aquarium journal

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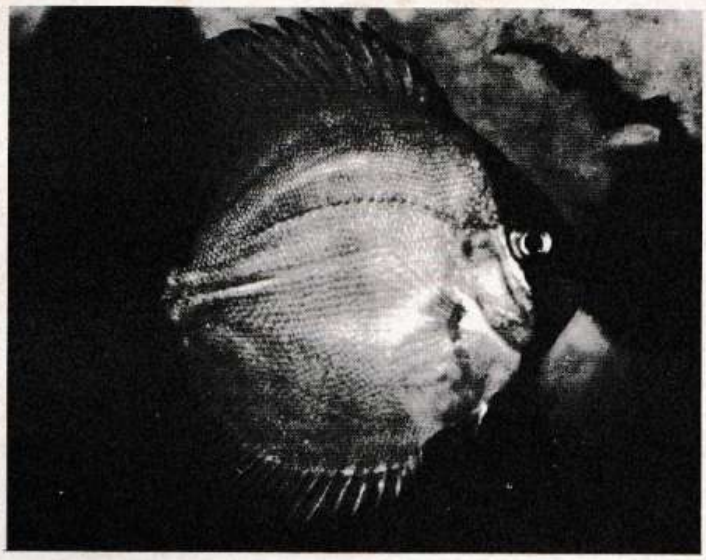
contents

cover photograph

Amneris rubrostriata, *an Australian native fish, as photographed by Trevor W. Lambert. For more information about this and other native fishes from "Down Under," turn to Page 613 and read the article by Mr. Lambert.*



Breeding discus isn't as hard as you think — providing you and the discus know how!

Peruvian Green Discus

R. A. C. Jensen
Davis, California

Discus spawnings are no longer a rarity, but it seems that few aquarists successful with discus take the trouble to pass on pertinent information on how they breed their discus. Possibly commercial considerations play a part in this; luck obviously plays another part, since many breeders are at a loss to explain – or repeat – their results. In this writer's opinion, discus breeding is not nearly as difficult as often claimed. One purpose of this article will be to give a few pointers. It's simple – provided you (and the discus) know how.

The following report on a recent spawning of the variety called "Peruvian green discus" may be taken as fairly typical of successful breeding. In fact, the observations corroborate to a remark-

Photo: Fourteen-week-old Peruvian green discus, as photographed by the author. All photos in article by the author.

able degree those made by Otto Wagner (1958) amongst others (Wagner's discus were apparently the brown or red form). Consequently attention will be concentrated here on previously under-emphasized or overlooked aspects of breeding.

The breeding pair were isolated out of ten discus imported via Florida from Iquitos, Peru. Perhaps due to their wild origin and poor shipping conditions, seven succumbed to a "blanket-like" slime disease involving scale loss. The pair were chosen by the author (i.e. they did not "pair off" naturally), and were placed in a 30-gallon outside-filtered aquarium with gro-lux lighting.* Sex was distinguished by color differences (more green in male) and behavior. The latter criterion cannot be more satisfactorily explained than to say that the male acted in a dominating, lordly male fashion.

Starting from completely hard tap water (28 DH), distilled and demineralized water was gradually substituted over a period of four or five months. The fish were well fed two or three times daily with live or frozen brine shrimp and later raw frozen beef heart, although it was a month or more before they would accept the latter. After the first few weeks, tubifex worms were rarely given. Large daphniids were relished.

In the few weeks prior to spawning, a piece of slate was leaned against one end of the tank. The fish had not improved much on their original size of about four-and- a-half inches, but were in fine color. The male was bold and a complete glutton; the female was far shyer and ate "sensibly." Soon after the slate was introduced, she began to clean it and other objects in the tank. She then attempted to "kiss" the male. He responded half-heartedly at first, but when she became more vigorous, it became clear that the male's education was sadly deficient in the fishy facts of life. He mistook her actions for those of battle, and losing his color and his nerve completely, fled to the planted corners of the tank.

After a week of this display of cowardice, the female (and I) lost hope. She stopped chasing the male and for

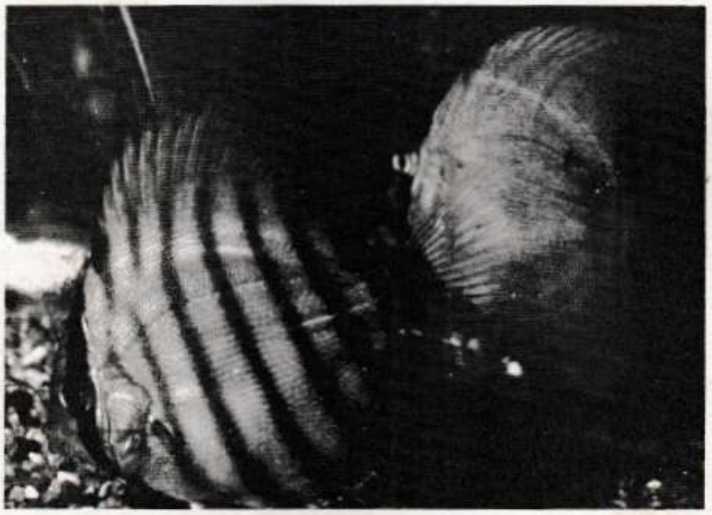


Photo: Fourteen-week-old discus showing broken third bar anomaly. Note striped phase, while young discus in background exhibits the "pale" (unstriped) phase.

*See White (1964).

several days things returned to normal. The male recovered his previous arrogance and color.

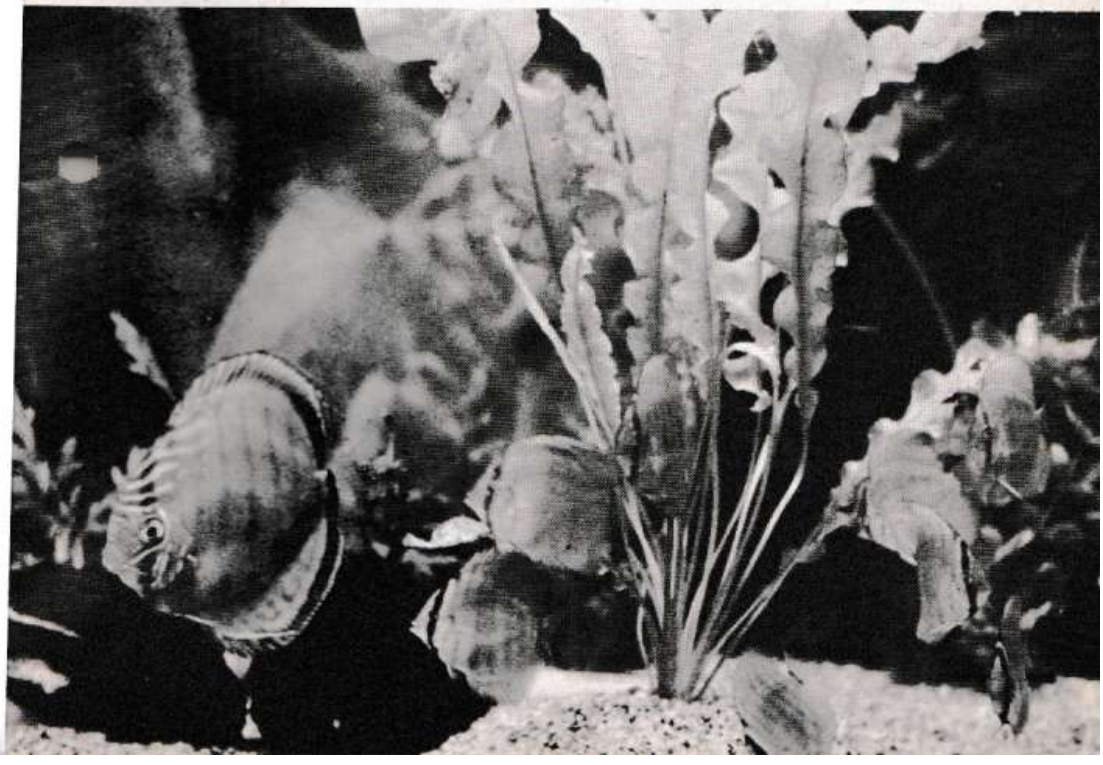
The fish now began to behave somewhat differently towards each other. They would display with a peculiar body lashing movement sideways, to one another, and then "kiss", rather coyly and nervously, with the male always the more nervous, while the female appeared to try to encourage him by being more gentle. Both fish began to chase the three cardinal tetras and two catfishes which shared their tank.

A day before the spawning, the most characteristic of the courtship displays occurred. This was a simultaneous charge by both fishes at one another. At the last possible moment they would swerve slightly to miss each other and end the charge in a heads-down position of about 45° to horizontal, their bodies exactly parallel to one another. Many repetitions of this heads-down charge interspersed with head-jerking (see Wagner, 1958 and Schmidt, 1962), cleaning and chasing the other fishes finally culminated in the spawning at 5 p.m. on April 17. At that time the parents were about five inches in total length and had been under my care for roughly six months.

About two hundred red-brown eggs were deposited on the underside of the slate in the standard manner described by many authors, e.g. Wagner (1958). A thick spawning tube was obvious on the female, but only the barest trace of a thin point protruded from the male's vent. Temperature was 84° F, pH 6.7 DH 6 (latter two tested with Miracle kit). The tank had been "vacuumed" and three gallons of distilled water had been added the previous day. During spawning, the Gro-Lux light was on, and diffused sunlight was entering the green-painted back of the aquarium.

At this point let us review the essentials thus far. The courtship procedure in discus appears to be a highly variable

Photo: Female with some of the brood at the age of fourteen weeks.



and individual affair. The important requisite as far as the aquarist is concerned, is "fish sense": the ability, for example, to tell a battle-to-the-end from a plain domestic battle. Other requisites are water of less than 10 DH, heavy feeding (without allowing overeating) of brine shrimp, beef heart and daphnia (or other fresh or live foods), and a temperature above 80° F. In my experience, and that of some other breeders, pH is not very important. A reasonably quiet location is helpful, and it is essential to have the discus conditioned to human beings. Discus are sensitive to disturbance partly because they are intelligent – for fish, that is. They also are very sensitive to vibrations. On the other hand, their intelligence makes them relatively easy to tame – the writer's pair spawned quite happily in his living room, once they got used to the constant human activity.

Once spawning was over, the female guarded the eggs carefully, moving every few minutes to fan them vigorously as described by Wagner (1958). The male continued making spawning runs over the eggs for at least ten minutes after the last batch was laid.

In the ensuing three days, the male was occasionally allowed to take over guard duty while the female ate or exercised herself by chasing the catfish (other fishes having been removed when spawning started). However, he seemed rather clumsy at this job, and when the female was guarding or mouthing the eggs, he would frequently get in the way in his eagerness to share the duties of parenthood, being then firmly nudged out of the way again by mama.

