulf of Mexico between 63rd & 67th Sts., St. Petersburg Beach, Florida, the unique "Aquatarium" is the world's largest fish tank. It is 3½ stories high, holds 1,240,000 gallons of seawater and has 120 viewing windows on two levels, and a grandstand on the third level. An elevator is available for those who prefer not to walk. Performances by sealions and porpoises are held continuously in a second tank under the Golden Dome, the world's largest geodesic, free span structure of its kind. A grandstand is provided in this separate structure. Neptune's Reef Gardens offers 34 tanks of fishes for the public to view.





We'd probably see more of this sunfish if it came from some exotic far-away place!

The Neglected Native

PART I

THE PYGMY SUNFISH, *Elassoma evergladei* Jordan, is an unfortunate casualty of the old attitude that the fishes are always prettier in the other fellow's mudpuddle. If this sprightly little native were an inhabitant of some obscure locale in Africa or South America, aquarists would undoubtedly see a good deal more of it. But as it is, it seems doomed to a permanent semi-exile because of the onus attached to any fish with a North American origin. The genus *Elassoma*, established by the ichthyologist Jordan in 1877, until recently two species, *E. zonatum* and *E. evergladei*, both described by Jordan and known to the world of science for many years. A more recently discovered species, *E. okefenokee*, was described by Dr. James Böhlke in 1956. This genus contains the smallest members of the family Centrarchidae, which includes the black bass and the pumpkinseed, as well as the colorful sunfishes. Despite the general scrappiness of many members of this group, the pygmy sunfish is a model citizen and is far more apt to be timid than aggressive in mixed company. Easily housed, this one-inch beauty is quite satisfied with small aquaria, and a well-matched pair will keep their owner in *Elassoma* for the rest of his

Paul Loiselle
Santa Clara University

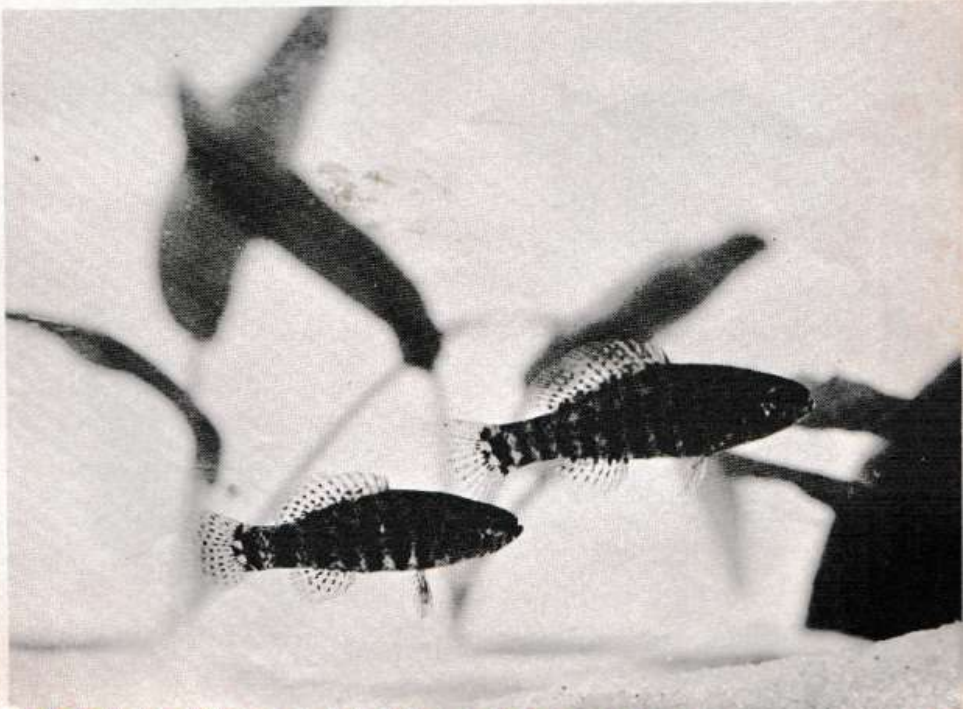
Photo: Elassoma zonatum, the Florida pygmy sunfish, as photographed by Gene Wolfsheimer, F.A.I. Note sewing thimble used for size comparison.

days without any special care. The only points that might be held against this little gem are its extreme timidity in the presence of larger and more active fishes or when kept in an unplanted tank, and its refusal to have anything to do with dry food in any shape or form.

