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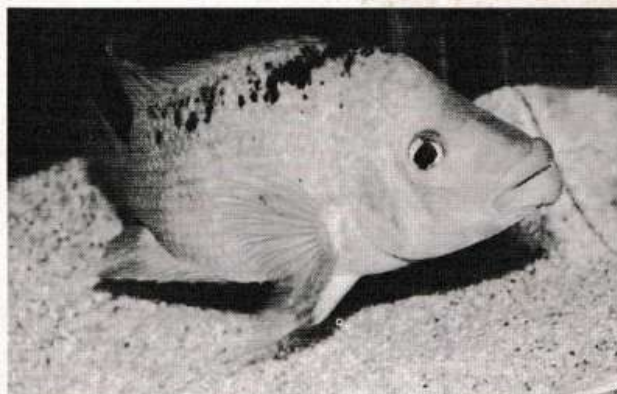
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cover photograph

One of the new "red devils" from Central America, probably *Cichlasoma erythraeum*. One of the outstanding characteristics of this fish is the large lips, according to Diane Schofield in an article beginning on Page 5 of this issue.





Not too much is known about this new cichlid — other than its volcanic ways!

The Red Devils

(See Cover Photo)

AQUARISTS HAVE BEEN seeing red recently. While red is a relatively common color in a great many other types of fish, it calls for a "double take" when a hobbyist is confronted with a cichlid that is wearing this color garb.

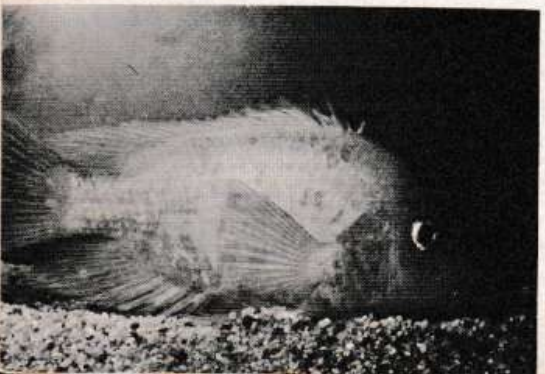
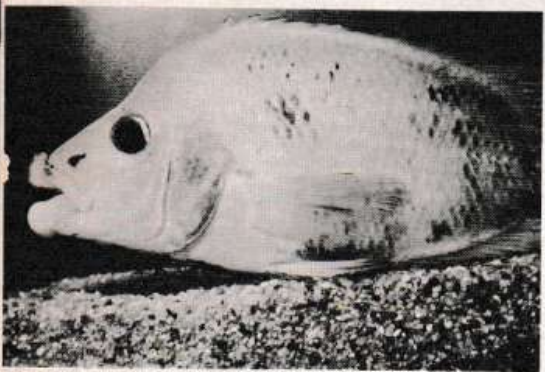
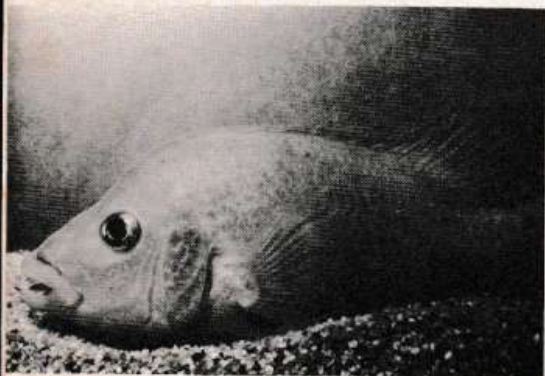
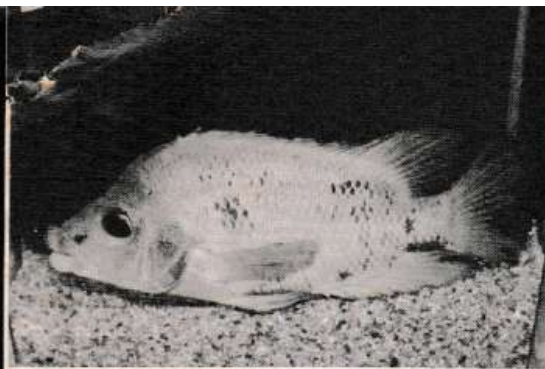
"The lady in red" has always been a figure of great mystery in any number of detective stories and it is no different in this particular tale of fishy "ladies", as well as "gentlemen", in red. For one thing, their point of origin seems to be shrouded in a hazy mist. Stories have circulated to the effect that they came from Guatemala. This is taken for gospel

Diane Schofield

Burbank, California

until somebody says, no, he heard that they came from Costa Rica. A third person comes up with the story that he heard that they are hailing from Nicaragua. All this sounds rather peculiar until you consider the fact that when they first arrived in the fall of 1964, the wholesale price was a husky \$25 each, with the retail running an impressive range up to a stratospheric \$500. Some

Photo: One of the new red devils, *Cichlasoma erythraeum*, showing the large lips. Photos in article by the author.



people were even charging for the privilege of letting their fish be photographed. When these amounts of money dance in one's head, it all of a sudden becomes blindingly clear why the mystery. After all, who wants to publish in 3" letters the location of a gold mine, or in this case, the lucrative "old fishin' hole"?

These fish piqued my curiosity after studying them and photographing them in one spot and another where I encountered them in various aquarium establishments. So I decided to run down their origin and their probable name. The two men who helped me do this were Gene Wolfsheimer and William Bussing, two extremely sharp men, fishily speaking. Mr. Wolfsheimer, of course, needs no word of explanation as he is one of the titans in the hobby. Mr. Bussing has spent some time in Costa Rica and he is currently working on his master's degree in ichthyology at U.S.C. by studying the ecology of the fishes of that country.

On two separate trips down into Costa Rica, Mr. Bussing worked over a section of the Rio Puerto Viejo. There he found some of these were cichlids and one was *Cichlasoma dovii*. Now *C. dovii* is a thoroughly confusing fish. It is a red cichlid. It's also a blue cichlid. And it's not above also being a golden cichlid. But from Mr. Bussing's experience, only a small percent of the *Cichlasoma dovii* are red. He says, "I saw in over a year perhaps ten individuals that were red. One sees them as one canoes along the river, because even in murky water, one could spot the red ones as they are quite sedentary and 'sit' under a log or in front of a rock." He goes on to say, "*C. dovii* is just like a big fat bass. They lurk under logs and spring out at their prey. If you cast a lure, they'll dart out and grab it. However, they don't want to get out too much. You never see

Photos: These four photographs of different fish show the great amount of variation from one to another, yet with points of similarity in common to all of them.

AQUARIUM JOURNAL

them cruising around to any extent, but when they do, they usually have young with them." In connection with their breeding habits, he elucidates, "I've seen no evidence that any of the fish in Costa Rica are mouthbreeders. I approached one red female that had a school of young that were all quite small. I came up and netted some of the fry but none of them showed the slightest indication that they would seek sanctuary in the mother's mouth". In taking water tests, Mr. Bussing found that the pH averaged between 6.8 and 7.2 in the water in which the *C. dovii* occurred, with the hardness being 20 to 50 parts per million.

When Mr. Bussing returned to Costa Rica for the second time, he gave Gene Wolfsheimer the only live specimen of *C. dovii* that he had brought back with him. Gene promptly named it "Charley". Naming it Charley must have given it a complex — it spawned. All by itself. Charley had to be rebaptized Charlene.

Charlene quickly grew from 5 to 6 inches to approximately 13 inches in length — all in her 23 gallon tank in

which she has remained since she first came to live in Mr. Wolfsheimer's hatchery. She has lived there in solitary splendor. Charlene has a disposition like an income tax collector with a bleeding ulcer and a migraine headache. When visitors come to peer at her, she makes quite a show of striking at the front glass of her tank. As Mr. Wolfsheimer says, "When you put your finger up to the front glass and she hits it, it sounds as if she's coming right through!" Coupled with this eagerness to lunge, Charlene also comes equipped with two definite teeth projecting from her lip on the bottom and two on the top. These are like needles and she can rip up anything with little effort on her part. These tendencies make Charlene sound not entirely lovable and he remarked, "People wonder how I clean the tank, but I put my hand in with her and watch her pretty closely. Before long she backs away into a corner of the aquarium, head down, and waits until

Photo: Typical lake country in Central America where conceivably the "red devils" can be found.





Photos: Both photographs on this page are bodies of water in Central America where the red devils are probably found.

I get through scraping the glass. Then she's right in there fighting again". Charlene also seems to have a high degree of intelligence and watches every movement of anyone who is in the hatchery. But in spite of her uncuddly attributes, Mr. Wolfsheimer stated, "She's a fantastic fish. She's the only thing around my hatchery that I'd really hate to have anything happen to - the other stuff comes and goes all of the time."

Later on Mr. Bussing sent Mr. Wolfsheimer another *C. dovii* - this time a more drably colored specimen of 8 or 9 inches. He has never put the two together. For one reason he doesn't know whether or not this fish is a male and for another, he says, "It's senseless to try and breed Charlene, even if I did have a male in the other fish. They are too large - far bigger than even Oscars."

For some time, and it may still be true, these two *C. dovii* were the only such fish in the United States. Then

recently a hoard of other red cichlids came pouring in. Immediately some dealers put the tag of *C. dovii* on them. Others called them *C. labiatum*. From doing ray and scale counts on them and noting other distinguishing factors, Mr. Bussing thinks that these new fish are neither. Superficially, insofar as some of the color variations goes, as well as some of the general body shapes, they do resemble *C. dovii*. From the process of elimination it is also now thought, with a pretty good "educated guess", that these new red fish do come from either Lake Nicaragua or Lake Managua, both of which are in Nicaragua. However, it is conceivable that they could also be found in Costa Rica, as the southernmost edge of Lake Nicaragua borders Costa Rica and these fish could find their way down one of the rivers that run from the lake in a southerly direction. *C. dovii* has been reported as being found in all these areas - it's just that these recent red arrivals have too many points of variance to be *C. dovii*.