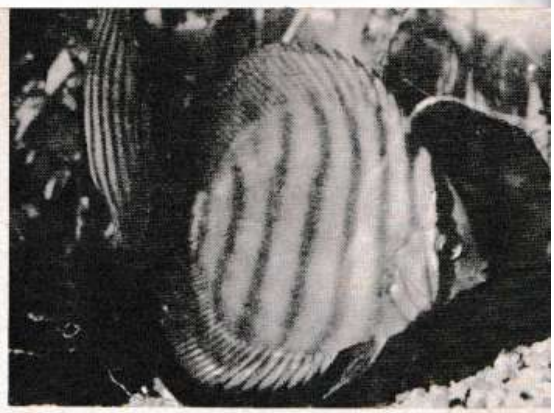
On April 20 the eggs hatched, mostly with vigorous help from the female. All white eggs had been carefully removed by the parents as soon as noticed, and it seemed that some good eggs were lost with them. The newly-hatched fry were

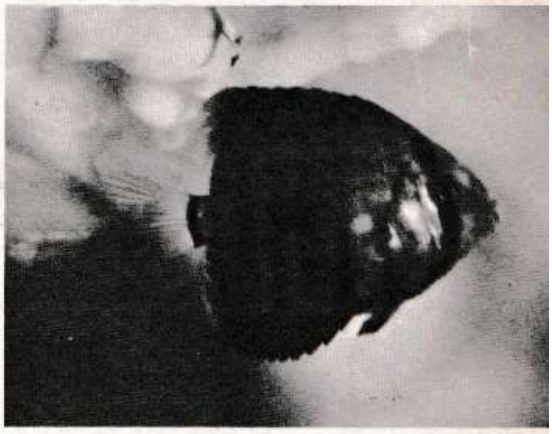
Photos: (Upper left) Fry at 35 days. **(Upper right):** Parent guarding eggs. **(Lower left)** Barely discernible is a parent with babies, five days old. **(Lower right)** Fry at 10 weeks.

removed to the top of the slate, where an estimate of their numbers revealed that I had become the proud foster-father of about a hundred discus fry.

For the next three days the parents tended the young much as they had the eggs, except that, no fanning took place. Among specific behavioral patterns observed at this time was the "yellow-nose" pattern noted by Wagner (1958) and certain others as well. In this phase, the fish (usually the female) would assume a very dark body color while the area of the head anterior to the first bar (the eye-stripe) turned a pale "putty" yellow. This occurred only when actually mouthing the fry. It was also noticed that the off-duty parent was usually lighter in color than the guarding parent. Possibly changeover seemed to be based on the arrival of the free parent at the nursery, the guarding parent then simply swimming away from the site. The female still assumed the major share of duty, however. On rare occasions both parents would desert the nursery for periods up to a minute in order to feed. The male continued to show a comically human ineptness (like the classical proud father) in caring for the babies. He would "spit" them out too forcefully with the result that half the nursery would become detached, and he would become more and more frantic in his efforts to replace the fry. Fortunately the female would always be on hand to calmly and efficiently save the situation by sticking the babies to the slate in a compact little bunch.

After being moved each night to a fresh location on the slate, the fry became free-swimming on the 23rd. It was amazing to watch them dropping off their anchorage and zeroing in straight and true on their first spasmodic swims to whichever parent was nearest. By mid-afternoon all were free-swimming, and were swimming in a cloud about the guardian parent, although it did not





Photos: (Top) Four-month-old "teenagers," one of the broken bar mutants. **(Middle)** The brood swimming briskly past the camera at the age of 28 days (four weeks). **(Lower)** Six-week-old discus baby, closeup photograph.

appear that they were actually obtaining food. The parents were excitedly "changing guard" every few minutes. This elaborate maneuver has been well described by Wagner (1958), and many excellent photographs (e.g. in Vorderwinkler, 1957) depict it well.

For the first two nights after the fry became free-swimming, the parents tried to put them to bed as before. Wagner observed the same phenomenon. In order to simulate natural conditions and not panic the parents by a sudden "sunset," the lights in the room were switched off one by one over a period of about 15 minutes, starting with the aquarium light. As soon as this procedure was started, the free parent would approach the other, suck in the fry a few at a time, and try to stick them to a piece of the slate. Some would stay stuck, but the majority would promptly zoom back to the parents. As it got darker and darker, the parents would redouble their efforts in picking babies off one another and bedding them down. The fry on the other hand resented this and soon learned to take violent evasive action. During the ensuing desperate maneuvers it is not unlikely that some of the fry were inadvertently swallowed. Fortunately for my peace of mind (and possibly that of the parents), night could fall in record time – and did! And by the third night the parents gave up their attempts anyway.

At this stage the numbers had dwindled to about fifty. The babies grew at an amazing rate, and several interesting facts were noted. One of the most interesting adaptations of the young to their strange existence was the downward direction of the mouth during early life. While still very weak, the fry attached themselves more or less parallel to, or in other words lying flat on, the body surface of the parent. The ventrally directed mouth made it possible for them to feed in this position. As they grew and became stronger, the relative position of the mouth became more terminal (as in grown discus) and the fry could feed with their body perpendicular to the parent's side.

Another interesting observation was that the young appeared ultra-sensitive to vibrations. It seems this may be significant in parent-offspring commmunication as evidenced by the following observations: When the parents saw an unfamiliar object or person approaching the aquarium, they would respond with the head-jerking display as witnessed by Wagner (1958), Schmidt (1962) and others. If the fry happened to be spread out looking for food (as was usually the case after the first week), they immediately responded by rushing over to the jerking parent and hovering around it in a tight, apprehensive bunch. It is impossible to rule out the possibility of a purely visual response, but it seemed to the writer to be often non-visual. The implication here is of course that the fry were signalled by vibrations generated by the head-jerking. This explanation at present is pure conjecture, but the fact remains that the head-jerking is an important signalling device in the discus.

For the growing babies, the male proved the better parent, paralleling once again the observations of Wagner (*op. cit.*). The female appeared to get rapidly irritated by the busy nibbling of the fry, and would shake them off after a short period of feeding.

The following account summarizes the developmental highlights of the fry:

In the first few days the head and eye developed particularly fast. The head had a distinct bulldog appearance, probably because of the previously mentioned mouth positioning. The eyes were a striking light copper color. By ten days after hatching, the vertical grey barring was well developed, and a conspicuous feature of the fry was its black mouth. Average length was 3/8 of an inch, and the babies were already markedly flattened laterally. Newly-hatched brine shrimp was successfully introduced into their diet at nine days, but most of their waking hours were spent in feeding off the parents.

At 18 days average size was about 5/8 of an inch. Fry were left with the parents to observe "natural" reactions. They still fed vigorously off the parents, but at this point the male died of digestive troubles. However, the fry were now taking *Bosmina* (a relative of daphnia), cyclops and other small crustaceans as well as newly-hatched brine shrimp and continued uninterrupted growth. The anal and dorsal fins had developed their typical brick-reddish color and showed faint traces of dark-light patterning. The intense dark eye and tail bars were quite clear. Ventral fins were blackish.

The female was often sorely irritated by the almost vicious nibbling of the babies. By 21 days, however, none were feeding off their mother. Accordingly half were transferred to another tank to avoid crowding.

By four weeks, the fry were about an inch long – comparing very favorably with other records. The black mouth area had lightened considerably. The eyes were red. Feeding on young daphnia, *Bosmina*, cyclops and occasionally tubifex was continued 6-8 times daily.

At five weeks adult live brine shrimp were introduced into the diet. Possibly as a result of this, or of a concurrent slight chilling, three fry succumbed to digestive troubles.

By six weeks, the babies averaged 1¼ inches in total length.

By eight weeks, green iridescence was faintly visible on the spiny part of the anal fin, and growth in length had slowed down considerably. At ten weeks, the largest fish were just two inches long.

(To Be Continued)

CLUB NEWS

Florida Skin Divers Association, Inc.

The Eighth Annual Southern Open Skindiving Derby was recently held at Marathon, Florida, in the Florida Keys. Contestants from over the U. S. and Canada competed in such events as underwater photography, tropical fish collecting, treasure hunt and spearfishing, according to Andrew Torony, derby manager.

★ IDEAS ★
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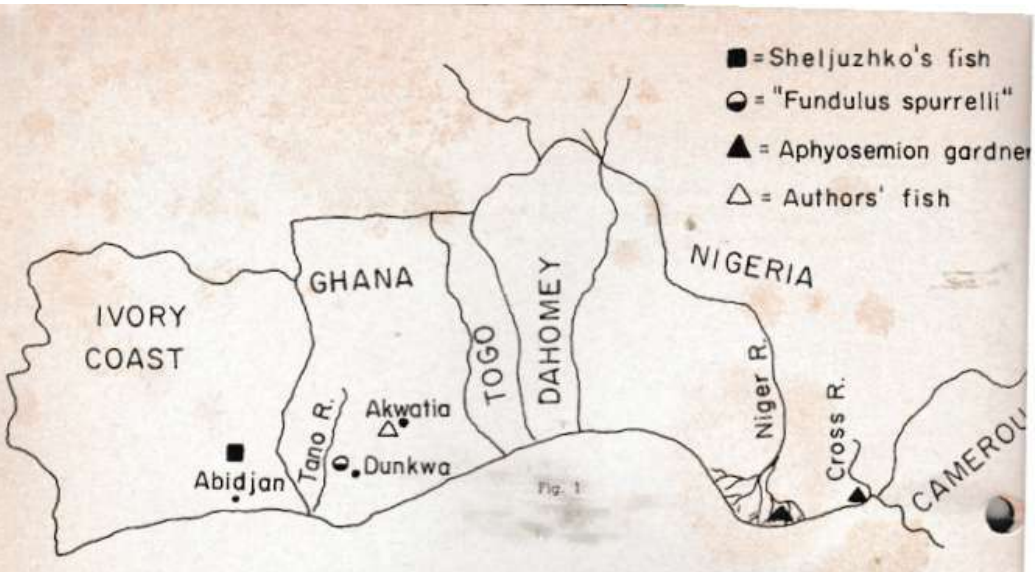
Showpiece Plant

Those aquarists who want to grow a "showpiece" plant might want to try this. In a three-gallon tank, away from a window, place one or more water sprite or fern plants. Place a chill-breaker heater that usually uses a 6 watt bulb, close to the plant or plants. When large the plants can be transferred to bigger aquaria. They have a wonderfully green color and show little deterioration. When first re-rooting plants, a little rockwork may be necessary to hold them down. – *Wilbur L. Hanford, New Britain, Connecticut.*



An exciting new fish for aquarists — especially all of you killifish fans!

Aphyosemion spurrelli

Albert J. Klee and Bruce J. Turner

SOME fifty-one years ago, the great Anglo-Belgian ichthyologist George Albert Boulenger, described *"Fundulus spurrelli"* from fish specimens collected by Dr. H. Spurrell near the Tano River in what was then the Gold Coast, a British colony on the Guinea coast of Africa and what is now the independent state of Ghana. The Tano River itself is situated near the border between Ghana and the Ivory Coast (see figure 1). The exact location of the new fish was given as, "Vicinity of Bibianaha, near Dunkwa, between the watersheds of the Tano and Ankobra Rivers." Dr. Boulenger described the coloration of these specimens as follows:

"Male pale yellowish-green with numerous narrow, often paired, vertical bars of dark carmine; sides of head metallic green, variegated with carmine; gular (branchiostegel) region of a dark rich blue; pectoral fins whitish with an oblique crimson streak, ventral with red tip; vertical fins grey, dotted with carmine and broadly edged with yellow or orange, the yellowish bands occupying the upper and lower fourth of the caudal. Female paler, more translucent, at times pinkish; fins white, dorsal and anal dotted with carmine."

From this vivid description, we surmise that it was based upon live specimens, perhaps the field notes of Dr. Spurrell.

From the placement of dorsal vis a vis anal fin, there is no doubt that *Aphyo-*

Figure 1. Geographic location of **Aphyosemion spurrelli**, as sketched by Albert J. Klee.

Figure 4. Aphyosemion spurrelli. female. Photos by Albert J. Klee, unless otherwise credited.

