JUNE, 1968
VOL. I NO. 8 SERIES II

THE AQUARIUM

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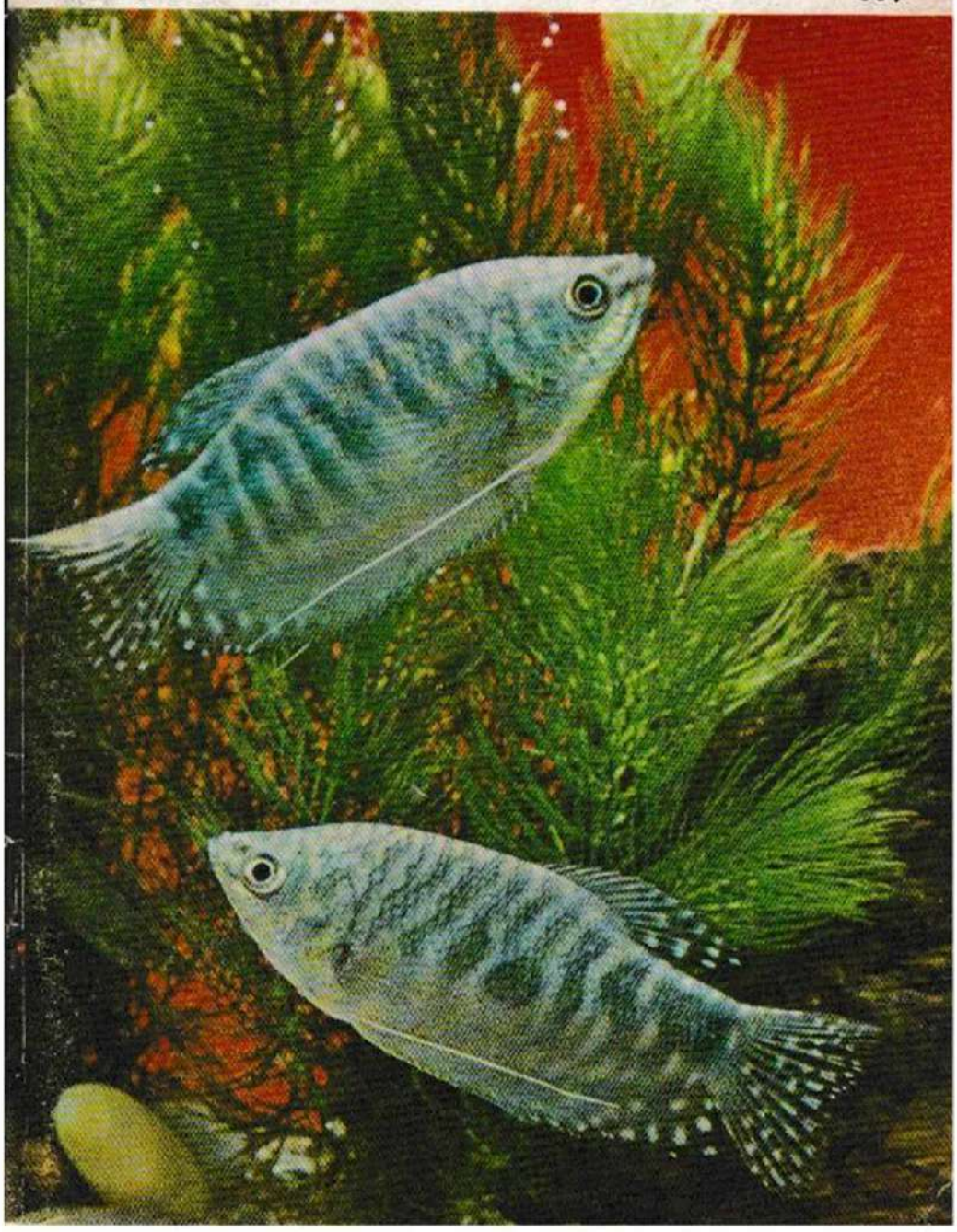

JUNE, 1968
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THE AQUARIUM

founded in 1932 by Dr. William T. Innes

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On The Cover

These beautiful blue opaline Gouramis were photographed by THE AQUARIUM photographer Andrey Roth using a Leicaflex with a Summicron-R, 50mm F-2 lens and a Elpro close-up attachment. (Additional credits appear on page 68)

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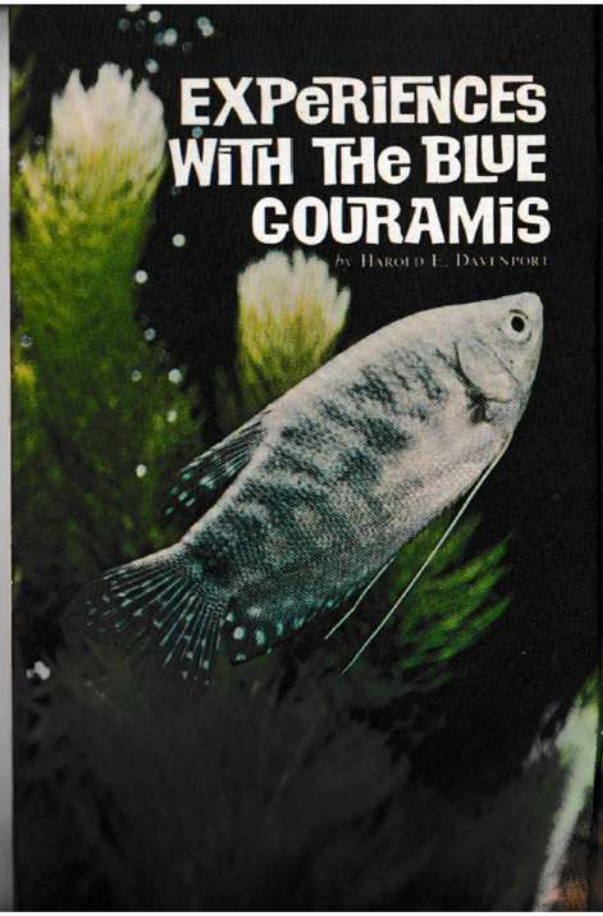

EXPERIENCES WITH THE BLUE GOURAMIS

by HAROLD E. DAVENPORT

I was introduced to the tropical fish hobby a little over a year ago by a friend who had little, if any, more experience than I. We have shared our mistakes as well as our discoveries, traded fish and supplies back and forth, and been well rewarded with hours of pleasure in the pursuit of this wonderful hobby. Like most beginners, I have made my share of mistakes. My first tanks looked like a department store on dollar day, with fish of every size, color and type fighting for living space in a jungle of castles, phony mountains, rocks and sunken pirate ships. When finally things were arranged more for the fish and less for my own viewing pleasure, I began to get real results.

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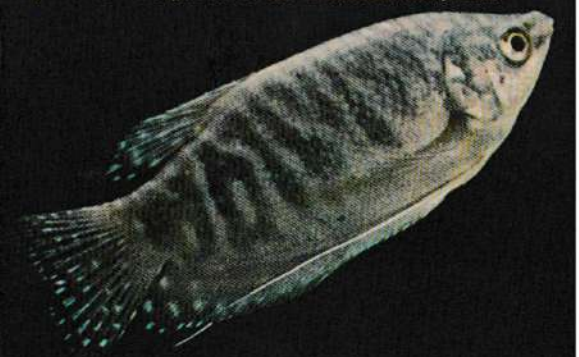
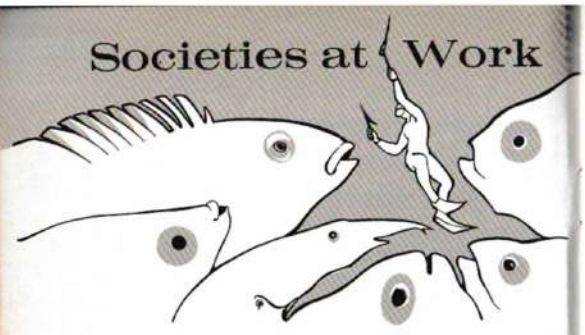


Two male opaline gouramis. The tip of the dorsal fin in females is rounded; in the males it is pointed as is shown in these two specimens.

Societies at Work



By HELEN SIMKATIS

SOCIETY BULLETINS ARE NOT NEW, although new ones appear on the scene quite regularly, and each one has something to offer even if it is only to reflect the activities of the publishing society. Many publications, however, not only tell us what the publishing societies are doing of interest, but also offer articles on the hobby and its many phases. Hence, these bulletins become an invaluable source of information and when controversy ensues, which it often does, the reader of many bulletins has the benefit of learning a broad spectrum of opinion on a particular subject. Society bulletins stem from the grass roots of the hobby and through them we can visit the fishrooms of aquarists we may never have the pleasure of meeting in person. These and many other thoughts passed through our mind as we picked up the February issue of *The Fish Culturist*, published by the Pennsylvania Fish Culturists' Association, and in its 47th year.

The lead article of this issue is Wm. T. Lawrence's *Breeding Barbus Tetrazona*. There have been many articles written on this old aquarium favorite but this one has the touch of a thorough, meticulously careful and knowledgeable writer of aquarium literature. The organization of the piece could be a model for many articles written on as many species of aquarium fish. The author commences by telling us how to pronounce the scientific nomenclature, gives the popular names, the meaning of the scientific name, its family, where it comes from, the type of egg-layer it is, its size, and life-span. Personality traits are gone into and under the description we are told how to distinguish between the sexes. Water quality and temperature are delineated, and feeding and the diseases to which the species is subject are not neglected.

In his treatment of *Ichthyophithirus* the author recommends Quinine sulphate, tells how to prepare it, how much to use, and why the tank should be kept dark during treatment. Breeding is discussed with the same detail as well as egg handling and feeding the fry. We do not know if this is the last article Bill Lawrence wrote before he died suddenly in February but if it is his swan song, it reflects remarkably well his dedication and his thoughtful approach to the hobby. Whoever the Pennsylvania Fish Culturists' Association selects for its new editor of *The Fish Culturist*, he or she will have an outstanding predecessor and one we all would do well to emulate. Robert W. Britton, the First-Vice-President of The Pennsylvania Fish Culturists' Association lives at 1823 Dudley Street, Philadelphia, Pa. 19145, and seems the likely person to write for information regarding the society and its publication.

Herb Meyer tells us about *Melanoides tuberculata* in his *Bottom Snails, Your Invisible Janitor* in the February issue of *The Tropical Breeze* and begins by listing the demerits most snails have earned as the aquarist's hobby has progressed. One of the complaints we hear most frequently is that snails tend to overpopulate and, of course, many hobbyists complain bitterly that their snails do not do the cleaning job expected of them. This latter complaint is somewhat unreasonable for snails have never been told that they are supposed to rid tanks of organic waste and clean plants of algal growth and yet add no waste products of their own to the aquarium. Herb Meyer, however, has found that the Malayan bottom snails, sometimes referred to as the burrowing snails, and scientifically tagged *Melanoides tuberculata*, have quite a bit going for them from the hobbyist's point of view because they spend most of their lives just below the aquarium gravel, mixing waste matter with the gravel so that plants are better able to utilize nutrients so provided. These snails dine on decaying plants and never touch healthy foliage. They also act as an indicator if all is not well beneath the surface of the gravel by climbing up the sides of the tank.

Should the population become too dense, those that are driven out of the gravel will vacuum algal growth from plant leaves without damaging the leaves even a little. They have a light cream to tan shell with reddish-brown spots which is turret shaped. Guy Jordan is still *Scanning the Periodicals* and making editors purr with pride all over the nation. *The Tropical Breeze* is published by the San Diego Tropical Fish Society, P. O. Box 4156, North Park Station, San Diego, California 92104.

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FISH PHOTOGRAPHY MADE EASY

by SYLVAN COHEN, *M.D.*

MOST AQUARISTS, AT ONE TIME OR ANOTHER, have had the urge to take pictures of a special, favorite fish or tank and have set about the task with whatever camera they happened to own or could borrow. The results of such a haphazard approach are usually color slides or photographs showing colorful blurs in various stages of under or overexposure which can hardly be recognized as a fish, much less be identified as to the species. After such an obvious disaster, the usual hobbyist gives up in disgust and comes to the conclusion that only a professional or experienced photographer with unlimited funds and equipment can produce fish photographs which are good enough for projection or publication. True, expensive and complicated equipment can be used by skilled photographers to produce the excellent photographs that we are accustomed to seeing in magazines and books, but excellent pictures can also be made with a simple, inexpensive camera having a built-in flash gun, if a few simple alterations are made. The accompanying picture shows a close-up camera made from a Kodak Starflash camera. Any similar camera can be altered in the same way, but once altered, the camera cannot take pictures under normal snapshot conditions.

The changes to be made are:

1. The lens opening must be made much smaller.
2. The shiny flash reflector must be dulled.
3. Accessory close-up lenses must be used over the normal camera lens.

