

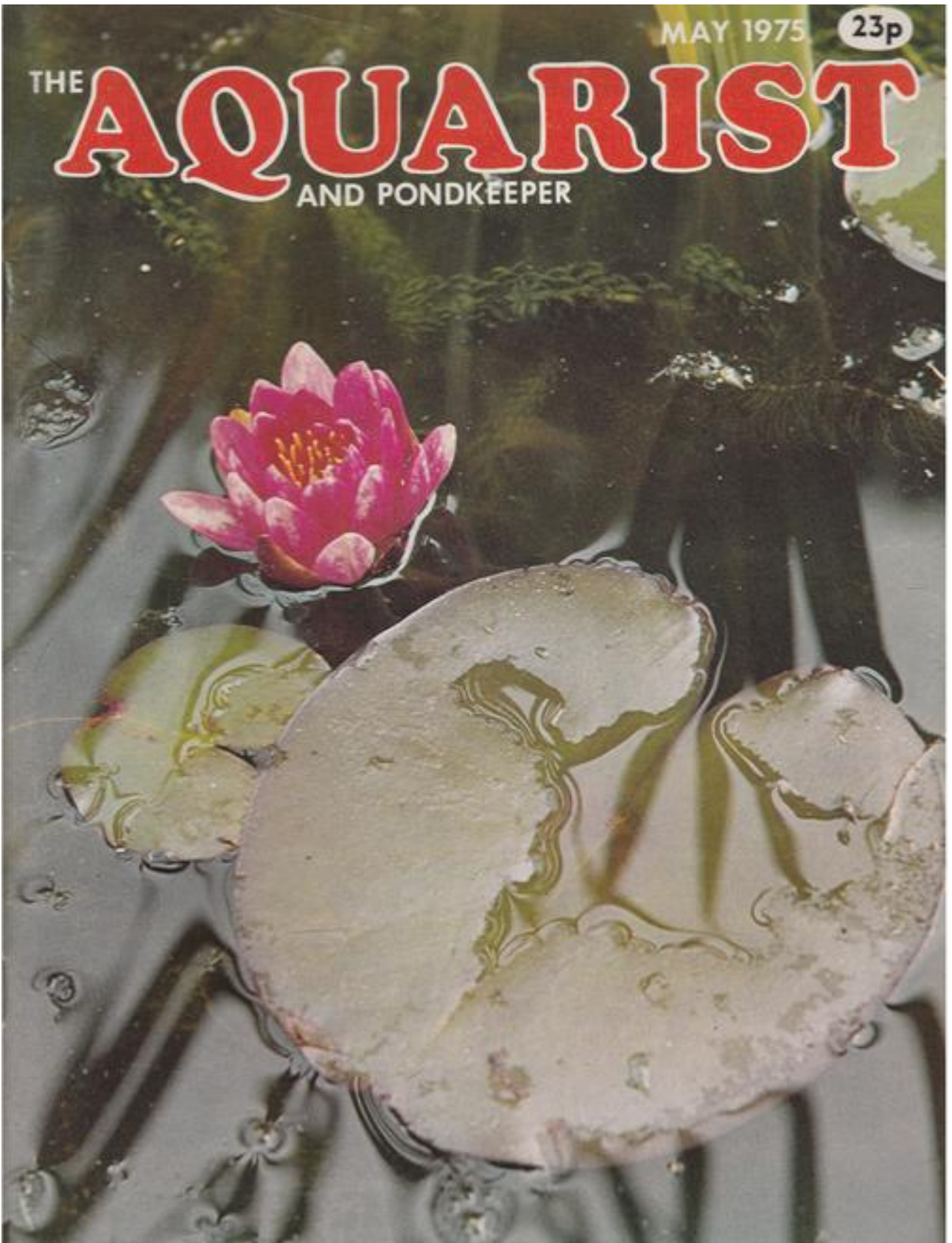
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THE

# AQUARIST

AND PONDKEEPER





# THE AQUARIST

AND PONDKEEPER

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The Editor accepts no responsibility for views expressed by contributors.



# "LOOK, GUPPIES!"

by G. T. Horton

I AM constantly amazed at people who visit me from time to time when they are given a "tour" of my tropical fish tanks. These are often laymen, as opposed to us aquarist enthusiasts, but almost invariably on peering intently into my large well-stocked community tank they will all immediately recognise one particular species of fish. Such spontaneous remarks as "Look, Guppies!" "I like your Guppies" and "did you breed the Guppies yourself?" are inevitable at that time.

This is not without good reason for this one small fish alone is perhaps the senior "founder member" of our whole, great and ever expanding hobby. Known and cherished everywhere, the Guppy well and rightly deserves the world-wide reputation it has achieved. The appearance of a modified aircraft, a cargo lifter, gave rise to the name "Pregnant Guppy" bestowed by the U.S. Air Force because of its fuselage resemblance to this small tropical fish. While we all recognise our small friend on sight, his origins and history are not always so well known.

The Guppy, *Lebistes reticulatus* (Peters), is very common and abundant in its native waters of Northern South America and the West Indies.

In Venezuela, for instance, great shoals of Guppies are found in the upper reaches of the streams where the water is fairly shallow, swift moving and well aerated. In such regions the stream beds are gravelly with average water temperatures of some 25° centigrade.

It is in such reaches that this fish is constantly preyed upon by its habitual enemy, the small and ferocious Gaubin or reinfish (*Rivulus larti*).

At certain seasons they are also menaced by the larvae of dragonflies; in return the Guppies feed on the eggs of *Rivulus* and on the mosquito larvae, thus aiding in the stabilisation of the all important balance of nature.

Lower down the streams the beds become sandy, the water moves more slowly, it is deeper and less well aerated. Here great stretches of the widening

stream is overhung and shaded by expanses of tropical vegetation.

It is here the Guppy has several more enemies to deal with should he venture out onto the warm sunlit sand bars and shallows; the Mountain Mullet (*Agonostomus monticola*) shoals there, as also does the very voracious pike-like "Warbines" (*Hoplias malabaricus*) and of course many *Rivulus* are still present.

All of these predators seek out and eat all the small Guppies they can find, and as the males are smaller than the females, and more conspicuous, they are taken first. Thus most of the Guppies found in this region of the river will be large females.

Here again nature has provided the means to balance this situation in giving the female the capacity to produce several broods of young from just one mating. Inevitably some of these young fry elude their enemies and escape into the safer upper reaches of the stream.

Still lower down the stream, which is now a river, the warm waters mingle with the ocean and become brackish; even so the Guppy can easily adapt itself and enters the ocean itself off some West Indian Islands.

Long before it was widely known to aquarists, the Guppy was celebrated and acclaimed as a destroyer of mosquito egg rafts. The low incidence of malaria in Barbados was directly attributed to this single fresh water fish native to the island.

Attempts to introduce it into India, again as a mosquito destroyer, were at first unsuccessful, but later it became established there and also in several other parts of the world.

Many years ago the Royal Zoological Society maintained and bred large stocks of Guppies for the Colonial Office, for despatch to many parts of the British Empire, Protectorates and Mandated Territories.

Our popular subject, *Lebistes reticulatus*, was introduced to science by the German ichthyologist,

Wilhelm C. H. Peters in 1859. Some of this species were among a collection of fishes brought from Venezuela, and were subsequently reported on in a monthly bulletin of the Prussian Academy of Sciences in Berlin.

In 1866 the Reverend Robert John Lechmere Guppy sent some to the British Museum. The Guppy family, originally of ancient French lineage, were from early times interested in Zoology in many parts of the world and one branch of the family eventually settled in Trinidad.

In 1909, already recognised as a destroyer of mosquito larvae, 150 specimens were sent in the care of a Major Selby to India; it is reported, however, that none of these survived. In the same year Captain J. A. M. Vipan, a collector for the British Museum, sent some living "millions fish," as they were then called, to Herr Arnold of Hamburg, where they were established as true aquarium fishes.

The name "millions fish" would seem appropriate at that time for two reasons: the vast shoals of these fishes seen by observers in the wild state, and because of their ability to reproduce themselves in such great numbers.

Our Guppy belongs to the family *Cyprinodontidae* or "toothed-carps," many of this diverse family having a carp or minnow-like appearance.

A sub family, the *Poeciliidae*, contains the Guppies and is distinguished by the fact that the species is viviparous, with the anal fin of the male being set far forward and modified as an intromittent organ or gonopodium.

Feeding mainly at the surface it hunts many organisms, including insects and their larvae, mainly by sight; it is, however a true omnivor feeding also on green vegetative growth such as algae.

Being mainly a surface dweller where the water is highly oxygenated, *reticulatus* is able to tolerate crowded conditions; it will even stand foul water for long periods. If occasion demands this small fish will partially climb out of de-oxygenated water and breath air until the danger of drying out forces it back into the water.

Wild caught females are some 1½ in. long, dark olive in colour with black edging on the scales; both the anal and dorsal fins are transparent and uncoloured.

The smaller males are rarely more than ¾ in. and sport bright colour and spots of black pigment on their flanks. It is said that of all the male Guppies in existence, both wild and domesticated, no two have exactly the same overall coloration in their make-up.

Since its introduction to the aquarium the wild type has been "evolved" almost beyond recognition. Now generally larger, the males, in particular, are much more colourful and have extremely bizarre finnage.

We now have true self-coloured specimens, spotted

examples and others with a chain pattern of wavy black lines along the back. In 1934 the eminent Swedish breeder, Fredlin, produced the Golden Guppy. We now also have the Wholly Black and of late the Leopard, a beautiful mutation.

The Guppy Breeders Society, which has done so much good work in helping to popularise and improve the species, lays down standards for the Guppy and in particular for the tail formations. Among these are the roundtail, speartail, single and double swordtail, lyretail, lace and of course veil tail.

Remarking on the apparent scarcity of males in the wild state it has generally been assumed that the marked sexuality of the species has been developed as a compensation for this. The lively male is at all times ready to pay attention to the female although she, it would appear, never displays the slightest interest in him. He will display by vibrating and expanding his dorsal and anal fins and tightening sideways rigidly as though about to spring.

It would appear that no actual contact takes place during mating. At this time, and in a split second, a number of spermatophores are discharged and shot toward the genital opening of the female.

After fertilisation the eggs develop rapidly and are seen in the genital region as a black patch; she is then termed gravid. The young may be born even after a few days or held for up to three months until conditions are favourable. Up to eight broods have been recorded; one brood contained 120 young.

After ingesting the yolk-sac the fry will thrive and grow rapidly. Here in the small Guppy we have the ideal aquarium inmate. It is non-aggressive, mixing readily with other fishes of its own size, is adaptable to adverse conditions and is an extremely free breeder. This adaptability is shown to good effect by the extremely wide range of water temperature it can endure, from 15.5° to 36°C., though the optimum is around 25°C.

Ideal environments for Guppies are small well-planted, well-lit aquaria. These should be planted thickly at the back with *Elodea densa*, *Wistaria* and *Watesprite*.

Many professional breeders favour the popular *Watersprite* with its elegant leaf formation and light rich green colour. They believe if these plants are healthy and thriving so will their Guppies be.

Guppies are among the cheapest tropical fish to buy and are always plentiful. Because of the strong sexual tendencies of the male a trio of two females and one male is recommended for the beginner.

Many schools now maintain a tank of these delightful live bearers as specimens for the study of biology, sex education and nature.

In many ways *Lebistes reticulatus*, the Guppy or "millions fish" from the New World is a joy and a popular asset to us all.



# RED DEVIL SPAWNING

## — AND UNWANTED FRY

by Richard A. Dunleavy

THIS South American species is one of the giants of the cichlid world; a fully grown specimen can make the oscar look small in comparison, and it certainly lives up to its common name of red devil as far as temperament goes, but as for the prefix red I have never seen a red *Cichlasoma citrinellum* although there is a school of thought that *C. citrinellum* goes through three or four colour changes, eventually ending up red. I personally do not subscribe to this theory and I believe some people may be misled by seeing the various colour plates in books simply stating red devil: to my knowledge the only red devil with red coloration is *C. erythraeum*, but then again there is very little information on the red devils in any of the aquatic literature I have seen, so I can only speak with any certainty on the ones I have kept and bred i.e. *C. citrinellum*. I spawned these fish some two to three years ago and my reason for writing this article such a long time after the actual spawning is due to the fact that I mislaid my notebook which contained the details of the spawning. I have only just found this book again, jammed down behind a tank in my fish house.

When I purchased these fish they bore no resemblance to the adult fish in coloration. They were a dirty grey colour with a number of black bands on the body but by the time they were about three and a half inches long they began to take on the adult coloration. During this process they looked even more unsightly, being a dirty white with black blotches. Fortunately this does not last long and they were soon a lovely lemon yellow. The fin development of this species is fantastic especially the anal and dorsal which extend to the caudal fin and beyond. This is the case with both male and female so this is no way to sex this species. In my experience the only reliable distinction is in the shape of the genital papillae during the breeding season, that of the male being slender and pointed while the female's is thick and round.

As I mentioned earlier, this species lives up to its name as far as temperament goes as they really are

devils. I can truthfully say this is the most vicious cichlid I have ever kept and I have kept quite a number. They just would not tolerate other cichlids in their tank. I tried all the dodges i.e. changing the tank furnishings around to confuse them, adding more and more fish to the tank to try and dissuade them from being so territorial, but it did not work. As far as my pair were concerned the whole tank was their territory and they intended to keep it that way. The pair was eventually housed in a four foot tank by themselves and almost exclusively fed on earthworms. The fish at this time were some eight inches long and although they were intolerant with other cichlids they behaved quite well towards each other which made me think they might be a pair. However, I was not interested in breeding at the time as I did not have the facilities for this having only three tanks available. My intention was to feed them up and try my hand at showing them.