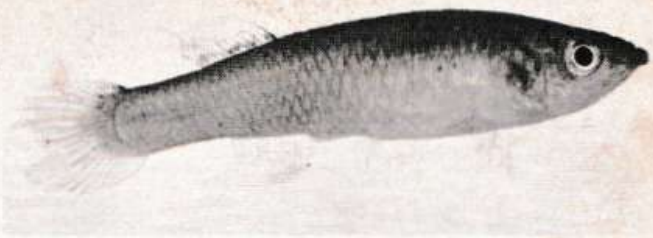


Fig. 4

semion spurrelli is a member of the *Fundulopanchax* subgenus of *Aphyosemion*. In his description, Boulenger briefly remarked, "Allied to *F. gardneri*." *Aphyosemion gardneri*, although similar in fin and scale counts, was described from the headwaters of the Cross River System, east of the Niger Delta. Additional specimens were also collected from the eastern Niger Delta, some 600 miles away (see figure 1).

There is no conclusive evidence that *Aphyosemion spurrelli* was ever kept in aquaria prior to the early part of the last decade (there are no ichthyological records of it since its description). In 1953, Prof. Sheljuzhko sent to Herr A. Werner of Munich, Germany, an *Aphyosemion* species which he collected some 40 miles north of Abidijan, Ivory Coast (a photograph of this fish is shown in figure 2). These specimens were identified by H. Meinken as "*Aphyosemion gardneri*" that same year. However, in his review of several Guinean *Aphyosemion* species, Col. J. J. Scheel (see reference) called attention to the fact that Sheljuzhko's fish were found only 75 miles away from the type locality of *spurrelli* and suggests that the fish in question is better identified as that species. In this we quite agree with Col. Scheel. The existence of the "Togo-Dahomey Gap" in the west coast rainforest, which acts as a natural barrier, further supports this conclusion.

In 1956, the authors received a fish identical to Sheljuzhko's *Aphyosemion* but it lacked the vivid yellow and orange noted in Boulenger's original description. It was referred to at that time as "*Aphyosemion gardneri*" but we are certain now that this was *A. spurrelli*. Not being a particularly brilliant strain, the fish quickly passed from the scene.

In the summer of 1963, we received a shipment of live fishes from our

Figure 3. Aphyosemion spurrelli. male.

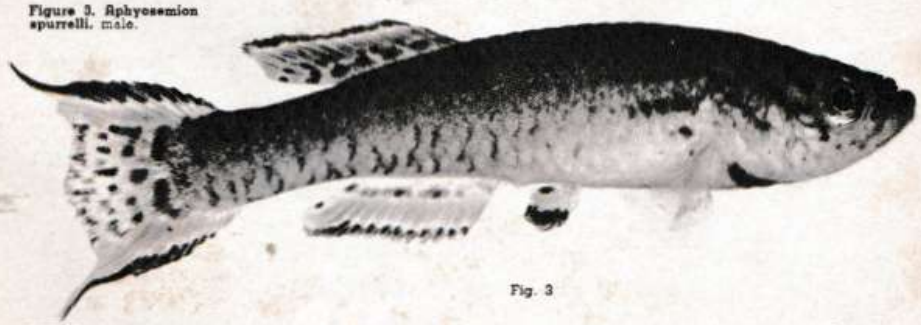


Fig. 3

friend Mr. T. Stuart McClure of Akwatia, Ghana. The shipment included several species of killifishes collected near that area, viz., *Epiplatys sheljuzhkoi*, *Micropanchax normani* (= *M. gambiensis*) and what appeared to be a brand-new *Aphyosemion*. Our fin and scale counts on 10 specimens are compared with Boulenger's data for both *spurrelli* and *gardneri* in Table I.

TABLE I
FIN AND SCALE COUNTS ON 3 APHYOSEMIONS

	dorsal	anal	lateral scales	transverse scales
A. gardneri	12-13	14-16	28-32	22-25
A. spurrelli	13-14	15-16	29-31	24-25
Our specimens	12-14	14-16	28-31	24-25

The coloration of our fishes is as follows:

Males (see figure 3): Sides bluish-violet, ventrum light-brown, dorsum brown; reddish to maroon markings on entire body, most numerous in predorsal regions; edges of gill covers and adjoining throat region a deep maroon; typical "wormlike" markings in red or maroon on head and gill covers. Pectoral fins yellowish, reddish submargin areas lighter. All fins clear to yellowish with some spots occasionally on dorsum; red markings on gill covers. Eye pale green.

Fig. 6

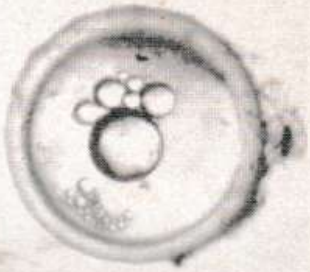
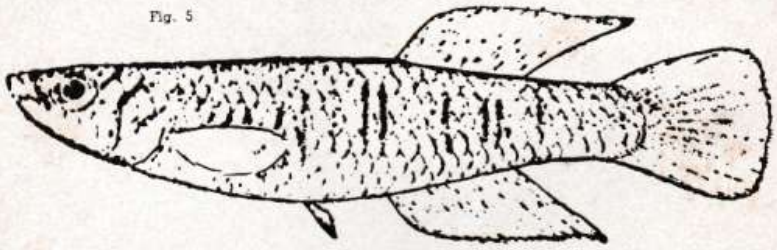


Figure 6. Newly-laid egg of **Aphyosemion spurrelli.**

The coloration and geographical origin of our specimens lead us to conclude that our fish is properly identified as *Aphyosemion spurrelli*. In this, Dr. Stenholt Clausen and Col. Scheel concur with us. Whether *A. spurrelli* is a synonym for *A. gardneri*, is a matter to

Fig. 5



and bright blue edge; ventrals yellowish, red submargin and blue edge; dorsal yellowish and covered with red spots, edged in yellow-to-yellow-green, submarginal band of red; anal bluish-white at base, yellow-green otherwise with red edge and covered with rows of red spots; caudal fin edged in red both upper and lower lobes, broad submarginal areas of yellow, middle of fin clear to bluish with red to maroon spots. Eye light blue.

Females (see figure 4): Sides brownish with suggestion of violet, ventral

be decided by qualified ichthyologists. There is a current divergence of opinion on this matter among specialists, however. Some take the view that *spurrelli* and *gardneri* are identical, while others take the view that *filamentosum* and *gardneri* are identical. Since *spurrelli* in no way resembles *filamentosum*, this is a rare state of affairs indeed! The problem is, of course, that we know practically nothing about *gardneri*. In counts and pattern it seems to have

Figure 5. From Boulenger's original drawing of **Aphyosemion spurrelli.**

affinities with *spurrelli*, and in geography it appears to relate to *filamentosum*. Presently, we prefer to consider *A. arnoldi*, *A. filamentosum and A. spurrelli* as species that can be identified as having been kept by aquarists, and to consider the case for *A. gardneri* as "not proven."

It will be noted that Boulenger's drawing (see figure 5) and Sheljuzhko's fish do not indicate extended filaments on the upper and lower lobes of the tailfin. Our imported specimens also had shortened lobes but our tank-raised stock produced very nice filaments indeed. We have noted three basic color varieties in our stock of *A. spurrelli*. The edging to the unpaired fins may be white (rare), yellow or orange. Occasionally, fins may be found that have yellow-edged dorsal and anal fins with a caudal edged in orange, or vice versa. White has been, so far, always noted alone. This chromatic polymorphism is common among *Aphyosemion* species. The white versus yellow dichotomy can be observed in *A. nigerianum* and *A. christyi*, to name a few. Col. Scheel has studied this variability extensively and has found it to be typically Mendelian in nature.

McClure informs us that our *A. spurrelli* were found in a small roadside stream with slowly flowing water, little vegetation and at a temperature of about 77° F. *Epiplatys sheljuzhkoi* and several young examples of an *Alestes* species with a red adipose fin, were also to be found in the same waters. The bottom was mixed mud and gravel with a few water plants and much organic matter, most of it filamentous in nature.

A. spurrelli can be kept and bred in aquaria following the more or less standardized techniques for the genus already developed by aquarists. There is no need to further elaborate in detail on these techniques here. Specifically, however, it can be handled as per *A. nigerianum*. *A spurrelli* tends to deposit most of its eggs in the lower levels of the aquarium. This, however, is of little importance to the aquarist as modern breeding techniques, which emphasize small aquaria and nylon mops, tend to minimize the differences between plant spawning and soil spawning *Aphyosemion* species. The authors have spawned the species on both floating and bottom mops, and in peat.

The eggs, which are clear and measure 1.4 mm in diameter (see figure 6), can be dried in the manner of *A. filamentosum* but drying does not increase

Figure 2. Sheljuzhko's killie from the Ivory Coast. Photo by Dr. W. Foersch.

the hatching percentage and is unnecessary. If kept in water, most of the eggs hatch within a period of five to six weeks; there are few "resting eggs." Drying seems to prolong the incubation period, and incubation times of 45 to 60 days were found to be advisable in our experiences. The fry can eat newly-hatched *Artemia* upon hatching, and they grow at the same rate as *A. nigerianum* fry. The sexes can first be noted after four to six weeks, and sexual maturity is reached about a month after.

The species lives for well over a year in aquaria and continually spawns for most of this time. Isolated specimens reach spectacular heights of beauty and size (average size 3 inches for males, 2¼ inches for females). As with many other species of *Aphyosemion*, fry can often be noted in aquaria containing a small number of adults; these are not harmed and can reach maturity in the same aquarium. In the aquarium, *A. spurrelli* reminds one of a smaller and less pugnacious version of the blue gularis, and has much of the "personality" of that species. The authors are happy to introduce the species, and recommend it highly. ◄

ACKOWLEDGMENTS

The authors would like to thank Mr. T. Stuart McClure for sending to the U.S. our original breeding stock of A. spurrelli, *and Dr. Stenholt Clausen and Col. J. J. Scheel for their help in its identification. Finally, we once again acknowledge our debt to our good friend John L. Gonzales of Philadelphia, Pa., surely one of the most accomplished killifish breeders in the world for his assistance in cataloging variations and making helpful suggestions re our notes on this species.*

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CLUB NEWS

Greater Pittsburgh Aquarium Society

The G.P.A.S. held its Eighteenth Annual Tropical Fish Show Sept. 27 thru Oct. 11, at the Buhl Planetarium, Pittsburgh, Penna., according to Henry Marzina, president of the group. Further information regarding the show may be had from L. A. Woefel, show chairman, 1136 South Side Ave., Pittsburgh, Penna.