These changes can be made at little or no cost for the first two, and for about $6.00 or $7.00 for the third.

The lens opening can be narrowed by creating a new lens diaphragm with an opening about the size of a large pin by simply poking a pin through a small piece of tinfoil or aluminum foil and glueing the edges of the foil inside the front lens mount or lens shade. If your camera has

Lion Head Goldfish

a two-element lens that can be taken apart, ideally the new diaphragm should be placed between the lens elements. The new opening should be slightly larger than a pin shaft, and the foil should be right against the lens with the hole centered over the lens if it will not fit between the lens elements. If the first pictures are under or overexposed, the hole in the foil can be subsequently altered until the pictures are correctly exposed, but the large pinhole should be about right for a camera taking 127 size film. This size camera also has the advantage of producing 2 × 2 slides that can be shown in a standard slide projector.

The second alteration, dulling the flash reflector, is easily done in about five minutes using a small brush and a few cents worth of aluminum or silver model airplane paint. This does not change the color balance of the flash but significantly reduces the light output of the flashgun. The reduced light is necessary because of the extremely close range at which

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THE EMPEROR TETRA

A head view of a male emperor tetra.

by BRAZ WALKER

A pair of emperor tetras, male above, female below. The colors of the female are less intense than those of the male, and her body outline shows the characteristic female characid fullness.

RELATIVELY FEW OF OUR AQUARIUM FISHES come from Colombia, northernmost country on the fish-rich South American continent, but certainly the apparent sparseness of aquarium desirables is compensated in light of one aquatic gem—the emperor tetra. *Nematobrycon palmeri* is a study in quiet, unflashing, dignified beauty. Although my tastes run ordinarily to larger, more bizarre and less often seen species than this small (2–2½ inches) beauty, I must confess that in my opinion there are very few aquarium fishes which can stack up against the emperor tetra on a feature-for-feature basis.

Less gaudy in coloration perhaps than some of its characid (characin) relatives, the neon blue of the eyes blends perfectly with the black lateral band which fades at its edges into the upper and lower portions of the sides. These somewhat lighter parts are rather changeable in color from almost beige, at times, to a golden-tan or even a metallic gleaming grey flecked with gold. The slightly forked caudal is penlined at the edges and is bisected by a black, almost wormlike extension ("nemato" = "worm") which in the case of the male fish may grow quite long.

Emperor tetras are excellent in a community aquarium containing similar-sized fishes. They grow a bit large for tiny species such as neon tetras or *Nannostomus marginatus*, but with lemon tetras (*Hyphessobrycon pulchripinnis*), red rasboras (*Rasbora heteromorpha*) or similar species, their actions are complemented and aside from some occasional horseplay, a harmonic situation usually results.

If proper conditions are present, it is the nature of fishes to attempt reproduction, although some are more reluctant to do so than others. Fortunately the emperor tetra takes well to captivity and is not particularly difficult to spawn. Most aquarists have a favorite method of spawning each of the different types of egglayers, but some of the published details are a bit foggy and can be confusing to those with less experience. For those who might wish to breed these tetras or similar egglayers, here is a simple method which will work on most species, including this one.

Breeders must be well-conditioned on good food such as frozen or freeze-dried live foods, beef heart, high quality dried foods and live foods if possible, although the great variety of excellent packaged foods makes the last less essential than it once was. If several pairs are available they may be conditioned together right in the community aquarium. When the females begin to look heavy and love-play is noticed, such as short dashes at each other, bumping one another, etc., they are ready. If only one pair is available, they should be well-fed in separate aquaria for a couple of weeks.

A small aquarium of about five gallons, or one of the now rather

continued on page 44

Floating Fish can Kill

PRO

by RED NICHOLS

EDITOR'S PREFACE: *The following article originally appeared in the November 1967 issue of "Pet Shop Management", permission to reprint having been secured through the kind offices of its editor, Vic Hinze. Similar versions have been published also elsewhere, including the "FTFI Trader" and sundry club magazines. Without doubt, it was the most provocative article of the 1967 aquarium literature "season".*

Mr. Nichols, as readers will discover, makes three major points in his article, viz., (a) The common practice of floating plastic bags is dangerous and inadvisable; (b) Mixing the water in the bag with the water in the aquarium can result in violent chemical reactions; (c) Rapid temperature changes are safe provided they are within the range of the temperature tolerance of the fish. All three, of course, are rather "radical" statements, at least as far as aquarium traditions are concerned. Mr. Nichols' article is followed by a rebuttal of point (a) by Messrs. Tohir and Stratton; this in turn is followed by an editorial critique which focuses its attention on points (b) and (c). We think that readers will find the exchange of ideas stimulating.

FOR THOUSANDS OF YEARS PEOPLE "knew" that the earth was flat. In fact there are those today who swear this is true in spite of our space program where men whirl about the earth for all to see. Much in the same manner, there are thousands of pet retailers who still float incoming tropical fish bags. The floating of fish containers was proper in the days of shipping cans and the cottage cheese container for the hobbyist to take his fish home.

Today, the use of the polyethylene bag makes shipping easier and safer because the bags literally "breathe". Oxygen enters any polyethylene bag freely and carbon dioxide leaves almost as easily as long as the outside of the bag is kept bone dry. This goes on through the seemingly solid walls of the bag as the poly is really full of microscopic holes which permit most gasses to pass through with ease. Floating closes these pores and keeps in the dangerous carbon dioxide and keeps out the valuable oxygen. Where a bag has been in transit for as little as three hours, this closing off of gas exchange can damage tropical fish very much.

Consider that the normal content of the air around us is 20 per cent oxygen and less than 1 per cent carbon dioxide, while water cannot hold more than 10 parts per million of oxygen or one part in 100,000. As the free air around us holds 200,000 times this much oxygen, it is easy to see that we should allow this life-giving gas free entry at all times.

Of more importance to the retailer is the carbon dioxide content of the bags. Carbon dioxide is the biggest killer of tropical fish, and the hardest to understand. Poisoning by carbon dioxide can be full or partial. Full poisoning results in the immediate death of the fish and is easy to spot. Partial poisoning is where the fish were floated short of death but damaged in vital brain areas. Many floated fish will die in a few days no matter what action is taken after the fish are put in the tanks, as the brain damage is not reversible and will continue to go from bad to worse as the days go by. Floating for as little as five minutes has resulted in this type of damage in laboratory tests. Floating does not always result in damage as the content of the water in the bag must be near the danger point before a short closing of the pores will hurt the fish. However, the danger point is not easy to notice and a far safer method of unpacking is to always open the bags at once on arrival and place an airstone in the water for a few minutes, netting the fish out and placing them in the aquariums. The water should never be saved that the fish arrive in as mixing water can cause violent chemical reactions should the water be different than the water of the tanks.

Aeration of the bags will result in safe temperature balancing if the bags are opened in a room of 75 to 80°F. A simple understanding of this temperature change from aeration will be seen if you try aerating a steaming cup of coffee. The temperature will be the same as the room in only a few minutes from the action of the air on the coffee. Warming action is just as smooth and will acclimate your shipment without harm in far less time than floating could accomplish. Temperature changes of ten degrees up or down in a few minutes will cause no harm to tropical fish as long as the end temperature is 75 to 80 degrees. Disease caused by rapid temperature changes is where the fish are rapidly changed to a temperature they do not like, never from a rapid change to the temperature they enjoy.

CON

by DAVID TOHIR & RICHARD STRATTON

IN THE PRECEDING ARTICLE, Mr. Nichols compares the belief in the practice of floating fish to the once prevalent idea of the world being flat. It should be remembered, however, that even those early mapmakers who proposed the theory of a round world could offer some support that their theory was correct. They pointed out, for example, that when a ship was first spotted on the horizon, only the top part of

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its sails could be seen. As it came closer, more and more of the ship would rise above the horizon, exactly as would have been expected of a round earth. Finally, a reasonably conclusive test was undertaken in the form of a trip around the world.

Fortunately, testing Mr. Nichols' theory is much simpler. The important thing is to have a series of tests—one test would not be considered conclusive—plus a series of "controls". We must admit, however, that our very first test gave a pretty strong indication of the way the following were going to go. Two of the common 9 x 12 inch size plastic bags were filled with one-third water, two-thirds air, and six neon tetras each. One bag (the control) was floated in an aquarium, and the other (the experimental bag) was placed outside, next to the aquarium. After *seven* days, all twelve fish were alive! The fish floated in the aquarium looked and acted better, but this, presumably, was due to their being less frightened. Obviously, if a fish died at this point, we wouldn't have known whether it was from suffocation or starvation! Accordingly, the fish were released into separate tanks and are still alive and well.

The tables show the results of the remainder of the tests. Each test was terminated when fish in one bag began to die or show signs of distress. The fish were then released into separate tanks. Rarely did we have fish die after being released. (Our highest mortality was with *Gambusia affinis*, but these fish were wild specimens, and their deaths may have been largely attributable to disease and parasites. In any case, as many died in one tank, or bag, as the other.) The water temperature of the two bags was always the same at the start of the tests (the fish came from the same tanks) and was within two to four degrees of each other at the conclusion of the tests. It will be noticed that the tests were grouped into three series. Albert Klee (who suggested these tests) had advocated using these three representative groups of aquarium fishes.

Our conclusions need hardly be stated; the tables indicate rather dramatically that fishes floated in plastic bags do not die in a few minutes, or even a few hours. This is, of course, contrary to Mr. Nichols' findings. Obviously *something* is wrong. Perhaps we used a better grade of plastic bag, or Mr. Nichols used a poorer grade of fish!

TABLE I CHARACINS

Test	Species	Number in each bag	Length of fish, inches	Number dead in control bag	Number dead in experimental bag	Time in bags in hours	Number of dead in tank after release: Control	Number of dead in tank after release: Experimental
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	168	0	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	168	0	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	168	0	0

TABLE II LIVEBEARERS

Test	Species	Number in each bag	Length of fish, inches	Number dead in control bag	Number dead in experimental bag	Time in bags in hours	Number of dead in tank after release: Control	Number of dead in tank after release: Experimental
4	Poecilia reticulata	15	1	0	0	38	0	0
5	Poecilia reticulata	15	1	0	0	36	0	0
6	Poecilia reticulata	15	1	0	1	38	0	0
7	Gambusia affinis	15	1	1	2	24	3	4
8	Gambusia affinis	15	1	3	2	12	0	1
9	Gambusia affinis	15	1	0	0	36	4	1
10	Gambusia affinis	15	1	0	0	38	0	0

TABLE III CICHLIDS

Test	Species	Number in each bag	Length of fish, inches	Number dead in control bag	Number dead in experimental bag	Time in bags in hours	Number of dead in tank after release: Control	Number of dead in tank after release: Experimental
11	Cichlasoma nigrofasciatum	6	2	0	0	72	0	0
12	Cichlasoma nigrofasciatum	10	2	0	0	69	0	0
13	Cichlasoma nigrofasciatum	6	2	1	0	89	0	0
14	Cichlasoma labiatum	3	3½	0	0	52	0	0
15	Cichlasoma labiatum	16	1	0	0	36	0	0
16	Cichlasoma labiatum	16	1	0	3	48	1	0
17	Cichlasoma labiatum	16	1	0	0	48	0	0

OVERVIEW

by ALBERT J. KLEE

WHEN MR. NICHOLS' ARTICLE WAS originally published, it literally took the aquarium world by storm; the article was subsequently widely reprinted throughout the club publication circuit. One report attempted verification of Nichols' findings with regard to bags but the proffered data reflected a woefully inadequate experimental design (e.g., the bags were half-filled with water, something that no knowing aquarist would ever do), and the statements made were suspect (e.g., "The floated fish soon showed signs of distress and began to die shortly after". If the fish were bagged properly, there was no reason why this should have occurred, floating or no floating.). Consequently, we asked Richard Stratton and David Tohir to conduct a series of valid experiments, the results of which have just been presented.

A number of noted hobbyists have vigorously opposed the Nichols' bag thesis, e.g., Roy Vail (a biologist who has previously contributed to the pages of THE AQUARIUM, and who takes a position as far apart from Red Nichols as it is possible to get) and Don Cook. These

aquarists essentially agree with the position of Dr. Warren J. Wisby, Director of the National Aquarium in Washington, D.C., that it is ammonia toxicity that is the biggest killer of tropical fishes, not carbon dioxide. The British aquarium press bordered on looking with amazement at the ideas put forth by Mr. Nichols. In summary then, Mr. Nichols has stirred up the proverbial hornets' nest, and has his supporters and his opponents.