The pair remained on their own until some two months later my third tank burst and I was left extremely short of space so I decided to try housing some large non-cichlids with my citrinellums. Having found to my cost how much damage the red devils could do in a short space of time, I approached this task with some trepidation. I removed all the tank furnishings siphoned off one half of the water and topped up with water straight from the tap. I then replaced the rocks, petrified wood etc, being careful to arrange them in an entirely different pattern to that of the previous set up, the idea being that the red devils would be so busy trying to re-establish their favourite resting places and swim patterns that they would not have time to notice their new neighbours. This seemed to work for when I introduced the new inmates they were completely ignored. Of course, this may have been because they were non-cichlids. The fish introduced were: one fifteen inch snakehead, one ten inch *Osphronemus gourami*, and one sixteen inch *Clarias* catfish. The temperature was raised from 76 to 80°F, as this was the temperature the non-cichlids were used to. The combination of raised



temperature and fresh water seemed to trigger off the spawning instinct of the citrinellum as they spawned some two or three days later. I feel I should point out here that I can take no credit whatsoever for this first spawning; in fact, at the time of spawning I was in bed with a chest infection and taking no interest in my fish at all, hence the reason for not knowing the exact day the fish spawned.

Exactly four days after the change-over I was on my feet again and anxious to see how this mixture of species had got along together. Imagine my surprise when, on entering the shed in which the tanks were housed, I found that not only had the fish settled down well, but that my citrinellum had actually spawned. The first thing I noticed was a huge mound of gravel in a half circle which screened off the back right hand corner of the tank. Behind this were my citrinellum guarding their eggs. The spawning site was two round flat rocks which I had forgotten were in the tank. Both rocks were covered with eggs and the pair were guarding one each. The other fish did not seem to take any notice of the pair, and on the odd occasion when they did swim towards the spawning site they were quickly turned away by one or other of the pair. The next day the eggs were gone and the citrinellum were swimming around quite unconcerned so I presume they ate the eggs themselves.

I had never heard of cichlids spawning on two separate rocks and guarding one each, so I mentioned this (to me unique) event to my local dealer. The only suggestion he could put forward was that maybe my fish were both females and they had spawned on separate rocks. I was rather sceptical as to the

correctness of this suggestion so I decided that I would try and induce the fish to spawn again and see what happened.

A week later I had my burst tank repaired and decided to use it for the spawning attempt. I half filled this tank with water from the four foot tank and topped it up with tap water. I then furnished the tank with petrified wood and the two round rocks. These I located in the same corner as they had been in the four foot tank, buried under the gravel. The temperature was 80°F. and the pH. 7-2, the pair were then transferred to this tank where they settled in quickly. I stopped feeding them garden worms and fed them only flake food for two weeks. On the third week I again started feeding them worms and replaced one third of the water with tap water which lowered the pH. to 7. Four days later the fish spawned and once again both rocks were used, with each fish guarding one rock. They did change places occasionally, and at feeding time both of them would leave the eggs to feed and then resume guard duty. The eggs hatched in three days time and the fry were free-swimming after a further four days, thus proving that my dealer's suggestion was incorrect. The pair proved to be good parents and were left with the fry for exactly one month before being transferred back into the four foot tank along with the two rocks. I had a number of subsequent spawnings from this pair and each one was a carbon copy of the first.

When the fry were three months old I began casting around for ways of disposing of them but nobody wanted to know, so they ended up as food for my snakehead and clarias catfish.

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### "SINGLETONS JOIN FORCES WITH ARMITAGES"

SINGLETON Brothers Limited, a leading manufacturer of aquarium heaters and thermostats, have joined the Armitages Group of Companies.

This long-established Cornish Company will continue to manufacture the excellent heaters, thermostats and other well-known aquatic accessories with the same precision and attention to detail that is the hallmark of its products throughout the world. Marketing will be handled by the Armitages International Sales Force.

The Singleton "ES-ES" range embraces a wide selection of precision aquarium equipment such as the "Preset-matic" thermostatic heater, the "Standard" and "Superb" immersion heaters, the "Major" and "Minor" thermostats, the "Super-Summit" pump, the incredibly accurate "Dumpy" thermometer, together with a number of other first-class aquatic accessories.

Sid Singleton, the founder of the Company, is one of the pioneers in the aquatic world. In 1931 he introduced the first ever glass-cased aquarium heater—

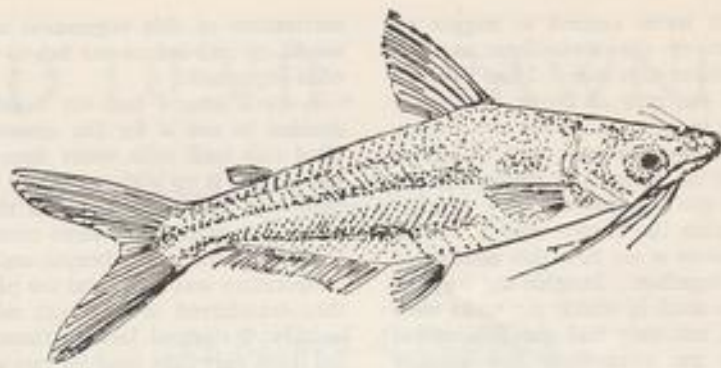
which quickly made the metal-cased heaters obsolete.

"We have rather concentrated on export markets in the past but we shall now have the means to bring our products to the notice of all aquarists throughout the U.K." says Sid Singleton, "and it will mean more time for me to increase production and concentrate on several interesting new items I have up my sleeve."

Each "ES-ES" product is considered by knowledgeable aquarists to be the Rolls Royce in its class—yet at a generally acceptable price.

Armitages' Sales Director, Frank Perry, says " 'Good Boy' is an acknowledged Brand Leader in the doggy world, and I am sure that the Singleton 'ES-ES' range will build to a similar position in the aquatic world. These are fine products that our Sales Force will offer with every confidence."

This expansion of Armitages' stake in the Pet Industry gives a flying start to their bi-centennial year; they originally began trading in Nottingham in 1775.



## THE SCALE-STEALER

### A FISH YOU SHOULD NOT KEEP

by B. F. Chhapgar

ALL THE ARTICLES on tropical fishes go to such an extent in extolling their beauty, harmlessness to other fishes in the community tank, and other desirable traits, that I have decided to be otherwise and write one on a fish that you should *not* keep! However, in spite of all my arguments against the fish, I'm sure there will be at least some aquarists loony enough like me to want to keep it in their tanks!

The fish that I am about to describe is a catfish found in a few restricted localities in peninsular India, viz. the Kistna and Panchaganga rivers in Satara and Kolhapur districts. To look at, it is definitely ugly. The colour is a drab silvery grey; its shape is not streamlined, with a shovel-shaped flattish head. The mouth is bewhiskered with eight barbels, and even the nostrils are tubes pointing forward like the cowl of ventilators in ships.

In addition to the nasty looks, it has a still more nasty armature to fend off enemies—these latter including the fingers of unwary aquarists! The pectoral fins have a strong spine with 8 to 13 sharp teeth superbly adapted to hook into hand-nets and then jab the hand that tries to free the poor(!) fish entangled in the net. The spine on the dorsal fin is equally devilishly armed, but with only three to four barb-like serrations. To add insult to injury, these spines have a poison which leaves an intensely painful memory to anyone unlucky enough to have been cut by them.

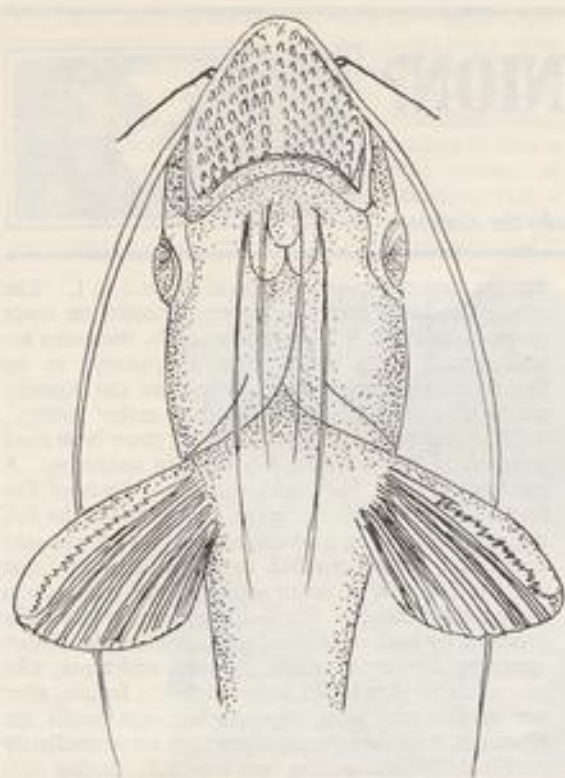
So, did you find any redeeming features in the above description? However, the worst is yet to come. If you are still anxious to keep this fish in your tank, turn it over and look at the mouth. You will immediately note the difference. While other fishes have teeth *inside* the mouth, in this one they extend over the entire under-surface of the snout. What use could they be in this peculiar position? If you wish to find out, just cut open one of the fishes and examine its stomach. You will find scales of other fishes arranged like a pack of cards.

This fish has discovered a unique method of feeding, known as "lepidophagy." When hungry, it moves alongside other fishes and rasps off their scales with the help of its file-like teeth. The meal does not sound a very nutritious one, but inside the stomach the scales are found to become thin and brittle, the markings on them having almost disappeared. The fish is aptly named—*Neotropius khavalchor*. "Khavalchor" in the local language means "scale stealer," which fully describes the feeding habit of the fish. This mode of feeding is not unique in this fish; two Cichlid fishes of the genus *Corematodus* living in Lake Nyasa, Africa, have the same habits.

For the aquarist who is hard put to have a sufficient number of fishes for the *khavalchor* to feed on, there is one consolation—they also feed on water insects.

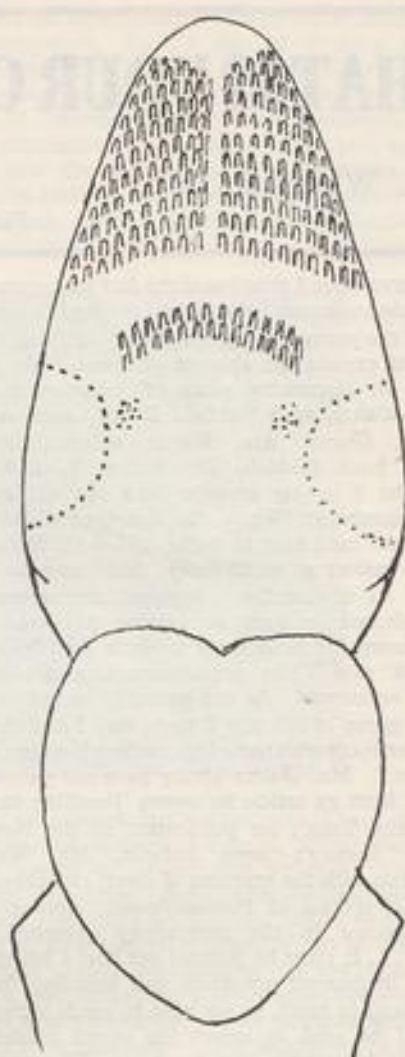
Still want to keep this fish?





*Above:* View of underside of head showing entire under surface of snout covered with teeth.

*Right:* Underside of head. Here the lower jaw has been removed to show the teeth, in two patches on the upper jaw. Heart-shaped structure below head is the swim-bladder.



*Another date for your Diary*

## **THE MIDLAND AQUARIUM AND POOL SOCIETY**

in collaboration with THE AQUARIST AND PONDKEEPER present

## **THE 2nd MIDLAND AQUATIC FESTIVAL**

at BINGLEY HALL, BROAD STREET, BIRMINGHAM  
on THURS, FRI, SAT. 14th 15th 16th AUGUST 1975

*Further details shortly*



# WHAT IS YOUR OPINION?

by B. Whiteside, B.A.

Photographs by the Author



IN A RECENT issue I mentioned the fact that spawnings of my *Pelmatochromis kribensis* had resulted in virtually 100% of the young fish being females. I asked if anyone could explain the absence of males. My query brought an interesting piece of information from Mr. K. Walter, of 8 Fairfield Road, Caerleon, Nr. Newport, Gwent. Mr. Walter writes: "In his excellent book *Cichlids*, Dr. Robert J. Goldstein quotes the following passage from the writings of W. Heiligenburg: 'When the fish (genus *Pelmatochromis*) are bred in acid water (pH 4-5), there may be 90% males; at neutral pH, there may be 90% females. It is therefore suggested that species of *Pelmatochromis* be bred at varying pH values, to assure enough of both sexes to make distribution of the stock easy. The sex determining mechanism remains unknown.' As the genus *Pelmatochromis* is the only group of fish that I keep, may I add that my own experiences with these fish confirm Heiligenburg's statement." Mr. Walter kindly gave me permission to quote from an article he wrote, 'Breeding and the Community Tank', for publication in the Newport Aquarist Society's news bulletin. Mr. Walter's article deals with the breeding of dwarf cichlids—such as various species of *Pelmatochromis*, *Apistogramma* and *Crenicara* in the community aquarium. He writes: "... It must be pointed out that a beautifully planted, landscaped aquarium and breeding fish do not go hand in hand, so we have to reach a compromise. If we wish to spawn the dwarf cichlids we must provide suitable sites for them. These usually consist of flowerpots, coconut shells or easily dismantles rockwork caves. These must be positioned in the aquarium so as to give the fish a choice of spawning areas; and it is important that they be sited so as to give the fish occupying them a sense of security and to be easily defended against unwelcome intruders. Once placed in the tank these spawning media can, if the aquarist finds them offensive to the eye, be easily concealed by carefully placed plants. The choice of fish is quite considerable but it is suggested... that the aquarist confines himself to four or five species, for reasons which will become apparent later. When buying fish most aquarists think in terms of pairs of fish; but for the dwarf cichlid community tank it may be more practical to have more

females than males—say a ratio of about 3 to 1. The reason for this is that whereas most females are ready to spawn at about 4 or 5 week intervals, the males are willing and ready much more frequently; so by having a larger proportion of females the aquarist can be sure of making the most of the males' virility.