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Shrimp Net

When we began raising fish as a hobby we were told that baby brine shrimp were excellent food for fry. We had several wonderful hatches but had quite a problem removing the shrimp for feeding. We were just one big wet mess of siphon hoses and cloth until we hit upon the idea of sewing a piece of fine mesh nylon onto an old net frame and using a syringe such as is available at hardware stores for filling batteries for automobiles. We just fill the syringe with water from below the surface and squirt it into the net. The water runs through leaving the shrimp which can be washed and fed from the net. There are no shrimp lost and the salt water stays where it belongs, not all over everything because of an uncontrollable siphon hose. We are sure others have thought of similar methods, but for those who haven't perhaps this will be a help. — *Mrs. H. L. Hamilton, Altoona, Pennsylvania* ◄

Discovered in 1955 in Western Nigeria
and first brought to Denmark in 1957

Aphyosemion nigerianum

Joergen Scheel
Copenhagen, Denmark

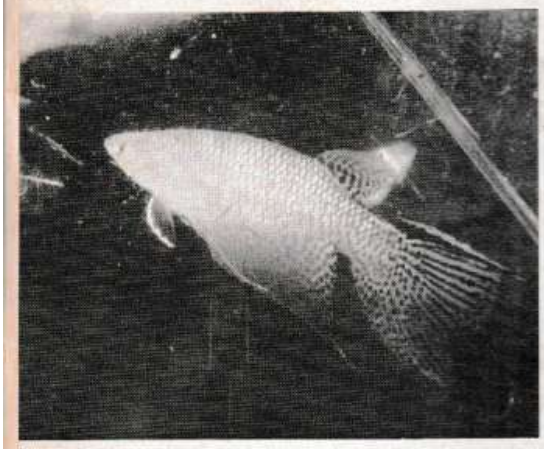
PART III

ONE may ask why is it so that within certain populations of *Aphyosemion nigerianum* there are two rather different-looking forms of the male. Perhaps we might answer this question in the following manner. Yellow males are conspicuous indeed. Their glaring appearance makes them rather easy to spot should females want him for spawning. However, he is also easily seen by animals of prey looking for some good food. There are reasons to believe that such males possess some advantage in the reproduction of the population but also that these advantages are counteracted by a higher degree of vulnerability to animals of prey. If within a given population, the stress from birds and fishes of prey increases, it might be that the percentage of yellow males is reduced and that blue males become more numerous. It might even be that the yellow males may be eliminated from that population. However, as the yellow form is not dominant (genetically), it would be very difficult to eliminate from future populations as many females and also some of the blue males, possess hidden genes for yellow. The presence of the dominant blue male thus acts as a "buffer" when predatory systems increase their pressure on the population. If this surmise is correct, the presence of the two forms of *A. nigerianum* within certain populations of this species, may cast some light on the evolution of the male type within *Aphyosemion*.

Within *A. nigerianum*, the reduction of the yellow coloration on fin edges is a complete one, i.e., yellow fin edges or no yellow fin edges. Within *A. cinnamoneum*, the yellow coloration of the dorsal fin is reduced. With Roloff's 1962 stocks of *A. roloffi* from Sierra Leone, and also with the well-known *A. calabaricum*, there is no yellow color in the dorsal or the anal fin. The caudal fin may show yellow coloration on the upper and the lower edges, or on the lower edge only, or no yellow color at all (e.g., *Aphyosemion roloffi gervi* Lambert). In *A. cognatum*, the reduction is effected by the increased number of red dots on all fins. Some reduction or contrast is also produced when there is no separation (red) line in the fins.

The development of body and fins is seen in the photos. In *A. nigerianum*, the upper and lower rays of the caudal fin do not form long filaments, and only short lobes are seen on males from the known populations. The rays of the dorsal and anal fins are somewhat produced beyond the fin membrane. These short hooks probably are used to obtain a firm hold of the female during spawnings as both fins clasp the female (or better to say "try to . . ."), as is usual in *Aphyosemion* and *Nothobranchius*. However, in *Aphyosemion* these fins usually are too short to obtain a truly firm grasp. Also, in *A. nigerianum* there is no conspicuous prolongation of any of the pectoral finrays which are used by males (e.g., *coeruleum*, *filamentosum*, etc.) to hold the female when the male is approaching her back.

(Continued on Page 610)



Photos: (Top) Miles Playhouse in Santa Monica that housed the combined show. The city also donated the use of the building for the show and a large recreation room there for the buffet luncheon. **(Middle)** Winner of the Best in Show award in the killie division, a **Pterolebius zonatus. (Lower)** Cold buffet luncheon was served exhibitors and guests.

FINNY FOLKS

By Diane Schofield

Do you ever find yourself about to leap upon your clothesline and skip along it blithely? After attending a circus and watching some of the performers, who make the whole thing seem easy, it seems almost that this would be no feat at all. It is a paradox that many of the more difficult things of life are made to seem easy by the skill of the people that set examples. This paradox certainly was evident at a recent show-convention-auction that was held in Santa Monica, California. It would appear that few events have been carried off with less squeaking of the wheels or grinding of gears – in short it was a well organized, coordinated effort with excellent results.

Many factors worked against this achievement. First, this was an endeavor carried out in virgin territory. Never in the history of aquarium shows in Southern California had there been a show without the "crutch" of another exhibition that more or less took the fish exhibition under its wing. Shows in the past have been held with fairs, hobby shows, home shows, flower shows and one wild year, tanks were crouching between hobby horses and dolls in a toy show.

Another thing that might have worked against this show was the fact that the Los Angeles Aquarium Society had a bare two months to prepare for it when invited by the American Killifish Association to co-sponsor such an exhibition. Incidentally, this made it another unusual undertaking, since, to my knowledge, it was one of the few times that two aquarium organizations "co-hosted" such an event. Yet these two clubs linked arms and put on a series of events over one weekend that gave

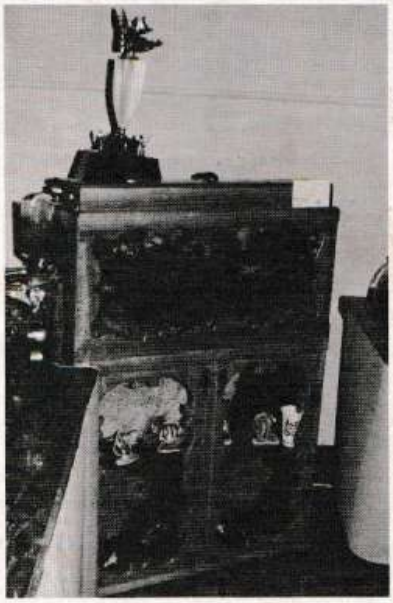
the impression that heads had been put together for at least a year to produce the end result.

The chairman in charge of the AKA portion of the show was Peter Tirbak. Messy details, irritating questions, and last minute changes do not ruffle his calm exterior in the least. Working with Mr. Tirbak were Don Lund, who handled the financial details, and Ed Bishoff, who rounded out this efficiency team.

The man at the helm of the Los Angeles Aquarium Society part of the show was a member of their board of directors and specialist in rare fishes, Trenton Fewkes. With one hand tied behind him (which makes it especially difficult when setting up a tank) he not only guided this portion of the exhibition, but also managed to put in a "rare fish community tank" of his own and win a first trophy with it.

There were 44 entries from the members of the Los Angeles Aquarium Society and 82 entries from the AKA. These latter entries included over 50 different species of killies, with 60% coming from local members and the remainder being sent in from outside the area. This show was an "open" show — so "open," as a matter of fact, that Glenn Henderson, president of the Pomona Valley Aquarium Society, won the Sweepstakes. Mr. Henderson holds no allegiance with either the AKA *or* the LAAS!

The "kick-off" for the three gala days, that was the combined Third Annual AKA Convention and First Annual Show of the LAAS (their last show was held in 1954) was an open house to welcome



the visiting "piscophiles". This was followed on the next day by a tour of Marineland of the Pacific that ended in a "happy hour" and banquet in the

Photos: (Above) Sweepstakes winner of the show, a fruitwood framing of the tank in French provincial. It belongs to Glenn Henderson, president of the Pomona Valley Aquarium Society. **(Below)** Tanks belonging to the LAAS were arranged in a U-shape in the middle, while killies occupied gallon drum bowls against the wall.



neighboring Marineland Restaurant. No more appropriate spot could have been picked for this cocktail camaraderie, as the central portion of the bar is paved with aquariums that face, in turn, other large tanks that are placed here and there on the walls to spark up the decor.

After an hour of fishy talk cadenced by the clinking of ice cubes, everybody trooped into the luxurious Penguin Room for the dinner itself. It would seem to stress the obvious to mention what the entree was – even a little disloyal somehow when you've lived so close to the things over a period of time. We all ate fish.

There may have been dessert, but because of the real "dessert", the program that followed, I hardly remember. First a welcome by Dr. William Dewhurst, president of the Los Angeles Aquarium Society (and breaths a club that *doesn't* need a psychiatrist as its president?) that was echoed by the Chairman of the American Killifish Association, Al Markis. Mr. Markis then, in turn, gave way to Gene Wolfsheimer. Everytime that I see any of Gene's sildes, I fully expect to get splashed. They have a degree of realism about them that is seldom equaled in fish photography. Gene's subject matter was "Miniature Fishes of the World". Not a few of these "miniatures" were killifish to pacify and make happy the faces of the AKA members present. Gene opined that "Killies are easy to spawn. I've spawned 75% of all killies I've ever kept". Then he added ruefully, "I only wish that some of the characins were *half* that easy!" [*Editor's note: Oh, how true!*]

Next behind the projector was Al Klee, who obviously is a man of great personal courage, judging by his series of "almost-steps into the afterworld" on his recent trip down into Peru on a fish round-up. Five of the people who accompanied him were AKA members and another was converted later by threatening to dump him into the Caribbean. This odyssey was undertaken in an arthritic 20-year-old B-25, which developed a case of the pip in its left motor before they ever got to Panama. Al said, "We didn't really worry too

Photos: (Above, L to R) Gene Wolfsheimer showing slides. Richard Haas doing his stint as auctioneer. Dr. William Dewhurst, president of the LAAS. **(Below, L to R)** Don Lund, treasurer of the LAAS. Ed and Jo Bishoff, he was co-chairman of show. Al Markis, chairman of the AKA.




much about the plane in the beginning until our pilot changed to bright orange coveralls in New Orleans. He said that they'd be easier to spot in the water." After feathering an engine, making numerous passes over a stone-age landing field in Colon, Panama, with finally a top altitude that the plane could make of only 200 feet, Al said that once on the ground they visited an air force survival school. "Oddly enough", he remarked wryly, "we all had developed an unusual interest in survival." Although not exactly skipping, leaping, and jumping up and down with glee, the crew members and fish hunters did crawl back into the protesting innards of Old Betsy, once she had been repaired, and off into the wild blue yonder again. It was pretty wild up there for awhile, because she couldn't make better than 17,000 feet in altitude and some of the peaks of the Andes, through which they had to fly, reach a height of 22,835 feet. This aerial obstacle course was successfully passed and ultimately they managed to come back with a great many fishes, as well as other fauna. Among the fishes were two brand new species of *Apistogramma* and one of the largest collections of preserved fish ever brought back from this area of South America. This collection is, incidentally, now residing in Tulane University. Another of the reasons for Al Klee visiting the native rivers of many of our familiar aquarium fishes was to test the water. Speaking of the extreme turbidity of most of it, he laughed, "An ideal community tank or aquarium beautiful is supposed to be that which most closely apes nature. This will be easy for me from now on. All I'll have to do is dump a bucket of mud into it!" In closing, this foremost authority on killifish threw an egg in the fan by saying, "Frankly, my favorite fish are cichlids!"

Allowing the AKA-LAAS members to recuperate, the next event wasn't scheduled until the following day at 1:30 p.m. when the wives had their innings. They prepared a luscious cold buffet that was finished off by 2 large cakes. One bore the likeness of an angel for the LAAS members and the other a blue gularis for the AKAers. The professional

Photos: (Above, L to R) Trenton Fewkes, LAAS show chairman. Dr. Sylvan Cohen, member LAAS board, has done much research in fish diseases. Mabel Ervin who exhibited two pair of spawning Metynnis. **(Below, L to R)** Albert J. Klee telling of his hair-raising experiences en route to Peru. Peter Tubak, AKA show chairman. Mel Boyle, editor of the LAAS Bulletin.



baker was obviously more familiar with angels than blue gularis. The one that they drew on the cake looked as if he had lived a colorful life and died happy anyway.