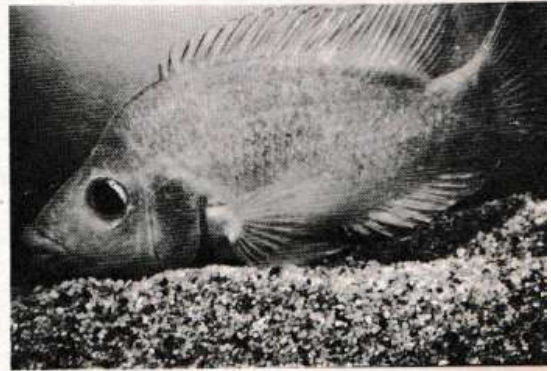
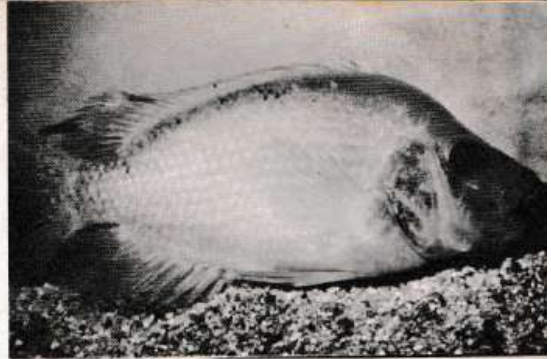
The reason for rather impetuously putting the name of *C. labiatum*, another red Central American cichlid, on them is because of the huge over-sized lips on some of the specimens. However, a true *C. labiatum* has exceedingly long appendages on its prominent lips. Mr. Bussing stated that, "These look like two triangles, one pointed with the point



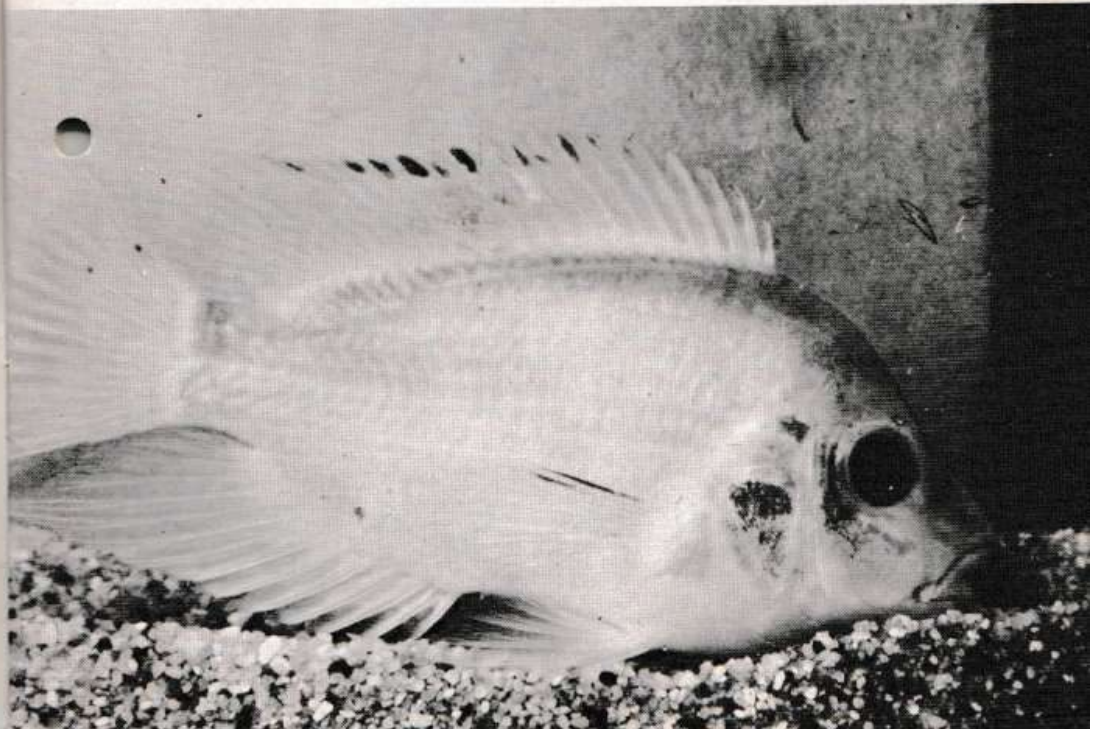
up from the upper lip and one is rather like a beard hanging down. These are truly long fleshy protruberances and sometimes they are one-third as long as the head." Since none of these recent red cichlids come equipped with such rather spectacular features, it might seem that *C. labiatum* could be eliminated as a possible tag for these fish.

The two varieties that Mr. Bussing has narrowed the field down to is *C. erythraeum* and *C. citrinellum*. Both of these hail from the Great Lakes of Nicaragua, and indeed are 2 of the only 3 red cichlids ever listed as coming from there. The other being the aforementioned *C. labiatum*.

There are almost no reference books on the subject of fishes of this area, as practically no work, ichthyologically speaking, has been done in the Central America region since 1907. One reason for this is that Central America doesn't have the variety that is found in South America or Africa. The cichlids which are found in Central America are probably forms which have migrated up



Photos: (Above) Shots of different fish showing how they can vary in looks. (Below) this may be *Cichlasoma citrinellum* as it has no thick lips and is a flesh-gold in color.



from South America at a rather recent date, geologically, and they haven't evolved into the greater number of species that one encounters down in South America.

One paper of the few on the subject is "Synopsis of the Fishes of the Great Lakes of Nicaragua" which was written by Dr. Seth Meek, who was then Assistant Curator of the Field Museum of Chicago (now the Chicago Natural History Museum). Dr. Meek lists only the three red cichlids from this area - *C. erythraeum*, *C. citrinellum* and *C. labiatum*. He also lists *C. dovii*, but interestingly enough, he does not list it as having a red color phase. Meek stated that at this time there was organized fishery for *C. dovii* and he often saw them in markets in Nicaragua. They were then caught by gill nets and throw nets. Should fish from this area, such as the

★ IDEAS ★
BY HOBBYISTS

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

Foster Fry for Brine Shrimp

As a hobbyist, I tried many ways to keep my freshly hatched brine shrimp alive for long periods of time. However, all suggestions did not completely meet the requirements. My problem is now solved. A few drops of Foster Fry for egglayers does the trick. If you breed egglayers you probably have some in your home now. Use 4 drops per day for one-half teaspoon of brine shrimp eggs in 1 gallon of salt solution (4 heaping teaspoonfuls of non-iodized salt). Try a temperature of 72° F, however, 65° to 78° F. is acceptable. My pH level is kept at 7.0. For maximum results, use slow aeration. - P. W. Stinnett, Fort Worth, Texas

new red cichlids, be caught in this manner today, it would go a long way to explain the rather poor condition in which they are received. Many have scales missing and shredded fins - of course, this could also be accounted for by the general pugnaciousness of the fish themselves. Mr. Bussing remarked in regard to the catching methods, "Cichlids are pretty rough to net in nature unless they do occur in great schools."

When you consider all of the years that fish have been shipped into this country for aquarists to keep, it seems a little strange that only now the red cichlids are coming in. Especially so when one goes back and discovers that *C. dovii* was described by Guenther in 1869; *C. labiatum* (Guenther) in 1864, and *C. erythraeum* (Guenther) in 1869.

From these names, it would seem as if *C. erythraeum* would be a red fish and *C. citrinellum*, a yellow one, as these are the meaning of the names. If it were as clear cut as this, all would be well; however, if nothing else, these cichlids are extremely unpredictable. Both seem to have a variety of color phases, as well as other points of variation. One of the main features of these new red devils from Central America is an outstanding one - many of them have huge protruberant lips. This in itself, Mr. Bussing believes is not too significant as a

CLUB NEWS

The Buffalo Aquarium Society, Inc.

The Sixth Aquariama sponsored by the B.A.S. recently took place at the Buffalo Savings Bank, Bailey Avenue Branch. Theme of the show was: "Aquarium Beautiful," according to Adelaide M. Delpriore, president.

Robert Heppner was the winner of the trophy for the best pair of fish, a lovely pair of jet-black mated angels, Miss Delpriore said. ◀

means for identification as he mentioned another cichlid from Central America, *C. tuba*, that is also called "The Fig-eater" which is known to have such lips. The surprising thing is that some individuals will have them and others of the same species will not! Mr. Bussing said that often in one netting he will find an assortment of the lipped ones and the lipless kinds. He therefore offered the opinion that perhaps this same condition might be in existence in *C. erythraeum*. *C. citrinellum* is not listed in any of the limited reference books as having prominent lips, nor has he seen them so equipped. An interesting sidelight is that the other thick-lipped fish of Central America, *C. tuba*, definitely liked algae and used these lips to advantage. The thick-lipped red newcomers have absolutely no use for it and are strict carnivores!

These lips vary greatly in size. Some are huge and others seem to be merely thickened. There are also other great variations, not only in the color, which ranges from almost a flesh tone to a bright fiery red, but in their black markings, as well. Some specimens are free of any such dark accents while others are prominently marked on their dorsal, caudal and paired fins, as well as on their huge lips. I have seen one fish, at least, which looked as if it were overlaid with black lace, the markings were so concentrated. In some the eye is coal black and in others it has a more prominent golden iris. The head in some is merely sloping and in others there is a distinct hump, giving rise to the theory that this might be a sexual difference.

Most of them seem to have a disposition very similar to Charlene's, more's the pity. They are very territorial in nature and ready to take on everybody, especially those of their own kind. When photographing them I used a dark background to further set off their coloration. This proved to be a mistake because

such a color mirrors the fish and I found them constantly trying to get at their "enemy", much as a betta would. As this color was on the back of the aquarium, I quickly saw that I was going to end up with one of the most outstanding collection of pictures of the backsides of red cichlids in existence.