"Provided a sensible diet is offered, there is no need to specially condition the fish prior to spawning. A good staple flake food, with occasional feeds of live food such as *Daphnia* or white worms, is all the fish require. Sooner or later the urge to spawn will take them, and having decided to spawn it seems that nothing short of a major disaster will make them change their minds. The act of spawning is usually preceded by both male and female cleaning the chosen spawning site very carefully, a process which may take several days. Once this is complete the female, after one or two trial runs, deposits her eggs inside the flowerpot, coconut or cave, where they are immediately fertilized by the willing male which, during this initial move by the female, has been hovering close by ready to repel any other inquisitive fish. The eggs are quite small—about 1-1½ mm. in diameter—adhere to the wall of the flowerpot or coconut shell. At this stage it is necessary to remove the eggs and incubate them artificially. The reason for this is that no matter how protective the parents may be, the chance of the young surviving more than a few days in the community tank is practically nil. A useful additional piece of equipment here is a small show tank, say 8 in. x 4 in., into which the flowerpot, coconut shell or piece of rock with the eggs attached can be placed, using water from the community tank. To this must be added methylene blue or one of the commercially produced products such as Fungistop to help prevent the eggs from becoming fungused. Finally, an airstone is positioned close to, but not on top of, the patch of eggs, and the show tank then floated in the community tank. The eggs hatch after about 3 days at a temperature of 78°F., and the fry become free swimming in a further 4-5 days.

"It is at this stage that the aquarist with a single tank faces his greatest problem. The sooner the young are placed in a large tank, on their own, the better. Their growth rate is largely dependent upon the space available, so it will be seen that a second or 'growing on' tank is essential. There are many varieties of



baby fish foods on the market, and I have never found it necessary to keep cultures of live foods, hatch brine shrimps or the like, in order to raise the young fish to maturity. It may be seen then that the aquarist with one or perhaps two tanks can, with a little forethought, make the most of his fishes' natural instinct to raise a family of young fish. A considerable amount of pleasure and enjoyment may be obtained, and a wealth of knowledge gained, by the aquarist willing to try and breed dwarf cichlids in the community tank."



In a recent issue I wrote about the new journal of the British Cichlid Association. Since then Mr. Terry Green, the group's general secretary, sent me several copies of the Association's Newsletters. Like the journal, these are professionally printed and contain a lot of useful information for members. The Association's publications are of a high standard and it is obvious that a lot of keen cichlid fanciers are working hard to make the B.C.A. a success. I am sure readers who keep cichlids, and who are not already members of the Association, will give the group the support that it so obviously deserves. Mr. Green, whose home is at 12 Greenwood Meadow, Chinnor, Oxford, OX9 4JG, sent me the following reply to a query I posed concerning the election of officers of specialist groups. He writes: "... As secretary to such an association I think I might have something of interest to say. In our association officers are elected at an A.G.M. from nominations received—in theory anyway. In practice one finds that few people are actually prepared to stand; thus volunteers/pressed men are 'elected'. Very often specialist organisations find unconstitutional moves have to be taken in the election of officers; for example, I came to my present post via a temporary appointment as acting secretary when the general secretary

retired at short notice because of a change in his circumstances. In this type of situation committee members either need to unconstitutionally second a volunteer (unpopular with other members), call an E.G.M. (unsupported by other members), or allow the association to run with a major post unfilled, in our case the secretary's, an unthinkable situation. All I'm really trying to say is that whatever system is employed, whether it be a fish, philatelic or jazz society (my particular failings!), the only people who

serve as officers are volunteers. These volunteers have various motives of course. Many see positions as a source of power and prestige. They don't usually last long! Some take on the job because nobody else seems willing; and others have the well-being of their society at heart, or feel its policies and activities should be changed for the better. The B.C.A. has undergone a very major shake-up of late and is now a major force to be reckoned with when it comes to cichlid lore." (I'd be pleased to hear from members or officers of other specialist groups. Let me know whether or not you consider your group or society is being run satisfactorily.)

My thanks to Torbay Aquarist Society for sending me the latest issue of their interesting publication 'Toras Topics'. They are the only society to regularly send me their magazine. I hope they continue to do so despite the recent and hefty increase in postal charges. I hope that ordinary readers will continue to write to this feature despite the fact that a second class letter now costs 5½p to post. WYO? has been going strong now for quite a few years and I would be saddened to see it killed off by increased postal charges. If you have something interesting to say and can afford the 5½p postage please send your letters to me c/o *The Aquarist*. Please PRINT your



name and address and put the date on your letters.

Mr. B. White lives at 134 Audley Road, Hendon, NW4 3HG. He writes: "May I say how useful I find the snippets of information in WYO? each month. This must be the feature where there is nearly always something for everyone... Some six months ago I decided to breed angels, following the often described procedure I purchased six immature fish at 25p each. Now six months and three spawnings later I find my fish are in the £2.50-£3.00 class already. Who needs to breed with this kind of appreciation? Although I say three spawnings, the first was a failure. The next two were raised artificially in a separate tank. The first successful spawning was a model in every way; but the second spawning seemed most unusual to me. Of my six fish, four grew quickly; two seemed stunted so they were removed to another tank. Of the four left two were female and two were males. Notice I didn't say two pairs, because they were not. One male became extremely timid, while the other became dominant; and the two females continually bickered over who should attend the dominant male. Imagine my surprise when I returned home from work to find three fish—two females and one male—moving across the slate in unison. I watched closely and both females were laying; and the male was certainly fertilizing the eggs for most of them eventually hatched. I estimated the number of eggs to be well in excess of 900—possibly as many as 1,100. The slate was removed from the parents' tank soon after spawning—just as the two females were showing disagreement over which fan the eggs. I estimated a hatch failure of between 10-15%. Alas there is a sad end for while an enormous shoal of tiny ten-day-old angels swam in my tank, I was finding out that hatching brine shrimps is sometimes harder than hatching angels themselves! For some reason two consecutive batches of my brine shrimp cultures failed. Although I tried both red and green Tetramin baby foods, one morning very many fry were dead. Has anyone else found that their fry dislike dried food at this early stage?" (My own pair of angels spawned a couple of weeks ago; and two hours later they ate their eggs. The female spawned again yesterday but the male refused to fertilize the eggs. The pair of fish then had a brief fight and the female ate her eggs. Unfortunately, I just don't have the time to hatch any fertile eggs away from the parents.)

Mrs. L. Atherton's address is 59 Whitebridges, Honiton, Devon. She writes: "I have several tanks ranging in size from 60 in. x 15 in. x 15 in. down to small plastic ones and the occasional old sweet jar for temporary accommodation. All my tanks are planted—even the Malawi ones—and I feel that the planting enhances the appearance of the fish. Plants also provide cover for shy fish. My keyholes are always in their planted tank despite my children running

round the room. I find my tanks remain cleaner when planted; and, of course, most people find planted tanks more pleasing to the eye. I think Tetramin produce the best flake foods and I have had very good results using Tetra Ruby. King British Vit-A-Min has too much powder when one comes to the end of a tin; and Phillips flakes are very coarse. All have their advantages but I think it's perhaps best to use several kinds so that a more balanced diet results. Tetra flakes can be crumbled easily, don't sink too fast, and my fish eat them eagerly. I keep mainly cichlids and have recently bred 'kribs'. I found that, contrary to the books, it was my female that had a go at the babies, while the male has proved to be an exemplary father. I'm now hoping to breed from my pair of *Pelmatochromis guentheri*. Can anyone give me any information on them?" (I would remind readers that I do not necessarily agree with the views expressed by contributors to this feature. My own fishes' favourite British food is Phillips Superfood—at the moment—



but like Mrs. Atherton I like to feed my stock on as wide a range of foods as possible. I also use King British and TetraMin foods.)

Mr. G. Harrison's home is at 4 Teignmouth Gardens, Perivale, Greenford, Middlesex. He writes: "... I am having great problems trying to keep male fighting fish (*Betta splendens*). So far I have purchased two males, both from reputable dealers, and both have died within a very short time of buying them. The first one looked healthy enough when bought but became very weak about two days after being introduced into the community tank. He was found one evening lying on his side on the bottom. He showed pale coloration, split fins and fungus growths on the body near the caudal fin and around the head. He was placed in a quarantine tank but died the following day enveloped in fungus. I had no cure for fungus infections. The second one showed the same symptoms and I was shocked at the rapidity of the fungus growth from the mouth, gills, body and fins. Treatment with phenoxethol at a dosage recommended by Van Duijn in his book *Diseases of Fishes* slowed the progress of the growth



but did not prevent the death of the fish within the week. This second fish had been placed into a quarantine tank on the day he was bought; no other fishes were present so any bullying by fin-nippers can be ruled out. The water in the quarantine tank was about two weeks old and had been previously used to quarantine a pair of guppies and two kuhli loaches. None of these fish showed any signs of disease... The water temperature was around 75°F. I would like to point out that the female *Betta* purchased at the same shop as the first male fighter has given no trouble in this respect and is continuing to grace the community tank with her splendid appearance. I have noticed that it is common practice in shops to keep male fighters in small jam jars in such a way that they are on constant display to each other. They expand their gills, flash their fins and dash themselves

These are merely my opinions and whether right or wrong I do feel that the keeping of male fighters in this way is both unnecessary and cruel. I certainly would appreciate your opinions on this and would welcome any advice from those who have experience in keeping Siamese fighting fish. Another problem at the moment is the sheet of blue green algae that partly covers the gravel and plants in my community tank. I am aware that this unsightly growth is encouraged by waste matter, but would like some advice about ridding the tank of it. At the moment it is not very offensive; but any further development must be discouraged. I prefer not to use chemical treatments, if possible." (I'll leave the comments about fighting fish to the experts. As regards the algae problem, I'd have no hesitation in recommending AlgoStop. If used *exactly* according to the directions



against their cell walls in frustrated attempts to knock each other's blocks off! People watch spell-bound at the dazzling array of colours of these aquatic butterflies and they, like me, tend to overlook the few that lie on the bottom of their jars, collared with fungus and showing general malaise. Even the six or seven dead males I noticed thrown down the drain in a well advertised shop failed to make an impression on them.

"I now feel sure that this inhuman practice is responsible for causing injury to the fish, thus laying them open to disease—especially when they are transported home in this English weather. I would also think that the tension of being constantly encouraged to fight would lead to the ill health of these fish, especially when their attempts are frustrated. After all, look what constant stress can do to human beings!

supplied it should clear the problem with a minimum of trouble.)

For next month send me your opinions on the following: 1. How well has your tortoise survived its hibernation and when did it waken up? 2. How do you hatch and serve brine shrimps? 3. What have been your experiences with neon swordtails? (I had never heard of such a fish until a dealer friend told me he was getting some with his next order. I bought a pair when they arrived but cannot imagine how the label 'neon' got attached to them. I can see nothing faintly resembling neons in this variety of swordtail—and their colours are not particularly attractive.) 4. I am still waiting for comments about the breeding of good quality guppies. Please send me your opinions—if you have any. 5. How often do you have

*Continued on page 58*





## OUR EXPERTS' ANSWERS TO YOUR QUERIES

### READERS' SERVICE

All queries MUST be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Broomfield, Middlesex, TW8 8BN.

## TROPICAL QUERIES

Please give me some information about a fish called *Gnathonemus petersi*.

*G. petersi*, popularly known as the long-nosed elephant fish, is found in the freshwaters of Zaire. It reaches a length of about 8 in. and is a member of the African family *Mormyridae*. Mormyrids are very knowing and retiring fishes that are essentially bottom-livers. The tank for them should have thickets of plants to afford hiding places and a temperature of about 75°F (24°C) or slightly higher. The foods mormyrids go for are the sort that hop, wriggle or lie on the compost. In short, such things as live *Daphnia*, bloodworms, *tubifex* worms, whiteworms, swallowable earthworms, tiny fragments of raw red meat and so on. They also pull at and eat tuft-growing or mossy algae. *G. petersi* is a peaceful fish and if it is introduced into a community tank, its companions should be quiet-living and inoffensive. Given a good home, *G. petersi* should live for several years. I don't think it has bred in captivity.

I have a pair of mouth-brooding *Tilapia mossambica* and, after they spawned, the male turned very spiteful. Therefore I wasted no time in separating him from his partner. Yet because I did this, she spat out the eggs she was carrying and refused to take any further interest in them. The result was I lost the lot. What should I do if the fish are reunited and spawn again?

Give the fish a tank sufficiently large to afford the female plenty of hiding places behind tallish slivers of slate or granite. If the male persists in seeking her out and molesting her, that is after she has picked up eggs, then remove him from the tank with as little disturbance of the aquarium as possible. This can usually be accomplished if you wait until he is at the opposite end of the tank and then capture

by Jack Hems

him in a large rectangular net. Always bear in mind that a female mouthbrooder, with her cheeks swollen with eggs, or newly hatched fry, is usually in a nervy condition and should not be frightened or made uneasy in any way.

I am planning to construct a 96 in. by 24 in. by 18 in. fish tank. What size angle iron and thickness of glass should I use?

2 in. angle iron should prove satisfactory, but I suggest that you weld two flat tie-bars some distance apart across the bottom of the frame and a single tie-bar across the middle top of the frame. These bars would add strength to the frame and afford rigid support for the glass. With regard to the latter, use ½ in. toughened plate.

Please give me the names of some plants you can recommend for a 24 in. by 15 in. by 12 in. tank illuminated by an ordinary 60-watt strip-light kept switched on for most of the day.

I suggest you plant some clumps of *Microsorium pteropus* and *Cryptocoryne affinis* along the rear of the tank and at both ends and about a dozen *Sagittaria subulata* near the front of the tank where they will receive the best light.

I should be grateful for any tips you can give me regarding the cultivation of *infusoria* for my livebearer fry.

I cannot imagine why you require *infusoria* for livebearer fry. I have kept and bred a score or more of different livebearers over the past forty years and all I have ever used has come out of a small drum or packet or the pantry. That is to say, ordinary dried fish food or pieces of wholemeal biscuit pulverised to a fine dust. A few days of this and the fry will be large enough to be given crushed flake food, newly hatched gnat larvae, tiny *Daphnia*, micro worms, and the like.



I read in an old number of an aquarium magazine that the house plant called *tradescantia* will grow in the tropical aquarium. Is this true?

It is not true. The *tradescantias*, plain green or otherwise, just rot away after about a week under water. I do not believe there are any house plants which will stay alive for long when completely submerged, though the roots of some of the aroids such as *Monstera delicosa* may be guided through the aperture of a cover glass and into the water where they will help to absorb a lot of the waste products given out by fish. These aroids, however, must be raised in their pots above water level.

I should like to know the maximum size of the giant scissortail.

*Rasbora caudimaculata*, popularly known as the giant or greater scissortail, grows to a well-fleshed 8 in. or thereabouts.