Al Klee was back in the saddle again after lunch with an excellent dissertation on the 46 genera of killifishes, although he remarked that even probably as he was talking, some of them were being changed.

One of the requirements of entering this show was that all killies were to be auctioned, so before even the last of Al Klee's words had drifted out into the ether, the auction sale began. Dick Haas, who co-judged the killies with Mr. Klee, did the now-what-am-I-bid-for-this-beautiful-fish? stint. The best of show in the killifish department, a pair of magnificent *Pterolebius zonatus*, which had been swimming in the wilds of Venezuela until recently caught by Leo Hoigne, went for a top of $18. They went to a little Japanese woman whom nobody from either organization had ever seen before, which all goes to show that you can't sell small Japanese women short. Not when it comes to skimming off the cream of killifishes, anyway.

• • •

Where will it all end? – could well be the cry of the American Killish Association. This very much "alive" group is gathering speed with each passing year. The end of their first year saw them with 200 members; the second, with 350; and now, nearing the end of their third year, they have almost 600 members. These killifish coveters are spread throughout the world, according to Al Markis, the young dashing chairman of the AKA. Although Illinois is tops with 58 members, California comes chugging right up there with 50. There are only 8 states in which there are no AKA members.

Last year they didn't let the first part of their name limit them anymore. And

★ IDEAS ★

BY HOBBYISTS

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Acclimating Fish

Many fishes have been lost by a sudden change of water, temperature or pH, when being introduced into a different aquarium. Sometimes they are killed by failure to be released from a small container, before being suffocated by lack of oxygen. I use a "hour glass" principle and make this transfer in a manner which permits a slow change of water to equalize temperature and water conditions. Using any fairly deep box-shaped plastic container, drill a small hole somewhere within the bottom two-thirds of the container. This hole should be so small as to permit water to flow from the aquarium into the container over a period of one half to one hour. The container will sink by its own weight, slowly and a heavy container will need a smaller hole than a light one. If desired, a loosely fitted cover may be laid across the top of the container. As the container sinks to the bottom, the cover will come off and the fish will be released without further attention. – *A. L. Hayley, Anchorage, Kentucky* ◄

CLUB NEWS

Tri City Aquarium Society
(Riverside, Calif.)

The Tri-City Aquarium Society held its 3rd Annual Show October 16, 17 and 18, at Riverside Municipal Auditorium. There were all the usual classes for Junior and Senior Hobbyists, plus a Betta and Guppy Division. Miss Kay Ragland judged. For further information contact show chairman: George Donner, 4065 Dell Ave., Riverside, Calif.

although this part still reads "American", the AKA did open their ranks to foreign members. As a result there are AKAers in 21 countries, such as South America, Africa, England, Denmark, Canada, etc., with England having the British lion's share.

One of the South American members is Leo Hoigne, who won Best of Show in the killifish division in the recent AKA-LAAS show. Mr. Hoigne does all of the collecting for the AKA down in this area. He has been responsible for introducing two new species of killies – *Austrofundulus transilus* and the recent trophy winning *Pterolebius zonatus*.

It originally took seven men to "mother" the baby that was to become the AKA – Al Klee, Bruce Turner, John Gonzalez, Charles Glut, Bernie Halverson, Bob Criger and George Maier. They breathed life into it until now it is, at three years, a healthy stocky "brain child".

There are few better bargains than that which an aquarist can get for a $5 membership in the AKA. He gets (1) The "Monthly Newsletter" (2) "The quarterly "Journal of the AKA", a "slick" magazine in more ways than one. (3) A booklet with such excellent instruction on how to pack and mail fish and eggs all over the world that it has been accepted as scientific reference material by various institutions. (4) A Roster of Members so that one can contact a handy one for exchanging various killifish or perhaps just plain old palavering pisces with him. (5) A member "Want" or "Have" list which contains the names and either surpluses of various eggs or else eggs of a specific fish wanted by that member.

In December, members will also get a brand new book that is written by Mr. Markis called, "Beginner's Guide to Killies" so that none might hesitate to forge into killiland. Underway is also another new project. This will be the only "extra" to AKA members. Each year there will be a number of loose-leaf pages to be added to a folder on killifish. The tab for this will be a puny $1 a year in addition to the regular $5 dues.

The man to contact in order to start this bonanza pouring in your direction is Robert Horton, 1842 25th St., Moline, Illinois. It's an excellent bargain – even if they don't give green stamps. ◄

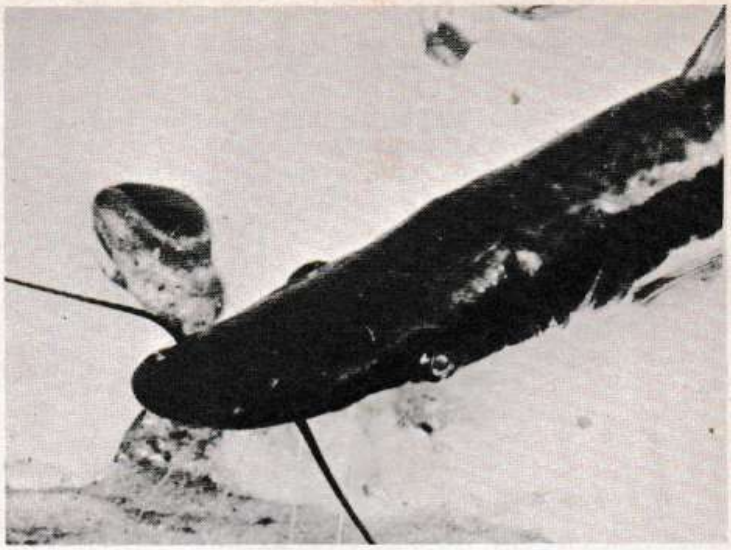
★ IDEAS ★

BY HOBBYISTS

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

Food and Filter

Today I came upon a very convenient way to feed small frozen or live foods. The equipment is an outside filter, the food and, of course, an air supply. There should not be any partitions in the filter that will not let the food pass through, and no filtering material. Put the amount of food that you want fed to the fish into the filter. Turn on the air and the "brine shrimp" are pumped out into the tank at an even rate of speed. You can turn the air on at intervals to let small amounts in at a time. I have found that this works very well for baby frozen and live brine shrimp. – *Mark Olsen, Downers Grove, Illinois.*



The shovel-nose catfish surely lives up to its name — an unusual show-type fish!

Sorubim lima

Braz Walker
Waco, Texas

THE pimelodid catfishes of South America, with their great diversity of shape, size and temperament afford a seemingly endless array of odd and show fishes for the collector who has facilities for keeping some of the larger species. Of the pimelodid catfishes which are frequently available, however, none is more likely to leave a lasting impression on the aquarist and non-aquarist alike, than the shovel-nose catfish *Sorubim lima*.

Although reputed by some authorities to be timid, sluggish and nocturnal, preferring to remain hidden during the daytime, in my experience nothing could be farther from the truth. Although there are a number of species from the Far East belonging to the families Schilbeidae and Siluridae which remain in mid-water in constant motion, this is one of South American catfishes which prefers to remain suspended in the water rather than resting lazily on the bottom. As a matter of fact, if *Sorubim lima* is seen resting on the bottom for more than a short length of time it is usually a good indication that at least a partial change of water is in order, not only for the well being of the fish

Photo: Shovel-nose catfish, **Sorubim lima**, exposing his namesake for the camera of the author.

but for the other members of the tank as well. The unhurried movements of this fish give an impression not of laziness but of unwasted motion and there is a dignity about the creature which is approached by few aquarium fishes.

The shovel-nose catfish's spectacular appearance could not possibly be accurately conveyed by a single photograph. Although his rear two-thirds could be considered somewhat conventional, just in front of the dorsal the head begins to take on a flattened shape and maintains its width almost to the tip of the snout, the end of which is rounded and almost unbelievably thin for its breadth. The mouth is located rather far back on the underside and when viewed from underneath is reminiscent of some of the members of the shark family. There is also something shark-like about the manner of this fish which cannot be described. Perhaps it is its movement. Maxillary barbels are long and thin and give the impression of being stiff. As a matter of fact there is bone in them. In the literature this fish is often illustrated by a drawing rather than a photograph and the wavy appearance of all three pairs of barbels might possibly be due to using a dead or preserved specimen as a model for the drawing, since they do not appear this way in the water.

Although no sex distinctions are recorded I noticed a definite difference in two specimens shortly after they were obtained. The smaller, which was approximately eight or nine inches long at the time, aside from being more slender had a definitely longer and more pointed lower lobe on the caudal fin. The black streak which adorns the side extended completely to the end of this point. The lower caudal lobe of the larger fish was rounded and shorter. Since my specimens are kept in company with some rather "playful" species, the pointed lobe on the smaller fish has since been rounded as in the other. These differences were similarly observed in an aquarium containing about a dozen young specimens. However, in another aquarium containing several specimens there was no noticeable difference.

This is among the least offensive of the larger catfishes and may be safely kept with any fish which cannot be swallowed since it is not in the least quarrelsome with other species. The mouth of the shovel-nose catfish is deceptively large and after it has become acclimated it is a ravenous feeder which

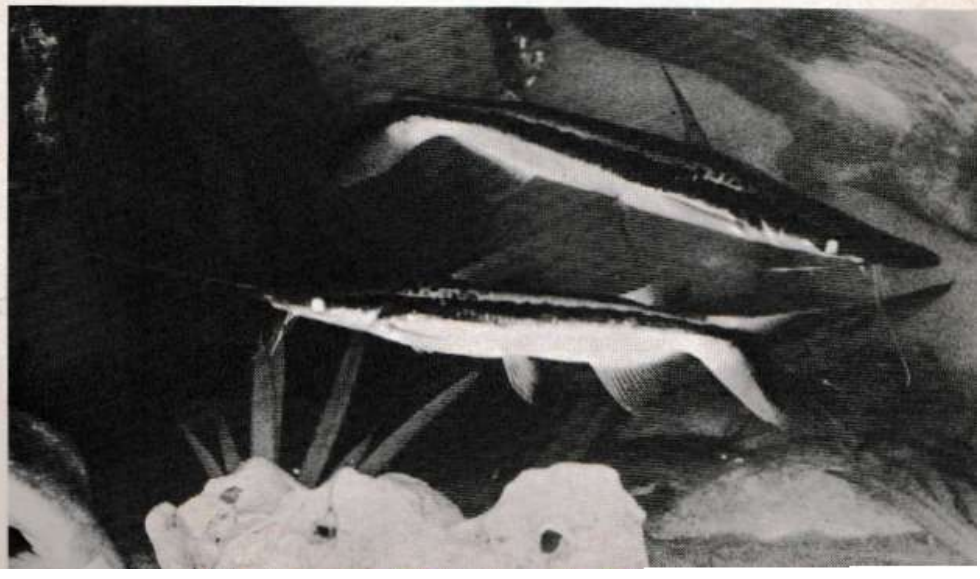


Photo: This illustrates how the shovel-nose catfish swims around the tank rather than lying prone on the bottom. Photo by author.

will accept almost any kind of food, including canned cat food, ground beef heart and dried dog food which has been presoaked. Attempting to satisfy fish of this size with fancy fare such as frozen brine shrimp could be paralleled to feeding a hog caviar.