Another rather disconcerting thing that I noticed was that they have a habit that is similar to that of clown loaches. When I first approached one tank to photograph them, I spotted one laying on its side half underneath a rock. I thought, "Ye gods, there goes \$25!" I reached inside to pick up the "dead" fish, only to have it go swimming away, seemingly giving me dirty looks as it went.

Another odd peculiarity about them is when I tried to catch them, they would seek sanctuary in a large flower pot. As it was too heavy to lift out, I stuck my hand into it to ease out the fish into a net, only to find that they would allow me to simply pick them up and deposit them in the net to be carried to my photographing tank. Obviously they are not *C. dovii* like Charlene. I still have all eight fingers and a couple of thumbs left. ◀

Happy New Year!

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Life is not dull aboard an old B-25 headed
for tropical jungles in search of fishes!

A Peruvian Adventure

PART I

THIS is the story of a collecting trip to hitherto unexplored regions of Central Peru, but it is not the usual type of story that one might read in the aquarium literature. A good many trips have been made by aquarists to foreign lands, it is admitted, but assuredly never before has one been made such as the one to be described! Furthermore, it has been observed that some of the reports made of previous expeditions are stereotyped pap where the reader may easily guess the next line. Strong words these may be but for nine people who came within inches of losing their lives for their hobby, we intend to mince no words. Another observation that can be made is that all too often, reports of trips really do not tell the reader any-

Albert J. Klee

Cincinnati, Ohio

thing about the trip itself, its planning, problems and execution. This we intend to remedy. In addition, there is often an element of forced mystery about such expeditions regarding the mundane details and consequently, the participants are frequently looked upon as aquarium "gods." Rest assured that anyone with a little spirit of adventure and determination, could repeat any or all of them, including ours. One does not have to be a millionaire, a Frank Buck or a "distinguished world traveler"

Photo: This plant, located in Panama, was bigger than three members of our expedition put together. All photos by the author.

to join these over-exalted ranks. Thus on the one hand, we make light of our accomplishments but on the other, our trip was something special to the nine persons who made it, and will forever remain the one great adventure of our lives. If then, we think aloud as we share our experiences, we hope that you will understand.

During the summer of 1963, I was fortunate to renew an old acquaintance with Jon Krause of Columbus, Ohio. Jon is a former metallurgical engineer who became interested in aquarium fishes while working at Battelle Institute in Columbus, and subsequently gave up metallurgy to own and operate the Verco Fish Hatchery, a wholesale operation in that city. One of Jon's other interests is aviation, like aquarium fishes, a relatively recent focal point in his life. After enjoying himself with light planes for several years, Jon thought that the addition of a twin-engined cargo plane would be helpful in his business. Consequently, he managed to bid on, and obtain, an old B-25 bomber, built circa 1944. He spent over a year rewiring the

craft and installing radio equipment necessary for long flights. When Jon bought the plane, he knew neither how to take off or how to land it. A commercial pilot acquaintance went up twice with Jon, pointing out all that could be indicated in two short trips up and down. Then, Jon was on his own. On his first landing, he used all the runway Columbus Airport (Port Columbus) had but he made it! A quiet, unassuming but confident man, Jon Krause is my candidate for the title of "Most Unforgettable Character I've Ever Met."

Afterwards, he decided to fly his B-25 down to South America to pick up a cargo of aquarium fishes from local collectors. His first trip was to Iquitos, Peru, where most of the large fish importers have compounds. Jon nearly lost his life when, in trying to find Iquitos, they ran low on fuel and were forced to fly right above the surface of the Amazon River in order to find that city. But Jon's big dream was to locate a compound of his own in a different area.

Photo: Jon Krause, Win Rayburn and Jim Thomerson collecting rosy tetras in Central Peru.



Asking around, someone told him of a sort of missionary way-station called Tournavista, located in the jungles of Central Peru (more about which we shall relate in detail later). He found it and subsequently established his long sought-after compound. At the time I met Jon, he had just completed construction.

Jon's accounts of his experiences were, of course, thrilling to me and I men-

ciation (and we converted the sixth en route!) although little in the way of killies was expected to be found at our destination. It is the unique character of the killifish fancier, however, that generates a hobbyist who is resourceful and willing to put up with hardship in a cheerful manner. It was not the guppy fancier who beat upon our door; rather it was the aquarist interested in fishes such as cichlids, killies and "oddballs."



tioned that I would give almost anything to make one such trip. "Why not?" said Jon. After pinching myself to assure that I was awake, we discussed the matter further. "Would there be a chance that some of my friends might come along?" The answer was affirmative and we set a tentative date for the following summer.

As news began to leak out about the trip, I was approached by many who wanted to go along. Selecting five was a difficult task indeed. From the start, we wanted to make this a balanced, well-planned trip, incorporating people of diverse interests and talents (we did not want a "one-man show"). As it turned out, five of the six of us (three crew members completed the roster) were members of the American Killifish Asso-

As a group we desired to get away from the artificiality of the hobby and to communicate with its most primitive and basic elements. It was not the blackface angels we wanted to see but the wild ones with fins torn as a consequence of attacks from predators such as *Hoplias* and *Erythrinus*.

Among the first two who accepted my invitation were James Thomerson and Richard Stone, both of New Orleans, La. Jim, a towering Texan, is currently completing the requirements for his Doctor's degree in ichthyology at Tulane University. He is an inveterate and skillful collector, good-natured and willing to help anyone whenever he can. Without doubt, Jim worked harder at collecting fish than any of us, and the

Photo: A jungle waterfall where *Plecostomus* abound.

splendid collection of preserved specimens he brought back to Tulane (and live ones too!) forms a significant addition to the little-known fish fauna of Central Peru. Jim, by the way, is a Trustee of the American Killifish Association. His good friend, Dick Stone, is Chief of Psychiatric Services at the Veteran's Hospital in New Orleans. "Doc," as he is affectionately known, is a walking encyclopedia with a photographic memory to boot. Beside his interest in fishes, he is avidly interested in insects and molluscs. Dick spent his time in Peru with a fish net in one hand, a butterfly net in the other, and a fishing rod clutched under his right arm! He introduced me to the lore of the rhinoceros beetle, and the giant Peruvian cicada. Never complaining, always ready with either a smile or the generic name of some "bug," Dick (and his medical skills) were a comfort to our group.

One of the most improbable members of the expedition was Emanuel Ledecy-



Janacek ("Zeke," for short), Curator of Fishes and Reptiles at the Cincinnati Zoo. A native of Czechoslovakia, Zeke was the only other professional on the trip in addition to Jim. With his full



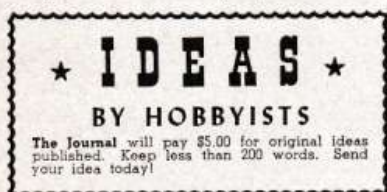
Photos: (Left) A rainforest area in Central Peru. (Above) Chapeba Indians in Pucallpa, Peru, docking on the Ucayali River.

beard and moustache, Zeke was more of a wonder to the natives than we were to them! The courage of this man is, however, hard to understate and his capture in bare feet, of a bushmaster, and his crocodile wrestling in the dark, we will take time out later to relate.

Jerry Anderson of Waukegan, Illinois, also a Trustee of the American Killifish Association, formed member number five of the expedition. Jerry was the "half-pint" of our group, weighing but 121 pounds wringing wet, but I have yet to see more "guts" per pound than Jerry has. Since he most likely saved my life at one point, I may be biased but other events serve to back up my claim also. Jerry's sense of humor saved the day on numerous occasions and we will long remember his, "Lot's o' luck, fellas!" whenever we proposed some

dangerous, hairbrained scheme (he always went along, however!). Expedition member number six was Winfield (Win) Rayburn of Cincinnati, Ohio. Win is a real devotee of hunting and fishing, and was the only member of the expedition who took down more arrows than he brought back. Win was a great one for hunting with bow and arrow, and his favorite complaint was that he couldn't get deeper into the jungles to hunt game! In spite of his hunting proclivities, Win is a sucker for animals and was the first in the group to adopt one . . . a baby squirrel monkey.

Two more people rounded off our complement. Our co-pilot, Bill Kretch-



Noiseless Filter

I found that with the Miracle bottom tank filter, the tubes made too much noise. My tanks are a decoration for my home, as well as a hobby. As an experiment, I bought an extra set of filter tubes, filled them with fine sand, and held them under hot water until pliable. Then I carefully bent them in the center to a 90 degree angle. After they cooled and set, I snipped out the cross pieces in the small round pieces that fit on the top of the tubes, and set these small rounds as a splicer joining the new angle piece to the top of the filter tube, in the corner of the tank. This allows the water to ease out over the top of the tank water, just at the surface, lowering the noise to a bare minimum. It is not audible in the room away from the tanks at all. I have done this to three tanks in the same room, and there is no sound from any of them.—Robert Mavel, Rio Vista, California

mer of Columbus, Ohio, is a young, good-looking fellow of easy manner and pleasant personality. More to the point, he is an excellent airplane and engine mechanic to boot. Bill kept our old B-25 flying under all conditions, and some of them were very difficult indeed. More than anyone else, Bill probably made the greatest sacrifice of all of us in going on this trip as he was married but one week before we took off! Our last crew member was Felix, a Peruvian working for Jon but living in the United States. Felix, a young bachelor without a seeming worry in the world, made us feel close to all Peruvians. His famous "I are tired peoples!" made us laugh time and time again. He acted as worker par excellence, interpreter and good friend. It is significant to close these remarks about the people who went on this expedition with a statement by one of the group: "You know, if I had to do it all over again, I would want to have the same people along!"

One might wonder what sort of clothes and equipment are needed for a trip such as this one (which extended over a period of 22 days). Therefore, I present my own personal list of what I actually took along.