Elassoma is no exception to the strong sexual dimorphism that characterizes the sunfishes during breeding season. The males are deeper-bodied than females, and their handsomely arched fins are dusky at all times. The females have hyaline fins. Fully mature males always show a generous sprinkling of golden scales, but this is seldom evident in younger males. The ladies have the same warm brown body color as their mates, but their fins are shorter and clear, save for a pattern of tiny dots along the fin rays. Both sexes have a "fleeting" blue-green iridescence in good light. This picture changes radically when an amorous male dons his courting colors. The dusky beige of the body is replaced by an intense velvety black, which is echoed in the unpaired fins. Scattered over this is a brilliant assortment of metallic green and gold spots, repeated in the fins by dots and streaks of the same hue. The eye glows with an emerald green life of its own. The total effect is something like seeing a jeweler's display of topaz and emeralds on a velvelt backdrop. It is hard to find any fish to equal this display, much less surpass it. In color, however, the Jack Dempsey sports similar hues, while the small killies of the genus *Cynolebias* bear a strong resemblance to *Elassoma* in body form. One is sometimes tempted to think of them as some impossible miscegenation between a killie and a cichlid.

As a matter of fact, this is a good analogy to keep in mind when keeping these little fellows. In their day to day activities, these fish should be handled like dwarf cichlids, with the same sort of care paid to matters of diet and water conditions. *Elassoma* will condescend to eat frozen food, but there can be no question that a hefty portion of live

Photo: The Florida pygmy sunfish, **Elassoma zonatum.** Photo by Gene Wolfsheimer, F.f.l.



food is necessary for their total well-being. Live adult brine shrimp and tubifex worms are preferred, with white worms as a close second. Daphnia are taken with considerably less enthusiasm, while small fry are ignored altogether. Like the African dwarf cichlids, the pygmy sunfish is very sensitive to a high bacteria count in its water, and reacts unfavorably to such an environment. Adequate filtration, care in feeding, and a suitably low pH brought about through the addition of peat extract to the tank a few days before the pygmies are introduced will keep this problem under control. So will avoiding excessively high temperatures, about which more will be said later.

Elassoma is quite tolerant of the chemical makeup of its water. I have kept specimens that bred well in rather hard, alkaline water. As long as extremes in either direction are avoided, the pygmy sunfish seems to be satisfied. More important to their welfare is an adequately planted and lit aquarium. A dimly lighted five gallon aquarium planted with ***Hygrophila*** and a good layer of floating *Ceratophyllum* is ideal for this fish, especially if several rocks are used to break up the open area of the tank bottom. In such a tank, the fish will spend a great deal of time displaying in front of the plants. In a poorly planted tank, they will constantly try to hide, refuse to eat, and go into a decline that ultimately results in death. Nor are these fish at all comfortable with tankmates like the zebra danio or some of the more "busy" barbs. Ideally, they should be kept by themselves, but the smaller tetras, *Rasbora maculata* or the pygmy members of the genus *Corydoras* make good companions for them.

(To be continued)

CLUB NEWS

Greater Pittsburgh Aquarium Society, Inc.

The G.P.A.S. had Angels for their Fish of the Month at the April meeting at the Buhl Planetarium, Federal and West Ohio Streets, North Side, Pittsburgh, Pa. ◄

• • •

San Francisco Aquarium Society, Inc.

The next regular meeting of the S.F.A.S. will be Thursday June 4, 1964, at 8 p.m., Steinhart Aquarium, California Academy of Sciences, Golden Gate Park, according to Robert P. Dempster, president.