In my opinion the catfishes are certainly among the most interesting and individualistic of fishes for the aquarium and *Sorubim lima* is no exception. Once considered a "rare" species only possessed by public aquariums and a few lucky individuals, modern transportation methods have made this fish available to the hobby and most of the larger aquarium stores are now able to stock them from time to time. Certainly it is worthy of a place in any collection containing the larger aquarium fishes.

Native to the Amazon, La Plata and Magdalena Rivers of South America, *Sorubim lima*, which is the only member of the genus, is a food fish of some importance and reaches a length of 18 or 20 inches. Its cousin *Pseudoplatystoma fasciatum*, known as the tiger fish, is also a "shovel-nose" but reaches a much greater size and is of more importance as a food fish. The name tiger fish is taken from the striking pattern of vertical bars which adorn the sides of the fish and it is certainly one of the most beautiful of all catfishes. Although importations seem to be rare it is hoped that this most desirable fish too will become more readily available. ◄

★ IDEAS ★

BY HOBBYISTS

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Contact Paper

Would you like your present aquarium to be different, look custom made, match your decor? Well, I have discovered the perfect solution. Cover your aquarium frames with contact paper. It comes in a very wide variety of colors and patterns. I have five aquariums framed with contact paper and they are spectacular. They look like living pictures. Contact paper is inexpensive; yet makes your aquariums look custom made. This won't work if you are constantly dismantling your tanks, and dousing them in the bathtub, of course. But, if you seldom change your set-up, then try it. If you do not like the results, then you can just pull the contact paper off, and no harm is done. This idea is also ideal if you are forever polishing your aquarium frames, for with them covered with contact paper, they don't smudge, or get sloppy looking as easily. This is a blessing when you have small children. — *Mrs. Stella Rico, Los Angeles, Calif.* ◄

CLUB NEWS

Eastern Iowa Aquarium Association

The E. I. A. A. of Iowa City completed its first year of operation this October, according to Dr. William Spector, publicity chairman. The club has a membership of 50 and has set a goal of doubling the membership during the coming year. Meetings are held the first Wednesday of each month at the Iowa City Civic Center at 7:30 p.m. Bowl shows, auctions, films and lectures are several of the varied activities enjoyed by the membership. ◄

Scheel

(Continued from Page 596)

Females of *A. nigerianum* are rather uniformly colored as are most females of the genus. Her belly has an orange tinge as do females of *labarrei* and the *Aphyosemion* from the Ndian River. Her unpaired fins have some brown spots.

The results of the crossing of *nigerianum* to *cinnamomeum* have already been reported. In its crossings, *A. nigerianum* acts somewhat differently than other species of the genus. Most crossings result in viable hybrids. Only one cross resulted poorly and this was a cross between a male *A. roloffi geryi* to a female of the Port Harcourt/Akure mixed stock. During the first 14 days I was unable to trace any development that was significant. An Akure male and a *gulare* female (so-called "*beauforti*") produced only a few eggs. One of these resulted in a very viable hybrid. However, not a single egg from her in backcrosses to *nigerianum* developed.

An *Aphyosemion australe* (aquarium stock) and Akure *nigerianum* female produced eggs and embryos which developed normally. The fry, however, were difficult to raise. A later repeat of this cross resulted in two males. They were shaped and colored mostly like *A. australe* males (see photos). When young, both had lemon fin edges but this color faded with age. Red dots formed longitudinal lines on the foremost part of the body, and tended to produce transverse red bars on the caudal peduncle. The Akure male and female were crossed to male and female *A. cognatum*. Most hybrids of this cross had deformed lower jaws and were not able to close them. Only one such individual reached maturity and as far as I could tell, he used his gills to hold the food before he swallowed it. All

hybrids were males (more than 50 were raised to average *A. cognatum* size) and all were sterile in their backcrosses. Hybrids from these crosses were very feeble and difficult to raise.

The hybrid between male *A. christyi* and an Akure female resulted in 15 young. These hybrids apparently were more viable than the hybrids produced with *A. cognatum*. However, only two individuals reached maturity. They were very close to *cognatum* hybrids but oddly enough, the male had more red dots on its body. These formed long red bands and he grew nearly to the size of normal *nigerianum*. The other fish was female-like when young but later on she developed male characteristics. She never laid a single egg. An *A. labarrei* male and an Akure female did not produce viable fry as all embryos died within the egg. Dr. Edward Seligmann informed me that he was able to produce viable fry from this cross and his color slides show a male which closely resembles my *cognatum* hybrids. The Akure male and *A. coeruleum* female cross produced more than 50 very viable hybrids. Both sexes were present in this cross. The males developed very brilliant colors and grew up to *coeruleum* size. They were very active and defeated even adult blue gularis males. Males were sterile in backcrosses and in crosses to their sisters. The females spawned but their eggs differed markedly in size, from less than 1.0 mm to more than 1.8 mm (egg of the blue gularis ordinarily measure about 1.4 mm). In backcrosses with males of *coeruleum and nigerianum*, I obtained more than a hundred eggs. Only the large eggs were fertile, however. Embryos then died in different phases of development. Only a few fry were hatched and were very feeble, only one surviving the first weeks. The unidentified Ndian River male and the Port Harcourt/Akure female produced eggs

and embryos which developed normally. Eight normal fry were hatched and the biggest male (all are males) is very much like a normal *nigerianum* male of the yellow variety. The results of these crossings so far indicate that *A. nigerianum* is somewhat closer to the subgenus *Fundolopanchax* than it is to subgenus *Aphyosemion*. However, the differences in results are not very large.

Finally, I return now to the crossing of Port Harcourt males to Akure females. The first generation contained both sexes and the variations in color patterns were natural. However, the results of this uncontrolled reproduction were highly unsatisfactory as only a few fry were obtained (peat was used, dried and subsequently watered in the usual manner). In order to study the reproduction better, two pairs were spawned on nylon. The eggs measured 1.2-1.5 mm (Akure females usually spawn eggs of 1.0 mm size). Such differences in egg size are abnormal within rivulins where the egg size normally is a very constant character within different populations of the same species. The development of the embryos differed markedly among eggs of the same age. Most of them died within their shells and only 8 have been raised. Furthermore, these are rather feeble, with only one female among them.

If I had not obtained similar results from crosses among different populations of *A. bivittatum*, it would be difficult to understand that individuals from two populations geographically close to one another and which apparently belong to the same species, are not able to reproduce when brought together. It seems as if these two populations are about to form two different species. It is not known if this is because of the differentiation as a result of the Niger River, or some climatological event that occurred a long time ago. ◄

★ IDEAS ★
BY HOBBYISTS

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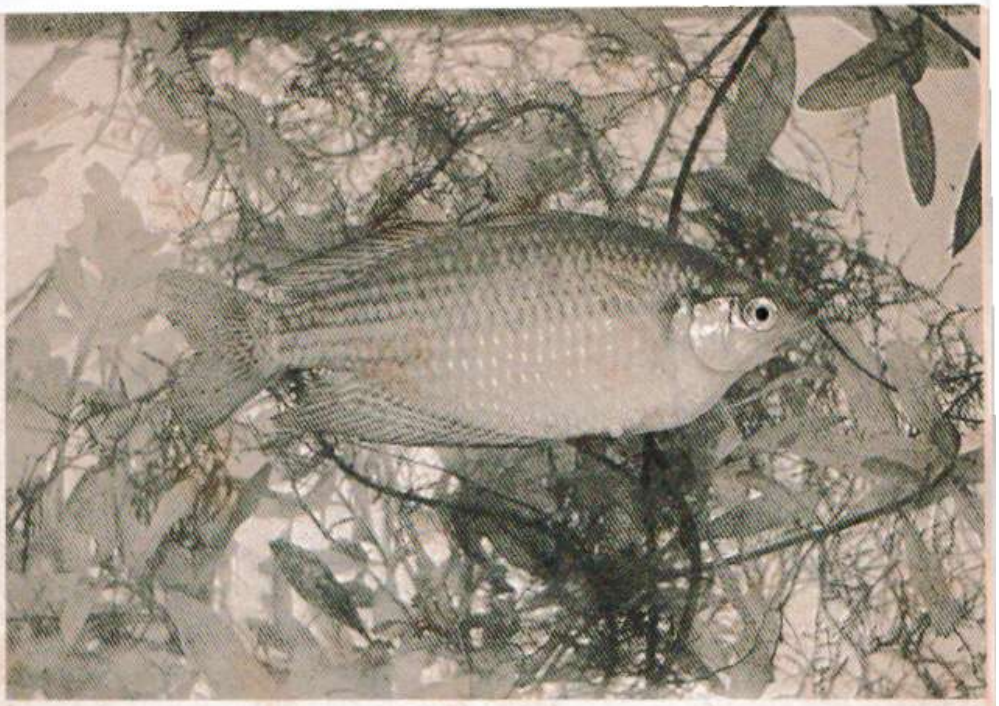
Glass Replacement

There are two inexpensive ways to replace plate glass. One way is to buy crystal glass of the same thickness. Crystal is the same as plate except that it does not have as much of the distortion polished off. However, glass distortion does not show when water is in the tank. Crystal is about 25-40 percent less expensive than plate. The other way is to buy salvage plate. Salvage may be either the "cut off" of new plate or old plate removed from broken windows, etc. Salvage plate costs about 50 to 75 cents per square foot. Salvage is by far the least expensive. Both crystal and salvage can be purchased from large glass distributors or glazing contractors. One thing to keep in mind about salvage is that it may have some scratches on the surface. This does not affect its strength. Salvage does not have a fixed price so do not be afraid to bargain. — *Robert W. Hampel, Ankeny, Iowa*

CLUB NEWS

Aquarium Society of Eastern Connecticut

The A. S. E. C. was host to the meeting of the Northeast Council of Aquarium Societies on November 22, 1964, at the Crocker House, New London, Conn. Harry Gault was chairman of this event, according to Avis Varkade, corresponding secretary.



Strangely enough, many "Down Under" fish behavior patterns are like American species

Australian Native Fishes

Trevor W. Lambert
Chatswood, N.S.W., Australia

A CASUAL acquaintanceship with the Australian continent could not be considered an aquarist's dream. It is an ancient land devoid of freshwater fishes of the more familiar aquarium families, Characidae, Cyprinodontidae, Cichlidae and Cyprinidae. Strangely however, Australian fishes seem to have behaviour patterns like fish familiar to aquarists in America, possibly evolved under similar ecological conditions.

One genus, *Galaxias*, has habits similar to trout or salmon, some species ascending rivers to spawn, others spending their lives in icy mountain streams and lakes. There is a catfish *(Tandanus tandanus)* which builds pebble nests in river shallows and then fans and protects his young. Mouthbreeders are represented by a cichlid-like fish, *Glossamia*, of Queensland and New Guinea. This fish belongs to the Apogonidae, a widely distributed tropical marine family. In western and southern Australia are fishes which could easily be mistaken for dwarf cichlids; although lacking their breeding habits, they are of the genera *Edelia* and *Nannoperca*, speci-

Photo: Amneris rubrostriata. an Australian native fish, as photographed by the author, and shown in color on this month's cover.

mens which, when in good condition, assume deep shades of orange or red on their bodies. Blind cave fish, *Milyeringa veritas*, a gudgeon, i.e. a goby, occur in northwest Australia under similar conditions as the Mexican *Anoptichthys*, but come from a limestone well. Archer fish, freshwater soles and various gobies and scats make up most of the fishes of interest to aquarists. There are also a couple of freshwater pipefishes.