Clothing: Khaki trousers (3), khaki shirts (4), T-shirts (6), shorts (6), handkerchiefs (6), socks (6 pair), 1 pair boots, 1 belt, 1 light jacket, 1 heavy sweater, 1 pair tennis shoes, 1 towel and facecloth, 1 cap, 1 pair dungarees, 1 duffle bag plus clothes worn down on trip (sport shirt, slacks).

Personal: Shaving gear, mirror, toothpaste and brush, soap (4 bars), insect repellent (3 bottles), suntan lotion, pair extra glasses, foot powder, pocket knife, nail clipper, toilet paper (2 rolls), lighter, sunglasses, first aid kit, and flashlights (2) with extra batteries.

Miscellaneous Equipment: Rope, hunt-

ing knife, handbag, army blanket and life jacket.

Special Equipment: Field water testing laboratory, formalin (2 quarts), small plastic bags, labels, rubber bands, vinyl tape, notebooks and pens, camera and equipment, 12 rolls 36-exposure color film (Kodachrome X), tape measure and hand net.

Documents: Passport, shot card and and visas.

The equipment brought along by the others was similar but our special equipment varied considerably. Jim Thomerson, for example, brought much more materials for preserving specimens; Win Rayburn brought bow and arrows along with a spinning rod and reel; Zeke brought snake bags and snake catching equipment. The special equipment was tailored to suit each member's own particular goals and interest. Also, remember that we had our own plane and could carry more than if we had to travel via commercial airlines.

Financing varied somewhat but roughly, it went as follows:

\$250 — *Jon Krause's services*

\$ 50 — *clothing and equipment not already owned*

\$200 — *expenses incurred while on*

CLUB NEWS

Chicago Flower and Garden Show

Preparation is being made this year by the three tropical fish societies of the Chicago area: the Midwest Aquarists, the Suburban Aquarist Society (Mt. Prospect), and the Midwest Guppy Society to show in the Chicago World Flower and Garden Show. Dates of the show are March 20 to 27, 1965, at McCormick Place, Chicago. Anyone wishing further information about the show should contact Bruno Bywalec, Chairman, 6337 N. Normany, Chicago 31, Ill.

trip (meals, accommodations, local transportation, souvenirs, etc.)

\$500 total.

In addition, there were some extra expenses of an individual nature as, for example, my own connected with my job as "official photographer" for the expedition. This startlingly low figure, however, is a result of two factors:

(1) *We were willing to live and travel as the ordinary Peruvians or Indians might do (cigarettes in Peru, for example, cost only 6c per pack!) and*

(2) *We were willing to make our flight in this old B-25 (cramped, cold, uncomfortable, no oxygen and take your chances!)*

While the rest of us were preparing our clothes and equipment, Jon and Bill were busy working on the plane. Both engines were quite old and had over 1,000 hours each operating time. In addition, the hydraulic system was in poor shape. The latter was corrected with relatively little difficulty but we were plagued again and again with engine trouble. Everytime we looked, something else was found in need of repair. One Sunday, Jon took off for Chicago with a trailer and purchased an old B-25 engine for spare parts. This helped some but our departure date continually was being delayed to fix something else. Consequently, six of us had to juggle vacation dates and to square things with our employers at frequent intervals. Finally, on a Friday evening, August 14, Jon called and said, "Everything set to go! Can you collect the fellas and get ready to leave Sunday?" Ready we were and take off from Columbus was scheduled for 2 p.m. Sunday, August 16. Our trip was on its way! ◀

(TO BE CONTINUED)

Join the S.F.A.S.



Of a total of six pearlfish, two showed presumptive symptoms of tuberculosis

T. B. in Pearlfish

THE ARGENTINE pearlfish, *Cynolebias bellottii*, is an interesting member of the family Cyprinodontidae widely occurring in the northeastern regions of the Province of Buenos Aires, where its distribution has been given as the Rivers Paraná and Plata, Salado basin, and the Azul and San Antonio streams (Ringuelet & Aramburu, 1957). In a recent publication by Nigrelli & Vogel (1963), reference is made to the observation by Walford of tuberculosis in *Cynolebias wolterstorffi*, *C. adloffii* and *C. elongatus*, the last named of which is found in the environs of the River Plata. An attempt was therefore made to determine whether the disease occurs in Argentine waters, to which end a small number of pearlfish, *Cynolebias bellottii* were obtained from their natural environment. The results of this preliminary investi-

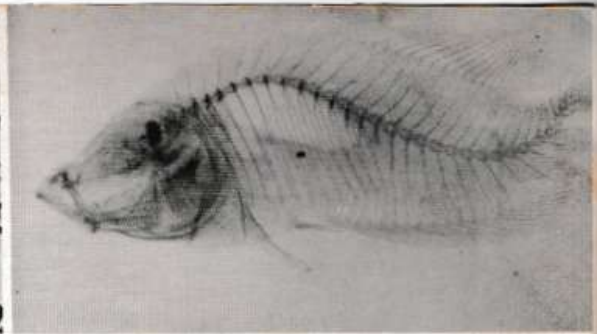
D. A. Conroy

Universidades Nacionales
de Buenos Aires
Argentina

gation are embodied in the present report.

Of a total of six pearlfish, two came to show symptoms of tuberculosis following maintenance in an aquarium. Both of these were male specimens, and the symptoms included a slight emaciation (Figure 1) and a tendency to remain quietly in one corner of the aquarium tank. No ulcerous lesions were detected externally. A presumptive diagnosis of the conditions as tuberculosis was made on the observation of acid-fast bacteria in the faeces. Over the course of seven

Photos: One of the specimens of Argentine pearlfish showing the deleterious effects of tuberculosis.



weeks one of the individuals referred to above came to show a quite pronounced and progressive curvature of the vertebral column, as is illustrated in Figure 2. An X-ray picture of the same animal was taken with a Phillips Oralix apparatus, using Kodak dental X-ray film and a time exposure of two seconds. This spinal curvature is clearly demonstrated in Figure 3.

The fish illustrated in Figure 1 above was sacrificed and submitted to an autopsy. Smears from the liver and kidney were stained by Bullock's (1961) modification of the Ziehl-Nielsen technique, and the presence of small numbers of acid-fast bacteria was detected on microscopical examination of the smears from each organ. The acid-fast bacilli

were subsequently concentrated by Petroff's method, and the deposit streaked onto the surface of Lowenstein-Jensen slopes. The fish showing the spinal curvature was preserved for demonstration purposes, and no attempt was therefore made to perform an autopsy.

After a period of three months, a small creamy colored growth was detected on the Lowenstein-Jensen slopes. This was shown to be due to acid-fast bacteria, the microscopical appearance of which is shown in Figure 4. Up to the moment of writing, it has not been possible to identify this isolate and work is current-

Photos: (Above, left) Microscopic photo of the tuberculosis bacilli. (Right) X-Ray photo shows severe curvature of the spine common in cases of TB in fishes. (Below) Another specimen of pearlfish showing the effects of tuberculosis.



ly in progress to determine the biochemical and other reactions of the organism. Pure cultures of acid-fast bacteria were obtained from the kidney of *Cynolebias wolterstorffi* and the liver of *C. adloffii* respectively by Walford, and the importance of the outbreak is shown by the fact that it produced the death of some 129 individuals within a period of six weeks (Walford, 1964).

The Argentine pearlfish, in common with other species of *Cynolebias*, has a rather interesting life cycle which has resulted in their being known collectively as South American annual fish. Typically they are to be found in small water masses such as ponds and pools, in the immediate vicinity of rivers and streams. On the approach of summer, when the water evaporates, the mature fish commence to reproduce and the fertilized eggs are buried in the mud at the bottom of the pool. Under such conditions they resist the dry period, and the young hatch when once the pool is refilled with water on the advent of the rainy season. It will at once become apparent that environmental conditions such as these may have a very important bearing upon the occurrence of infections such as those caused by acid-fast bacteria, and at the present time an investigational programme is under way to determine more precisely the effect which such factors may have upon the incidence of piscine tuberculosis in these fish.

It is of interest to draw attention to

the appearance of a spinal deformity in the individual pearlfish as described above. The X-ray picture fails to reveal anything which might be considered as similar to a typical tuberculosis of the bones, and the condition may possibly be due to an infection of the liver by acid-fast bacteria which in turn affects the vitamin D metabolism of this organ, resulting in a skeletal deformity. Reichenbach-Klinke (1957) and Nigrelli & Vogel (1963) have indicated that lordosis and similar abnormalities may occur in fish suffering from tuberculosis, and it is not uncommon to observe a moderate "hunched-back" type of symptom in many species of fishes suffering from mycobacterial infections. This particular specimen shows symptoms both of lordosis (descending curvature of the vertebral column) and kyphosis (ascending curvature of the vertebral column), for which reason the condition might be described as kypholordosis.

It is hoped that the present note will prove of interest to those persons who keep South American annual fish, as well as to other workers in the field of bacterial fish diseases.

ACKNOWLEDGMENTS

The author wishes to thank Dr. Ramon S. Baldonado, of Mar Del Plata, for the X-ray picture which herein appears as Figure 3, and to Mr. Jorge L. Rodriguez for the remaining photographs.

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THE AQUARIUM JOURNAL

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A Healthy New Year!

Breeding discus isn't as hard as you think —
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Peruvian Green Discus

PART II

AT FOURTEEN weeks the twelve young fish—"teenagers" now, one might say — which had been kept as potential breeders averaged body size of a silver dollar. The green pattern of the fins was becoming apparent, and the eyes had become more bronze than red (as in the parents). The mouth area had now become completely light.

At four months the largest fish was just three inches long.