Although Mr. Nichols has stated in his article, "Floating Fish Can Kill", that the water in the bag must be near the danger point before the floating method will result in damaged or injured fish, at other times he has made the blanket statement, "NEVER float fish in plastic bags". Under normal circumstances, Stratton and Tohir have made it clear that there is *nothing* wrong with the practice of floating. As for those instances where the bag water is fouled, there is little difference between floating and just letting the bag sit by the side of the aquarium. What is overlooked is the fact that very little of a floated bag is immersed in the water anyway (one would have to weigh it down with a brick to make any real difference). But in such extreme cases, *neither* method is correct. If a dealer (or a hobbyist) receives a shipment of fishes in which some have died, polluting the water and placing the remainder in jeopardy to the extent that quick action is required, the dealer will *immediately* transfer the fish regardless of temperature difference, and rightly so for it is the lesser of two evils. It remains now, however, to discuss points (*b*) and (*c*) of the Nichols' article.

At no time within our experience have we ever observed the "violent chemical reactions" suggested by Mr. Nichols when bag water was added to the aquarium. Indeed, we find it difficult to imagine even some theoretical situation in which this could occur. In some waters, "rust" or ferric oxide has precipitated onto fishes when water of low oxygen content and high ferrous ion concentration has mixed with water of high oxygen content, but the effect on the fishes was minimal. In certain areas of Anatolia, in Turkey, there are springs containing considerable hydrogen sulphide. Many of the fishes are covered with a whitish layer of sulphur as the water is admixed with other waters. Even here, many of these fishes survive. But these are the extent of the "violent" reactions known to occur in nature (other than an outright addition of poisons to the water due to pollution of some sort), and a better term for them would be "dramatic". Both examples would be extremely unlikely to occur under normal circumstances and accordingly, we cannot concur with Mr. Nichols' point (*b*).

One of the basic principles of fishkeeping has been: *Avoid sudden changes in temperature*. Thus, the aquarist traditionally not only has been discouraged from adding cold water say at 60°F to a tank con-

taining water at say 75°F, but he has been encouraged to "equalize" temperatures in all fish transfers. Consequently, cautious hobbyists make frequent use of thermometers; more "reckless" types substitute a finger. "Floating" (bags, glass jars, waxed containers, etc.) is a standard practice, most likely because while at the same time satisfying the principle of avoiding sudden temperature changes, it is also simple and convenient. People are most easily persuaded to an action when that action is "convenient".

It is an interesting thing to note, however, how practice is altered as the aquarist gains both experience and confidence. Gone are the thermometers; fingers are "in". Although no aquarist in his right mind would deliberately add 60°F water to 75°F water, the oldtimer will add 70°F water to 75°F water without so much as batting a proverbial eyelash. Where the beginner loses sleep worrying about one degree this way or that, the experienced aquarist sleeps soundly over five and even more degrees difference. The "expert" then, adheres to a different principle: *Sudden changes in water temperature are safe provided they are within the tolerance range of the species in question*. This principle, however commonly followed by experienced aquarists, is never (Mr. Nichols' article being an exception) voiced aloud in the hobby. Two questions are now raised. Is the principle valid? If it is, why has it not been made common knowledge?

Recalling the case of the dealer who transfers his fish suddenly because of some emergency such as polluted water in the bag, the dealer has an additional principle working in his favor: *Fish adapt themselves quickly to a rise in temperature, but less easily to a drop in temperature*. In the situation previously described, the sudden change is most likely to be from colder to warmer water. This principle *has* been verified by experimentation and we refer readers to the paper by Allanson, Ernst and Noble ("An Experimental Analysis of the Factors Responsible for Periodic Fish Mortalities During Winter in Bushveld Dams in the Transvaal, South Africa", in *Biological Problems In Water Pollution*, Third Seminar 1962, U.S. Public Health Service, pgs. 293-298) for a typical statement on the subject. In general, however, we must not lose sight of the fact that each species of fish has a thermal tolerance zone in which it behaves in a normal manner. On each side of this zone are zones of lower and higher temperatures in which the species can survive for a certain length of time.

The resistance of various types of fishes to temperature changes differs from one species to another. A gradual and regular acclimatization allows certain species to survive in temperatures that would be fatal if they occurred suddenly. When all is said and done, however, the following conclusion can be drawn: *In general, although all abrupt*

variation in temperature can be harmful to fishes, even if it is of short duration, nevertheless the dangers of sudden variations have been exaggerated in the past. If a fish is in good condition, the probability of its suffering any ill-effects from an abrupt temperature change of up to 10°F, provided the change occurs within the temperature tolerance range of the fish, is very small or nil.

That the above is a reasonable statement is supported by actual experimental work also. In his paper, "Cold Death In The Guppy" (*Biological Bulletin, 119,* (2), pgs. 231-245, 1960). Ronald Pitkow makes the following observations re *Poecilia reticulata:*

"Among the possible causes of death inherent in cold exposure, two factors may be excluded. The suddenness of a cold exposure is not of itself lethal, for sudden exposures did not cause more mortality than gradual exposures. Moreover, the cooling process *per se* is not lethal since even repetitive chilling into 'primary chill coma' caused no mortality. At a specific cold temperature, the duration of cold exposure is the decisive determinant of lethality rather than the abruptness or repetition of the temperature change."

Thus, we essentially (hedging only because we are specifically assuming healthy fish and allowing for the rare occurrence of those species for which all abrupt variations are harmful) agree with Mr. Nichols' statements in regard to rapid temperature changes and fish.

As to whether this information should be publicized with more vigor throughout the hobby, however, lies the rub. Some people, given an inch, take the whole yardstick. There are many who would misread what Mr. Nichols is saying, and disregard temperature altogether. The result would be sick and/or dying fish. We personally would prefer that the beginner exercise excess caution, rather than balance on the thin line that separates being right from being sorry.

"Floating Fish Can Kill", we have stated previously, is certainly a provocative article. The stature of its author within the hobby is such that it cannot be ignored. (Roy Vail has stated: ". . . most of Mr. Nichols' articles in other publications have been outstanding . . . "), and indeed, Red Nichols must be given credit for his courage in voicing principles which would be expected to be countered with strong opposition. We have invited Red to comment further on these subjects if he so desires (Mr. Nichols, by the way, has the reputation of being a truly fine person and it must be made clear that only technical points are being debated here, not personalities). Since we have already agreed with his temperature variation point, what would interest us most would be supportive data for the floating bag theory (with details similar to those presented by Messrs. Tohir and Stratton), and some specific examples of those "violent" chemical reactions that have been postulated should two kinds of aquarium water be mixed. ●

adversaria

ADVERSARIA is a column of controversy, dedicated to the uninhibited exchange of relevant opinion. Contributions to ADVERSARIA from readers is encouraged.

"When a thing ceases to be a subject of controversy, it ceases to be a subject of interest". William Hazlitt.

Editor's Note: The following are excerpts from a letter from Mr. "Red" Nichols, in reply to the series of articles appearing in this issue of THE AQUARIUM.

To The Editor:

To help you put my work on bag floating in the correct light, please let me point out that the articles I have written in the past were done for commercial people who work with crowded bags and many fish in large operations. To compare conditions where hundreds of fish are in one gallon of water with a few small tetras in a sizeable container, is like comparing walking down a country lane with walking down Madison Avenue in rush hour traffic. Notwithstanding the views of really great fish men like Mr. Ross Socolof and Mr. Roy Vail, both of whom I know and like very much, there is much merit in not floating fish when the bags are crowded.

Gas transfer is very much greater from gas through plastic to liquid and vice versa, than from gas to gas through plastic, or liquid to liquid through plastic. For this reason the surface of the plastic bag outside the water level in the bag is the most important area of a shipping bag. This is the area covered by water in the process of floating, and the cause of most damage to fish. Since the most common ratio of fish to water in commercial shipping is 125 normal platies per gallon of water, the Stratton-Tohir tests were not very applicable to the actual conditions I was interested in in my work. A few minutes with the proper concentration of fish and you will possibly see the great discomfort of the fish when handled the "old way" as compared to the more modern methods I have outlined in the article in question. The tests were well done, but failed to approximate the conditions of any commercial operation. Many purchases at the retail level also are far more crowded than the test conditions used, and should be taken into account for protection of those buyers.

Your point *b* is well taken as my choice of words is certainly not the proper one from a chemist's standpoint. When I refer to a "violent reaction", this is meant as it would appear to a biochemist or, more to the point, to a fish. Violent reactions of a chemical nature are unknown in very dilute solutions, but violent reactions on a biochemical level are extremely common. A rise of a few percent in the salt content of a marine aquarium is so violent that all the fish will die quickly as

their tolerance level is reached, their bodies giving up fluids to balance the osmotic pressures. This is "violent" in every sense as far as the hobbyist, the fish and the biochemist are concerned. I suggest, therefore, that complete avoidance of water mixing can control loss to the benefit of the dealer and home aquarist alike. Certainly, all mixing is not harmful but I can assure you that many complaints that lower the profits of dealers and the pleasure of hobbyists would cease to occur if the waters were not mixed in any substantial amounts (a small percentage mixture will almost never cause harm while larger amounts will often cause unexplained losses.)

As for your last point where your entire staff agrees with my findings on temperature changes, may I say that I am very disappointed. It just doesn't seem fair to agree with something when most of my real fun is in answering letters against something new I have proposed: *Red Nichols, Jungle Laboratories, Orlando, Florida.*

EDITOR'S COMMENT: In fairness to Mr. Nichols, we might note that the above was an abbreviated version of his letter to *THE AQUARIUM*, due to space considerations. In addition to the points covered, Mr. Nichols discussed ammonia toxicity (a point that none of the participants seem to hold in contention), gave an example of a magnesium sulphate/calcium carbonate reaction found in nature in water, and made some very optimistic predictions for the future.

The gaseous exchange properties of plastic bags certainly are not denied by *THE AQUARIUM* staff. Indeed, Mrs. Simkatis checked with an appropriate U. S. Government agency and verified the statements re: exchange previously mentioned by Mr. Nichols. Our point, however, is that very little of a bag is immersed when floating so that we can see very little difference between floating and not floating. Of course, if Mr. Nichols postulates a condition of overcrowding to a point where this "little difference" is precisely that between life and death, then we have to throw in the sponge and agree with him, but certainly the assumption is *not* generally understood by the hobbyist in this controversy in view of the panic-like statements made by some. It seems unprofitable to continue discussion on this point because it is obvious that *not* floating will certainly not do any harm. From the aquarist's point of view, the matter is merely one of convenience.

We readily agree that, although the chemical reactions can never be "violent", the biochemical ones can very well be "violent" in some accepted sense. However, Mr. Nichols' recommendation is to ". . . always open the bags at once on arrival and place an airstone in the water for a few minutes, netting the fish out and placing them in the aquariums." We cannot see that this "plunge" method avoids those "violent" biochemical reactions that Mr. Nichols warns against. Indeed, it does just the opposite.

We are grateful to Mr. Nichols for his stimulating ideas and his kindness in taking part in these controversial discussions.

The following letter is from Dr. Sylvan Cohen, Canoga Park, California:

I am grateful to the editor of *THE AQUARIUM* for the opportunity to reply to Robert Gold-

A Female Guppy Containing Dactylogyns With Hooks.

A Female Guppy With Dactylogyns

stein's comments in his article, "A Critical Review of the Aquarium Literature on Flukes", which appeared in the last issue of this magazine. He objects to my comparison of Swimmer's Itch in humans with skin and gill fluke infestations in fish, but has apparently completely missed the point of the comparison. The intent was to show the superficial nature of both infestations, not to indicate that the organisms involved are closely related. In a similar manner I compared human fungus infections with those in fish without discussing the taxonomy of the causative organisms. Goldstein's misinterpretation would only be made by one knowledgeable in parasitology, since I did not even mention the species causing Swimmer's Itch. No monogenea parasitise humans, and my comparison seems reasonable in the context in which it is used.

The relative hazards of copper and formalin in aquarium water are debatable and largely depend on the individual's experience with them. Goldstein's suggested treatment is vague and dangerous since he does not even hint at the amount of formalin usually required, the duration of the treatment, or how much water should be changed. The formalin dip treatment is recommended not only by Innes, (one of Goldstein's favorably reviewed authors,) but by other works intended for professional and scientific audiences.[1,2] It seems unnecessary and out of place for a critic to try to impress his personal views on all authors whom he reviews.

Goldstein's opening comment that, "The discussion is apparently a synthesis of previously published misinformation", is more difficult to reply to, since his specific criticisms have been answered here. The remainder of my discussion agrees essentially with that of van Duijn, (another of the favorably reviewed authors,) as well as that presented in the previously cited works.[1,2]

Goldstein's comments in his review of Axelrod's book that a distinction between *Gyrodactylus* and *Dactylogyrus* based on location on the host is completely invalid, disagrees with all these authors. ●

1. Reichenbach-Klinke, H., and Elkan, E., "The Principal Diseases of Lower Vertebrates", Academic Press, London and New York, 1965.