Purposely left out of the previous selection were the silversides generally grouped under the title of Australian rainbows. I feel that these deserve much clearer definition and discussion than is found even in the most advanced scientific and aquaristic reference works available.

An Australian ichthyologist has several genera under revision; many, including the familiar *Melanotaenia nigrans*, will come out with different names. But for the present they will be referred to as they are now known.

An atherine which springs to mind as a rare and beautiful fish, especially suitable for investigation by advanced aquarists by virtue of the difficulties in keeping it, is *Quricthys stramineus*. This fish grows to two and three-quarters inches, has a very high black first dorsal fin giving it the popular name blackmast, the body is straw yellow turning light brown on the back. The quiet beauties of this fish are however given a gem-like touch with the bright blue eyes and the silver stripe down each side. Unfortunately this fish is hard to acquire, being found in a very out of the way part of the Northern Territory, the Katherine River. The difficulties in keeping it further enhance its values. Perhaps a clue to keeping it could be in the nature of its teeth which are designed

for nibbling and scraping (algae?). It has even been known to graze over swimmers legs. Its apparent nearest overseas relative is the Celebes' rainbow *(Telmatherina ladigesi)* although it does not necessarily need the same water or feeding conditions.

Another little known but very beautiful fish is the blue eye *(Pseudomugil signifer)* named for its brilliant sky blue eyes. This fish has other virtues, particularly its wonderfully elongated fin rays, especially those of the dorsal and anals. Colors and fins vary according to geographical location; the northern variety is suffused throughout its body by translucent sapphire yellow, which may turn copper or gold in courting males. Black spotted varieties are also found in some localities. The superb fins of the male may be black or scarlet. The females, have a more subdued attire. A gold lateral stripe completes the picture.

This active little fish (2½ inches) likes schooling in a sunlit, well-planted tank, water medium-soft, near neutral pH and possibly a little salt added to around 200 ppm. of sodium chloride. They prefer live food, daphnia, tubifex, etc., but soon become accustomed to dry food. Algae may also be healthful. It spawns on fontinalis or any bushy plant in water at about 76° F. The young hatch after about 8 days and soon graduate to brine shrimp young. In general, this fish is hardy and has a wide temperature range.

A fish closely related to species of *Melanotaenia* is *Rhadinocentris ornatus*, a fish found in southern Queensland and northern New South Wales. This fish is hard to catch, living in tree-strewn creeks, riddled with leeches and the air about choked with mosquitoes.

The fish itself has the typical rainbow fish shape but is spotted with blue and has an electric blue stripe running from the eye along the backbone almost to the tail. They grow to four inches and are

(Continued on Page 620)

Sketch by the author.

Known today as "Japanese Irises" — they originated in ponds of Northern Asia

The Water Iris

Charles O. Masters
Walhonding, Ohio

OVER FIVE HUNDRED years ago in Japan, flower specialists seriously started culturing two species of Oriental irises which were so common in the marshes and ponds of Siberia, Manchuria, and Korea. Although the work was being done almost entirely in Japan, there seems to be some question now as to whether or not the plants were ever native to that country in spite of the fact that they are known today as the Japanese irises.

Since the group is so very well adapted to water, they are being used more now in lily pools rather than just as a plant for wet places. In fact, they are considered by some to be "as aquatic as any water lily." Rest assured they grow equally well in water as an emergent species (like arrowheads and cattails) as they do along the edges of ponds, pools, or streams.

In about the year 1907, garden varieties of this group appeared in the markets of the world and now there are over six hundred different kinds believed by many to have originated from the two species: *Iris laevigata* and *I. kaempferi*. Some botanists still contend that in reality there is but one species and not two. By persistent breeding and selection both single and double forms in a great variety of colors

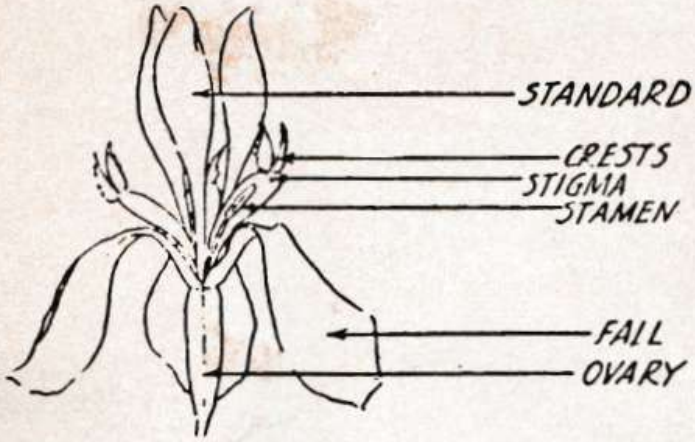
have been obtained for use in water gardens. Japanese names, of course, have been given to the plants and they have been translated but are quite meaningless. In fact, they are so badly confused that a list of the varieties is of such little benefit that it is better to secure desirable plants from nurseries only when they are in bloom and can be better studied.

I. kaempferi is commonly referred to as the clematis-flowered iris of Japan and *I. laevigata* as the true-blue iris. In 1929, after considerable study, Miyazawa, a Japanese botanist, claimed that both, with all their varieties, came from one common species which he considered as *Iris ensata* but this has not been generally accepted.

The Japanese irises, being mostly four feet in height, are considerably taller than most other species of iris plants, and then if the seven inch blossoms are actually doubles, the huge effect is breath-taking.

Colors of the iris flowers vary considerably. *I. kaempferi* has many, from a pure white to a deep blue with intermediate shades of red. *I. laevigata* has colors varying from white to lilac, crimson purple, to an extremely deep purple. Some blossoms too, are variegated or spotted. Flowers form during June and July depending somewhat on whether or not there is shade. They have a very subtle fragrance. It is easy to understand why then when the blossoms blend summer skies and soft pool waters into perfect harmony, it has been said that the Japanese iris is the "queen of all water plants."

All of the varieties are beardless and have elegant foliage with either single or double flowers.The singles have the usual three upright standards of the typical iris plant and three falls. The double blossoms are generally flattish with large petals, all six of which sometimes droop or are ruffled. With their ample petalage, the doubles are more showy but not quite as graceful as are the singles.



Parts of the Iris flower.

I. laevigata differs from *I. kaempferi* in that its leaves have no raised midrib and the standards are nearly as long as the falls but in spite of this, they are sometimes confused with the latter species.

Both are very easily grown from seed but this is hardly worthwhile since so

PROGRAMS

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

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

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

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

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

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

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

many superior varieties are now available. They are all perfectly hardy but do best in full sun. It is sometimes possible to delay the blossoming as much as two or three weeks by utilizing a little shade but this is done so by sacrificing some of the quality of the plants.

There is some disagreement among nurserymen as to exactly when they may best be moved. Some suggest early in the season as soon as the new growth starts but others say it can be done from July to September just as long as the plants are able to get well established for winter. In any event, plantings should remain undisturbed for from three to five years in order to insure large and abundant blossoms.

It is best to plant good strong divisions of about a half dozen shoots apiece spaced a couple of feet apart with the crowns about two inches below the surface, rather than single shoots. This will give a much better effect in the general pond or pool layout since the plants appear to best advantage when planted in large groups instead of singly.

They are best cultivated as aquatic plants requiring much fertilizer in the form of decayed cow manure and heavy leafmold. In fact, sunken tubs filled with a 50/50 per cent mixture of the mulch and manure below the water's surface, makes an ideal spot for the plants. The addition of aluminum sulfate at the rate of up to a pound per square yard of soil in order to maintain proper acidity is highly recommended. Where irises are the prime plant in a pool, it is well to acidify the water somewhat in the same way. Unless the soil is definitely acid, the foliage will turn yellow and the plants dwindle.

Manure should be added every spring with root divisions and soil changes in the early autumn at least every three years or the soil will become exhausted and the roots woody. As with all bog

plants, weeding must be done frequently since the weed plants thrive only too well on the very rich medium in which the irises are growing.

Water gardeners who have not experimented with the irises would do well to seek them out. Many Americans have been quite successful in their attempts to match the exotic beauty of the Japanese iris garden and have been well able to grow these favorites in much the same profusion as they are grown in far-off Japan. ◄

★ IDEAS ★

BY HOBBYISTS

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

MARINE FISHES can be kept alive in an aquarium by simply blowing through an air stone attached to a length of plastic tubing. This method is useful when transporting fishes in your car or keeping fishes alive for temporary periods when a regular aquarium pump is not available or practical. Sometimes during a storm when the electricity is off, it is a lifesaver. Just go from tank to tank and blow vigorously through the tubing. This will aerate the tank for a half hour or more depending on how crowded it is. The method is also useful at lectures where a few live specimens are kept in a small container for display. Just keep the airstone in the aquarium or container and give a quick puff from time to time. It will keep the fish alive, and at the same time demonstrate the need for aeration to the audience. I used this method recently while giving a lecture at a local school and kept a large six-inch porcupine fish, sea horses and other specimens in good shape in just a three gallon tank. I made the porcupine fish inflate several times for the youthful audience and as I returned it to the tank, I would give a vigorous puff on the airstone. The porcupine fish never showed signs of hard breathing due to lack of oxygen in the water and the other specimens did equally well. During the question and answer period, one student was quick to point out that perhaps I was blowing carbon dioxide into the water since we inhale oxygen and exhale carbon dioxide. I answered that we use only a small amount of the oxygen in our normal breathing and that the air we expel still has a large amount of oxygen and proportionately small amount of CO_2 in it. So that by blowing through the airstone I was giving the fish sufficient aeration to sustain them. Another method of aeration without a pump is to insert a piece of rigid plastic tubing into a rubber squeeze-type bulb. This may be filled with water from the aquarium and then vigorously squirted back into the aquarium so it makes many bubbles. It works quite well but

the airstone and tubing is usually more obtainable on short notice and will do the job with just a few quick puffs. — *Robert P. L. Straughan, Miami, Florida*

Lambert

(Continued from Page 615)

hardy in soft, neutral water at about 75° F, although here again they adjust easily to lower temperatures.

Now for a fish which is big, colorful and fast-moving. This is the red-banded sunfish of North Queensland *(Amneris rubrostriata.)* [*Editor's note: Some ichthyologists believe this fish should be called* Melanotaenia rubrostriata.] It grows to nearly six inches and has all the color of its smaller rainbow relatives. [*Editor's note: It is not related to the sunfishes of North America.*] Ground color varies between olive and yellow with white undersides. The sides have a full-length stripe blending from bright yellow in the middle to green near the tail. The body also has lesser stripes of a lighter yellow. Each opercle has an orange spot with a stripe above. The fins are yellow with scarlet patches edged with deep red. A yellow eye with a blue lower section adds further beauty to the general effect. This fish has been successfully hybridised with relatives from New Guinea indicating a close affinity.

The eggs of *these* fishes are suitable for sending through the mails, using the killie techniques. In the past eggs have been sent to places as far away as Denmark with good results. Perhaps the use of this method may create some interest in these fishes in America. ◄

THE DISEASE known as "Innesian Syndrone" although discovered and named by more illustrious researchers than myself, is incorrectly named. There is evidence to support applying a common but far more descriptive name, Tropical Fish Fever.

In its first, often unrecognized form, it may be caused by the gift or purchase of a tropical fish. There is a school of thought which suggests that a virus,

In fishy circles, it's known as "tropical fish fever"!

Innesian Disease

Lenn Tamm
Milwaukee, Wisconsin

transmitted from an infected dealer, is responsible for the disease, but I reject this idea. In recent experiments uninfected, blindfolded subjects did not receive the disease after handling plastic fish bags with fish, and previously handled by dealers known to be infected. Perhaps the victim is infected by visual means.