I have just bought a plant called *Crinum natans*. I wonder whether you can give me any information about this plant such as its country of origin and its cultivation in the aquarium?

*Crinum natans* is a bulbous plant that belongs to a genus of plants widely distributed over Africa. They all like moisture at the roots and some of them from South Africa make good border subjects if given protection against frost. *C. natans* is one of the few aquatic species that will flourish completely submerged. However, it does demand a strong light and a temperature in the middle to upper seventies (°F). Also it requires a good surface area to spread its ribbon-like foliage which may grow to a length of about 3 ft. It should be planted in a deepish pot or tray filled with non-fibrous loam or clay topped with coarse grit to prevent the fish muddying the water.

My mains water is slightly hard and alkaline. What should I do to make it more suited to the requirements of my Amazonian tetras?

Pack an internal or external box-type filter with scalded peat (that is peat onto which has been poured boiling water) and top it with a thin layer of filter-fibres. Run your aquarium water several hours a day through this filter which will result in softer water giving an acid reaction under a pH test.

I have a community tank housing some rather large angel fish, Chinese algae-eaters, lemon tetras, black neons and red platies. A day or two ago, I noticed that the sides of the angel fish showed small patches as though the scales had been torn away. The angel fish themselves are eating well and do not seem ill. There are no pieces of rock in the tank on which the fish

could bruise themselves. Can you give me any reason for the missing scales?

The culprit is the so-called Chinese algae-eater known to science as *Gyrinocheilus aymonieri*. (And let me hasten to say that this fish hails from Thailand and not China.) *G. Aymonieri* has the habit, in its larger sizes, if not before, of swimming alongside a more sluggish-moving fish and attaching itself to its body. Its sucker-like grip usually results in a loss of scales or a sore or raw-looking place. If your algae-eater is addicted to this practice, the sensible thing to do is to remove it from the tank.

I was under the impression that the installation of an under-gravel filter would relieve me of the task of cleaning my aquarium. Yet after a few months, the surface of the planting medium has become coated with sediment which the bottom-frequenting fishes stir up. Please give me your answer to this.

Without the undergravel filter in operation you would have more sediment to get rid of than you have at the present time. U.g. filters are not miracle-workers. Dust-fine sediment drains through the grit and is assisted by suction, that is when the filter is working. Over the course of time, however, the interstices of the grit do become filled with larger particles of sediment. Hence the aquarist should give the floor of the aquarium a good siphoning every few months. This will remove all the vegetable debris that accumulates in any properly planted aquarium.

Can some strictly tropical fishes be conditioned to sub-tropical temperatures?

Years of domestication has resulted in some of the more accommodating exotic warmwater fishes adapting themselves to a lower range of temperature than obtains ordinarily in their native lands. Guppies, limias, paradise fish and various barbs and rivulins will often live and breed well in water that seldom rises much above 68° to 70°F. However, it must be borne in mind that an abrupt change of temperature may do irreparable harm to fishes used to living and breeding in tanks maintained at a regular tropical temperature.

I set up a shallow box with moist peat and introduced some whiteworms obtained from a local dealer. Although I gave the worms the right sort and quantity of food, they have failed to prosper and, in point of fact, appear to be dwindling away. Where have I gone wrong?

Probably the culture medium is too acid. It is advisable to soak peat in several changes of water before using it as a breeding ground for whiteworms which, if anything, flourish best in an alkaline or only mildly acid culture medium.



## GOLDWATER QUERIES

by Arthur Boarder

**I have a pond about 60 feet by 15 feet, and keep 25 small Koi in it. Recently I found five of them dead. They showed no sign of injury or disease. What could have caused their death?**

In such circumstances it is most difficult to pinpoint the trouble. Where only a few fish die and the others appear healthy it would seem that the water cannot be foul or else all the fish would have been affected. However, among a number of fish it is probable that some are not as strong as others and the weakest would soon die. One theory may be that the Koi have been reared and kept under warm conditions and then when the cold weather appeared the fish could not stand the sudden change in temperature of the water and so succumbed. You state that the pond is fed by a spring and that the water seems clear. I do not like this idea, as after heavy rains even the spring-water could be affected and contain harmful matter. Some spring-waters contain minerals and these could be harmful. You still have the fact that some of the fish appear to be unaffected and so one is bound to infer that the fish were not hardy enough to withstand the cold water. Although the fact was not stated, I presume that this was the first winter that the fish have been out of doors in the pond and if so this may substantiate my suggestion re cold. I suggest you cut off the spring-water supply as a test.

**I have had a garden pond in fair condition for some years but this winter I have lost a few fish. Do you think the pond should have been cleaned out?**

I consider that any small or medium sized pond needs cleaning out every late autumn. If a pond contains fishes which have been fed fairly regularly, it is absolutely certain that there will be a lot of mud or mulm on the bottom. If this is not cleared out every year then it can build up to such an extent that not only does the water become foul, but the depth of water can be reduced considerably. Even a natural pond can silt up in time and become little more than a reed bed. If you empty your pond I am sure that you will find a quantity of stinking muck on the bottom. The effect of this decaying matter on the state of the water will soon be appreciated unless you have no sense of smell. A lot of

trouble with ponds is caused by the pondkeeper trying to be kind to his fishes and feeding more than the fish can easily clear up in a short space of time. Set up a pond with water plants, allow them to get established and give no food at all and I guarantee that the fish you introduce will remain healthy. It is a well-known fact that few people who put fishes into a fresh pond can resist feeding them as soon as they are out of the container. The fishes will probably be upset by the travelling or the different type of water and will not eat and so the food starts to foul the water. More food is given although the fishes are not eating it and the water soon becomes polluted and then the owner wonders why the fishes die.

**I am constructing an 8 ft. x 3 ft. x 15 in. tank entirely of wood as glass is too expensive. What water-proofing should I apply to the inside of the tank?**

I hope that you will have success with your venture. About sixty years ago my brother and I tried to make a timber-framed tank. It looked perfect when it was finished and was a joy to see. Unfortunately it had only one fault, it would not hold water no matter what we did. You say that glass is expensive; have you enquired the price of timber recently? I had a shock lately when buying a small amount. The price was almost twenty times what I used to pay. As for water-proofing the tank, I think that the only sure method to adopt will be to line it with a liner. Get one of the coloured types and not the black butyl as this will not look as good. If you want to use a liner then you will have to prime the timber well with a good primer and undercoat and then finish with a couple of coats of bitumastic paint. Wash out well before using and this should be all right. If the timber warps at all, the liner may be the best method to use.

**I have a 5 ft. tank and intend to keep two 10 in. Rainbow Trout in it. I have a large output power filter and water pump to create running water conditions. My problem appears to be that I wish to keep the tank in a room where the temperature is 20°C. (68°F), and could be higher in the summer. Do you have any suggestions as to how I could keep the water cooler?**

It will not be easy to keep two Trout the size



you state in a room. As you appear to appreciate, these fish like a cool, clear, running water and those I have seen in captivity have been in rather cold conditions with freshwater being forced into the tank at all times. I can only suggest that when the water is too warm, you drop a few cubes of ice from the fridge into the tank. You would have to watch that too many could necessitate the removal of some of the water occasionally. There is one method of aerating your tank which I recommend. Instead of forcing air into the tank from your warm room, you could arrange for a pipe to run from outside to a special chamber from which the aerator procures its air. This could be cooler than the air in the room. I think that the Trout would be unhappy in warm water because it would not hold as much oxygen as would colder water.

**I raised a number of Oranda fry but have now lost most of them. They were in a tank and I noticed that there was a film on the top of the water. What could have caused the death of the fry?**

You did not state the size of the tank. It is most important to give the fry plenty of space once they reach about an inch in length overall. The film on the top of the water suggests that you had gone wrong with the feeding. This is so easy to do. If the fry are seen to be taking food vigorously the aquarist may have the tendency to give that little extra which may remain uneaten. Just one day's overfeeding can cause the loss of all the fry in a tank. There must have been something decaying in the tank to cause the film to form. You did not say on which foods you had been rearing the fry. I have found that some foods appear to upset the condition of the water more than others. One of the worst which I have found is egg-yolk powder. I know that some breeders use this food for fry successfully but I found that it not only polluted the water but caused the fry to develop fungus disease to their gills. When you get another spawning see that the fry are not overfed and if there are plenty of water plants in the tank you will notice that the fry are practically continuously pecking at the plants for fine *algae*. Remember that a hungry fish is usually the healthy one.

**I have recently bought a Koi carp about six inches long. It has suddenly developed a curved body. What can have caused this?**

Curvature of the spine known as *Skoliosis*, may be due to hereditary causes. This may sometimes happen when fish have been bred continuously from related fish, in other words, in-breeding. In such cases it may be impossible to effect a cure. It is also thought by some authorities that this trouble

could be caused by something lacking in the diet. A deficiency of certain vitamins may be one of the causes. It would therefore be a good plan to try some different foods, including as much live foods as possible. Some soft vegetable matter such as boiled spinach or green peas might also help. A water temperature of about 70°F, might also help, but if these treatments do not give an improvement in the condition of the fish, then there is little hope for it and the fish should be destroyed.

**I am thinking of constructing a pond for coldwater fishes. Would one 8 ft. x 7 ft. x 3 ft. be all right? Is heavy duty polythene good enough and where can I buy it? How can I prevent a stagnant pool forming and what plants do you recommend?**

The answers to your more important queries can be found in my book, "Coldwater Fishkeeping", and if you have this book on hand it will prove very useful as a source of advice on pond maintenance, etc. The size proposed for your pool is all right but there is no need to make it 3 ft. deep. 2 ft. deep is quite enough. You can get a plastic liner from the firm whose address I have enclosed with my letter. As for the pond becoming stagnant, of course any garden pond will contain stagnant water unless it is supplied with a waterfall or fountain. I expect that you mean that it could become foul. To prevent the water becoming foul it is necessary to have sufficient water plants and to refrain from feeding when the fishes are not on the feed. As for replacing some of the water occasionally, I note that in your sketch you show a drain not far from the proposed pond. This will be useful as a means of getting rid of polluted water when a change may become necessary. When you make your pond, do so at the highest part of the garden and the earth removed from the site can be piled up all round the hole so that when the liner is fitted much of the water will be above ground level. This will make it easier to attend to and much of the water can be siphoned out to the drain with a hose. The best method for this is to place one end of the hose inside a container with holes in into the pond. Then take the other end of the hose away towards the drain. With a water can, pour water into the end of the hose whilst holding it as high as possible. When plenty of water has been poured in, quickly lower the end of the hose down the drain and the water will flow away until the level of the water is obtained. By placing the pond end of the hose in a container you prevent fishes and plants from being drawn up.

You could have a small growing water lily, and some Hornwort, *Ceratophyllum demersum*; *Egeria densa* and *Lagarosiphon major* for underwater oxygenating plants.



# VIEWPOINT

by A. Jenno

THE application of correct lighting to aquaria, to obtain successful plant-growth in both freshwater and marine environments, is a subject which causes much concern to both beginners and experienced aquarists. Some aquarists even become so frustrated with their failure to grow plants that they make excuses. "That tank won't grow plants," "my water's too hard," and "the fish eat the plants" are all common reasons given. This approach gives the impression that the speaker is a good aquarist who is unfortunately faced by some mysterious law of nature which prevents plant-growth in his aquaria, regardless of anything he does. What nonsense. The truly aquatic plants which grow entirely submerged in the wild are water weeds pure and simple and only require very straightforward artificial conditions to encourage them to flourish in abundance. Four environmental factors are important, these being temperature, water condition, availability of food substances, and light.

The well-known Midlands plant expert, Martin Harvey, starts off his society lectures by informing his audience that he keeps plant-tanks, not fish-tanks, i.e. many plants and very few or no fishes. This is a very essential point. Martin's argument is that anyone who insists on keeping a large quantity of fishes in a small aquarium should not expect, and will not achieve, lush plant growth. Too many things are against the plant's chances in that situation. For instance, it has been said that freshwater fishes produce 25 per cent of their own body weight of urine *per day*. Imagine a natural plant-filled lake. The fish population is very small if we compare total fish-inches to plant volume. Also, in aquaria nowadays we are all using powerful airstreams, air-lifts, and filter returns which benefit the fishes, but leave the plants at a disadvantage with regard to their necessary acquisition of carbon dioxide. As is well known, plants absorb carbon dioxide and give off oxygen during photosynthetic activity, but aquarists should realise that in a very turbulent oxygen-rich environment the plants may not find enough of this essential gas to carry through their natural functions, and so can suffer as a direct result of this condition. Most plants are also unnaturally disturbed by the relatively large turbulences and unusual water flow patterns created in small aquaria by our modern cleansing mechanisms. I

would agree then, that the very best plant-growth will only be likely to occur in plant-tanks where the fish population is minimal at least and where normal gaseous exchanges can take place unaffected by artificial disturbances. These are those aquaria usually classified as "natural" systems. There is no reason to suppose that marine plants (or more correctly advanced algae) are much different in these requirements, as they also seem to grow best in quiet, sheltered places.

Going back to our four important environmental factors as given above, we can easily provide correct temperatures, water conditions will be suitable if the fish population is small and the water is static or almost so, and plant food should be available in any established, mature aquarium or can be initially included in a new one. That leaves light as the factor to deal with in some detail.

Many, if not almost all, indoor aquarists nowadays rely on artificial illumination for their aquaria and, of course, we are now dependent upon fluorescent lighting in the main and, indeed, on specialised types of fluorescent tubes in particular. Some aquarists do still use ordinary tungsten filament lamps and strip bulbs, but their many disadvantages such as heat production, short life above aquaria, etc, make fluorescent lighting far more economical in the long term. Unfortunately the high initial cost of fluorescent systems is a contributory element in the failure of many aquarists' lighting installations.