2. Davis, H. S., "Culture and Diseases of Game Fishes", University of California Press, Berkeley and Los Angeles, 1961.

Life Of The Pond explores the birth and death of ponds, and the changes that take place with the coming and going of the seasons. More important, however, are the discussions of the plant and animal life to be found in ponds. Diseases of fishes, insect predators, fish physiology, infusorians, and the structure of aquatic plants are covered, and much more. The text is clear and adequate, the majority of the color photographs excellent (the bloodworm picture on page 127 should be framed — it is beautiful!). In addition, there are numerous sketches and line drawings that effectively supplement the text.

A very useful section, *How To Learn More About A Pond*, is found at the end of the book, and forms a catalogue of equipment needed for pond exploration. This and the very valuable Glossary are printed on colored, heavy stock so as to make them conveniently accessible.

Life Of The Pond has few weak points. It is somewhat outdated in certain of its nomenclature (e.g., *Tubifex* for the more commonly encountered *Limnodrilus*) and occasionally, an asinine statement will be made (e.g., "They (miniature ponds) are far more instructive than a crystal-clear tank filled with gaudy tropical fish"). There are a few technical errors (e.g., pH kits do *not* measure alkalinity . . . they measure pH, something quite different) but they are rare. In summary, this is a clearly written book that will help any hobbyist to become a better aquarist, and perhaps broaden his horizons in the bargain.

Salt-water Aquariums by Barbara and John Waters, illustrated by Robert Candy. Holiday House, 161 pages. $3.95. (Reviewed by Helen Simkatis.)

This is a thoughtfully written book slanted for the child in elementary school who has a penchant for keeping in a home aquarium marine animals collected at the seashore. The major emphasis is placed on marine animals such as anemones, shrimp, crabs, etc., and there is a good deal of basic information in the chapters devoted to setting up an aquarium. Discussions on water, salt, oxygen, carbon dioxide, light, etc. are interspersed with suggested experiments that will familiarize the reader with the characteristics and functions of all the elements with which he will have to deal in setting up his aquarium. The sections on equipment are especially well explained and a careful reading will give the child a sound background on the purpose, mechanics, and proper use of each piece of aquarium equipment as it is introduced. The child that has not had the benefit of scientific training in school will find this work easy to read and understand, and careful following of the advice given should lead to a successful salt-water aquarium.

We have previously commented in *Views & Reviews* on the identity of the albino *Corydoras*, and have since received several letters on the subject. For example, Mrs. Sara Rafus, of Morgantown, West Virginia, writes: "First of all, when I bred normal *aeneus* and this albino I got normal *aeneus*. There has never been a suggestion of the dark *paleatus* coloring, meaning spots, etc. I do not have any dark (i.e., non-albino) *paleatus* and have not been able to get any to try a cross with them. But, I have never been able to get the albinos to breed with other spotted or marked species of any color except *aeneus*.

"Secondly, I believe that you can scratch the remark about albino males being sterile. I have raised thousands of pure albinos. This is my fourth year of working with them and of the 50 I kept as breeders, I have found only one sterile male. (Even that one may be just a little too young to breed yet.) I am inclined to your suggestion that there has been a cross breeding of *aeneus* and *paleatus* in the albino forms. However, a comparison of my *aeneus* breeders and the first of my albino breeders certainly points to the fact that there is also a pure albino *Corydoras aeneus*. I say that and run for cover! I already have had letters from people refusing to recognize anything but albino *paleatus*, and these same people won't even answer my letters if I insist on pursuing the issue. I will probably end up in *Adversaria*, but how else can you get the answers?"

To this discussion, Mr. James K. Langhammer, Assistant Curator of the Detroit Zoological Park added the following comment: "I have seen literally thousands of these (i.e. albino *Corydoras*) and all that I have seen are beyond doubt *Corydoras aeneus*. Whether a European strain of albino *Corydoras paleatus* exists, I cannot say. If it does, I'd be willing to bet that in addition to the obvious physical differences between the species, the mottled pattern of body and fins will

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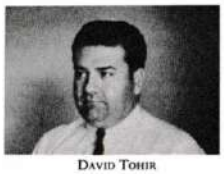
ABOUT OUR AUTHORS

RICHARD STRATTON

Born some 36 years ago in Colorado, Dick attended school in a number of States (his father was an immigration inspector). After a three-year stint in the U.S. Army (paratroopers), he obtained a B.A. degree from the University of Colorado and, later, an M.A. degree from San Diego State College.

Presently a teacher in San Diego, Dick has a number of hobbies, including his three young sons, chess, sports (particularly football), scuba diving, and a general interest in zoology. Although he has kept many kinds of aquarium fishes, including saltwater specimens, he is primarily interested in cichlids. A little over a year ago, he helped found the American Cichlid Association. Currently, he is president of the San Diego Tropical Fish Society, and frequently contributes articles to club and national aquarium magazines.



DAVID TOHIR

Dave Tohir (whose last name rhymes with "door") was born 33 years ago in San Diego and thus is one of those rarities, a native San Diegan. Dave has been a mainstay of the San Diego Tropical Fish Society, having served in numerous capacities, including president. His witty and vivacious wife, Pat, has served as editor of the Tropical Breeze, the Society's monthly publication, on at least two separate occasions, including the present year.

Dave has been lucky enough to be able to parlay two hobbies, photography and aquarium fishes, into a livelihood. He recently purchased a photography shop, installed an aquarium display room, and now has perhaps the only aquarium-photography shop in the country! Dave began photographing fish several years ago, and now has a very fine collection of fish pictures. His photographs have appeared in all the major aquarium magazines.
Tropical Breeze FTFI Trader

RED NICHOLS

Red Nichols earned an electronics engineering degree through attending UCLA, the University of Utah and San Bernardino Valley College. Upon graduation he worked in the research and development section of Hughes Aircraft. During this

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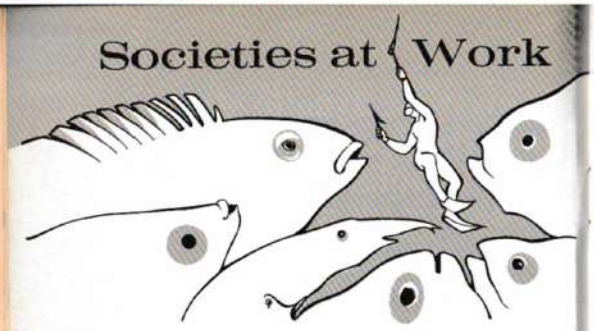
Societies at Work



By HELEN SIMKATIS

SOCIETY BULLETINS ARE NOT NEW, although new ones appear on the scene quite regularly, and each one has something to offer even if it is only to reflect the activities of the publishing society. Many publications, however, not only tell us what the publishing societies are doing of interest, but also offer articles on the hobby and its many phases. Hence, these bulletins become an invaluable source of information and when controversy ensues, which it often does, the reader of many bulletins has the benefit of learning a broad spectrum of opinion on a particular subject. Society bulletins stem from the grass roots of the hobby and through them we can visit the fishrooms of aquarists we may never have the pleasure of meeting in person. These and many other thoughts passed through our mind as we picked up the February issue of *The Fish Culturist*, published by the Pennsylvania Fish Culturists' Association, and in its 47th year.

The lead article of this issue is Wm. T. Lawrence's *Breeding Barbus Tetrazona*. There have been many articles written on this old aquarium favorite but this one has the touch of a thorough, meticulously careful and knowledgeable writer of aquarium literature. The organization of the piece could be a model for many articles written on as many species of aquarium fish. The author commences by telling us how to pronounce the scientific nomenclature, gives the popular names, the meaning of the scientific name, its family, where it comes from, the type of egg-layer it is, its size, and life-span. Personality traits are gone into and under the description we are told how to distinguish between the sexes. Water quality and temperature are delineated, and feeding and the diseases to which the species is subject are not neglected.

In his treatment of *Ichthyophithirus* the author recommends Quinine sulphate, tells how to prepare it, how much to use, and why the tank should be kept dark during treatment. Breeding is discussed with the same detail as well as egg handling and feeding the fry. We do not know if this is the last article Bill Lawrence wrote before he died suddenly in February but if it is his swan song, it reflects remarkably well his dedication and his thoughtful approach to the hobby. Whoever the Pennsylvania Fish Culturists' Association selects for its new editor of *The Fish Culturist*, he or she will have an outstanding predecessor and one we all would do well to emulate. Robert W. Britton, the First-Vice-President of The Pennsylvania Fish Culturists' Association lives at 1823 Dudley Street, Philadelphia, Pa. 19145, and seems the likely person to write for information regarding the society and its publication.

Herb Meyer tells us about *Melanoides tuberculata* in his *Bottom Snails, Your Invisible Janitor* in the February issue of *The Tropical Breeze* and begins by listing the demerits most snails have earned as the aquarist's hobby has progressed. One of the complaints we hear most frequently is that snails tend to overpopulate and, of course, many hobbyists complain bitterly that their snails do not do the cleaning job expected of them. This latter complaint is somewhat unreasonable for snails have never been told that they are supposed to rid tanks of organic waste and clean plants of algal growth and yet add no waste products of their own to the aquarium. Herb Meyer, however, has found that the Malayan bottom snails, sometimes referred to as the burrowing snails, and scientifically tagged *Melamoides tuberculata*, have quite a bit going for them from the hobbyist's point of view because they spend most of their lives just below the aquarium gravel, mixing waste matter with the gravel so that plants are better able to utilize nutrients so provided. These snails dine on decaying plants and never touch healthy foliage. They also act as an indicator if all is not well beneath the surface of the gravel by climbing up the sides of the tank.

Should the population become too dense, those that are driven out of the gravel will vacuum algal growth from plant leaves without damaging the leaves even a little. They have a light cream to tan shell with reddish-brown spots which is turret shaped. Guy Jordan is still *Scanning the Periodicals* and making editors purr with pride all over the nation. *The Tropical Breeze* is published by the San Diego Tropical Fish Society, P. O. Box 4156, North Park Station, San Diego, California 92104.

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FISH PHOTOGRAPHY MADE EASY

by SYLVAN COHEN, *M.D.*

MOST AQUARISTS, AT ONE TIME OR ANOTHER, have had the urge to take pictures of a special, favorite fish or tank and have set about the task with whatever camera they happened to own or could borrow. The results of such a haphazard approach are usually color slides or photographs showing colorful blurs in various stages of under or overexposure which can hardly be recognized as a fish, much less be identified as to the species. After such an obvious disaster, the usual hobbyist gives up in disgust and comes to the conclusion that only a professional or experienced photographer with unlimited funds and equipment can produce fish photographs which are good enough for projection or publication. True, expensive and complicated equipment can be used by skilled photographers to produce the excellent photographs that we are accustomed to seeing in magazines and books, but excellent pictures can also be made with a simple, inexpensive camera having a built-in flash gun, if a few simple alterations are made. The accompanying picture shows a close-up camera made from a Kodak Starflash camera. Any similar camera can be altered in the same way, but once altered, the camera cannot take pictures under normal snapshot conditions.

The changes to be made are:

1. The lens opening must be made much smaller.
2. The shiny flash reflector must be dulled.
3. Accessory close-up lenses must be used over the normal camera lens.

These changes can be made at little or no cost for the first two, and for about $6.00 or $7.00 for the third.

The lens opening can be narrowed by creating a new lens diaphragm with an opening about the size of a large pin by simply poking a pin through a small piece of tinfoil or aluminum foil and glueing the edges of the foil inside the front lens mount or lens shade. If your camera has a two-element lens that can be taken apart, ideally the new diaphragm should be placed between the lens elements. The new opening should be slightly larger than a pin shaft, and the foil should be right against the lens with the hole centered over the lens if it will not fit between the lens elements. If the first pictures are under or overexposed, the hole in the foil can be subsequently altered until the pictures are correctly exposed, but the large pinhole should be about right for a camera taking 127 size film. This size camera also has the advantage of producing 2 × 2 slides that can be shown in a standard slide projector.

Lion Head Goldfish

The second alteration, dulling the flash reflector, is easily done in about five minutes using a small brush and a few cents worth of aluminum or silver model airplane paint. This does not change the color balance of the flash but significantly reduces the light output of the flashgun. The reduced light is necessary because of the extremely close range at which

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Babalonia's home, deep in the heart of the jungles of northern Peru.

AN AMAZONIAN ADVENTURE PART V

by ALBERT J. KLEE

THE NEXT MORNING, WHILE OUR GUIDES WERE preparing breakfast, we secured our gear and prepared for another day on the River. There was an air of excitement in camp because we all knew that it would not be long before our canoes would leave the Amazon River proper, and turn up the Rio Atacuari, ultimately to enter the Yacarite River in northern Peru. These waterways would be less heavily traveled and indeed, approach what could only be termed desolation.