On September 20 at five months of age, the "teenagers" averaged about three inches in length. The green pattern of fins and head was fairly obvious so that the final selection of six breeders

R. A. C. Jensen

Davis, California

was made. As the ventral fins turned orange, it was noticed that the fish became more aggressive towards each other, indulging in mock battles similar to those between adult fish. This is presumably a practice reaction to fit them for their future role in reproduction. The skirmishes are particularly prominent at feeding time, and are accompanied by a general darkening of body color and a body lashing movement as described earlier for adults. This lashing

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is in fact common to a number of cichlid groups. The loser in such contests would invariably assume a pale yellow color with stripes prominent and fins folded — as do adult discus under such conditions.

By this age the eyes have completely lost their red color, and resembled the bronze-brown adult coloration.

Amongst the problems of raising discus is the one of feeding. Many aquarists insist on giving their young fishes light twenty-four hours a day "so that the poor little babies don't starve at night." A moment's thought will point this up as an absolutely unnecessary, and possibly harmful practice. It is unnatural, and one can assume that the fish are not adapted to it. It is possible, of course, that faster growth *may* be forced in this way for at least a while as is often done with chicks. However, the plain truth is that discus sleep at night. They rest on or near the bottom in a completely restful state; their metabolism is depressed, and they have no need of the same amount of food energy as during daylight hours. If woken up by the switching-on of lights, they will remain pale and bewildered for some time, and show no interest in food even after their eyes get accustomed to the sudden glare.

On the other hand, it is essential to feed discus fry very often during daylight, especially once they are removed from the parents. A little reflection reveals why this should be so: the fry must, in the course of their evolution through the ages, have become dependent upon their constant parental food supply. In the aquarium it is unreasonable to expect the fry to suddenly adjust from an all-day meal to breakfast, lunch and dinner with maybe a coffee-break or two thrown in, once they stop feeding from the parents. Accordingly, the ever-hungry little piscine pigs must be fed a minimum of six, and prefer-

ably ten or twelve, times daily once they have become "free-feeding."

Some writers, e.g. Wagner (1958), have reported that the parent fish will chew and spit out food for the young during their weaning stage. No confirmation of this could be obtained in the

(Continued on Page 32)

WANT ADS - \$2

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

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Marine supply catalog — coral, plexiglass tanks, all salt-water items. Sea-Land Marine Distributors, 1323 Flatbush Ave., Brooklyn, New York.

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WANTED

Tropical Fish Hobbyist magazines — between the years 1953 and 1961. Please send condition and price. R. Jones, 3634 Greenland Ave., N.W., Roanoke, Virginia 24012.



It's nice to have a hobby. Folks collect all manner of things — stamps, heads, coins, fishes and the errors that other people make, such as those of the typographical variety. If I were to report, for instance, "In their Second Annual Show, the 35 members that comprise the Aquarium Hobby Club of Indianapolis had 406 entries," some collector would immediately spring upon this as a "find" and try to tuck it away in his collection saying, "Hey, there's a good one! That 406 probably should have been either 40 or 46." Nice try, but it just so happens that this number is right

FINNY FOLKS

By Diane Schofield

and this club grossed \$1,000 on their show. When the financial smoke cleared away, it left them enough to purchase a typewriter with an oversize carriage and a new mimeograph machine.

These two items are calculated to please Dorothy Stimson, editor of "Tropical Topics," the bulletin of the Aquarium Hobby Club of Indianapolis. Dot got her feet wet originally by whipping out a column, "Just Fishin'" which dealt with the review of exchange bulletins. Soon Dot got not only her feet wet, but the rest of her too, as she became editor and then vice-president. She does a sterling job on their bulletin and interested clubs may check this out by exchanging with them — Box 11106, Indianapolis, Indiana, 46201.

Dot is really quite a girl in any number of ways. Who else, after all could win a trophy for "Best Odd-ball" and

Photos: (Top) A portion of the Central Kentucky Aquarium Society Board of Directors, (L to R.) Mr. and Mrs. Richard Jones; Charles Girard in the front row; In back, Billy Ward, president and W. C. Schmitt, show chairman. (2nd) Judging the Aquarium Beautiful category at the Indianapolis show. (3rd) George Sherpe, president of the Indianapolis club. (4th) Board of Directors, Aquarium Club of Indianapolis. All photos by the author.

AQUARIUM JOURNAL

"Best Amateur Female Guppy?" If the last category staggers the imagination, let me hasten to assure you that it has no bearing whatsoever on the past "experience" of the guppy.

Much of the success financially of this Indiana show was due to the IBM-like brain of Mildred Mendenhall, who runs a superb shop, Mendenhall Aquarium and Pet Shop in Indianapolis. As Mildred stated frankly, "I don't see any sense in going into an operation if you can't make money at it!" Clicking right along with her on this project was George Sharpe, the President of this society, as well as other members such as Bill Coutz, Dave Stimson, Ida Corder, Vern and Jean Parish, Bob Echolds, Carl and Mary Fulkerson, Paul and Madge Wilson, Ed Church, Fred Worley, Pete and Phyl Brown, Janet and Jim Young. Two other members of Mr. Sharpe's own family, his wife, Vivian and his son, Dennis, completed his working force.

Of course, even with a "rarin'-to-go" bunch like this, 406 entries are not physically possible from only one club of 35 members. Clubs, that hold shows in this area of the United States, are most fortunate. They are all close enough to one another so that it is no trick for aquarists from Chicago, Dayton, Cincinnati, Lexington, Louisville and other neighboring cities to just drop over with a tank or bowl and enter it in one another's show. Most of the clubs in this section of the country belong to CUSAC (Central United States Aquarium Clubs), a division of TIFAS (The International Federation of Aquarium Societies) and this CUSAC (pronounced, Koo-sack) bunch is perhaps one of the most enthusiastic groups. Many of the entries come from outside the Aquarium Hobby Club of Indianapolis and most of

Photos: (Top) A representative group who came down from Chicago for the Indianapolis club show. (L. to R.) Lew Kobanna, Stanley Mruk, Jim Zaitowski, J. Matson, George Maros, Mrs. Kobanna, Mrs. Zaitowski, Ken Hamus, Tom Kelly, Joe Hartman. (2nd) Mildred Mendenhall, show chairman of the Indianapolis club. (3rd) Erlene and Dick Bristow, winners of the People's Choice trophy. (4th) Bill Coutz, treasurer of the club and marine specialist.





the trophies went in the direction of Ohio at the show's end!

The awarding of these trophies was rather unique. Each class was judged by a separate judge or group of judges, and then the "People's Choice Trophy" was selected by balloting of all who attended the show. The club was kind enough to invite me to become a Temporary Hoosier and pick out the "Best of Show Guppy". This was a decision that would have turned King Solomon into a neurotic. Seldom have I seen a more magnificent selection of guppies. Ultimately the choice went to Jack Evans of Ohio for an unbelievable red delta-tail.

The work of dedicated hands was evident all over the large Eastgate Shopping Center Auditorium. One spectacular was the placards, designating the various classes, both in the varieties of guppies, as well as the various classifications of other types of fishes. Phyl Brown had drawn a picture of each particular fish and then completely paved it with sequins of an appropriate color. When you consider that each

sequin had to be separately attached with a pair of tweezers and there were literally dozens of these placards, you wonder what pursuit Mrs. Brown might take up to fill the rest of her empty hours.

A portion of the profit of the show came from the sale of tickets on a handsome wooden frame 40 gallon aquarium, won by Janice Sue Silver. All of the members of the Aquarium Hobby Club of Indianapolis sat about with their hands literally filled with tickets, and all of the visiting members of neighboring societies waited for the winning number to be theirs. But the girl who won not only belongs to no aquarium society, she is connected with a poodle clipping parlor!

The spot for the First Annual Show of the Central Kentucky Aquarium Society was originally slated to be one of the large shopping malls in Lexington, however, at a zero hour this didn't prove feasible. Happily, this club has as its president, a dealer, Billy Ward, who operates Ward's Aquarium. Mr. Ward turned over his shop, shutting down business for the day, and thereby

Photos: (Top) (L. to R.) Jim Fiske judging the guppies at the Central Kentucky show. **(2nd)** Robert and Betty Echolds of the Indianapolis club. **(3rd)** Tom Kelly auctioneering at Indianapolis.

Photos: (Below) (L. to R.) Billy Ward, president of the Kentucky club. **(2nd)** Ida Corder, board chairman of the Indianapolis club. **(3rd)** Vern Parish of the Indianapolis club, shown in his shop.





letting the society utilize his entire building.

For any annual show this one would have been a good one, and for a first show it was exceptional. The Central Kentucky Aquarium Society has just managed to stand upright and hasn't been walking too long at two years of age, yet in this time they have published a dandy little bulletin, "The Blue Grass Aquarama" (exchange address - 2021 Clays Mill Rd., Lexington, Kentucky), and have started another endeavor that is unique and most meritorious to the hobby. This endeavor is the "Society of Dedicated Enthusiasts". Any club can send in prospective nominees from their own ranks, the Central Kentucky Aquarium Society will issue an attractive certificate proclaiming that this person is a "fellow" in "The Society of Dedicated Enthusiasts". So far these awards have been given to Carol Honnold and Bruce Wood, both of the Colorado Aquarium Society (Carol is now of the Dallas Aquarium Society); Col. Harry McDougall of the Suncoast Aquarium

Society and Jim Fiske. Jim was one of the "godfathers" of the Central Kentucky Aquarium Society, shoving a bit of mortar here and slapping in a brick there when the society needed help in starting. He doesn't look like the normal conception of a godfather, however - he looks as if he would be more at home in the advertisement for Arrow shirts. Jim definitely is the handsome, collar-ad type. Not only is he a member of this club, but he is also affiliated with the Louisville Tropical Fish Fanciers. In addition, he is the former chairman of CUSAC, as well as the Visual Aids Chairman for this organization. A sad note - Jim says that he is giving up the hobby, although he was prevailed upon to be one of the judges for this recent show.