It is quite understandable if a beginning aquarist assumes that he will get good plant growth when he is supplied with an eighteen-inch Gro-lux (or similar) tube and its auxiliary equipment to fit over a two-foot long aquarium at a cost of around five pounds. How wonderful it would be if this were automatically true. If we could obtain good plant-growth by just spending money aquarium keeping would be simple indeed. It just so happens that an eighteen-inch tube is the most convenient standard size to put in the usual type of two-foot aquarium hood, and similarly other hood sizes will obviously only take certain maximum tube lengths. The power, and hence the light output, of a fluorescent tube in a direct function of its length, e.g., 24 in.—20W, 36 in.—30W, 48 in.—40W, etc. Both the above points are mechanical

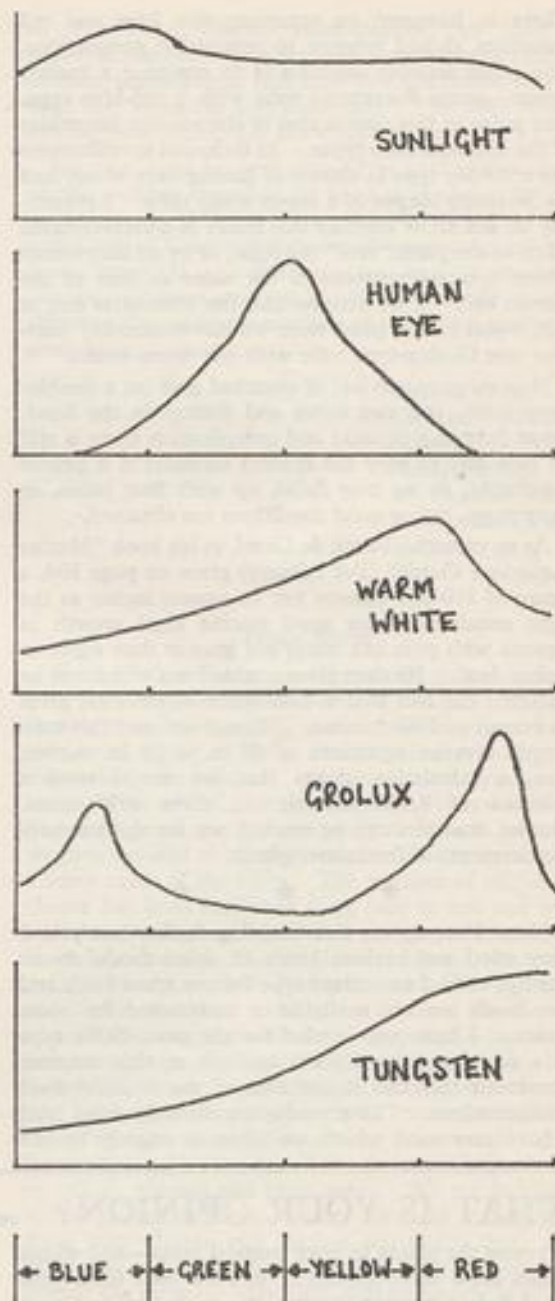


limitations of the tube lengths commercially obtainable. It is therefore tempting providence in the extreme to assume that by sheer coincidence a tube which best goes into a certain sized hood will also produce optimum plant growth in the correspondingly sized aquarium. Eventually, when the aquarist realises that his plants are not growing well he is more likely to accept poor results than to go out again to buy more lighting units to add to or replace the one he already has. Thus, there are a number of aquarists about who for these reasons have never had a successful planted aquarium and are never likely to do so. Fishes are naturally most aquarists' prime interest and plants, therefore, often come a long way after. A fish-tank with no plant growth included can be interesting and still attractive, but those with unsuccessful plant-growth are almost always nothing more than a mess.

To start at the beginning then, we must understand that plants need artificial light of the same, or very similar, type and intensity as the daylight which occurs in their natural habitats. Tropical sunshine is strong and is generally not weakened by clouds or other atmospheric influences for long periods, sometimes for months, in some parts of the world. The tropical day is of almost constant length all year round, and the temperature differences between seasons may not be very great. For discussion purposes we can split daylight up into four separate colour bands, blue, green, yellow, and red, in ascending order of wavelength. Sunlight can be said to contain all of these colours equally for our purposes, and the crux of the matter is that no one artificial light source can duplicate this situation. Tungsten light has a high red content, an ordinary fluorescent tube such as the warm-white type has lots of green and yellow, and the specialised Grolux tube and its equivalents have high concentrations of red and blue.

A further complication occurs if we consider the spectral response of the human eye. Things look right to us when illuminated by light which contains a high percentage of the green and yellow wavelengths, because this is the part of the colour spectrum to which our eyes are "tuned in." Thus Grolux and similar lighting makes things look different to us because the prominent red and blue light content enhances the red and blue colours in the objects illuminated, or conversely, apparently weakens the greens and yellows. We may like this effect or we may not, that is a matter of personal taste, but the point is that even good healthy plants tend to look pale and weak, and poor ones look terrible.

Thus we need to install artificial lighting which will grow the plants *and* portray their proper natural appearance to the human eye, or else they will not look right anyway. Tungsten lighting comes very close to this ideal as it contains a fair amount of green and yellow light besides the prominent red, and if lamp



### SPECTRAL CHARACTERISTICS

units which were more efficient electrically and mechanically stronger were available it might provide a near answer, even allowing for its lack of blue light.



There is, however, an argument that blue and red quantities should balance in reasonable proportions. The more sensible solution is to combine a mainly yellow—green fluorescent tube with a red-blue type. One point in this case is that of the relative intensities of the different tube types. In technical specifications the red-blue type is shown as having only about half the intensity output of a warm-white tube. I personally do not know whether this refers to a measurement taken as the plant "sees" the light, or by an instrument whose spectral response is the same as that of the human eye. If we assume that the intensities are, in fact, equal to the plant then we can reasonably combine one Grolux-type tube with one warm-white.

Now we need two lots of electrical gear (or a double-lamp unit), and two tubes and fittings in the hood. Apart from the expense and complication there is still no easy way to vary the applied intensity if it proves unsuitable, so we may finish up with four tubes, or even more, before good conditions are obtained.

As an example, Frank de Graaf, in his book "Marine Aquarium Guide" (Pet Library) gives on page 104, a figure of 100-200 lumens per 16 square inches as the light requirement for good marine algal growth in aquaria with pure salt water not greater than eighteen inches deep. He then gives a table from which can be obtained the fact that a 40W warm-white tube gives an output of 1880 lumens. Thus if we used this tube length over an aquarium of 48 in. + 15 in. surface area, a calculation shows that we would need a *minimum* of 4,500 lumens, i.e., three 40W tubes. Similar examples can be worked out for the intensity requirements of freshwater plants.

\* \* \*

Since I set up my fish-breeding facility last year I have tried out various kinds of dried foods, in an attempt to find a standard type for use when fresh and live foods are not available or convenient for some reason. I have now settled for the trout-pellet type in a fine, granulated form and am at this moment convinced that this is the best of the artificial food configurations. The granules are the only dried food I have ever used which are taken as eagerly by the

fishes as is live food. In fact, they will eat so much of it, if given, that they have to go away and rest afterwards, as in common following a good feed of white warm or *daphnia*. I no longer buy flake, freeze-dried, etc., etc., and feel that this relatively new formulation can only be an improvement. I should stress, however, that the fishes still get their liver, peas, etc. in their diet.

One point regarding all dried foods is that of the vitamin content which can be easily lost from all these preparations if the food is exposed to the air directly or stands in a badly-sealed container for a long period. Thus people who buy in bulk for long-term economy should either split the bulk supply into small properly-sealed packets, or should feed other foods in addition which will provide the fishes' vitamin requirements, such as fresh liver.

Graham Cox discussed the condition of *Avitaminosis*, which results from vitamin deficiency in the diet ("Marine Queries"—February) and further spotlighted the consequent possible development of *Anorexia*, which is complete disinterest in food. I have acquired freshwater adult fishes in this latter condition following the purchase of second-hand aquaria with fishes included. In the last case I enquired and found that the previous owner regularly bought the largest possible tin of a particular flake food and fed this without any other additions for months and months before it was all used up. The fish concerned was in a very bad way and did not, in fact, recover even though offered other foods in variety, and naturally its original aquarium water was thoroughly foul through the deterioration of all the food left uneaten.

The problem in using these commercial fish-foods where very many fishes are kept is that of the expense. I fail to see how or why a tropical fish food and a goldfish food made by the same manufacturer from the same ingredients should be so different in price for comparable quantities. In future I shall buy trout pellets in the pond-food containers and grind them smaller for my tropicals. I have a friend whose marine fish (Scorpions, Groupers, Tangs) eat them voraciously and grow very well.

## WHAT IS YOUR OPINION? continued from page 51

to prune the plants in your tropical tanks—and which plants grow most quickly? 6. How well have your pond fishes developed after the fairly mild winter? 7. What pond plants would you recommend for a complete beginner? 8. What is the best public aquarium of which you know? 9. How popular are powdered dried foods with specific species of fry? 10. If you show fishes, why do you do so? 11. Photograph 1 shows a green male sailfin molly. For how long have you been able to keep such a fish alive?

Have you found that the colour tends to fade with each new generation in a given strain? 12. Photograph 2 shows an attractive *Corydoras* species. Please send me details of your breeding experiences with catfish. 13. Under what conditions do you cultivate water wistaria *Synnema triflorum*? Photograph 3 shows a couple of baby 'kribs' amongst wistaria plants. I've posed a lot of problems this month and look forward to receiving your letters—even at 5½p per time!





### Nudge, Nudge

We have just returned home from yet another show which will be blacklisted next year. Some clubs or societies will have to brighten their ideas otherwise they will find that they will not be getting people to attend their shows. It's not that we haven't won, it is that they have put their entry fees up to 10p and upon winning you get nothing but a card to tell you so. A friend of ours today took a section and got nothing. Surely with the price increase they could manage to give good section prizes and aquatic aid for 1st, 2nd and 3rds which are usually donated for the price of a stamp? If some clubs can do it and make a small profit why not others? We, and many of our friends, hope this will give certain clubs (no names) a big nudge to do better.

D. and P. Birdsall  
23 Vesper Way  
Leeds LS5 3LW  
Yorkshire

### Appreciation

I would like to praise Armatage Bros (Gussie Products) for their prompt attention and kind offer of a replacement Gussie air pump, with their compliments, while mine was being checked at their factory. Thank you "Gussie".

F. R. Severn  
95, Stanley Rd.  
Chadderton  
OL9 7HA  
Lancs.

### Enlightenment

In your March edition, in 'Viewpoint,' the writer regrets that not so much has been heard of Dr Feroze N. Ghadially of recent years. Dr Ghadially is now residing in Saskatoon, Canada, where he has been for the past few years. He is however still a member of this Society and we would be happy to forward any correspondence.

Turning now to the article on Discus by E. Schulze, one does not need to turn to either Germany or the U.S.A. for drugs to try in the treatment of hexamitiasis

in *S. discus*. 'Flagyl,' manufactured by May & Baker, in this country, is available from any pharmacist, without prescription, will cure this condition, so one need not 'expect to lose these fish.' The dose rate is 200 mg (one tablet) per cubic foot of water.

No one need be embarrassed in asking for these on the grounds that they are used in medicine for the treatment of V.D. as they also employed in the treatment of Gingivitis (ulcerated gums), Amoebiasis (both intestinal and liver abscess) and some other diseases. Recent research has found that the drug is effective also against a number of infections involving gram negative bacteria.

Donald Cook,  
General Secretary,  
British Aquarist  
Study Society,  
48, Peplins Way,  
Brookmans Park,  
Hatfield,  
Herts.

### Open Show

Over the last few years of running an open show the members of the Middleton & District Aquarist Society have been gaining useful experience and have also been trying to keep abreast of the hobby by improving the classes available. Last year, for instance, we added a section for Rift Valley Cichlids. For our open show this year, only the 4th to be held, we have decided to try to give the coldwater enthusiast a fairer crack of the whip. The number of coldwater classes has been increased from four to ten and now includes common goldfish and comets, shubunkins, Veltails, Orandas, Lion Heads, Moors, Fantails, A.O.V. Fancy, A.O.V. European and A.O.V. Asian and North American. As it was felt that the owners of such fish might not be too happy at having them judged to tropical standards, the service of Mr. Les Baxter has been acquired. Mr. Baxter is a senior "A" class coldwater judge, and will spend the duration of the show on this section alone. An annual trophy for the best coldwater fish of the show will be awarded as well as plaques and prize cards. We are indebted to the Osram Aquarist Society for help in selecting these new classes and further comments from any coldwater enthusiasts together with their valued support at the show on May 18th, will be greatly appreciated.

Kevin Smith  
p.p. M.A.D.A.S.  
Committee,  
49, Marlfield Street,  
Manchester,  
M9 1BA



# From a Naturalist's Notebook

by Eric Hardy

WHILE SANCTUARIES for the world's diminishing turtles caught on among governments subjected to conservation pressure-groups, there are loopholes in last October's Australian Government fisheries notice, to prohibit commercial culling of turtles in Australian waters beyond territorial limits. It doesn't prohibit turtle-farming inside territorial limits, and aborigines may still take turtles for food. Its primary aim is to curb Indonesian fishing, which was also behind the extension of its Continental Shelf (Living Resources) Act, to prohibit taking beche-de-mer, razor fish (*Pinna dolabrata*), *Trochus* shell, greer snail, *Abalone* and pearl-shell at the Ashmore and Cartier Islands—excepting by licensed persons.

One of the most beautiful of pictorial publications on conchology, the study or collection of molluscs, sent to me recently for review, is *Shells in Colour*, a lavishly-illustrated book by the American conchologist Dr R. Tucker Abbot (Pelham Books, £4.25). Its 112 pages are largely a cradle for Kjell Sandved's 101 colour-plates of some of the rarest and most glamorous shells in the world, the pride of the collectors' cabinets rather than a guide to the shells you would find on the coasts of Britain. Printed in America, it has the irritating habit of using American spellings, like mollusks with a k. Starting with a broad and sensible description of the shelled molluscs, it then groups the illustrations and their references into their families as the Abalones, the limpets, top-shells, whentetraps, conchs (pronounced konks), cowries, murex, the highly priced if venomous cones, and finally scallops, chitons and the chambered nautilus.