Our canoes loaded once again, we climbed aboard and prepared to negotiate the half-mile or so to the River. To do so, however, it was necessary to travel past a Columbian Guardia Nacional military post. Although we had not anticipated stopping there, an invitation from the post Commandante and an armed squad of soldiers persuaded us to do so. To say that the Commandante was hot under the collar is an understatement. It turned out that the lights from the shore that we had ignored the night before, were signals from the post to stop for identification. We were under suspicion of being (*a*) smugglers or (*b*) a raiding party from Peru. Jon Krause and I, as interpreters for the group (neither the soldiers nor our guides spoke English), accompanied the Commandante to his headquarters, a cabin up the hill a few hundred feet. Left behind were our friends and two soldiers, the latter leaning on their rifles and smoking nonchalantly. We were all worried, to say the least.

When the Commandante heard our story and learned that we were "norteamericanos", we were off the hook. Our guides, however, were subjected to a long, violent tongue-lashing. While this was going on, Jon and I decided to play a little joke. We returned to the others with a cock-and-bull story a mile long to the effect that we were all under arrest, that the Commandante was going to toss us in the stockade, and that it would be years before we ever saw home again. This really shook up the group and Ed Corder took a solemn oath that, if he got out of this one, he would never set foot out of Beech Grove, Indiana, again. Jon and I returned to the camp headquarters to see how our guides were faring and, upon our return, announced that if we paid a 1,000 peso fine, we would be released. This was a mean trick since we didn't have 200 pesos among us! Another hour passed and our guides were released. We told our friends that, due to the magnificent persuasive powers of Jon and myself, we were free to go. To this day, not everyone who was on this exploration knows what the reader knows now!

I had an opportunity to make a series of short tests on a sample of Amazon River water, taken after we resumed travel, roughly at the point where the Rio Atacuari entered the Amazon River (see Table I). Compared with the water sample obtained at the Leticia docks, the results were essentially the same. The water was moderately soft, about neutral,

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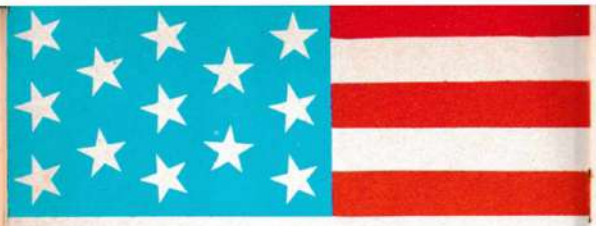

A HISTORY OF THE AQUARIUM HOBBY IN AMERICA

PART 7

BY ALBERT J. KLEE

IN 1893, PHILADELPHIAN William P. Seal was in charge of the aquaria of the U.S. Fish Commission at the Columbian Exposition in Chicago, and in that very same year, J. Hope originated the fancy goldfish hobby in Philadelphia. With a vengence, Philadelphians pursued the cult of the goldfish and polished that creature to a gleaming perfection seen nowhere else in the world. One after the other, the Philadelphia pioneers

In the small pet shop on Ninth Street operated by John Cugley (Cugley was the first to import calico telescope goldfish from Japan), a appeared; Franklin Barrett, Z. K. Dannenhower and others, led the way. few hobbyists began to congregate to discuss the problems of this new hobby. One of these regulars, H. G. Burrows, suggested that the group organize and conduct meetings in a regular way and so, the very first meeting for the purpose of effecting a permanent organization was held, at the Colonnade Hotel, on May 5, 1898. Burrows, who was elected President, proposed the name by which the society was henceforth known, i.e., THE AQUARIUM SOCIETY OF PHILADELPHIA. Other officers elected were: Harry Folwell, Vice-President; George Cugley, Secretary; and E. Thalag, Treasurer. The object of the Society was simply, "The scientific management of the aquarium and the amateur breeding of aquarium fish". In that breeding (of goldfish) was stressed, the Philadelphia group set goals quite different from that of the New Jersey society.

Active membership in the Society cost $6.00 per year; Associate membership cost $3.00. For the first three meetings the average attendance was 10 and by the end of the year, the total membership stood at 18. On June 14, 1898, a practice of meeting at members' homes was started. In August of 1898, the Society was visited by Mr. M. Hammerschlag of THE AQUARIUM SOCIETY (New Jersey) and thus, intersociety contacts were started. One aspect of interest is that, independent of the New Jersey group, the Philadelphia society also wrestled with the problem of commercialism. Their By-laws stated: "It must be definitely understood that no member shall use the Society as an advertising medium".

By the end of 1899 the Society, perhaps influenced by its New Jersey compatriot, realized that its due were too high. In order that the charter members not lose their initial investment, the Society disbanded on January 10, 1900, dividing the cash on hand ($20.40) among 15 members. All but 2 members immediately reorganized, adopting the old Constitution as a whole, but reducing the dues to $1.20 per year. In March of 1900, the Philadelphia Society held the first competitive aquarium exhibition in America. The competition was held in the home of one of its members, Mr. E. Hoffman of 1813 South Third Street. The

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***DAVENPORT** continued from page 5*

I bought a pair of blue gouramis and tossed them into a ten-gallon tank containing a mixed-up collection of "what have you" with no regard for living space or even possible cannibalistic tendencies. I often wondered what happened to my guppies, and where my pretty little neons were hiding! For almost nine months, the gouramis acted as if they had bad breath or something for they avoided each other completely. Then, as the female started to show signs of being egg-laden, I started to research its breeding habits.

Reading that labyrinth fish prefer shallow water, I was now faced with a space problem. A trip to a local department store, however, soon provided a solution in the form of plastic boxes of various sizes, used for the storage of shoes, hats, etc. One type, intended for sweaters or shirts, was perfect. Measuring 11 x 16 x 7 inches, with a tight-fitting clear-plastic cover, these boxes hold just about four gallons of water and are strong enough to last for years. Just don't move them when filled (but don't try that with any type of tank!). A one-inch hole was drilled in each corner of the cover for ease in feeding and, as it later turned out, for observing the action at close range. Following this, a seven by seven inch section was sawed out in the center of the cover. An eight-inch square cake pan, with a light socket mounted in one side through a hole, made a very good reflector. It was fastened over the square hole with two machine screws, a light coating of Vaseline on the inside of the pan helping to prevent rusting.

After some experimentation, a standard 15-watt bulb was found to be just about perfect. It supplied adequate lighting and held the water to a very close reading of 86 degrees day and night. One batch of fry was lost by leaving a 25-watt bulb going all night. The temperature rose to well over a hundred.

For breeding, keep the furnishings of the bridal suite as simple as possible. A box filter, a leafy plant (real or artificial) and about a quarter-inch of gravel will do fine. Avoid sharp rocks and other unneeded items. Keep it simple. Set the filter out from the corner about an inch, to give the female a hiding place in case the male gets too rough. The flow of air should be about two or three bubbles per second so as not to stir things up too much. A small magnifier will afford a critical view of the proceedings through the corner holes in the cover.

After ignoring each other for nine months in the community tank, my gouramis wasted no time at all when they found conditions to their liking in the new set-up. In minutes, the male turned from a pinkish-white to his wedding suit of deep navy-blue. The female darkened up too, but not as much as the male. The male went right to work building the bubble nest among the leaves of the plant while the female stood by at

This is another color variety of the blue gourami, known variously as the "marbled" or "Cosby" gourami. At one time, it was known under the erroneous name of "Trichogaster marmorata". Another popular name sometimes used is "opaline" gourami. All of these marbled strains originated in the tanks of a Houston breeder and dealer, D. B. Cosby, in April of 1950.

the far end of the tank near the filter. As soon as the nest was completed, the male started trying to coax the female under it. He would ease her gently along the side of the tank, pressing her against the wall. She would go along just so far, then slip out from under him and rush back to her corner. The male would give chase, then hurry back to repair the nest, courting her again later.

The female appears to decide just when she is ready. No amount of coaxing by the male will sway her. But when she feels that her time has come it is she, rather than the male, who does the chasing, indicating her readiness by racing over to the nesting area and butting the male on the side. This took place a little less than two hours after they had been placed in the tank.

Then, the action really started. I became so interested that I stayed up all night watching them with my magnifier. The male slowly circled the female, then wrapped his body around hers and started to squeeze. She rolled over on her side, head down and tail almost out of the water. After a few seconds, her tail quivered violently and a stream of bubbles came out of her mouth. The pair slowly sank toward the bottom as a batch of eggs floated up. They then separated, she returning to her corner.

Two males under different lighting conditions. During breeding, the males tend to become very dark and temporarily lose their marbled coloration. Opaline or marbled gouramis are rapidly phasing out the old stand-by, the three-spot blue gourami, as they are much more popular.

Now the male began his big job, that of gathering up the floating eggs and placing them among the bubbles of the nest. Several times the female was observed helping out by gathering in her mouth the eggs which had drifted over to her section. Rushing to the center of the tank, she blew them over toward the nest. Sometimes the female got a little impatient and dashed over to the male for another embrace before he finished his egg collecting. When this happened, he chased her away, but she usually arrived just as he finished. I counted sixteen such embraces during one spawning, only one during another.

The eggs can be seen easily with or without a glass. They clearly stand out among the bubbles like tiny bits of cloudy glass. A very few eggs will be china-white. These, I believe, are infertile. They always seem to disappear after a while, perhaps eaten by the parents. The number of eggs varies from one embrace to another. Sometimes there may be only a dozen or so, at other times there are so many you can't even count them.

When all the eggs have been delivered, the female retires to her corner, at which time she may be removed. The male has no further interest in her, and busily fusses with the nest. This is something to watch. He never seems satisfied with the egg arrangement, carrying them first to one corner and then to another. Sometimes they seem to finish up just where they started!

The nest, having served its purpose, is allowed to fall apart, the male retaining just a few bubbles here and there along the sides of the tank. The presence of the male is not needed at all, once the eggs have been delivered.

Now came a surprise. I had expected the egg development to take at least two or three days but in the morning, only 17 hours after the first embrace, most of the eggs were hatching. They were in the first stage, that is with long tails protruding from the shells. On some, the heads were simultaneously starting out of the other end of the shells. Every once in a while the tail would jerk, propelling the fry a short distance along the water. In about two hours all heads were out, the big eyes showing and the egg sacs still attached behind the heads. These egg sacs act as "life jackets" as the fry try to dive beneath the surface. They go down just so far, and the egg sac then pops them back up to the surface. I don't believe they could drown if they wanted to, wearing these life preservers!

I always feed my young gouramis on liquid egg-layer formula, a few drops per day. They seem to do very well on it. As the spawnings are usually very large, at least one spare tank must be available to give the fish ample growing space. Also, the parents will be spawning again before the last batch gets very large.

The blue gourami, Trichogaster trichopterus. This is the classical standard blue gourami known as the "three-spot", because of the eye, mid-body spot and caudal peduncle spot positions. The overall impression is that of three spots.

I have noticed one thing which puzzles me. Perhaps someone can help me out. Just about the time the eggs start to hatch, there are hundreds of small, white worm-like growths on the walls of the tank. They do not seem to bother the fry, and I have never seen the fry eating them; yet, in a day or so, they disappear as quickly as they had appeared. Are they harmful, or beneficial? Or, are they some form of afterbirth?

EDITOR'S NOTE: The threadlike worms that Mr. Davenport observed were most likely bristleworms, members of the class Oligochaeta (which means "with few bristles"). Included in this Class are the families Enchytraeidae (which contains the white worms), Tubificidae (which contains the tubifex worms), and Lubricidae (which contains the earthworms). Other families, such as Naididae and Haplotaxidae, contain the animals observed by Mr. Davenport. They feed on the infusorians that are often present in the aquarium, especially at hatching time when the decomposing egg shells form food for the infusorians. These bristleworms (see sketch) are harmless to fish, and since many of them are but semi-aquatic, disappear from the tank in time. Since their eggs are frequently present in aquarium water, should conditions (including an adequate food supply) favorable to them reappear, so will the bristleworms. ●

WALKER *continued from page 9*

A male emperor tetra, Nematobrycon palmeri. The fin extensions are longest in the male, shortest in the female.

A female emperor tetra.

scarce all-glass battery jars which hold four or five gallons, should be covered with two layers of marbles (not absolutely essential although fewer eggs will be eaten), filled with tap water and covered. Do this at least a week in advance of the proposed spawning. If an artificial spawning medium such as a nylon mop or artificial spawning grass are to be used, they may be allowed to stand in the aquarium during this period.

A pair of emperor tetras under different lighting conditions, showing the iridescence due to the guanine crystals located beneath their scales.

Two or three drops of acriflavine in the water can do no harm, but are usually not necessary since most harmful organisms will have starved in the darkened covered tank at the end of a week.

I would advise the beginner not to tamper with the pH or hardness of the water as long as your local water is fit to bathe in and doesn't have to be chewed before swallowing. Most fishes have a wide range of tolerance as long as the water is clean.

The breeding aquarium should be in a place relatively free of activity. Passing shadows are prime offenders since to almost every type of fish they represent the presence of potential predators. Even the easiest of egglayers may refuse to spawn if moving shadows continually fall upon their breeding aquarium.