The Spring 1964 Fish Show trophies and ribbons will be awarded at this meeting, according to Ray Cabrera, Show Chairman. Other highlights of the evening include discussion of members' fish problems, Frank Tufo, Program Chairman, announced.

Due to the Fish Show Awards, there will not be time for Fish of the Month competition at the June meeting, Charles P. Bange, Chairman, announced. ◄

AQUARAMA

By James A. Mason

For some really great reading about fishes I would like to refer you to the following articles published in the *Scientific American*. I guarantee it will be well worth the effort to acquire these publications from your local library.

In the 1960 October issue (page 115) you will find an article by Harry Grundfest titled *Electric Fish*. Dr. Grundfest explains the electrical capabilities of fishes which many aquarists have been familiar with for many years, fishes like the elephant nose of Africa *(Mormyrus)*, the South American knife fish *(Gymnotus)*, and some less familiar fishes as the African catfish *(Malapterus)* and the mormyrid *Gnathonemus*. This article points out that many of these fishes can use their electrical powers not only for defense but for the purpose of attack and navigation.

The Buoyancy of Marine Animals: Page 119 of the July 1960 issue. Here will be found an extremely interesting article which deals with the buoyancy factors not only of fishes, but other marine animals such as the oceanic swimming crab, deep-sea prawn, and various types of squid. Learn how fishes with swim bladders can adjust to changes in depth, also how fishes without swim bladders have some advantages over others. This article explains how the cuttlefish adjusts to pressure change through the medium of a fluid stored in its cuttlebone, but how does the squid do this? The squid has neither cuttlebone nor swim bladder? To learn the answers just read this fascinating article by Eric Denton.

Cleaning Symbiosis: This article starts on page 42 of the August 1961 issue. This article was written by the late Con-

rad Limbaugh who was a great marine biologist and one of the best skin divers. His article is a real must. It's a super must for the aquarist who is interested in marine tropical fishes. There are many species of cleaning fishes, some are well-known to the aquarist, such as the neon goby, Spanish hogfish, and the gray angelfish. Other animals have entered into this strange relationship. The cleaner shrimp and even a cleaning crab. Don't walk, run to your nearest library.

If you have not already acquired the first article recommended by *Aquarama*. Shame! Shame! Because you are now behind on your homework for the next article on page 50 of the March 1963 issue is, *Electrical Location by Fishes*. by H. W. Lissman. Who is the star character? An African "knife" fish *(Gymnarchus niloticus)*, not related to the African knife fishes well-known to aquarists. You will be absolutely amazed when you find out what this fish can do with electricity.

Next and last on page 100 July 1963 issue there is an article about a fish which is well-known to all hobbyists but believe me, you can't possibly know all about this fish until you read this informative work. *The Archer Fish* by K. H. Luling. Dr. Luling tells how, where, when, and why this fish shoots down little bugs. Did you know that *Toxotes* has bad aim when he is tired? This fish has wonderful eyes with excellent vision in both dim and bright light. His eyes are more highly developed than most other fishes. ◄

★ IDEAS ★
BY HOBBYISTS

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

Peeling Frozen Food

Cutting pieces of frozen food can be a hateful job to say the least, as it tends to shatter – and the separate pieces fall to the bottom of the tank before it is all consumed. I use my potato peeler and peel off slices right over my tanks! These slices are thin enough so that upon hitting the water they melt and are consumed by the fishes before reaching the bottom. – *Pat Doyne, High Falls, New York*

Salt Water Fishes
By Robert P. L. Straughan

Q. – *Can coral be repaired if it is broken?*

A. – *Yes. Let it dry thoroughly and then cement the pieces together with epoxy cement. The pieces may be held in place with rubber bands until they have dried. Be sure the coral is completely dry before cementing with the epoxy or it will not hold. The coral should be soaked for a week in fresh water before returning to the aquarium.*

CLUB NEWS

Fort Worth Aquarium Society

The F.W.A.S. will hold their 15th Annual Exotic Fish Exhibit June 14-28, 1964, in the Town Hall of the Seminary South Shopping Center, Forth Worth, Texas. Judging and presentation of awards will be held on June 18, with trophies and ribbons being awarded to the best pair of fish in each family as well as Tank Beautiful, Novelty Tank, Family Tank, Community Tank, and Best Fish in Show, according to Mrs. Alice Nunley, 1964 Show Chairman.