Two good gimmicks were trotted out for their first annual show - the first being a large "fishing" tank. This huge aquarium was loaded with little guppy. These were the kind that if they were plants, they would be uprooted quickly in any garden as weeds. But for 25c a

Photos: (Top) (L. to R.) Dorothy Stinson, editor of "Tropical Topics" and vice president of the Indianapolis club. (2nd) Paul Wilson of the Indianapolis club regarding one of his show bettas in a unique hanging bowl arrangement. (3rd) W. C. Schmitt, show chairman of the Kentucky club.

Photos: (Below) (L. to R.) A photograph taken at the Aquarium Hobby Club of Indianapolis show. At times the crush was so great that people had to be turned away. (2nd) A random photograph taken at the Central Kentucky Aquarium Society show by the author.



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crack, any small moppet could take fishing pole in hand and with the end "baited" with a net instead of a hook, they could take home as many guppies as they could catch. This did "net" the club extra money, of course, but what an insidious way to insure new members for years and years to come! Some of these kids are going to get royally "hooked" once they start with their guppies.

Another good member-getting gimmick was a registration book. This book held a two fold purpose — the first was to get the names of people attending for future contact and the second was for tallying up the votes of the Most Popular Aquarium in the show, as each person put down the number of the tank opposite their name that they thought most meriting this award. ◀

Discus

(Continued from Page 27)

present case, although the parents were noticed to suck food in and out during feeding, some of the pieces thereupon being swallowed by the fry. This seemed however to be a completely random occurrence, which may have been misinterpreted by other observers.

Genetically, the possibilities of the discus fish are most exciting. Many color variations are known, and some have probably yet to be discovered. Results of the writer's own work in this field are by no means extensive, but will be published as they accumulate. One interesting developmental anomaly which cropped up in the present spawn was called "broken bar" for want of a better name. It is characterized by a broken, or an extra short color bar on one side of the fish only, although the position may vary.* The peculiarity *may* be the result of a freak of development, triggered

*A similar case in blue discus recently came to our attention.

by some environmental factor. However, in the present spawn a total of 12 out of 49 showed some barring aberration or other, a figure remarkably close to the classical 3:1 ratio of genetics; hence the anomaly may yet prove to be due to a heritable recessive character, above remarks notwithstanding.

Of more practical interest to breeders would be the inheritance of eye-color and amount of blue or green pattern. The former seems likely to be governed by simple Mendelian inheritance (like albino in man and other animals). The patterning (blue or green streaks, red spotting, etc.) seems on the other hand to be governed by multiple factors, or polygenes. This means in practice that careful selective breeding over many generations will be necessary to increase the incidence or amount of such characteristics. With the continuing rise in the frequency of successful spawnings, this is no longer an impossible task. Well, discus fanciers, the rest is up to you!

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★ IDEAS ★

BY HOBBYISTS

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

Filtering Material

I have found that some artificial sponges discolor the water of my tanks when I use them for filtering material. Next time you clean your filter, get a clean cloth napkin. Fold it up to fit the filter or cut it to size and whenever you clean it just run hot water over it or boil it. I have been doing this for about 2 years. — *Kent Kurtz, Millbrae, California.*

PROGRAMS

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

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

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

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

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

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

CLUB NEWS

San Francisco Aquarium Society, Inc.

The next regular meeting of the S. F. A. S. will be held Thursday January 7, 1965 at Steinhart Aquarium, California Academy of Sciences, 8:00 p.m., according to Frank Tufo, president.

The outgoing president, Mr. Dempster, will introduce the incoming president for 1965, along with new officers and the 1965 Board of Directors.

Dr. Sigmund Ketterer was the only new member elected to the 1965 Board of Directors. The following incumbents were re-elected to the Board: Charles Bange, Treva Bell, Lee Heise, Fred Jenne and Joseph Zins.

Charles Bange, president *emeritus* and chairman of the Fish of the Month committee, will present a cup to the winner of the 1964 Fish of the Month awards covering the entire year. Fish of the Month for January: (1) Male guppies, (2) Characins, except tetras (*Hyphessobrycon* and *Hemigrammus*). Mr. Bange announced.

Election of officers for 1965 was held by the Board of Directors at their December meeting. Frank Tufo was elected president; Joseph Zins, vice president; Treva Bell, re-elected secretary; Theodore Steinhauer, re-elected treasurer, and Gary Meltzer, elected Librarian.

Volunteers for 1965 committees will be asked to make their choice of committees, Frank Tufo, program chairman, announced. There will be the usual doorprizes and fine refreshments according to Joseph Zins, chairman of the refreshments committee. ◀

"Tiki Tropicals" Aquarium Opens in the East Bay

Bryce and Dawn Stetler, owners of Tiki Tropicals, announce the opening of this new shop offering a complete array of tropical fishes — with emphasis on the more exotic specimens of cichlids.

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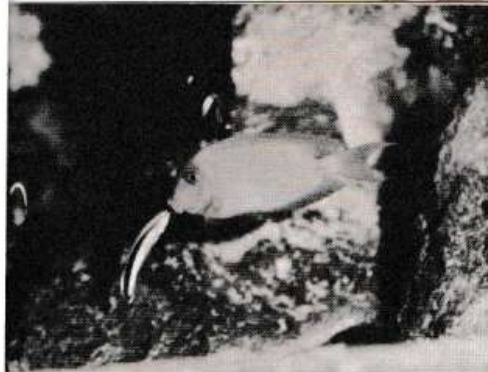
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These piscatorial valets perform grooming services for free on Steinhart's fishes

Hail the Cleanerfish!

EARLY African explorers marveled at the industrious tick birds which invariably swarmed over the backs of the lumbering hippopotami, rhinos, giraffes and other veldt animals — these strange birds usually paid for their keep by removing parasites from their slow-moving hosts. In recent years ichthyologists have discovered that certain small fishes, shrimp, and others perform this same function for large carnivorous fishes. In some instances these larger fishes make periodic visits to the areas where these small cleaners live — just to receive their necessary grooming. Now an interesting biological question arises — how is it possible for these large fishes to learn about this valuable cleaning activity? Do they learn this from watching others, or is this knowledge with which they are

Photos: (Left) Boo! The sprightly cleanerfish is about to clean house for Steinhart's giant sea bass. Photo by Fran Ortiz. All four other photos by Fred Jenne, official photographer of Steinhart Aquarium.

Earl S. Herald, Ph.D.

Superintendent-Curator
Steinhart Aquarium

born? In this regard, some recent observations made at Steinhart Aquarium are quite startling.

More than eight years ago, Seaquarium in Miami sent to us a juvenile Atlantic giant seabass, *Epinephelus itajara*. This 12-inch fish has now grown to a length of almost 4 feet and a weight of about 50 pounds. For a long time it has lived in a tank by itself since it is highly belligerent, killing other fishes, and not even hesitating to attack the hip-boot of the aquarist as he stands in the tank to do routine cleaning.

Photos: (Top) (L. to R.) One of the smaller rock fishes gets cleaned by our friend the cleanerfish. (2nd) Doing the same thing to an Atlantic green moray eel. (Below) Our friend swims fearlessly inside gill cover opening of the sea bass. In the second shot he is working on the sea bass' generous exterior.



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With this as a background then, let me describe to you what happened when recently our good friend, Mr. F. Earl Kennedy of Manila sent to us a box of brilliant blue 3-inch cleaner fishes, *Labroides dimidiatus*. This type of cleaner fish is a very interesting fellow who spends most of its time removing mucous, debris, and other materials from the bodies, mouths, and gills of other larger fishes. Knowing that unrelated but similar Atlantic cleaner fish exist, we thought it would be worth a trial to introduce some of these Manila cleaners into the Atlantic sea bass tank, merely as an experiment, to see if by any odd coincidence they might perform their normal cleaning service.

Within 15 minutes after the first pair had been introduced into the tank, the giant sea bass raised its gill cover and in swam one of the diminutive cleaners to start work on the gill filaments. The other one of the pair proceeded with the same activity on the outside of the body. This worked so well that we added another six cleaners to the tank and they were soon busily at work with one very ornery seabass.

In a short time the cleaner fishes quickly learned that the best area for their activities was within the large 8-inch mouth; sometimes as many as three at one time would be at work cleaning the teeth and throat. The entrance of the cleaners would invariably cause the seabass to open its mouth wider, and expand its gill covers to permit easy passage from the throat through the gills. Occasionally there was evidence that their activities would cause a tickling sensation — the seabass would hiccup and the cleaners would be spurted outside. Fortunately for the cleaners, the hiccups always seemed to be outward, and never inward.

Whether the old seabass' belligerency will disappear because of this treatment

AQUARIUM JOURNAL

is something yet to be determined. The important thing from the biological standpoint is that these two kinds of fishes had never before this moment been closer together than 10,500 miles, and yet instinctively the seabass which grew up in our tank, knew what these cleaner fishes could do.

Introduction of a few cleaner fishes into the tropical moray eel tank resulted in a great yawning contest with one eel trying to outdo another. As a cleaner would swim near a moray, the response of the eel was a great yawn as though the eel were trying to entice the cleaner. Whenever the cleaner entered the eel's mouth, it would sometimes disappear down the small throat, apparently moving into the gill cavity. The cleaner usually re-emerged from the mouth rather than out the small tube-like exterior gill opening. Incidentally, this tank contained both Atlantic and Hawaiian moray eels, in neither of whose habitats does this Manila type cleaner fish occur. However, both kinds of morays immediately recognized and accepted the cleaners as valuable additions to their aquarium life.

In the tropical reef community tank which contains some 65 fishes of 15 species, the experience was not so fortunate. Several cleaners introduced into this tank did very well during the day time and seemed to be accepted by most of the fishes, but during the night some carnivorous Judas failed to recognize them and the next morning they had disappeared.

Since that initial cleaner-fish day, we have placed these fish in a series of tanks, and in spite of the fact that all of the fishes in these tanks are larger than the cleaners, they usually seem to respect instinctively the cleaner's ability and do not make a meal of them.