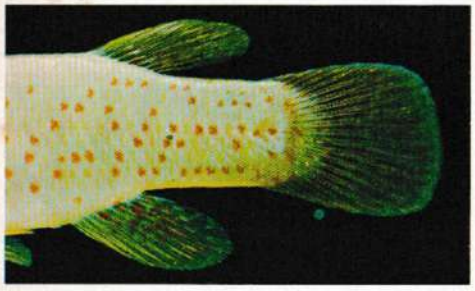
Fish which are well conditioned will sometimes spawn the morning after being introduced to the breeding aquarium on the previous evening. Love-play may take place for several days before any eggs are laid, so don't assume that spawning has occurred until you either see eggs (like tiny glass beads) present or a female is obviously less robust than previously. Be patient and wait up to five days if necessary, during which time DO NOT FEED THE BREEDERS. If by this time they have not spawned, which is unlikely with well-conditioned healthy breeders at 80 degrees in a quiet location, remove them and start over, beginning with conditioning.

After the eggs are laid, remove the breeders, hatch and raise the babies according to one of the many fine books available which cover this in detail. To bring fishes to ultimate size and health is a great reward. If you happen to have personally promoted the union from which these prize specimens eventually result, the reward is many times compounded.●

GOSSINGTON *continued from page 7*

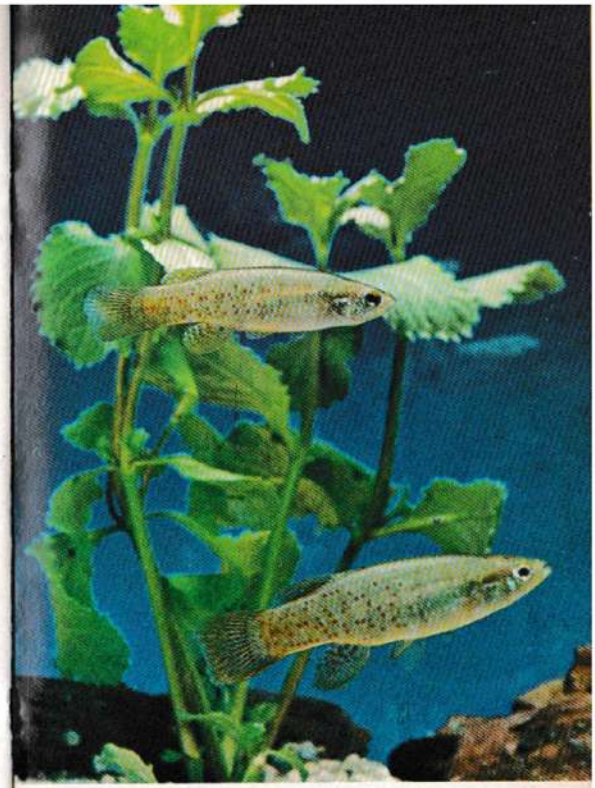
(RIGHT)
Female Fundulus chrysotus. Females are duller in coloration, and her numerous, glittering spots are very conspicuous.

(BELOW)
The red pigment cells, erythrophores, are carried into the vertical fins of the male.



It was during one of these thinning procedures several weeks later that I realized that some of the fry in the tank had taken on strange characteristics. They surely didn't look like *Betta* fry and what's more, they weren't! They were *Fundulus chrysotus*. And, I soon found that there were more of them than there were of bettas.

Here now was a first-hand look at a typical environment—the weed-choked pond—of this particular *Fundulus*. Later, I found their eggs on other plants besides the lettuce roots. They were rather large and hatched in a little more than a week with the water temperature in the 80's. The fry were able to take newly-hatched brine shrimp soon after



Two male Fundulus chrysotus. Another color variety exists that is spotted heavily with black, somewhat like a male Gambusia holbrookii.

A male Fundulus chrysotus, or-"golden-ear" as they are sometimes called.

they became free-swimming.

The species is a member of the killie family, Cyprino-*dontidae*, and, like many killies, they are equally at home in fresh or brackish water. Its range extends from South Carolina to Florida and at maturity, individuals grow to a length of up to three inches. That unsuspected spawn that came in with the lettuce was deposited in the Spring, but I have seen males driving their lady-friends during late summer, here in Florida.

They like the running water of rain storms and may be collected as they swim up little rivulets, seemingly to areas that will drydock them when the rain stops. In their home ponds and streams you will find them swimming in small groups, rather than in large schools, and they seem to prefer to hug the shore line. They feed on crustaceans, insect larvae and apparently, on the fry of other fishes. In an aquarium they will accept prepared fish food readily.

Kept occasionally as a "tropical" fish, they are said to be snail killers and fin nippers. However, I have had them in tanks with fish their own size and did not have any trouble. They are certainly colorful and interesting; especially attractive are individuals which display an unusual color phase. These fish sport black pigment amid the gold flecks on their sides. Were the golden-ears more popular, these individuals might have been selectively bred into a black variety by now. At any rate, they do make a colorful and interesting addition to any collection.●

THIS IS MY PROBLEM

by HELEN SIMKATIS

From: V. R. Cashion, Chicago, Ill.
Could you please tell me what kind of tropical fish I could get that would breed easily with black mollies?

Answer: If your question means what other species of fish you could keep in a tank now containing black mollies that are breeding that would also produce their own young, we might suggest swordtails or platies. If, on the other hand, you are asking what species might cross-breed with mollies, we would suggest guppies. If our first assumption is correct, and you merely wish to add another type of livebearer to your mollie tank, we would advise against it. Mollies like a tank to themselves and do far better when they have this luxury. If you are a true molly buff, you will think the species important enough to pamper it in this respect.

From: Danny Morem, Austin, Minnesota
I am a beginner and would like to learn how to breed my two male guppies and my female.

Answer: If you are keeping these fish together I am sure by now that you know that they have taken care of the matter themselves. We should like to add, however, that it would be better to have several females and one male. Two male guppies are apt to worry your female to the point that she will die an early death from exhaustion.

From: Howard Finkelstein, Brooklyn, New York
I have a scatty fish that acts most peculiarly. It keeps playing dead. It goes down to the bottom of the tank and lays there like it's gasping for breath. For two or three days it looks fine, and then it plays dead again.

Answer: If by a "scatty fish" you mean *Scatophagus argus*, it may be that your fish is not playing games but is in trouble a good part of the time. This species likes about a teaspoon of salt to a gallon of water. Use aquarium salt, of course. It likes a good deal of vegetable matter in its diet. Duckweed can be used. It also likes live food and brine shrimp

continued on page 61

KLEE *continued from page 37*

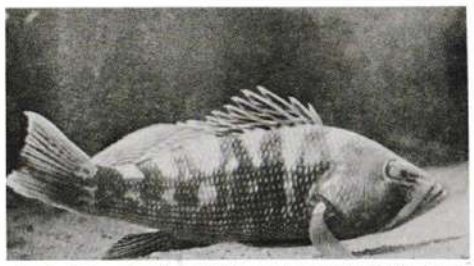
The "Father of Aquarium Photography", Dr. R. W. Shufeldt.

fish (goldfish only) were divided into three classes: under one year, one to three years, and over three years. Ribbons were awarded upon the basis of popular vote, not by judges selected for that purpose.

A historic point of considerable importance occurred at the May, 1901 meeting when the Secretary of the Society, Mr. Herman T. Wolf, proposed a series of subjects to be taken up for discussion at the meetings. This afterwards formed the basis for his famous book, *Goldfish Breeds and Other Aquarium Fishes*. We shall return to this subject in a future installment.

In this brief history of the founding of the AQUARIUM SOCIETY OF PHILADELPHIA, we must make it clear that we are talking about goldfish fanciers starting a goldfish society. In no way can an analogy be made between THE AQUARIUM SOCIETY (New Jersey) and the AQUARIUM SOCIETY OF PHILADELPHIA. The former was a society reflecting the term "aquarium" in its fullest sense; the term was narrowly interpreted by the latter.

We take time out now to discuss another significant personality of the day . . . our first authority on fish photography. Dr. R. W. Shufeldt. Shufeldt, an Army surgeon, pioneered in photographing live fishes. An impressive report by this brilliant man, of his early efforts in the field of fish photography, appeared in Volume XIX of the Bulletin of the United States Fish Commission for 1899 (entitled, *Photography of Live Fishes*). However, he later contributed many articles in various foreign and domestic magazines devoted to photography, natural science and the aquarium hobby. Some of his work is reproduced here but it must



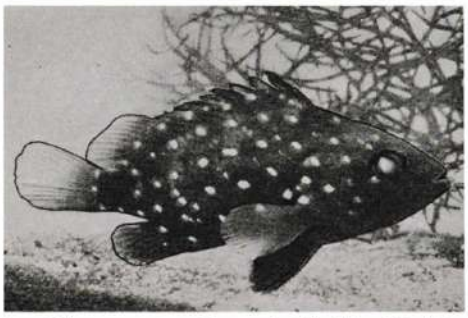
A study of the sea bass by R. W. Shufeldt, taken at the turn of the century.

be understood that these are photographs taken from very old magazines, and do not reflect the full quality of the originals.

Shufeldt's techniques are still of considerable interest to us today. He utilized a specially-constructed aquarium, 14″ high x 16″ long x 5″ wide. The bottom was covered with 1¾ inches of sand and small pebbles, into which aquatic plants were anchored, as well as a small stone or two. Back ground was either natural sky or lacking this, a large sheet of white blotting paper. The camera used was an 8″ x 10″ view camera with ground-glass focusing. In general, the camera was focused on some object in the middle of the aquarium, although Dr. Shufeldt would also readjust focus on the fish itself as it swam into view. The shutter speed selected was a function of the degree of activity of the fish. However, Shufeldt was never in a hurry. He waited patiently until the subject calmed down and swam of its own accord to the desired position. In those days, of course, only black and white film was available but his photos were masterpieces. Shufeldt was more than a fish photographer; he was a philosopher of photography as well. He once said: "The camera is more than a tool; it is a thing for which to have the deepest sympathy. It is worth more than promiscuous snapping just to use up the rest of the films; it is worth making it an end in itself".

In addition to his photographic skills, Shufeldt was also an excellent aquarium writer and in the 1900's, he contributed to a number of aquarium publications. We should never forget then, the "Father of Aquarium Fish Photography", Dr. R. W. Shufeldt.

In our last issue we introduced Eugene Smith, the founder of organized aquarium activity in America, and one of the five great American aquarists of all time. In 1902, Smith wrote *The Home*



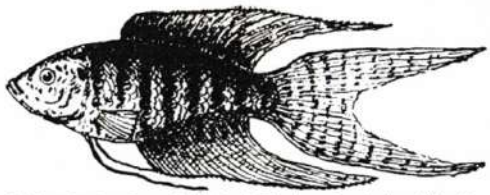
Young of the snowy grouper, another example of Shufeldt's art. Considering that these photos by Shufeldt were taken about 70 years ago (and copies from very old magazines at that), we can easily see why he merits the sobriquet, "Father of Aquarium Photography".

Aquarium . . . How To Care For It. It was truly a milestone for it marked the beginning of modern aquarium literature, and introduced concepts never before unfolded in the writings that preceded it. The book itself consisted of 213 pages, illustrated with line drawings prepared by Smith himself. Here was a book concerning freshwater aquaria that was truly authoritative and based upon the personal observations of a keen student of aquatic natural history.

Even its introductory paragraphs were a startling departure from past practice. Where Samuel merely sought to expound its principles, except at the end of his book, Smith made a vigorous attempt to "sell" the aquarium pastime and to place it in its proper relationship to other popular hobbies of the day. The following are his first few paragraphs:

"An aquarium in a living-room or parlour is more easily maintained than house plants or birds. It requires less attention, bears changes of temperature more readily, and if neglected for a time need not suffer. A bird must have constant care, house plants need regular watering, security from cold drafts in winter from without, and from the dry heat within doors, and must be guarded against destructive insects.

"Were it not for the feeding of the animals, provided the aquarium is rightly placed for light, you could leave it undisturbed for months and



An illustration from Eugene Smith's book, "The Home Aquarium", published in 1902. The paradise fish was, at the time, the "staple" tropical fish of the hobby.

then find that it had not deteriorated in the least during your absence, but had become perhaps even more attractive than before.

"There is no danger to health, no damp soil to produce exhalation; on the contrary, it is well known that all clean water absorbs gases and acts as a purifier of the air. The evaporation of the water, especially during the winter season, will also give much needed moisture to the air of our usually overheated rooms. In these ways the aquarium becomes of sanitary value in our homes".