One of the judges of the show will be Braz Walker of Waco, Texas, author of many articles for the *Aquarium Journal*, Mrs. Nunley said. ◄

Potomac Valley Guppy Club

(Washington, D. C.)

The P.V.G.C. spring "Fish Fair" was held at the National Guard Armory March 5-11, with the National Flower Show, according to Elliot R. Tracy, secre-

tary of the group. Shown is a portion of the P.V.G.C. exhibit at the Flower Show, and the crowds admiring the club's guppies. Club meetings are held the third Monday of each Month at 8 p.m. in the John Mosby Inn, 300 N. Washington St., Alexandria, Virginia, Mr. Tracy said.

• • •

Cleveland Aquarium Society

The C.A.S. recently had an exhibit at the Home and Flower Show in Cleveland, according to G. H. Allen, Secretary

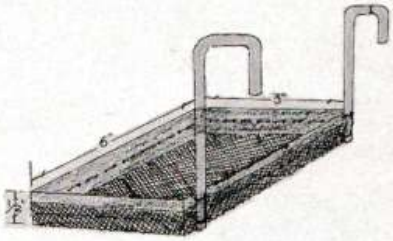
of the C.A.S. Over two hundred thousand persons visited the show, and over one hundred thousand lists of publications devoted to the tropical fish hobby were distributed at the show, Mr. Allen said. A photograph of a portion of the C.A.S. exhibit is shown here. ◄

★ IDEAS ★
BY HOBBYISTS

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

Corydoras Egg "Hanger"

I have found that several types of *Corydoras* become so rambunctious while spawning, that many eggs are dislodged from the sides of the glass and plastic plants. They fall to the bottom where, because of the freshness of egg adhesive, the eggs collect great amounts of sedi-



ment. These eggs will fungus regardless of the amount of Methylene Blue used.

I took several plastic refrigerator jars (the type used for leftovers) which were rectangular in shape, and cut them in half-inch widths. I then took an ice pick and punched holes about one-half inch apart around the center of the plastic. Then a fine mesh nylon net was sewn in, and two pieces of non-flexible plastic tubing were heated and bent in a "U" and attached to either end. When completed, the hanger will extend about 8½" into the water. Place the loose eggs into the "hanger." When the eggs hatch, the fry swim out, and any eggs that fungus can be observed and easily removed with an eye dropper. – *Martin R. South, Jr., Long Beach 15, California*

Masters

(Continued from Page 299)

much too small for other species. Because they are so extremely active searching constantly for food, they earn their keep as aquarium scavengers. The snails are continually in motion over the glass and through the water up and down as well as across the surface, with its shell hanging downward or along threads of mucus. These invisible filaments are attached to the bottom and extended upward, remaining in place, so that the tadpole snail can climb up or down as if they were floating in midwater.

Because of air which is retained within its pulmonary cavity, the specific gravity of the snail is less than that of water, causing it to rise from the bottom at will. Too, because of this arrangement, the snail is able to escape from an enemy by expelling the air and falling by its own weight to the bottom. When this happens, however, the snail cannot reascend to the surface directly through the water but must crawl up on the sides of the aquarium or on a plant.

The young snails, as they hatch from the egg, already have shells too hard for fish to crack so they are not eaten as are the others and can become excessively numerous in an aquarium and might even for this reason be considered a pest. They easily survive winters in outdoor pools.