And so, thanks to a box of cleaner fishes, Steinhart is now the cleanest aquarium in the fish world. ◀

JANUARY, 1965



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African Knifefish

Most aquarists who have been in the hobby for a number of years are familiar with the so-called gymnotid eels, having seen them in public aquaria or perhaps a dealer's show tank. These are not true eels, but strange fishes related to characins. Facilities permitting, many aquarists may have even possessed these oddities themselves, entranced by the unusual propulsive system of these creatures. Even the Indians of South America have noticed their strangeness and believe the ghost fish, *Sternarchus albifrons*, to be the possessor of strange and terrible powers. The honeymoon is

Braz Walker

Waco, Texas

often over, however, when the aquarist realizes that he has in his possession a sluggish, gluttonous carnivore whom he seldom sees and the knife fish is either taken back to the dealer, given to a public aquarium or relegated to an ignominious existence in an aquarium in which it doesn't matter whether he ever comes out or not.

The family Notopteridae are a kind
(Continued on Page 48)

Photo: The African knifefish as photographed by Braz Walker.

About a year ago, while I still lived in Denver, I received via airmail special delivery from Dallas, four of the most amazing fish I have ever seen. They

Carol Honnold

Dallas, Texas

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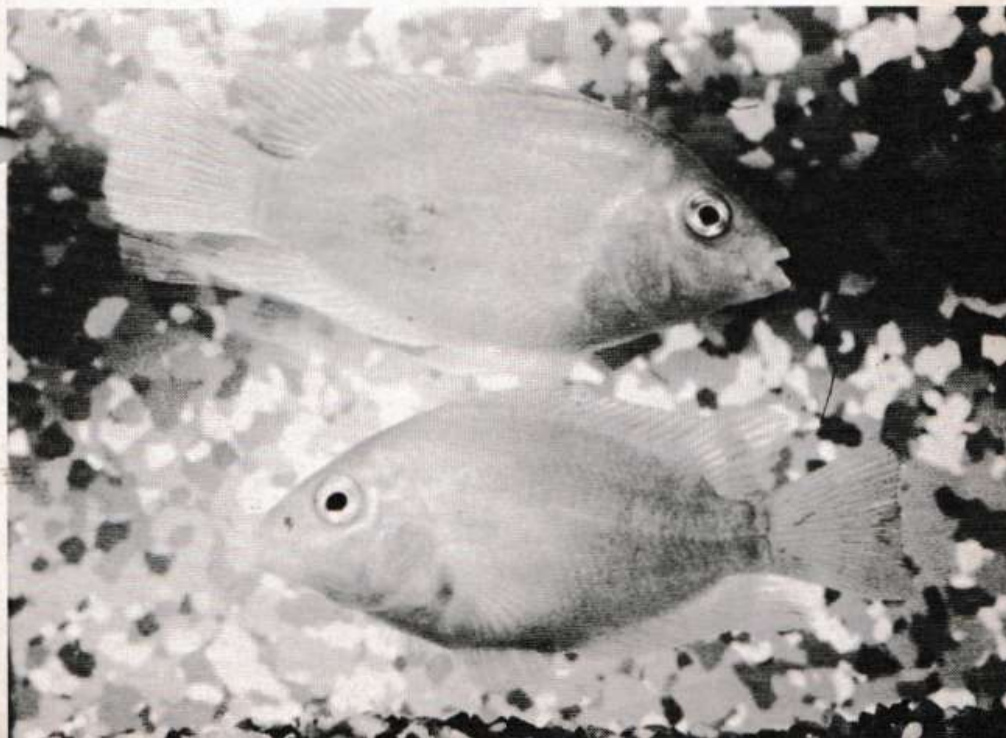
In the "Pink"

were pink Congo cichlids. The only thing that kept them from being classified as complete albinos was their very black, snappy eyes, which were rimmed with gold. My guess, from the way their offspring have grown, is that they were between two and three months old when I got them. In spite of a long, and probably rough journey, they were immediately at home in a 10-gallon aquarium. They were not the least bit shy — and they were hungry! From the first, they have been the most curious, most friendly fish I have ever kept.

But let's go back for a minute about

their origin. I've heard quite a bit of controversy about these fish — some claim they are actually pink *Cichlasoma octofasciatum*. I'm not questioning that there may also be pink *C. octofasciatum*, but these definitely are *Cichlasoma nigrofasciatum*. A hobbyist by the name of Kenneth Grisham of Ft. Worth spotted several pink babies in a spawning from a pair of regular *C. nigrofasciatum*. These were separated and found to breed 100% true — so a mutation was born!

Photo: A pair of pink Congo cichlids, subject of the article by Carol Honnold, and photographed by Braz Walker.



Cichlasoma nigrofasciatum is an attractive fish in its own right. It is characterized by having a light brown body with six or seven vertical black stripes, the first one being inclined toward the head at a 45 degree angle to give him a "rakish" appearance. The dorsal fin has an attractive edging of bluish-green, and when mature both the dorsal and anal fins are longer and more pointed in the male than they are in the female. This is one species in which the female is more colorful. Flecks of gold adorn her sides and lower portion of the body, and when in spawning condition, she has a brilliant bluish-green belly. They will breed at two inches, and may attain a length of six inches. Because of their size and some other undesirable tendencies, they are not suitable in a community tank except with fish of their own size and temperament. "Congo" cichlid is a misnomer, however, as these fish come to us from various Central American waters. They are also known by such aliases as convict cichlids and black-banded cichlids.

For the novice who is eager to try his hand at spawning an egg layer, this one is an ideal choice. In spite of his rather scrappy tendencies, he is an eager breeder and a wonderful parent. And — if fishes have such a thing as personality, these are the original "IT" kids!

My "pinkies" grew rapidly, and ate any food I offered them. They are a little more aggressive than the regular *C.*

nigrofasciatum, a fact which seems to be true of a good many "sports." Mine became very tame and ate out of my fingers. The minute I walked into my fish room, there they were at the front of the tank, probably hoping I had some food for them.

It wasn't long before I realized that out of my four little fish, I had two pair. As with the regular "Congos", the female is the more colorful of the two. The male is a beautiful, brilliant pink at all times, with a blue edging to set off his very striking dorsal fin which he carries with apparent pride. The female, with her brilliant red belly, which stays that way all the time whether she is breeding or not, makes this a pair of fish that is outstanding in any fish room. Large, prominent black eyes rimmed with gold provide just the right "finishing touch".

As soon as I was sure I had two pair, I separated them, putting one pair in a ten gallon and the other in a fifteen. There had been quite a marked difference in the rate of growth — I had one pair almost three inches long, and the other had to stretch to make two inches!

Both pairs bred at approximately seven months. It is unbelievable that two such small fish can make such a complete shambles of an aquarium! I've never seen two fish clean more rocks or dig more holes! I had supplied them with a heavily planted tank in which there were lots of rocks, pieces of slate and a flower pot. They uprooted all



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plants, and finally chose as their spawning site a "cave" I had fashioned out of rocks, a cave with a front and rear entrance. They became so ambitious in their digging that the cave collapsed, but this didn't deter them for a minute. After the rock of their choice was cleaned to their satisfaction, the female started laying eggs in a circle, with the male following very closely and fertilizing them. The first spawnings consisted of over 100 eggs, and each successive spawning has been larger. After spawning is completed, both parents are devoted to the nest. They mouth the eggs and move them frequently to holes that have been previously dug. Both fish will vigorously attack anything that attempts to interfere with them during the time they are guarding the nest — they come at you with gills extended and look just as vicious as it is possible for anything three inches long to look.

By the third day, the eggs can be seen "wiggling" (providing you can find them) and by the seventh day, the female is surrounded by a swarm of tiny, almost transparent fry. About all that can be seen is a school of tiny black eyes. At this time, the female "takes over" and it is best to remove the male, for she makes life completely miserable for him and could kill him. (In this respect, these fish differ from the regular Congos, with which it has been my experience that both fish take care of the eggs and young.) The female is devoted itself, and her vigilance does not stop for a minute — if a small fry wanders away from the brood, he is immediately sought out, picked up and "spit" back with the rest of them.

The fry are large enough to take newly hatched brine shrimp immediately after hatching — and what quantities they consume! I leave the female with her brood for two weeks, remove her

(Continued on Page 46)

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A H A P P Y

It looks as though the grownups had more fun with Santa Claus (portrayed by Jim Mills) than the kids did at the Annual Christmas Party of





NEW YEAR!

the San Francisco Aquarium Society! Program Chairman Frank Tufo and his program committee did an exemplary job on this year's party.

Photos by Jim Crawford



Honnold

(Continued from Page 43)

and put her by herself for a week — and then place her with the male again. Within 24 hours, the pair will be spawning again.

I entered the smaller pair in our annual fish show last spring. They were in a five gallon mirror back aquarium, and absolutely stopped the whole fish show by spawning in front of droves of people (70,000 saw the show). They spawned on the back of a rock, but because of the mirror back, all of their actions could be clearly seen. The eggs were not yet hatched when it came time to "tear down" and take my tank home. Because it was a small aquarium, I siphoned off a 3 gallon bucket of water, moved the tank to the seat of my car, took it home, hooked it up and refilled it with the water I had saved in the bucket, and the whole process didn't even phase them! They didn't stop

guarding those eggs for one minute — I raised over 200 fry to salable size from that spawning. They are hardy, grow amazingly fast, and are not the least bit particular about what they eat — so long as there is plenty of it.

The foregoing should completely dispel any rumors that these sports are sterile! And they aren't the least bit particular about conditions under which they spawn. A "must", at least from my experience, is plenty of rocks. An under-gravel filter isn't too satisfactory because they invariably uncover it (even if it's under three inches of gravel) and the fry are sucked under the filter. An outside filter seems to be best, with *fine* nylon netting over the openings — otherwise you'll have a filter full of fry. They seem to like a temperature of 76 to 80 degrees F., but the tank in which they spawned during the fish show was, on one occasion, down to 60°, and was 72° F when they spawned. pH seems to be unimportant — it has ranged all the way from 6.4 to 7.8 in tanks where they have spawned.