When Smith wrote his book he had before him an aquarium which he had set up in 1893. Nine years later, without ever being taken down, it was still going strong! To accomplish this feat, he observed what he considered to be the one great principle of the aquarium, i.e., "to bring about a balance of life, plant and animal, amid natural surroundings". One must appreciate this principle to understand Smith. He was not particularly a breeder for few fishes were bred in aquaria in those days; he was, however, a true student of aquatic life.

Smith, although not alone responsible for its introduction, first popularized the name "tank" for the aquarium, using it throughout his book. He recommended against the use of the six- or eight-sided aquaria so popular in the 1800's, and against goldfish gloves (which he referred to as "torture-cells"). Smith was the first to discuss the manufacture of wooden tanks and his advice on setting up aquaria is still followed today as, for example, the practice of sloping gravel from rear to front (Samuel, in the manner of the day, had merely suggested placing the gravel evenly over the bottom of the aquarium). One bit of counsel we vigorously second was, "Do not use such whimsicalities as submerged castles, lone fishermen, nymphs, and the like"!

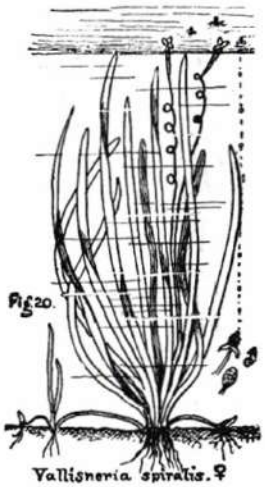
Another of Smith's innovations was a discussion of the external anatomy of fishes in some detail including an explanation of the fin and scale count formulas. For every fish described in his book, Smith pro-

The chanchito, Cichlasoma facetum, reproduced from Smith. Although this was our first aquarium cichlid, it is rarely seen in the hobby today (the zebra, convict or "congo" cichlid is another species, Cichlasoma nigrofasciatum).

vided dorsal, anal and lateral line counts. As might be expected, native fishes made up the greater part of the discussion. Of tropical fishes he referred to the following: paradise fish, chanchito (*Cichlasoma facetum*), climbing perch, betta and the mudskipper (*Periophthalmus koelreuteri*). Passing mention was made of labyrinth fishes of the genera *Osphronemus* and *Trichogaster*, and to certain South American and Indian catfishes. He advised keeping covers over tanks containing tropical fishes.

Smith's recommendations on aquarium care and maintenance were very sound. He was the first to write about the floating feeding ring and his cardinal rule in feeding was, "*Never give more than is eaten*". In those days, little was known about fish diseases, the standard remedies being salt and potassium permanganate, and so, Smith emphasized prevention such as a careful inspection of all new fishes for the presence of disease, plus a quarantine period. He included in his book also, chapters on field-collecting and aquatic insects, something present-day authors could emulate to advantage.

At the end of this book, Smith provided tables of animals and plants (where Samuel only had animals) which harmonized, and pointed out those species which might be troublemakers. It was Smith



At the turn of the Century, Vallisneria spiralis was a staple, a situation that exists even today. (Drawing from Smith).

Smith's drawing of Ludwigia natans. As Roe has stated: "The cultivated form, Ludwigia Mulertii hort., has replaced the species which is probably not cultivated in any nursery today".

who introduced the term "exotic" to fish fanciers and who was the first to explain scientific nomenclature and the naming of fishes. (Not even neglected were the niceties such as placing the name of the original describer in parenthesis when the species was no longer considered in the original genus.) He pooh-poohed the myth of the necessity of having snails in the aquarium and pointed out the damage they can cause to aquarium plants.

In short, most of the principles of fishkeeping upon which modern-day aquarists "cut their teeth", were enunciated by Eugene Smith, an aquarist in the broadest interpretation of the term.

To be continued.

continued from page 27

be just as evident in the albino *paleatus* as in the normal."

While Mr. Langhammer and I were disagreeing over his last statement, a very interesting letter arrived from Mr. Loren J. Beller, which we repeat in part: "While living in Brussels, Belgium, I purchased some albino *Corydoras* "*paleatus*" from a fish store on Rue Lombard. This was in 1959 or 1960, and the owner thought that they had come from South America.

"I bred these fish, crossing female albinos with natural *paleatus* males, as well as using both albino males and females. The albino male was not, at that time, sterile. I raised approximately 100 albino *Corydoras* which were sold to an aquarium on Place Leydts, Brussels. The observation that they may be short and chunky was true in my experiences with them, for they were always much heavier than my normal *paleatus*."

At this point, I decided to write to Dr. Stanley H. Weitzman, Curator, Division of Fishes, Smithsonian Institution (and a specialist in this genus), for a professional opinion. Dr. Weitzman's answer is (in part) as follows: "In regard to your question about albino *Corydoras*, several years ago when reports of these began to appear I briefly looked into the situation. One of these *apparently* appeared in the San Francisco area and these is a report on this somewhere in the Aquarium Journal (Editor's Note: "Albino *Corydoras aeneus*", Aquarium Journal, pages 460-461, November 1962). At the time, or a year or two thereafter, I obtained one of these and I still have a couple of kodachromes of this. Checking these I agree with my early decision that it is *C. aeneus*. To this date this is the only albino *Corydoras* I have kept, although I have seen others on occasion. About this time there also appeared on the east coast another albino *Corydoras* that I would state is *C. paleatus* or some related form; definitely not *C. aeneus*. I would guess that albino specimens of both species may be in the trade, and that they may often be hopelessly confused by aquarists."

After reviewing all of this additional comment and evidence, it is difficult to know just what to think. There is no doubt that whatever species the albino was in the beginning, it most certainly has since been successfully crossed with both *C. paleatus* and *C. aeneus*. This, of course, begs the question of whether in the beginning there were two species of albinos, *aeneus* and *paleatus*, but in view of the fact that the European albinos, which were from the start identified as *paleatus* and cross-bred with that species, appeared somewhat chunkier than normal *C. paleatus*, it is quite possible that they were mistaken for *aeneus* when they arrived in the United States. Accordingly, the tendency would have been to cross them with the readily available normal *aeneus*. This would explain the early reports of sterility

made by American aquarists. The conclusion is, therefore, that the albino strain seen in the United States today represents a hybrid of *aeneus* with *paleatus*, hopelessly intermingled due to generations of breeding, but due to the scarcity of normal *paleatus* approaching *aeneus* more and more closely every year. ●

continued from page 28

time he kept up his hobby of tropical fish. He discovered, while assigned by Hughes to the Alamogordo Missile Test Station at White Sands, that brine shrimp live in the alkali streams there.

Red left the Hughes firm upon discovering that his sideline tropical fish retail business was making more money than his engineering. With the spare time he now had, he became interested in the problems of tropical fish raising. Through self study and the assistance of chemists, doctors, veterinarians and others, he was soon able to attack the problems of the professional breeder through biochemical treatments. In the 1950's Red sold his California interests to move to Florida, ". . . to be near the heart of the tropical fish industry".

Today, Red is president of Jungle Laboratories which boasts eleven fulltime employees. In addition, he is a contributing Editor of the FTFI Trader, the official organ of the Florida Tropical Fish Industries, Inc. ●

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which should be offered at least once a day. Frozen brine shrimp can be used. The tank you use should be large enough to offer plenty of swimming room. A 10-gallon tank would be sufficient for one specimen.

From: Debbie M. Ferraglio, Brooklyn, New York

For the past year I have been tying pieces of liver (raw) in my tanks. Also I feed my fish the yolk of a hard-boiled eggs. Our fish love these foods greatly and I would like to know if they will do them harm. How do I rid the cloudiness in the water afterward?

Answer: Both of the foods you mention are good for fish but both are known to cause cloudiness in the water. A power filter might remove some of the cloudiness but suggest that you only use these foods as supplements to the diet of your fish. There are other good foods that will not cause cloudiness such as brine shrimp, tubifex worms, high protein dry foods, and tiny pieces of raw shrimp (washed) and tiny pieces of lean raw beef. The last two foods can be frozen and small minced chunks used at each feeding. This will help eliminate some of the cloudiness you are now experiencing from the constant use of liver and hard-boiled egg yolk.

FROM: David G. Golden, Morgan City, La.

Perhaps you can give me some information. I would like to know where I can obtain the Japanese Trap-Door snails, which I believe are live-bearing. Several years ago, I had some of these in a goldfish pond in Kansas, but have not been able to locate any since moving to

Louisiana.

ANSWER: An establishment where goldfish are raised for sale and dealing in water lilies and other aquatic plants would be the most likely place to find Japanese live-bearing snails for sale.

FROM: Kenneth Herzog, Brooklyn, New York

My platy female was placed in a breeding cage about four hours before she had babies. One baby was fully formed but the rest were eggs. Will these eggs hatch?

ANSWER: Removal of the female platy from a tank to a breeding trap may have caused her to miscarry or expel her eggs before they developed. These eggs will not hatch.

From: John Tobia, Jackson, New Jersey.

My attempt at raising bettas and gouramis failed. The fry died when two weeks old. The tanks were covered and the fish were being fed first green water and then infusoria and fine powdered dry food. Where did I go wrong?

Answer: It may be that your baby fish were not fed frequently enough Infusoria should be offered as soon as the fry are free swimming and within four or five days newly hatched brine shrimp may be offered. The water should be gently aerated. In that you brought these youngsters through two weeks before they died, the chances are that they were not fed frequently enough and that they should have been given newly hatched brine shrimp at least by the end of the first week.

Question: Can black angels be bred by the same method used for regular angels?

Answer: Black angels are bred the same way as the standard angels. Some breeders use a black with a standard on the theory that the resulting stock will be hardier.

From: Gregory Roszkowski,
Kearny, New Jersey.

I was raising white clouds for four months and two of my females were "heavy". How come they did not deliver any eggs?

Answer: A favorite method for inducing these aquarium favorites to breed is to condition them for about two weeks with newly hatched brine shrimp. The tank should be well-planted and a ten, fifteen or twenty-gallon tank may be used. The temperature should be about 72 degrees F. Infusoria is a first food for the babies and after that newly hatched brine shrimp and microworms along with a good grade of high protein dry food prepared especially for fry. If floating plants are present the parents do not have to be removed from the tank.

From: Earl Smith, Baltimore,
Maryland.

Several friends and I are interested in starting an aquarium club and would like to have information on starting one.

Question: How many members are necessary to start a club?

Answer: Many clubs have started with only a few members (6 or 7) and begin by having meetings in the private homes of the members. As the club grows, other meeting quarters can be obtained.

Question: Is it necessary to be certified as a club?

Answer: It is not necessary to be "certified". As the club grows, it may be desirable to become incorporated but that is a matter the members will have to decide. ●

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Donald Fowler, in his *Invertebrates for a Salt Water Aquarium*, appearing in *Mid-West Aqua-Notes*, February issue, divides these animals without backbones into three classes, i.e., filter feeders, detritus feeders, and predators. The filter feeders are not good aquarium subjects, Author Fowler tells us, because they require a continuous supply of plankton which is not present in the captured salt water aquarium water. Detritus feeders, on the other hand, are good candidates because they are scavengers and feed on small bits of food which can be readily supplied. Predators can be used also but they must be watched for they are apt to feed on their tank mates if they are not kept well-fed. This is note-book material for salt-water buffs for the author discusses the species that fall into the groups he describes and those wishing to set up a salt-water tank for invertebrates will find his suggestions invaluable. *Mid-West Aqua-Notes* is published by The Mid-West Aquarists and information regarding the society and its publication should be addressed to the society at 5552 W. Fullerton Avenue, Chicago, Illinois 60639.

Who Says We Gals Are the Weaker Sex? Dolores Bialk asks in the January issue of *The Splash*, published by the Milwaukee Aquarium Society, Inc., and after reading her methods of repairing leaking tanks, we have to admit that what this "gal" lacks in brawn she makes up for in ingenuity. Somewhat shy about using a blow torch, she decided that placing several 5-gallon tanks in her freezer would lessen the task of removing the old cement from the tank frames. One tank at a time was placed in her freezer while she did her housework. After a lapse of time, the tank was removed and the old cement was brittle enough to remove from the frames with the aid of small chisel. She reset the glass with Silastic sealant. She repaired five 5-gallon tanks in this manner and now has plenty of space for the bettas she breeds and rears. Her problem with two 15-gallon tanks worried her because her freezer would not accommodate such a large object. She discovered, however, that the cement in these aquariums was so old that it gave way easily under her skillful plying of a large chisel. Caulking sealant was no chore when she experimented with a caulking gun. Now two tanks that had been retired to the basement were placed back into service. The real challenge came in the form of a 10-gallon tank with three broken glasses. Encouraged by her previous success, she used the now necessary propane torch and three burns, a cut, and a blister later she had another tank ready for duty. All we can say is: "Bravo!" Charley Whitney, a junior member of the Milwaukee Aquarium Society, tells us how to artificially hatch and rear bettas to the free-swimming stage in this same issue. He floats an

uncovered plastic petri dish (100 x 15 mm. size) in a tank containing no fish. He recommends that the water temperature be between 75 and 80 degrees F. He removes the eggs as soon as the bettas have spawned with a pipette or eyedropper and releases them into the floating petri dish. He adds only enough water to allow barely the coverage of the eggs. He inverts the cover of the petri dish and places it on top of the dish. This prevents evaporation of the small amount of water. The dish should not float directly under a light in the tank reflector. During the two-day incubating period, he replaces a portion of the water. At the end of the second day, he uses a widemouthed jar about 4 inches in diameter filled three-quarters deep, and floats it in the tank containing the floating petri dish. By now the eggs have hatched and he pours them into the floating jar. Any remains of the old bubble nest are placed in the jar too, even though most of the newly hatched fry remain on the bottom of the jar. A slow aeration is present in the aquarium proper. After two days in the jar, the youngsters are released into the aquarium proper and are ready for their first feeding of infusoria. Author Whitney explains that he uses this method for raising betta fry when he is confronted with a male that cannot resist eating eggs. *The Splash* is the official publication of the Milwaukee Aquarium Society, and is edited by Arno

Tellier. Exchange information can be had by writing Robert Watkins, 3416 S. Kansas Avenue, Milwaukee, Wisconsin 53207 and information regarding the society should be addressed to the Milwaukee Aquarium Society, P. O. Box 1416, Milwaukee, Wisconsin 53201.