I wonder how true are all these glamorous pictures of fresh, cleaned and polished univalves, for while the text describes the well known Pacific cowrie *Cypraea asellus* with three characteristic broad black bands, its colour-plate clearly shows coffee-brown bands. The rebirth of interest in conchology in recent years will welcome this new book. But it is largely a work for collectors, making full use of modern colour-photography. The Admiral Cone, from the southwest Pacific, is placed the highest of the 2,000 dollar collector's items, owing much to its rarity; but the once considered rare Miraculous Thatcheria, of Japan, is now caught up in moderate numbers in fishermen's nets. Unlike our native scallop, which swims by flapping its valves, the tiny glassy *Cavolina trispinosa* swims through the sea with fleshy, flap-like wings until pelagic fish or whales catch it. The cockle

leaps by flicking its foot. Our common green crab is claimed to devour half-a-dozen cockles in 24 hours. The moon-snails escape from predatory starfish by extending a slippery mucous envelope, or cape, over their backs. In some countries where land forms of hermit crabs exist, collectors who cleaned out their trophies and left them to dry overnight on the sands, had their shells appropriated by these crabs, as a protection for their soft bottoms.

Once more, phoney naturalists have been at work forecasting the sort of summer we shall have. In February, a national paper quoted some would-be reader of the secrets of nature predicting a good summer because toads were spawning deeper than usual. As if they didn't learn from the astonishing mildness of last winter, after some yokel in the Cotswolds conned a newspaper reporter into stating that a hard winter was on the way because snails were hibernating deeper than usual, when many didn't hibernate at all.

As mentioned at a recent annual meeting of naturalists in Cheshire, scientific naturalists resented association with this recent glut of predictions of the weather, seasons ahead, from people so inexperienced of natural life, and so ignorant of the reasons behind what they saw in animal and plant behaviour, that they made these unfounded guesses. This is different from scientific interpretation of averages in meteorological statistics, from winds and pit-pressures, recorded on any good barometer, for short term changes.

No animal or plant (or human) has any occult power of forecasting weather-changes which have not yet formed. These responses are due to present or previous weather conditions, excepting for inbred cycles like the circadian rhythm which, for example, makes a swallow migrating from Spain under good weather fly to death in bad weather when arriving here because it has no foreknowledge of the weather here. Toads spawn when water temperature is suitable, earlier on high land, where frosts finish earlier, than low ground, where late frosts linger. They choose shallow water when it is weedy enough for them to drape their chains of spawn among the plants; in deeper water, lacking so much top-vegetation, they go deeper into the bottom plants. Wildlife responds to changes in air-pressure slower than the barometer.

The best answer to the modern cult of the occult was the outbreak of war in 1939, when, as *Punch* quoted, the magazine *Prediction* closed, quoting "the uncertain future" for this.

With similar uninformed reporting, newspapers began March with a story of a "monster" which came ashore on the North Wales coast and scared a bunch of schoolgirls. Obviously, from the statements liberally quoted, but only from these girls, about its head and clawed feet, they were not sufficiently informed on marine mammals to interpret what they saw—presumably the first bull grey seal hauled-out in their lives. A reporter once phoned me when a girl, bathing on the shore, brought him a dead great crested grebe she had found. He wanted to know how "rare" was this bird. When I told him that "rare" was the most misused word in bird "news", that it could be seen on the sea any day in winter, that up to 300 were often counted in offshore flocks, and he had better forget it, he protested! "But it's a story! I can't ignore a story!" "Then don't for heaven's sake call it rare," I added. Next morning it appeared, headlined "Rare Bird," and quoted me, quite wrongly, as saying it was a rare visitor to the coast.

The worst came last winter when a lad caught a short-spined sea-scorpion, or father lasher, in a disused Liverpool dock. It received a great splash of news as a rare stonefish which had migrated from the Australian barrier reef! Despite the fact that such a venomous fish would have meant the death of any captor, the sole foundation for this story, I discovered on visiting the lad and seeing his fish in the bath, was a single fish-picture which, though totally different, he had "identified" it by, in Newnes' encyclopaedia. The fact that the lad couldn't even pronounce Newnes, and that he had no books or knowledge of fishes, didn't check this chance for "a story."

How wonderful to be at school again and enjoy happier modern methods of education, far from our memories of Crabby Aggy and the unnatural history we were brought up in. Recently I spent an evening giving some desert collecting experiences as a briefing to a party of lads in Shorefield comprehensive school, in the Dingle, one of Liverpool's toughest quarters, who, by now, will be on their way trucking across France, Spain, Algeria and the Sahara to the famous Hoggar mountains of northern Nigeria, a two months trip. They will spend a week at the Hoggar and a fortnight in a wadi on serious field-studies, guided by an intrepid geography master leading his fifth school expedition across the desert.

They produced a 25-page report with maps on their previous expedition. From a border post at Mali, they visited haunts of hippo and catfish on the River Niger, but found the native's charges for rowing them over beyond their means. They finally settled with

tins of margarine. This two months' expedition of 18 members is costing about £2,500, each of the boys contributing £100 and the rest coming from donations by local industry, plus an education grant. Years ago, these sorts of expeditions were confined to rich public schools. The first summer camps for schoolboys were started early this century at Grasmere, for Manchester Grammar School. Now the wheel has come full circle to share the opportunity of exploration and field-research among all who can benefit from it.

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My apologies to Mr W. G. Hartley. My March article was not intended to imply any cry for help by the famous Quekett Club. In line 4 of paragraph 2, "in" should be substituted for "by". The Quekett, I am assured, is as strong as ever and extremely active.

E. H.

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# LIVING WITH OSCARS

by Linda A. Robertson

IT ALL STARTED when we wanted to fill a 4 ft. 6 in. tank with some large fish. We saw three three-inch Oscars and home they came. For a few days all seemed to go well until two started to gang up on the other one. We had to remove the poor thing and take it back. If I'd known what was in store they'd probably have all gone back!

I soon got used to chopping heart and liver for their ever-open mouths. We even dug the garden when they had a spell of eating only earthworms. They were so greedy that on one occasion one of them came out of the tank to get the food as I lifted the lid. I grabbed the dog whilst my husband chased the Oscar across the floor, picked off the dog's hairs and put it back in the tank.

They grew rapidly and were soon seven inches long and consuming vast amounts of food. Then about a year ago the fun really started. We had wondered from the beginning if they were a male and female when they wouldn't tolerate the other Oscar. When they started throwing each other around the tank we were pretty sure. We had to drop the water level of the tank by three inches to stop the floor being regularly soaked; we also had to warn visitors about the sudden splashing and other strange noises. The normal tungsten bulbs had to be replaced with pigmy bulbs as these made a smaller target for splashes and I was beginning to get fed up with changing broken bulbs two or three times a week.

After the one we thought was a female had had her bottom lip ripped right off in a particularly passionate moment, we decided to put in a tank-divider until their battle scars had healed. We found that painting the wounds with a 0.01 per cent solution of acriflavine helped healing. That wasn't quite as easy as it sounds; taking the fish out of the tank meant giving the room and ourselves a shower-bath. The splashes actually hit the ceiling on one occasion. The tank-divider seemed to be in position more often than not for the next nine or ten months. The male's breeding tube was showing most of the time and several times we thought they were about to spawn when they were together. I made the mistake of touching a piece of slate they'd been cleaning; not only did they attack my hand, they really glared at me for hours afterwards when I approached the tank.

Then there was the Sunday morning we came home and found broken glass in the bottom of the tank. It wasn't the light bulbs; then we realised that the heater element was no longer enclosed in glass! We switched off everything and searched the gravel for

the fragments of glass. That was the start of a spell of attacking heaters, thermostats and air-lifts. We had to watch the tank temperature because they "adjusted" their thermostats by banging them against the side of the tank! We built cairns of rocks round everything but that didn't deter Wimpey and McAlpine, as they were now referred to. What they couldn't push over, they undermined; it was a waste of time trying to arrange their tank. They really are intelligent fish; one day the male was digging a pit in the gravel. The mouthfuls he was depositing on the rim kept falling back in and he was getting quite cross. Suddenly, he stopped, looked at the pit for a moment, then took a mouthful of gravel the full length of the tank before he spat it out. They also enjoy pulling the floating plants down and watching them rise to the surface again.

The funniest moment was when we were sorting out the runts from a batch of baby swordtails. We put one in to the Oscars to see if they would bother to eat anything so small. The sight of two fat nine-inch Oscars cowering in a corner away from a  $\frac{1}{4}$  in. swordtail has to be seen to be believed. The swordtail was still cornering them three hours later but he disappeared during the night; the Oscars must have been braver in the dark!

For the last two or three months Wimpey and McAlpine have been living in peaceful co-existence. Their pre-spawning behaviour has been much gentler. Knowing that our local water is very soft and acid, we put a shell in the tank to try to harden the water as the books recommend for spawning. It was not meant to be a toy but it's been buried and dug up again more often than the dog's bones. Being in the middle of decorating the house, we've neglected the regular water changes for several weeks and on more than one occasion the Oscars haven't been fed.

Last night when I switched the lights on to feed them I was "threatened" and they didn't want to know the tempting pieces of steak they usually fight over. There, on a big flat stone on the bottom of the tank (it was hiding the heater two days ago!), were about 500 eggs. I spent most of the evening watching them fanning and cleaning the eggs, taking it in turns. The eggs are still there this morning and the proud parents are still tending them.

I think I'll put up with buckets of water "ageing," mopping up the tidal waves that regularly spill onto the floor and keep cutting up the heart and liver because suddenly it's all worthwhile.

# NEW LIGHTING SYSTEMS FOR AQUARIUMS

By J. D. Adams

I HAVE BEEN aware of the tremendous importance of adequate, balanced lighting in both marine and freshwater aquariums for many years. Simply providing a faithfully reproduced habitat, in terms of gravel, rocks, plants or corals is not sufficient and animals and plants that have evolved under natural sunlight quickly deteriorate when cultured indoors under conventional artificial lighting. Until recently, in Britain, however, it has not been possible to acquire an artificial lighting system that gives the advantages of natural daylight within aquatic closed systems.

For approximately six years now I have had fair results in culturing a wide variety of light sensitive invertebrates including *Tridacna* sp. (clams), *Trachyphillia* sp., *Goniapora* sp. (medrapore corals) and other Coelentrates including anemones many of which contain Zooxanthellae (symbiotic algae) living in their cells. Sometimes the animals in question deteriorated and died as a result of a partial breakdown in the stability and quality of the water; on other occasions the death of the very important Zooxanthellae were partly to blame. Obviously many factors must be considered as contributing to the lack of success in these cases, notwithstanding the overall limitations and artificiality of aquatic closed systems. However, in trying to discover a common denominator, I believe light, or I should say lack of it, deserves a close scrutiny.

Light being a form of energy can and does change the molecular structure of water. Poor lighting of inadequate spectrum structure, not only low lumens output, will undermine the quality of aquarium water, especially synthetic sea water and render it unsuitable for the long-term culture of aquatic animals and plants.

This process can be slowed down by the addition of some filament bulbs working, in conjunction, with one of the many types of normal fluorescent tubes available. The effects of shafts of light from a spotlight, cutting through the water is also very attractive and reminiscent of sunlight playing through natural bodies of water. Using a combination of one 100 watt spotlight to 20 watts of North light fluorescent per one metre of aquarium length, I have kept many species of marine invertebrates and algae for periods in excess of three years and maintained in my opinion good water conditions. I was never totally satisfied however with the stability of the systems; something was missing and that something was of course natural sunlight, nature's primary energy source.

Now, with the introduction into Britain of a wide spectrum tube, True-lite by Duro-Test, many of the problems involved in the culture of marine invertebrates, fish and plants in aquariums have been overcome. True-lite has been available on the Continent and in America for some years now and I first saw it in use at Wilhelma Zoo, Stuttgart, three years ago, where they have had astonishing success in breeding and rearing a variety of marine fishes sometimes through several generations. Dr. Lange, curator of the aquarium there, puts a lot of emphasis on correct lighting both in the aquariums and the impressive reptile house where the therapeutic properties of True-lite have helped prevent the outbreak of a number of skin infections normally quite common in reptiles and fish housed in systems where inferior lighting is used.

Houston Zoological Gardens, Texas, also use True-lite and have reported improvements in the

continued on page 65



# THE HALF-STRIPED BARBEL



Written & illustrated by Jack Hems

NOT A FEW tropical aquarists, anxious to keep electricity bills down, will find in the half-striped or green barbel a species worth having. Firstly, it appears to suffer no ill-effect if the temperature of the water drops very gradually from the middle seventies (°F) to the middle or upper sixties (°F). Secondly, it may be rested at this lower range of temperature for weeks on end.

There is much more in its favour, too. For one thing, it is a peaceable species that minds its own business and may be kept with much smaller fishes excepting swallowable fry. Next, it has a life span of upwards of four or five years. Finally, it is no problem to feed or breed.

*Barbus semifasciatus*, to give the fish its scientific name, is native to the coastal freshwaters of South China. It is said to be quite common in the rivers and streams of the islands of Hainan and Hong Kong. The fish was first made known to aquarists (in Germany, if my memory serves me right) in the early 1900s and made an instant hit. Certainly it was one of the most popular exotic fishes in the early days of the tropical fishkeeping hobby.

A full-grown male is smaller than the female (of about the same age) and attains a length of about 2½ in. The basic coloration is pale olive green to greenish grey. In common with most fishes, the back is darker than the belly. In fact the watery green lower parts of *B. semifasciatus* shade to ashen grey to white. There are five or six narrow black vertical bars, or stripes, on the middle of the well-fleshed sides which, in a well-illuminated tank, reflect golden to green lights. The dorsal fin, forked caudal fin, ventral fins and anal fin are yellowish orange to red; the pectorals are clear. The scales are silver, or rather have a silvery glitter, and are edged with black. All too often the two barbels on the mouth escape notice. This is not surprising because they are minute and virtually colourless.

In the community tank, *B. semifasciatus* is, in general, a frequenter of the upper and middle layers of the water. It is seldom still but, during the first few months of its life, prefers to haunt restricted areas

of the aquarium rather than follow the other occupants around or swim to and fro near the front glass of its tank.

When food is given, it is the custom of the half-striped barbel to dash into the middle of the milling throng, grab a mouthful and then beat a hasty retreat to a less busy position. This performance will be repeated several times over while food remains to be taken. Generally speaking, *B. semifasciatus* will feed on anything and, though it is fond of cropping mossy algae, a great point in its favour is that it will leave the higher plants alone.