Approximately six to twenty eggs are deposited as a globule of clear spawn and hatch in about fifteen days. They eat meaty foods as well as algae and often the spawn of other snails. When full grown snails are collected in the spring and put in a jar with plants and gravel, they very often will deposit eggs on the glass within twelve hours. The development of the eggs make an interesting subject for the children fortunate enough to own a microscope. This is one snail no aquarist has to buy! ◄

From: George Klineduist
York, Pennsylvania

I am an aquarium hobbyist and would like some information. I have a female firemouth and a male Congo cichlid which have spawned. The babies have been free swimming for 10 days now. Is this common? Will the babies have traits of the female, male, or both?

REPLY: I don't remember hearing of this cross. Both are neotropical cichlids despite the name "Congo" for the one, and I am not surprised to learn they can be crossed. The first generation of youngsters should have characteristics of both parents in regard to color and body shape. If the young live and grow up they may be sterile. However, if they are fertile the next generation may *produce quite a variety of young in regard to color and body form. Time will tell you what happened and we hope you will tell us about it.*

° ° °

From: Richard Unger
Mount Vernon, Washington

I would appreciate it very much if you would send me any information you may have on Oriental hatchet fishes. We are unable to find any information on these. Right now we are raising black tetras.

REPLY: The so-called Oriental hatchet fishes or "glass barbs" belong to the genera Chela *and* Oxygaster. Chela laubuca *is the most commonly imported species. They are minnows as the goldfish and carp and not closely related to the South American hatchet fishes. They come from Southeast Asia and are reported to breed in a manner similar to Danios, at least needing a tank of similar arrangement. They spawn in the evening and even on into darkness. The eggs are scattered and the young which hatch in about 2 days at 78° F. should be raised just like* Danio *fry.*

° ° °

From: Harvey Flatbush
Fair Oaks, California

Could you possibly send me information leading to setting up *slowly* a fish hatchery. Let me backtrack. Six months ago I purchased a 15-gallon aquarium.

Letters to The Journal

Since then I have bought 2 more 5-gallon breeding tanks and I am getting three 8-gallon tanks. Also, I have been building fry tanks 15" x 30" surface with a 9½" depth. They are made from one-half inch plywood with a glass front. I am just starting out slow with black Yucatan mollies, red velvet swordtails and fancy guppies. I would certainly appreciate it if you could point me in

the right direction towards a reliable source of information.

REPLY: First and foremost, we are glad you are taking it slowly. Do not invest a lot of money, for you must first learn to be a good aquarist and this usually takes longer than six months. Talk to dealers, find out what kind of fishes sell most rapidly and for what price. Find out how much it is going to cost you to raise a fish in terms of time, heating and light bills, etc. Find out how much you can get for your fishes. Can you compete with pond raised fishes from Florida? Is your water suitable to raise fairly rare fishes such as some tetras or Corydoras *that always have a market and bring a fair price? I don't want to discourage you. The point is that many people have had the idea that they can make money at raising fishes. They try it and most fail. They become discouraged and give up fishes completely. Thus what might have been good aquarists are lost to the hobby. Let dealer demand for your fishes guide your investments. Don't invest and then expect a dealer to take your young fishes. Mollies, especially the kind you mention are a bad risk. Tank raised specimens ordinarily cannot compete with pond raised specimens for size and beauty. These are not fishes for you to try and raise at a profit. Good fancy guppies (or fancy, "special" mollies) are a much better bet, if you have the experience to develop really super stocks.*

As for the physical aspects of a fish hatchery, these depend on many things, especially on how you specialize. If you specialize in bettas for example your tanks and arrangement will be much different than if you specialize in guppies, Corydoras, *dwarf cichlids, or tetras. Your experience with the kind of fishes you chose must be your guide. As you get to know the fishes and their requirements, you will develop techniques, methods and equipment that are suitable for you, your fishes and the room*

or building available to house your fishes. It would take a good size book to write down all the possibilities, arrangements and techniques that I have seen and I think are worthwhile. No book of this type has been written or is likely to get written. Most if not all successful breeders prefer to keep their methods to themselves. In a competitive business one can hardly blame them for this attitude. I am not a commercial breeder, however, in the past I have bred several hundred different kinds of fishes. This experience has given me many ideas to try, if I ever wanted to become a breeder. My advice to you is to get the experience on a small scale, see if it gives you worthwhile ideas. If it does, and you can find an assured market, try your hand. If you get no ideas or if you can find no market, forget it, enjoy your fishes and seek employment in more profitable areas.