After the initial infection, the disease moves swiftly to the intermediate stage, wherein the victim purchases fishes, tanks, air pumps, filters, plants and innumerable other "necessities."

When these items are in place, the disease moves into the third stage, *B! F!* stage. (A cure in its early stages seems to be a leaky aquarium, but a chance for a simple cure by this method is soon lost.) Symptoms are: (1) blood pounding in the temples; (2) failure to hear

(or understand) a spouse speaking (this symptom of the disease is subtle for it is sometimes a normal state); (3) a tendency to ignore such things as children, home and P.T.A.; and the frustrating feeling the victim has until he is inside a tropical fish store or a well run fish room. The most common symptom is the repetition syndrome, from which this stage of the disease is named. One thought keeps repeating itself in the patient's mind, "Buy, Fish!, Buy! Fish!" Hence the name of this phase, *B! F!*

When this advanced stage of Tropical Fish Fever appears, the only thing which alleviates the excruciating agony of frustration is the purchase of tropical fishes. Lots of them.

The final stage is characterized by the victim moving furniture from the living room to accommodate more fish tanks, breeding fish which never seem to have less than a thousand babies, and adding a nursery or "fish room" to the house. In the most extreme phase of this stage, the patient often sits up all night, holding, as it were, the expectant fish's fin, while it lays fourteen thousand eggs.

The disease is chronic and never terminal. There is a form called *Innesia recurrens*. Upon occasion the patient may seem to have effected a complete recovery. He usually is found sitting in a bare room (from which all traces of fish tanks have been removed) and mumbling incoherently to himself, cursing softly things which sound like discus or red hook metynnis. This will usually last until the patient has enough money to obtain another breeding pair of very nervous fishes.

Tropical Fish Fever is a far superior name than that used to identify this disease. The glass-eyed stare, the high temperature present when the patient first breeds fish and the hot and cold flashes (of enthusiasm) for certain fishes are all reminiscent of fever.

I suggest that a group be formed to fight the insidiousness of this disease. Let us form an organization known as T.F.A., or Tropical Fishes Anonymous. It could be arranged much like the famous A.A. organization, wherein a member, feeling the urge to enter a tropical fish store, would call a brother member and receive the moral courage and uplift needed to refrain from succumbing to the "one, just one, can't hurt" kind of philosophy. Unless, of course, the member should happen to call me. I'd have him wait outside the tropical fish store until I could get there. Then we'd go in together and buy fish by the hundreds. ◄

★ IDEAS ★
BY HOBBYISTS

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Inexpensive Pool Covers

If you keep some tropical fishes outside in pools during summer and cool weather or cool nights occasionally provide trouble, try covering the pool. Plastic drop cloths, available at paint and hardware stores, make ideal covers. They are inexpensive and come in many sizes. By covering the pool with one of these before if gets cool, enough insulation is ordinarily provided to protect your fishes. — *James W. Stutman, South Bend, Indiana* ◄

CLUB NEWS

The Aquarium Society of Wichita

The A.S.W. held its Eighth Annual Tropical Fish Show on September 12-13, 1964, at the Coca Cola Hospitality Room, George Washington Blvd. and Harry St., Wichita, Kansas, according to the publicity chairman.

From: Ronald Barnett
Chicago, Illinois

Are there any guppy breeders in my vicinity where I may purchase guppies reasonably?

REPLY: Unfortunately we have no way or the funds to keep track of local breeders of guppies or any other fishes over our considerably large country. I suggest that you join a local aquarium society. Ask members about guppies. Ask local dealers if they know anyone raising fancy guppies. These are the best ways to search out specialized aquarists.

Letters to The Journal

From: Don E. Hansen
Glen Ellyn, Illinois

I am planning to raise fancy guppies and would like your views on the advisability of using Gro-lux lighting or "cool white" fluorescent.

REPLY: There has been a great deal of argument about using Gro-Lux lamps. According to Thomas E. Brown there are no reasons to fear that Gro-Lux lamps emit any appreciable amount of "harmful" infrared or lethal ultraviolet light. In my own experience with these lamps I have not found them producing any ill effects on fishes or plants. I have had one problem with them. Suspended green algae (pea soup kind) seems to thrive with great ease under this light. Cool white light will not grow many kinds of plants very well but will not harm your fishes. In my estimation it may be more a matter of taste and what you are used to. Cool white deemphasizes the colors of guppies and other fishes, Gro-Lux emphasizes them in a peculiar way. Both lights are "abnormal" for viewing color when compared to sunlight. Warm white lamps produce a color balance more like a combination of blue sky and bright sun than either cool white or Gro-Lux. Warm white also grows plants better than cool white, but not as well as Gro-Lux. Take you choice, experiment to see what you personally like.

• • •

From: Byron E. Allender
Pleasanton, California

I was particularly interested in the article "*Cryptocoryne beckettii*" by A.v.d. Nieuwenhuizen tr. by Albert J. Klee in the April 1964 issue of the *Aquarium Journal*, pages 182-186.

What especially intrigued me were the statements by Nieuwenhuizen (page 183) —"In general, we as aquarists cultivate cryptocoryne species entirely under water and in so doing, deviate considerably from natural habitat conditions." Also, "It is evident, of course, that to bring *Cryptocoryne beckettii* to bloom, it is necessary to cultivate it in what might be called a bog tank, or paludarium."

Now this raises one or two questions: 1. Is there available a description of a paludarium, or bog tank, such as is mentioned? 2. Is there a formula for raising the cryptocoryne species successfully entirely under water in the standard aquarium or does success only attend cryptocoryne raising when treated as a bog plant?

With the exception of *C. ciliata* I have had no success with *Cryptocoryne* in aquaria.

Another question maybe you can answer:

3. Why would the pH in aquariums, one 30 and one 20-gallon, change from pH 7.4 to pH 6.4 in the matter of a few months when the DH remains the same at DH 20 and every other condition is normal and as usual and there have been no changes made nor anything new added? No sodium biphosphate nor peat has been used?

It baffles me and I fear it is not a good sign. Outside filters are used.

A. J. KLEE'S REPLY: (1) The word "paludarium" is derived from the Latin "paludis" which means "marsh." The simplest form of paludarium is merely a large aquarium containing sand or a mixture of sand, peat and earth to a depth of several inches. Water is added so that the consistency of the bottom is decidedly marshy. A fairly tight-fitting glass cover is used in order that a high-humidity atmosphere is maintained. If one desires, animal life (e.g., frogs, etc.) may be added along with the plants, and a very nice picture of nature obtained. More elaborate paludaria have a steeply sloping bottom at one end so that water can be added, and fish kept in the resulting "pool."

(2) Here, I quote from Colin Roe's excellent little book, "A Manual of Aquarium Plants."

"Cryptocorynes should not be disturbed more than necessary as they are slow to establish themselves and often, after moving, will lose their entire foliage which, however, in the case of most species is renewed quite quickly. This often occurs if the water in the aquarium is changed or even after introducing new plants or fishes which may change the condition of the water. This is considered by many to be a disease, but after observations made over a long period, another possible explanation would appear to be the existence of a physical condition related to the fact that in the natural state many of these species lose old foliage as the water evaporates and the level falls in the dry season, leaving the plants to grow as bog plants, when aerial leaves develop, often quite different in appearance from the submerged foliage, which persist until the water rises again with the following rains. It is normally during this period of bog growth that inflorescence (i.e., flowering) is produced."

*Since the nomenclature of the genus is badly mangled by aquarists, I cannot be certain that your "*ciliata*" is that species, but the true* ciliata *is fairly easily cultivated. Most crypts will grow fairly well submerged, but ordinarily much more slowly than when emersed. The*

★ **IDEAS** ★

BY HOBBYISTS

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

Pegboard Plant Holders

Inexpensive and easy to construct are plant holders made from masonite pegboard. Just cut board to appropriate small size and place roots into holes, the boad sinks to bottom of tank. Board can easily be covered up by placing gravel on top. This is excellent for small *Vallisneria* plants. — *Terrence Clark, London, Ontario, Canada*

answer to your question then is "No, there is no such formula and in general, raising crypts under normal aquarium conditions is at best, only moderately satisfactory."

(3) There is not necessarily any relationship between pH and hardness; the former refers to the concentration of hydrogen ions in water, the latter to metallic ions which interfere with the sudsing of water (primarily calcium and magnesium). Experimentally, here is how one could get the four possible combinations (but don't try it in the aquarium!):

(a) soft and acid – distilled water plus sulfuric acid

(b) hard and acid – magnesium sulfate plus sulfuric acid

(c) soft and alkaline – distilled water plus sodium hydroxide

(d) hard and alkaline – magnesium sulfate plus sodium hydroxide

However, it is possible to add certain chemicals which will alter pH and hard-

CLUB NEWS

San Francisco Aquarium Society, Inc.

The next regular meeting of the S.F.A.S. will be held Thursday, December 3, 1964, in Morrison Auditorium, California Academy of Sciences, at 8:00 p.m., according to Robert P. Dempster, president.

This is the night of the annual Christmas party – and this year it will be a BIG one, Frank Tufo, program chairman, announced. Details of the party will appear in the S.F.A.S. meeting notice, mailed to each member of the group.

Also at this meeting will be the elections for the 1965 Board of Directors, according to Percy Bell, chairman of the nominating committee.

There will not be any Fish of the Month Competition for the December meeting, due to the Christmas Party, Charles Bange, chairman, announced.

ness simultaneously; magnesium bicarbonate, for example, will make water both acid and hard at the same time.

Changes in pH without concomitant changes in hardness as you have described are primarily caused by chemical decomposition of the food you add to the aquarium (at least a small portion of which is invariably uneaten) and/or the excretion products of the fishes (and even the plants) themselves (CO_2, urea, etc.). Therefore, your statement that there has been "no changes nor anything new added" is just not true unless you have discovered a new kind of fish that neither eats nor breathes. Aeration and frequent partial water changes obviate this condition. You will note, however, that nature is frequently perverse and although frequent changes of water are good for most fishes, it will not be so for your crypts!

***Editor's addition:** It has been my experience that if you have water that will grow several species of crypts such as* griffithii, *the true* cordata, *and few others,* ciliata *will not grow in it. On the other hand* griffithii *and* cordata *will not grow in water that grows* ciliata *well. Some of the best success with crypts I ever had was with* C. nevillii *(short form),* C. willisii *and* C. beckettii *(known in the trade as* cordata*) all in concrete 40-gallon aquaria with 3 to 5 inches of sand and* hard *alkaline water. These plants never suffered crypt "wilt." Why I don't know. I have kept them in soft and hard water in all-glass tanks and had "wilt" appear. Incidentally a bacteriologist friend of mine once tried to cultivate bacteria from wilting crypts and found none that he could use to reinfect other crypt plants. Obviously different crypt species do best under different conditions. Experience and experiment may be your only answer.*— S.W. ◄

★ IDEAS ★
BY HOBBYISTS

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

The Backscratcher

I have found my most useful aquarium tools are a pair of common plastic oriental backscratchers, such as can be bought in any novelty store. I use these for raking drifted gravel, setting plants, moving ornaments, removing rubbish or casualties – all the small weekly housekeeping tasks of my aquarium. Perhaps other readers have already hit on this idea. But none of my friends had; and they all have become enthusiastic users of the back-scratcher! – *Mrs. Howard M. Lee, New York, N.Y.*