A tank about 18 in. × 10 in. × 10 in. is not too small to breed this species, but a larger tank is better. It should be filled with tapwater from the mains and then left for a few days to age. In the meantime plants with finely divided foliage as, for example, *myriophyllum* or *cabomba* should be rinsed in tepid water to get rid of adhering dirt and scrutinised for snails; for snails destroy fishes' eggs.

To prevent what could produce a disturbing effect on the fish, the glass floor of the tank, with its looking-glass reflections, should be carpeted with a thin layer of washed compost. Keeping the plants in position should raise no problems if you tie bunched stems to small pieces of clean slate or some suitable stone. The fish may be placed in the tank set aside for spawning when they show evidence of sexual excitation. This is denoted by the greater activity and brighter colour of the male and the nervous comings and goings and distended sides of the female.

After the fish have been introduced into the spawning tank at the regular temperature, give them a little extra heat. The fish usually spawn the morning after being placed in the tank. If they don't, then keep them parted for a few days before placing them together again. Generally speaking, a short separation, combined with a higher temperature and a change of surroundings, is all that is required to precipitate the nuptial drive.

The male is an ardent driver and pursues the female all over the tank. During the wild pursuits and

momentary body-pressings, the female releases spurts of adhesive eggs. These are invariably released as the couple draw near to, or drive headlong into, the plants. The rest is of the simplest. Every time the female reaches the plants she shakes and shivers, the male does likewise as he spills his milt and the eggs, or most of them at any rate, are fertilised.

Although it would not be true to say that all half-striped barbeils are avid cannibals, it would not be sensible to permit the parent fish to remain in the same tank with their unhatched or freshly hatched offspring. Therefore, do not delay in removing the couple from the results of their love-match.

The eggs hatch in a day or two and the fry cling head-up to the plants (and other objects). Before a week is out they are free-swimming. They look like splinters of glass or ice with a dark spot (the eye) at the larger end. Some of them will carry a tiny sac under their middles. This, the yolk-sac, is absorbed in a matter of hours. Once the yolk-sac is no more, the fry require microscopic food. Dealers sell liquid fry food. Alternatively, you can cultivate infusorians in jars. If the latter are preferred, then the jars must be set up a week or so before spawning

is attempted. First food should be given in minute quantities in order not to pollute the water. All the same, enough of it should be given to fill the bellies of the fry, so that they resemble yellowish or silvery beads. Thus feeding should be little and often. If you are away from home most of the day, then it is advisable to rig up a drip-food system. This is simply a jar of infusorians or proprietary food in suspension dripped into the tank through a siphon. The siphon tube must be squeezed with a spring-clip or pinchcock to permit not more than a drop of the food-carrying liquid to drop into the aquarium too often.

After about a week of microscopic food, the fry should be large enough to take powder-fine dried food, micro worms, brine shrimps, gnat larvae, and the like, and not require such frequent feeding. In fact a meal in the morning and several minute-meals (as much as can be cleared up in a minute) in the evening should prove adequate. Thenceforward, all food should be graded to suit the size of the fish.

The number of eggs scattered at a single spawning may vary from a few score to a few hundred. A well-grown but not too aged a pair will spawn several times a season.

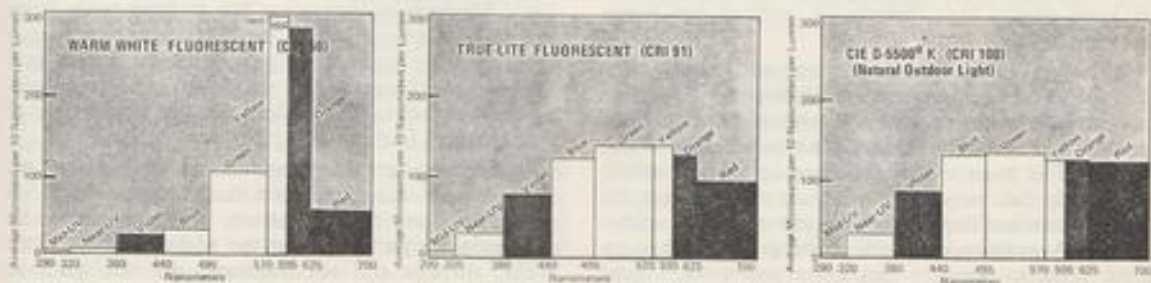
## NEW LIGHTING SYSTEMS FOR AQUARIUMS *(continued from page 63)*

health of their snakes and lizards after only a few days of exposure. A number of difficult specimens had refused to feed for months and after only three days under True-lite all accepted food.

To help illustrate the similarity of True-lite to natural daylight I reproduce for comparison three

the production of Vitamin D. Because of these properties hospitals in American use True-lite therapeutically as an aid in curing certain jaundice conditions in human patients.

It must be pointed out that the use of True-lite will not of course solve all the problems confronting



charts giving the spectral distribution and chromatic index of a warm white tube, True-lite and natural daylight.

From these charts it can be seen that although obviously not identical to daylight, True-lite has an index of 91 per cent compared to only 56 for warm white. In addition True-lite emits middle and long wave ultra violet which, like sunlight inhibits the growth of bacteria and viruses and stimulates

aquarists and herpetologists involved in the culture of animals in captivity. Other environmental factors must also be carefully controlled such as temperature, hygiene and of course diet. Nevertheless, I do believe that fluorescent tubes of the True-lite type have an important role to play in the successful, long term culture of marine life in aquariums, especially those traditionally difficult species normally labelled "impossible".



# EXPERIENCES WITH COLDWATER MARINES

by Roger & Linda Cooper

FOR THE PURPOSES of this article, "Coldwater Marines" are those found around the North West and North Norfolk coasts, the present limits of our collecting activities.

Our set up consists of three main aquaria; two 36 in. x 12 in. x 15 in., plastic coated angle iron, and one 27 in. x 12 in. x 15 in. plastic framed. All employ "Algarde" U/G filtration and a separate charcoal filter. The two larger tanks employ slightly different filter media in that one consists of fine and coarse gravels, and the other, along with the small tank uses fine gravel and sand. Natural sea water is used, and although we live within a quarter of a mile of the sea, we prefer to obtain the water from a spot about twenty miles further round the coast, as we feel it is less likely to be polluted. The water is transported in large plastic bins, previously used in our home brewing hobby.

Although our coastline is predominantly sandy, with the aid of a 3 ft. fine meshed shrimp net, we have caught at least 35 species of vertebrate and invertebrate life, a number of which are now thriving in our tanks. The most notable of these include an edible crab—this has shed its shell four times since its introduction last September—hermit crabs and spider crabs. Anemones, too, do well and grow rapidly—we have beadlet, plumose and daisy anemones. Sand gobies, plaice and flounders do well, but we have not had much success as yet with pipefish or sea snails, but hope that with more experience in management and brine shrimp culture, we shall be able to keep these as well.

The main diet of our fish is shrimp (fresh and frozen), mussel flesh, grated whitefish, and cockles, with the occasional sprinkling of flake food. These foods seem to suit all species in our tanks; the anemones get fed once, and the rest, 2-3 times a week.

Whelks, periwinkles and top shells, along with the shrimps seem to take care of any excess of food, as do the common starfish.

No artificial heat is used; the tanks, being in the living room, seem to remain at a fairly constant temperature around 60-64°F. We are rather concerned that, if we have any sort of a summer at all, we shall have to devise a system for keeping the temperature down to these levels!

Water changes have been relatively infrequent, and total water changes have only been made when gross pollution has occurred. A notable instance of this was after the introduction of some sponges because of some interesting brittle stars resident in them. Unfortunately, the sponges were already dying, and heavily polluted the water, resulting in heavy loss of life. We had no alternative but to start again from scratch! We have learnt our lesson now, and use a small tank for quarantining doubtful specimens, and for gradually bringing new specimens to the temperature of our tanks—the sea temperature at this time of year (March) is about 40-42°F.

Since these are low temperature biosystems, we have come to the conclusion that it takes about 3-4 weeks for a new tank to mature. This appears to be the optimum period before the addition of fish, but crabs, shrimps and sea anemones are not quite so particular, and may be added earlier, and may well help to speed up the maturing process. The size of the fish, too, can be critical; for instance, small flatties—less than 2-3 in.—seem to be difficult to encourage to feed, but those larger, can and will, take shrimps and mussel flesh readily.

Even with a cold water system, due to the relatively heavy aeration required for the filters to work efficiently, there is a fairly high degree of loss by evaporation. These losses are made good with clean rainwater, thus

avoiding the problems of destroying chlorine and hardness in tapwater. Salinity is maintained at around 1.023-5 at 60°F., the same as the sea in the area where we obtain our specimens. With the shrimps and crabs shedding their shells, and the molluscs constantly adding to theirs, there is a steady drain on the calcium reserves of the water. This is corrected by the inclusion of locally found hard red or white chalk pebbles to the tank. These dissolve at

an extremely slow rate as the chalk is taken out of solution by the marine life.

These tanks are a continuing source of interest to us and to our friends, and are of considerable educational value to our three children—even a shrimping expedition becomes more exciting, when new specimens are required for the tanks. In short, the whole family takes pride in collecting and maintaining the specimens in our tanks.

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# THE A.B.C. OF MARINE FISHKEEPING

## (2) FEEDING

*by Les Roberts*

UNLIKE land animals, fish are swimming with one hundred per-cent bodily contact with the water which is their environment. Therefore, the water must be clean and healthy and free from any pollution. Where one would give the kid's left-over porridge to Tibs, the household cat, one would hardly scrape the left-over porridge into one's fish tank. The results would be obvious as the pollution can be seen with the naked eye, but there are dozens of other ways we can pollute our tanks, often effects of which are not so easily seen and most forms of pollution are caused by wrong or over feeding. If we can visualise the marine fish tank as containing a complete chain of life in various forms, each life-form drawing its nourishment from the life-form before it, by the time the last in line has had its fill, anything left over will undoubtedly cause pollution.

The most obvious example is the biological filter where one feeds the fish, the fish waste (i.e. ammonia etc. which create nitrite toxics) feed the bacteria within the gravel filter-bed, which in turn converts the nitrite toxics into the relatively harmless nitrates. There are plenty of other examples and I don't pretend to understand them all. Unless one is a qualified chemist, one must learn from the people who dedicate their lives, uncovering the truths of marine fish keeping. When you can begin to understand the

chain reaction caused by the introduction of one piece of food you will begin to understand the importance of correct feeding.

If we now list the three main feeding problems into the following categories, (i) Correct feeding, (ii) Over feeding and (iii) Underfeeding, I can take each item separately and analyse it.

### **Correct Feeding**

When I say correct feeding, I mean the right size and type of food for the right size and type of fish. Once you have ascertained the size of food to feed your fish, you must then decide upon the type of food. Flake food of a very high standard and suitable for marine life is ideal as it contains all the proteins, fats and oils, carbohydrates etc. that are essential to the life support of marine life. Getting your fish to actually eat this unfamiliar food can be rather a headache, but a lot of patience and careful training should pay dividends. There are, of course, a lot of fish that would prefer death by starvation rather than eat flake food, such as a large proportion of the Butterfly family and Lion fish. The finicky Butterflies will only eat their natural food, such as live coral heads and minute living crustacea. Now, as every marine aquarist knows, to feed Butterflies on living coral



heads at anything from one to ten pounds per head would make the keeping of these extremely attractive fish financially impossible, but once again, due to unselfish dedication of one of the world's leading marine biologists and friend of mine, Graham Cox worked out a formula to completely sterilize all natural sea foods with the use of Gamma-rays. This ensures that all Gamma-Ray sterilised deep frozen foods are completely free from all pathogenic organisms such as spores, eggs, cysts, copepods, flukes, bacteria, viruses, protozoans, nematodes, cestodes, fungi etc., etc. and therefore cannot infest your tank with disease. Completely safe natural foods such as those now being available, our Butterfly fish are much easier to feed. Irradiated deep-frozen mysus shrimp, is eagerly devoured by the majority of the Butterfly family. In the same way our Lion fish can be safely fed on the irradiated silver-fish.

As there are now available a wide range of these A.A. foods, all our marine life can be safely and easily fed. I have stated above that these foods are completely safe. They are, but this does not give us a licence to shovel loads of food into the tank and assume that because it is Gamma-ray sterilised it will not matter.

All food, whether sterilised or not, will rot if left uneaten and great care should be taken to feed your fish only enough food to keep them happy and healthy. All uneaten food must be removed from the tank if not eaten within half an hour.

#### Vitamins

As I have now covered the basic feeding problems, I will go into other factors which are directly connected with feeding and the good health of marine life. Two of these very important factors are Vitamins and Trace elements.

It is well known that vitamins are essential for the healthy life support of ninety nine per cent of all living creatures and, of course, this covers our fish and invertebrates. Vitamins are absorbed by our tank inhabitants from their food and the surrounding water; their food alone does not supply enough vitamins for the fishes' needs and therefore they have to obtain the rest of the vitamins from the surrounding water.

Now, in their natural environment among the coral reefs of the tropical oceans, the waters are being constantly changed and revitalised by natural means, but in the case of our tank fishes the same old water is going round and round in circles and gradually, all the vitamins are being used up. It is therefore very important to regularly supplement the synthetic sea water with a proprietary supplement high in vitamin content which has been specially formulated to replenish all the necessary vitamins and thus keep your fish in first class condition.

#### Trace Elements

I am often asked "what are trace elements?" Well, lets clarify this in laymen's language. The elements used in this sense are all the inorganics, metals etc. that are collected by the rivers, streams and weather conditions and which eventually arrive in the seas of the world, and are duly mixed and blended by the various motions of the sea, and because the rivers keep flowing and the weather keeps changing, the elements found in sea water remain constant in their very minute or trace amount content. We also assume that the seas and all the elements were created when the world began, and as life forms followed on and were created within this environment, the trace elements became part of life and are therefore needed to sustain healthy life among our fish.

Exactly how many elements there are I don't think anybody knows, but amongst those that have been traced, no less than fifty-two elements have been found to be important for the safekeeping of the most delicate fish and invertebrates and these elements have been included in only the finest synthetic sea salts that are manufactured. So, when buying your synthetic sea salts, ensure that the following elements are included:—

Silver, Aluminium, Argon, Arsenic, Gold, Boron, Barium, Beryllium, Bismuth, Bromine, Carbon, Calcium, Cadmium, Cerium, Chlorine, Cobalt, Chromium, Caesium, Copper, Fluorine, Iron, Germanium, Hydrogen, Helium, Mercury, Iodine, Indium, Potassium, Krypton, Lithium, Magnesium, Manganese, Molybdenum, Nitrogen, Sodium, Neon, Nickel, Oxygen, Lead, Rubidium, Radon, Sulphur, Antimony, Silicon, Tin, Strontium, Titanium, Uranium, Vanadium, Tungsten, Xenon, Zinc.