To the best of my knowledge, there aren't too many of these fish available yet, and they are expensive. However, as prolific as they are, the market should soon be flooded with them, and every cichlid lover will be able to have a pair of these friendly and most attractive fish.

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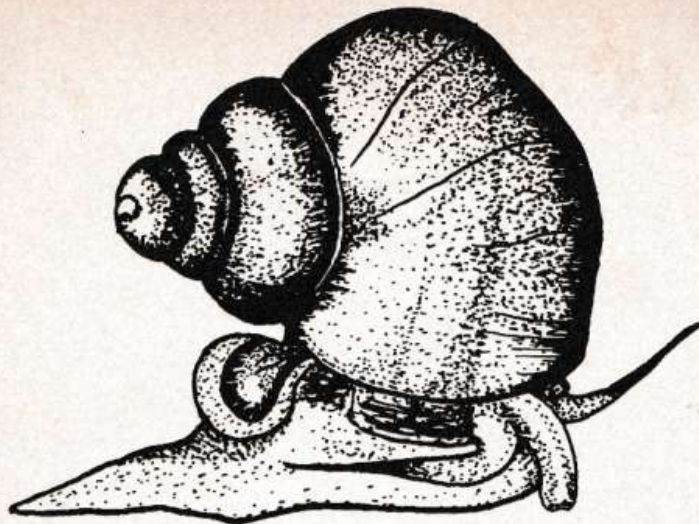
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Separate Tables

If you have a fish that harasses other fishes at mealtime — keep him suspended in a large net in the aquarium until after the others have eaten.—Mrs. Stella Swain Rico, Los Angeles, Calif.



Identify sexes by the appearance of their feelers; they enjoy animal foods

Live - bearing Snails

PART I

IN 1930 the author purchased a Japanese livebearing snail for twenty-five cents and after having it in a jar at home for approximately three days it gave birth to a rather large number of living miniature snails. Most of these were raised to maturity after it was discovered that they were more fond of animal food than they were of the vegetable food which was being given to them in generous quantities. At that time it was often suggested by pet-shop owners that the common wafer fish food was "best for snails" along with the usual head lettuce.

The author took pride in the fact that he was able to identify the sex of the snails by the appearance of the "feelers."

At that time it was quite possible to actually sell the snails without too much

Charles O. Masters

Walhonding, Ohio

trouble to friends because they weren't quite as common as they are today. The author was able to make a little "movie money" in this way, at least until some of his friends discovered similar snails in some of the local waters. It was believed at that time that the snails similar in appearance that came from the Ohio Canal in beds of *Vallisneria* were Japanese snails so that the market for the author's snails soon disappeared. Obviously the author and his friends were not very well informed.

(To be Continued)

Join the S.F.A.S.

Walker

(Continued from Page 40)

of African and Asian counterpart (at least in body shape) of the knife fishes of South America and are more satisfactory fishes in many ways. More handsome as a rule than most of the gymnotids and also much less eel-like, the anal fin is joined without interruption to the caudal fin. With a graceful rippling motion these combined fins are capable of propelling these fishes forward with tremendous bursts of speed or backward with almost equal efficiency by merely reversing the rippling motion. Turns are achieved by bending the body in the desired direction but the body of the fish is used very little for propulsion.

The African knifefish, *Xenomystus nigri*, has been in fair supply since fishes from the Congo River hit the market a number of years ago. It was at that time that I obtained my first specimens and they have yet to lose any of their appeal as far as I am concerned. For a time they were popularly misnamed the black knifefish which they certainly are not (at least I have yet to see a black specimen). This misnomer was due to a misunderstanding of the scientific name (*nigri*) which means black and in this instance probably referred to the Niger River in Africa. Actually the coloration consists of varying shades of brown to reddish brown.

Xenomystus, like other members of the family is nocturnal by nature. It is by no means shy, however, and soon after being placed in the aquarium will be seen parading up and down the front glass. When a number of specimens are kept together, unless large quarters are provided bullying will take place. If, however, the aquarium is large enough to accommodate them comfortably definite territories will be established. Intruders (other *Xenomystus*) will be immediately chased from these established territories but at other times a truce seems to be declared and the fish will shoal together in neutral territory. The quarreling that does take place is inconsequential, for little if any damage is done. Fishes other than their own kind are ordinarily ignored if they are of comparable size but an individual *Xenomystus* may occasionally become a fin nipper.

In its natural habitat the African knifefish feeds upon small aquatic crustaceans and worms for which it hunts at night. In the aquarium, however, they will accept substitutes such as beef heart and canned cat food, and as soon as they have learned the feeding routine, will manage to be at the head of the chow line. Rare exceptions may accept only live food. A word of caution about their feeding: I have several of these fish in a large aquarium containing other large fishes and their staple food is comprised of dried dog food which has been

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previously soaked to soften it. Although outweighed several times by almost all of the other fishes present, at feeding time, the *Xenomystus* without hesitation, jump right into the feeding mass of snapping jaws and flailing tails, giving the appearance of getting more than their share of the food. Evidently this is not so for if large quantities of raw meat, such as beef heart or raw fish, are not regularly fed the knife fish eventually waste away from lack of nourishment.

From the aquarist's viewpoint *Xenomystus* is probably the most satisfactory of the knife-shaped fishes since it is not shy, is easily fed, long lived and can

even be kept with fishes smaller than himself (within reason).

To my knowledge *Xenomystus nigri* has never spawned in captivity, so virtually all specimens are imported from Africa. Since duplicating their natural conditions and habitat would be extremely difficult to say the least, it is unlikely even if these fish are spawned in captivity that aquarium bred specimens will ever become numerous enough to affect the market. Since this is more or less a collector's fish perhaps in a way this is fortunate because often fishes in the "odd ball" class which become readily available seem to lose some of their charm. ◀

Letters to The Journal

*From: Ercan Unalan
Ankara, Turkey*

Could you please give me information about a fish locally called "leopard fish"? I could not find its name in my books. As far as I know it is a cross between a zebra danio and spotted danio. If this is true, which one is male and which one female and under what conditions do they cross?

REPLY: The fish you mention has been described recently by Herman Meinken of West Germany as Brachydanio frankei. Its origin is apparently not certain, at least there appears to be some question about it. This species was first imported in 1963, apparently from India. But there is still some question about a hybrid origin for the fish. Zebra danios and spotted danios have been crossed in the past but usually the young were sterile. However, it is not impossible that a cross is the origin of the fish. Its habits are the same as the zebra and spotted danios.

• • •

*From: Howard L. de Voss
USS Ranger*

Being in my present position, which is aboard one of the U.S. Navy's mighty Aircraft Carrier, presently deployed in the Far East, I am not at present an active member of the aquarists hobby. However I do find much time for reading and have gleaned every particle of information available from the copies I have of your excellent *Aquarium Journal* and was hoping that you could send me a short list of books that I might procure on the subject of tropical freshwater fishes, and related subjects. I realize such a list would be quite extensive, but I was hoping you would recommend some of the better publications.

REPLY: At the moment, it is very difficult to recommend books of value to you on tropical fishes. The one most respected by many aquarists for many years, Innes' "Exotic Aquarium Fishes" is now out of date in so far as parts of the nomenclature and numbers of spe-

cies listed. Some of its remarks on keeping killies and on characins also need updating. Nevertheless it is still a book well worth recommending. One of the most complete catalogues of aquarium fishes is "Freshwater Fishes of the World" by Günther Sterba as edited by Denys Tucker. Available from the Viking Press, 625 Madison avenue, New York, N.Y. I would rate this one high but there are a number of nomenclatural errors in some sections. Still one of the best books available on technique of keeping fishes is "Keeping and Breeding Aquarium Fishes" by Emmens. First published by Academic Press Inc., New York in 1953.

From: Joseph S. Presha
Riverside, California

I would like to have reference material on equipment such as pumps, filters, heater, etc. Is there some source in which they are evaluated or which provides information that enables the hobbyists to select more intelligently the one that is best for his purpose as well as money?

REPLY: We have no reference material on equipment for aquarium use. Actually the quality of most of the products we have had occasion to use has been good to excellent. Heaters are often the greatest risk for the aquarist. As to intelligently selecting what is best for a particular purpose, you are faced with a real jungle. Of course your own personal experience is your best guide. Next would be that of recognized competent aquarists known to you. This is a strong reason for joining local aquarium societies. Study what your needs are. For example in pumps, the number of aquaria and the amount of filtration, aeration, etc. you need to do is your guide. Most pumps list the amount of air pumped per minute, check the ratings. If a pump does not have this information it might be best to ignore it. It should be noted that some expensive pumps that

produce significantly less air have a longer life. I have one of these purchased in about 1936 that will still pump air (but not without a lot of noise). It is a standby pump. Filters again are something of a problem. The size of the tanks or the special purpose at hand can be your guide. Some extremely rapid filters for large tanks would be ridiculous on a small tank except in cases such as creating a riffle effect for attempted breeding of some rare fishes. Evaluate your needs, compare a wide variety of equipment and select that which best fits your needs. Often this is difficult but it is the best one can do. At first you will make a few mistakes, we all do, later with experience you will know better what to do. Remember, as a beginner, don't buy the most expensive, powerful equipment, but don't buy the cheapest either. The later will usually prove to be a bad investment.

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BY HOBBYISTS

Flower Fertilizer

If you have an undergravel filter, try this next time you empty the tank. Place one end of the siphon in the large hole of the filter, and the other end out the nearest window. This method will get rid of the water with no hauling to the nearest sink, and the flowers will be fertilized. — Bradley H. Theissen, Kan-kato, Minnesota

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