Ken Prosser discusses his experiences with Tetracycline Hydrochloride in his *"Miracle" Drug*, appearing in the February issue of the Northeastern Indiana Aquarium Society *News Bulletin*. He finds this medication particularly useful when a fish is sick from something difficult to identify, such as an internal disorder or a bacterial infection. It is particularly effective as a fungicide and the author uses it when artificially incubating eggs. According to author Prosser, the chief difficulty with the drug is that it discolors water and leaves a sticky substance along the edges of the tank. Some hobbyists report that it retards growth but in that other hobbyists deny this, the author points out that local water quality may be the culprit here. Tetracycline Hydrochloride is a prescription item and it comes in capsules containing 250 mg. For a tank that has been hit with an unidentified disease, 50 mg. to the gallon is the author's dosage while he uses half this for preventative purposes. For incubating eggs, he uses the 50 mg. per gallon dosage. Correspondence is invited by those who have worked with this drug and should be addressed to Ken Prosser, 707 South Street, West Dundee, Illinois 60118. In this same issue Ralph Tepedino spotlights *Rivulus cylindraceus* as *An Easy Fish*. He admits the fish is a jumper but in its favor is that it is prolific, lively but not a bully, easy to feed, and not fussy about water quality. A spawning pair is placed in a one-and-a-half gallon tank (or terrarium), two-thirds filled with aged tap water. A nylon spawning mop is placed in the tank. Eggs are removed from the mop after gently squeezing it dry and placing it on a terry towel for several minutes. The eggs are removed by hand and stored in a topless jar containing an anti-fungus remedy. Incidentally, eggs that appear white or showing a trace of white are discarded as they are probably fungused. A temperature around 72 degrees F. is ideal and the jar is stored in a dark place as the eggs are light-sensitive. The incubation period is approximately 14 days and the youngsters will take newly hatched brine shrimp as a first food. The Northeastern Indiana Aquarium Society *News Bulletin* is well presented with excellent typography. Pertinent and worthy reprints are used regularly and among its regular features is Sandy Dentzer's *Bulletin Bylines*, a review of articles appearing in other society bulletins, which is particularly well-written. Write to Sandra Dentzer, 1655 W. Third Street, Fort Wayne, Indiana 46808 for information regarding the society and its publication. ●

CREDITS

PHOTOS:

THE AQUARIUM, A. Roth, P. 4-8, 39-41, 43-48; Sylvan Cotten, M.D. P. 22, 33, 76-78; Braz Walker, P. 45; THE AQUARIUM, A. KLEE, P. 34-35, 73-75

FISH:

BLUE GOURAMIS supplied by Grassy Forks Fisheries, Allendale, N.J.; GOLDEN EAR KILLY supplied by Floridian Tropical Fish Farm, Sebastian, Florida; EMPEROR TETRA supplied by Dade County Fisheries, Bronx, N.Y.

***KLEE** continued from page 35*

and contained an appreciable quantity of iron.

TABLE I

Water Analysis: Amazon River, near the mouth of the Rio Atacuari, North Bank—May, 1966

pH	6.9
Hardness	68 ppm
Alkalinity	40 ppm
Chloride	4.5 ppm
Iron	2 ppm

Later in the morning, after being on the River for several hours, we turned up the Rio Atacuari. Not only did we see fewer canoes and habitations, but things were much quieter. We passed the Peruvian military garrison but were not required to stop. Soon, the character of the water changed markedly and for the first time, we found ourselves on a true blackwater river. The river water appeared as black as ink and served as a giant mirror, reflecting canoes and their occupants with perfect fidelity.

Blackwater rivers have their origin in the clearwater ("Whitewater") rivers that flow from the granite mountains of South America. When the clearwater rivers reach the flat Amazon Basin, their beds widen. During the rainy season (in the middle Amazon Basin region this is from the end of December to the end of May—we were just at the tail end of the rainy season) large areas of rainforest are inundated when the rivers overflow their banks. Great quantities of organic material, mostly humus, are leached from the forest floors and enter the rivers. By virtue of this organic material, the water is colored dark-brown to blackish. Further, it is low in calcium and contains many free acids (tannic acid and others). The fish fauna is only moderate as the water is poor in food animals. Stream velocity is reduced as a consequence of the widening of the beds. My water analysis (Table II) confirmed these general observations—blackwater is very acid and contains very little in the way of dissolved materials. However, the inevitable high iron content was certainly present.

TABLE II

Water Analysis: Rio Atacuari, twenty miles from the Amazon River—May 1966

pH	5/5
Hardness	less than 10 ppm
Alkalinity	15 ppm
Chloride	2/5 ppm
Iron	2 ppm

As we entered the Yacarite River, a tributary of the Rio Yaguas, our sense of isolation increased and the changes that were occurring were subtle indeed. For one thing, the stream (the Yacarite is a narrow river) banks disappeared under the vegetation that engulfed them. At one point, when it was decided that we would stop and eat, our canoes drifted into the tangle of overhanging branches and vines. Our companion canoe was almost immediately swarming with reddish Tangarama ants, most of them proceeding to attack our co-pilot, Bob Fitzsimmons. Watching him yell, jump and squirm, we all thought it pretty funny until a number of the varmints got into our jockey shorts as well. No discotheque ever saw such dancing! Our guides got our canoes back into the middle of the river, and peace reigned once again.

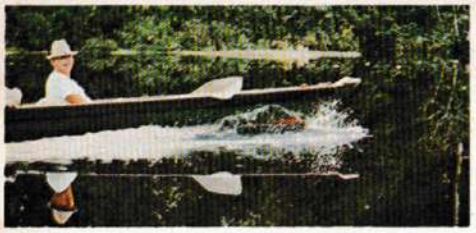
It was necessary now to pick up a Yagua interpreter for neither of our guides spoke that exotic tongue. We wended our way through one sacarita after another. This is the name given to the channels or fiords which join one river with another. In essence, they are aquatic shortcuts which can be cruised in vessels of limited draft such as canoes. There are so many sacaritas, and normally of a very complicated course through the jungle, that they are usually known only to the nearby residents. Any stranger who dares to travel through a sacarita must be quite sure of its course for otherwise there is the possibility of getting lost in unending marshes. In time, we reached the home of Babalonia, our interpreter to the Yaguas.

Babalonia, who was a boy of about 14, lived with his family at the edge of one of the tributaries of the Yacarite. While our guides proceeded to complete the hiring arrangements, we made friends with some of Babalonia's younger brothers and sisters (the adults were too shy to confront us) by offering them various kinds of candy. We had long since learned to carry candy for just such occasions. Needless to say, the candy made a big hit!

We returned to our canoes, Babalonia perching in a squatting position at the very tip of Pedro's canoe. How he managed to squat for hours upon end, without moving a muscle, was beyond us. He was a serious-faced boy, and never cracked a smile but once. The occasion involved a case of acute diarrhea (a malady which got us all at one time or another) in one of us (who shall remain unidentified—we are sworn to secrecy!). As explained previously, it was seldom possible to approach the shore because of the impenetrable brush that lined the banks. Diarrhea doesn't wait and he had a real emergency on his hands. Quickly lowering his trousers *et al.*, and hoisting his derriere over the gunwales just in the nick of time, he increased the nitrogenous content of the Yacarite manyfold. Our guides nearly fell out of the canoes, laughing, and for the first and only time, Babalonia's face broke out

Traveling on the Rio Atacuari. From stern to bow — Our guide, Pedro; Babalonia. Warren Dody, Ed Corder, Win Rayburn, Richard "Doc" Stone, and Vern Parish.

Someone once asked if the crocodiles in South America grow very large. Here the author's family prepares for the long, tedious job of curing a black caiman skin, collected while in the Amazon. Without head and part of the tail tip, it measured 13 feet, 4 inches! Shown is just the belly skin.



So many fish were jumping into our canoes that John Krause positioned himself in front with a net, ready for instant action!

in a broad grin.

It was getting dark and it became necessary to search for a camp site. Because of the jungle growth, this was not easy but we finally found a tiny clearing, used by Indians traveling in the region. We had to scramble up a steep bank to get to the top. As our guides prepared dinner, we set to work with our machetes to clear individual tent and hammock sites. Duane Wait and I elected at first to use one of the canoes in which to sleep, but the canoe leaked and when a bottle punctured our air mattress, we gave up and hung our jungle hammocks with the rest.

We sat about the camp fire and recounted the experiences of the day. I strung my hammock with a minimum of difficulty, shed my boots and went to sleep. Like the others, I was drenched with perspiration but slept in these wet clothes nevertheless. As there were growls and other strange noises all around us, Bob slept with his .38 in its holster, right by his head. The single shotgun we had with us was useless as the shells had swelled with moisture, making it impossible to insert them in the breech.

At about 3 a.m., we were all awakened by shouts and a stream of cuss-words emanating from Ed Corder who, while turning in his sleep, managed to get himself hopelessly twisted up in his jungle hammock. It took Warren a half-hour to free him! Meanwhile, the temperature had dropped to the low seventies and now I was really cold. My clammy clothes added to my misery as did the manta blanca flies which came right through the mosquito netting to bite at will. Sounds of the Otorongo (Amazonian jungle tiger) could be heard on the other side of the river. *To be continued.*

(RIGHT)
One of my "companions" at the jungle camp site!

(CENTER)
The red objects in this picture are Tangarama ants. Its sting is strong and powerful.

(BOTTOM)
Our camp site in the heart of Yagua Indian territory. The Indians make "permanent" overnight camp sites on their frequently traveled routes.

COHEN continued from page 33

A Shortailed Common Shubonkin

the camera will be used.

The last alteration consists of the use of a clamp-on filter holder with a double retaining ring and two +3 portrait lenses. The double retaining ring permits either one or both lenses to be used. With the very small lens opening in the altered accessory diaphragm, the depth of field is very wide. Using one +3 portrait lens over the regular lens, everything from about 10 to 18 inches will be in focus. With both portrait lenses, everything from about 4 to 9 inches will be in focus. On my own camera, I have permanently attached one portrait lens to the original lens mount, leaving me only one additional loose lens to keep track of.

The camera should be used with Kodak Ektachrome-X daylight type film. M2-B bulbs should serve for extreme close-up pictures, while the brighter M3-B bulbs can be used for greater distances. If the pictures are consistently overexposed, the accessory opening in the foil diaphragm can be replaced with a smaller one, or a handkerchief can be draped over the flashgun to cut out about half the light. My outfit includes a small

The basic Kodak Startlash camera outfit.

To the upper left of the camera: a closeup lens. To the lower left of the camera: The translucent plastic shade, used for extreme closeups.

A Veiltailed Goldfish

translucent plastic shade which I cut to fit over the flashgun to use instead of a handkerchief with extreme close-ups. If the pictures are consistently underexposed, a larger diaphragm opening can be made or M3-B bulbs can be used for close distances.

One advantage of the large size slides obtained with a 127 camera is that the slides can be cropped to improve the composition and remounted in 35 mm size mounts.

When using this type set-up, it is important to point the camera down slightly at your subject or the picture will include a reflection of the flashgun in the aquarium glass. Another factor that must be considered is called parallax. My camera viewfinder is located about an inch above the lens and obviously does not point to the actual area being photographed. This is corrected for by keeping the subject in the lower half of the viewfinder while taking the picture. A helpful reminder is to scratch a horizontal line across the front viewfinder lens and to estimate this as the top of your picture.

After the first roll of pictures is developed, any additional alterations can be made to correct under or overexposure. Using this simple equipment, pictures suitable for projection or publication can easily be taken. ●