* * *

From: Masuo Niida
Tokyo, Japan

I have been a marine aquarist for five years and I consider myself quite experienced. For the first two years I lost many fish because of diseases. Now I can cure almost any external diseases. Perhaps you agree that one of the most nasty diseases is *Oodinium* which is very difficult to notice at the initial stage. From my experience (and many of American marine fish experts such as Mr. Robert Straughan have pointed out) copper sulfate works wonders with this fish epidemic. 1/2,000,000 of copper sulfate (plus 1/1,000,000 of quinine surfac) can cure *Oodinium* in four to five days.

Last September I went to New York and Washington on business and whenever I had free time I visited pet shops and tropical fish laboratories to learn their disease control technique. One tropical fish establishment in Washington, D.C. suggested to me to put 5 pennies into a tank of 20 gallons. They said that copper contained in pennies "melts" into the water and the copper can prevent the outbreak of *Oodinium*. I followed their suggestion and immediately after I came back to Japan in October I put copper coins into my tanks. Since then *Oodinium* has never broken out! But I have one trouble. I am very fond of clownfish. As you know clownfish are not happy without sea anemones. The trouble is that sea anemones are very susceptible to chemicals. After I put copper coins into my tanks all sea anemones died and my clownfish are not comfortable without them. I am left with two choices: (1)—Copper pennies not put into tanks and *Oodinium* breaks out, sea anemones removed and then copper sulfate added. (2) – Copper pennies put into tanks at the expense of sea anemones (although my clownfish are not happy) so that my aquarium is free from the epidemic.

Or is there any other method to prevent the outbreak of Oodinium without the use of copper pennies?

Mr. Niida's letter was answered by marine collector Robert P. L. Straughan:

REPLY: Adding copper pennies to a salt water aquarium for disease control is risky and probably more fish have been killed by this method than have been saved. It is a haphazard way to introduce copper to the aquarium and of course since pennies are not pure copper, other poisons are also being introduced to the tank. Unfortunately the pennies "dissolve" slowly and don't kill the fish right away so that the aquarist thinks everything is grand and his troubles are over. Actually they are just beginning. One of the prime rules in salt water aquaria is to eliminate all metal from the aquarium and this includes pennies. The fact that you haven't had an outbreak of disease since adding the pennies proves very little. But the fact that your fishes are not happy since your anemones died could mean that they are slowly being poisoned. Copper introduced this way acts very slowly. It kills the minute organisms first and then eventually kills the fish. This is why most literature stresses a specific amount of copper in the water.

Oodinium *or diseases similar in nature (of which we know little) are peculiar in that they may never show up in an aquarium or they may show up periodically. If the latter is the case, then the disease was probably not cured when the tank was treated but simply controlled. When conditions become right, it breaks out again. I doubt if* Oodinium *is always the villain. There is a disease startlingly similar to the freshwater* Ichthyophthirius *which we call salt water "Ick." This is common at times in marine tanks. Introduction of new fishes or fresh sea water may cause an outbreak. Sometimes the disease organisms are present in new fishes or in sea water collected in certain areas. To guarantee against outbreaks of the disease, quarantine new fishes and age fresh sea water before adding it to the tank.*

There are several new systems for disease control of salt water currently on the market, that control disease without chemicals, but it will take considerable time to evaluate their efficiency. One uses ultra-violet light for sterilization of sea water, the other uses ozone and the third uses a high speed water pump and a filter cartridge through which sea water is forced at great speed. Time will tell which is best.

* * *

From: Dr. George A. Wistreich
Los Angeles, California

I would like to thank H. G. Prenter, South Burnaby, B.C., Canada, for drawing my attention to an error *(see Letters column, May 1964 issue)* concerning the first fish stamp issued, which appeared in my article entitled: *"Fish and Stamps."*