As you can see from the above, trace elements are just as important to fishes and invertebrates as are vitamins and because of our closed-circuit marine tank, certain of these elements get used up completely and if they are not replaced you will most certainly see a deterioration in your fishes' health and if not corrected, it will lead to the death of some of your prize specimens. Trace element boosters are on sale at your leading aquarist suppliers so make sure you use them.

Other important ingredients in the feeding of marine life are : *Proteins* which are rather complex compounds comprising Carbon, Hydrogen, Oxygen, Nitrogen, Sulphur and phosphorous and used to make up all organisms; *Carbohydrates* consisting of Carbon, Hydrogen and Oxygen, and *Fats and Oils*.

These three items, are very important ingredients in the feeding of marine life and are very complex indeed. I couldn't begin to explain them in detail, but I can assure you that they are all present in the foods that you feed to your fish.



# *Coldwater Fishkeeping*

## THE PROBLEM OF SPACE

by *A. Boarder*

THE QUESTION of space is a very important factor when breeding any species or variety of fishes, but so many aquarists appear to be quite ignorant of its value. From many letters I receive I know that even pondkeepers err on the side of over-crowding in their ponds. Sometimes I hear that over forty fish are kept in a pool no more than six feet by four, with a depth of about eighteen inches. As far as tanks are concerned I am sure that many beginners (and some who should know better) over-stock their tanks; and then when troubles occur they wonder why and state that they do everything as considered correct but yet have losses.

It is not always easy to state the exact number of fish for any tank as there are other considerations to be taken into account. The types of fish, the amount of growing plant life and the way the fish can play an important part in the successful management of a tank. The golden rule for stocking a tank is to allow an inch of body length of fish to each 24 square inches of surface area of water. This is a guide line, but it must be realised that as the inhabitants of the tank grow, so they require more swimming space. The old rule was to allow an inch of fish to the gallon of water. This may be in order if the tank is of the conventional shape. The standard tank of 24 in.  $\times$  12 in.  $\times$  12 in. holds roughly 12 gallons of water and so could hold 12 inches of fish. If, however, the tank was deeper than the one stated, then it could not hold as many fish satisfactorily. If the depth of the tank is doubled but still contains 12 gallons of water, the surface area of water would be half that of the former tank and therefore should only house half the number of fish.

Although the rule for the number of fish for a specific tank can be according to the later rule, it does not mean that it is impossible to keep more than the allotted number in a tank. An experienced

aquarist who can regulate the feeding of the fish exactly can get by with a few more fish than the limit, but that does not imply that those fish, although they could be healthy, are going to grow at a normal rate. I have experimented with young fantails in a tank and have deliberately over-stocked, and have found that although the fish remain perfectly healthy they practically cease to grow at all, whereas a fish in a large tank, even unfed artificially, can grow much faster than those in the over-stocked tank.

I have reported previously that I use several tanks for growing on young fantails, and these are old coldwater cisterns which have had their holes blocked up and are coated with a thin layer of cement and sand mixture. I have, on more than one occasion, thought that a sixty gallon tank has been emptied of all the young fish, but after many months I have found a fish which was overlooked in a tank. This fish has been, not only in perfect health, but has grown better than fish bred at the same time which have had the best possible treatment except plenty of swimming space.

The question as to whether it is a good idea to use aeration in a tank often crops up. I know that it is possible to keep alive more than the recommended number of fish in a tank with aeration, but I am sure that if more than the rule allows are in a tank, even artificially aerated water will not mean that the fish will grow at their maximum. It is also a fact that many aquarists, when they do use aeration, fail to make the proper use of it. In a correctly planted tank there is usually enough oxygen for the fish during the day time, but at night when the plants do not give off any oxygen, the aerator is switched off. If only it was used at night instead of by day, it would be of much more use.

The probable lack of oxygen in the water at nights does not only occur in tanks but can also be a factor



in an outdoor pond. Many pondkeepers have written to me about the loss of fairly large golden orfe when the weather has been hot. They state that a waterfall and or fountain has been working in the day time, but still the losses occur. Of course, if the waterfall and fountain had been working at night time, there would probably have been no losses at all. When the water lacks oxygen it is usually the larger fishes which are in trouble first as they require more oxygen than the smaller ones. I have known of pondkeepers who have been cleaning out their ponds and have placed the fishes whilst doing so in baths or large tanks. These have been left in the sun and within a short space of time, the larger fishes have been at the surface mouthing for air and would soon have died without fresh water having been added.

It may be thought that warmth, food and oxygen are the only requirements for the successful rearing of

many fancy goldfish or other coldwater youngsters, but I am sure that it is just as important to provide plenty of swimming space if the fish are to be expected to grow at their maximum rate.

I have sometimes been asked by breeders if the golden rule applies to very small fry and if so how is it possible to judge their size. I never worry about the number of fry in a tank when they are very small as they do not appear to come to any harm. I have known the time when I could dip a small milk saucepan into a tank of fry and catch a hundred quite easily. It is when the fry are getting to look like small fish and are about half an inch long over-all that they should have more space. From that size on, they must have swimming space or they will not thrive and I have proved that this is one of the most important necessities for keeping your young fish growing well

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# *Pelmatochromis*

## *(Chromidotilapia)*

### *guntheri*

by K. N. Walsh

THE GENUS *Pelmatochromis* consists of over 20 species, most of which are found in West Africa. One exception is *Pelmatochromis (Chromidotilapia) exsul*, which is found in Lake Rudolf in East Africa. Most of this genus which is available to the aquarist are cave-spawners, such as *P. kribensis* and *P. taeniatus*. One species prefers to spawn on a smooth stone; this is *P. thomasi*. The odd one out is *P. guntheri*; this is a mouthbrooder.

*Pelmatochromis (Chromidotilapia) guntheri* is found around the Gold Coast area of Africa. Its main habitat is the tidal rivers in the vicinity of the coast. Therefore it is accustomed to differing degrees of salinity.

The body colour is olive green with a bluish tinge. A dark band runs through the body to the caudal fin. There are about eight irregular bars on the side intersecting the line running through the body. These

bars come and go according to the fishes' mood. On the grill-cover is a bright blue-green blotch. The iris is red. Sometimes a faint pinkish flush can be seen around the throat area of the male. The dorsal fin is greenish in colour with a wide gold band running through it slightly fading towards the rear. The caudal fin is yellowish and the anal fin is yellow to orange. The ventrals are a silvery green. The fins of the female have a greyish border and are generally darker than those of the male. A reddish tinge is sometimes visible in the belly region of the female which is lacking in the male. Also her fins are not so long and pointed as the males. The fin formula for this species is:—D XV-XVII/9-12, A III/7-8, LL/28-31, P 15.

The four fish which I had given to me were housed in a 30 gallon tank. There was two inches of fine gravel on the bottom of the tank. A large flat rock was placed at one end and a plantpot was laid on its side at the other. Plastic plants were placed in front of the plantpot to conceal the opening. I didn't use real plants because this species tends to eat them or tear them up. One tablespoon of salt per gallon of water was added to the tank owing to the fact that these fish come from tidal waters.

All the *guntheri* I had were between three and four inches long. Their diet consisted of three feedings of flake food and two feedings of live food each day. The live food consisted mainly of white worms and garden worms. Chopped lettuce and crushed peas were also included in their diet.

While in the tank, it appeared that the females are more territorially minded than the males. The two females kept themselves at opposite ends of the tank, one staying around the flat stone and the other near to the plantpot. The two males seemed to swim around the whole of the tank with no definite territory for a prolonged period of time.

The first signs of spawning behaviour took place in August 1973. The largest of the males spent a lot of time in the territory of the female who kept near to the large piece of slate. Whenever he approached her, they would circle each other head to tail with their fins outstretched. Sometimes they would lock jaws in the typical cichlid fashion, but not to any great extent. It was now that they became very aggressive with the other two fish in the tank. Both of them were forced to hide in and behind the plantpot. They were removed later for their own safety.

On the 15/8/73, the male and the female started to move the gravel from around the front edge of the slate. This, I thought, was for the depression in which the eggs were to be laid; but I was wrong. The following day the female started to clean the surface of the slate. The male also helped in this operation from time to time.

On the 17/8/73, the female started to lay a string of

eggs in a small area of the slate, about six at a time. The male moved in and fertilised them. This procedure went on for about half an hour, until the female was depleted of eggs. There were only about 40 eggs laid. Immediately after the last of the eggs were laid and fertilised, the male picked up the eggs in his mouth for oral incubation. The male remained at the back of the tank whilst incubating the eggs. Whenever someone approached the tank he would turn away from them as if he didn't want anyone to see him looking after the eggs. Most of the time he looked as if he was chewing, but this was because he was circulating water over the eggs to keep them clean and to stop any dirt settling on them and causing them to fungus. Most mouthbrooders eggs have thin shells and are very susceptible to bacterial infection.

I had no idea how long the incubatory period was: from past experience with other mouthbrooders the brooding varied from 10-12 days with *Tilapia mossambica* and as much as 36 days for *Labeotropheus trewavasae*. So it was just a matter of waiting and observing.

On the 21/8/73, the throat sac of the male had darkened considerably and was slightly more distended. The chewing motions were not so frequent as they were during the first two days of incubation. The male and female stayed in close proximity to each other, suggesting that a stronger than normal pair bond had been formed (for a mouthbrooder).

On the 28/8/73, the first fry were seen swimming around the bottom of the tank. There were still quite a few left in the mouth of the male; these were released at intervals throughout the day. The actual incubation period was quite shorter than I had imagined. It was eleven days.

When I approached the tank the following day, the young fry rushed towards the mouths of both parents. The female surprised me by accepting some of them. It seems that just the male does all the incubating with the eggs and both parents share the responsibility of protecting the young orally. The male and female took the fry into their mouths at night or whenever danger threatened for a further eight days. By this time they were too big to all go in. Both parents were now removed to another tank just in case they decided to eat their offspring.

The level of the water in the tank with the youngsters was dropped to four inches. This was to enable them to find their food more easily.

If fed properly with a balanced diet they will grow quite rapidly. Mine were fed on sifted *daphnia*, chopped white worms, crushed peas and dried flake food. Sometimes, if there was any meat left over on the dinner plate, it would be chopped up finely and fed to them. If any was left uneaten after ten minutes it was siphoned off.

*Pelmatochromis (Chromidotilapia) guntheri*, to me, seems a topsy-turvy mouthbrooder. This is because,



compared with a number of other mouthbrooders I have bred, this species seems to do things in reverse. It appears to be the female that holds the territory and spawns with the male that enters it. The male does all the incubating of the eggs. Both parents protect them orally. An extremely strong pair bond is formed which goes beyond the actual spawning activity; in fact, it is almost as strong as the pair bonds formed by true substrate breeders.

With other mouthbrooders I have bred, it is the

male that holds the territory and spawns with any willing female that enters it. The female is the one that incubates the eggs, and only the female that protects the young orally. No real pair bond is formed.

On the whole, these fish are very interesting to keep, but are not recommended for the community tank unless they are with other fish of the same size. They are rather pugnacious and play hell with the plants. But as far as breeding is concerned, they are different.



**New style aquarium shows off fish at Development Corp. Conservation and Ecology exhibition**

VOLUMATIC AQUASPHERES, a new type of aquarium were shown at the Conservation and Ecology exhibition staged by the Department of Architecture of the Northampton Development Corporation from 3 January until 23 January '75 at the Central Museum, Northampton.

Purpose of the exhibition was to help make people more aware of their environment and to illustrate how the Corporation is preserving and enhancing historic buildings and the countryside.

The Aquaspheres are used to show the types of fish which have been introduced into rivers and lakes in the Corporation's area to encourage plant

growth.

Sections of the exhibition, including the Aquaspheres, will be put on loan to schools in the Northampton area for educational purposes. One of the aims is to reduce the possibility of vandalism by making children more aware of their surroundings and more in tune with their natural environment.

Aquaspheres, which consist of a rigid acrylic sphere with access ports, mounted on a sturdy plastic coated metal stand, are supplied complete with air pump, filter, heater, thermostat and thermometer to keep the water fresh and clean.

Cost of the unit is £35.00 plus V.A.T. and carriage and it is available from sole distributors the Newform Company, 15 Sussex Gardens, Chessington, Surrey.

# AQUATIC BIOLOGICAL POLLUTION IN FLORIDA

FROM A CORRESPONDENT

(Extract from 'NATURE')

OF ALL THE WAYS in which man has affected the flora and fauna of the world one of the most profound has been by introducing exotic species wherever human colonies have been established. In the last century acclimatisation societies flourished with the object of introducing "beneficial" animals to various parts of the world, often with severe consequences to the native biota. Today, introductions still continue but are more often due to accidental release than deliberate introduction. A recently published study by Courtenay, Sahlman, Miley, and Herrema (*Biol. Conservation*, 6(4), 292-302; 1974) of the exotic fishes in fresh and brackish water in Florida illustrates most graphically the extent of biological pollution in this state which now contains 38 species of exotic fishes.

Thanks to its mild climate and the supply of even-temperature water from wells, Florida is the major centre in the United States for the aquarium fish industry. Some 250 fish farms exist in the state, producing nearly 80 per cent of the pet fish for the United States. Exotic species are often unintentionally released through unprotected effluent channels, or in times of flooding. Others are dumped into open waterways when holding pools are cleared for the reception of new stock. Courtenay and his colleagues made 62 collections of fishes in central and southern Florida between July, 1970 and July, 1972. Thirty-eight exotic species and several hybrids between these species were found; of these 20 species and five hybrids were found to be established as breeding populations.

Not all the established exotics came directly from fish farms: some are due to release of unwanted fishes by aquarists, research workers, and to stocking by angling interests. The spread of the pike killifish (*Belonesox belizanus*) is an example. In 1957 fifty specimens were released after a medical research project was terminated; it now occurs over some 160 square miles of Dade County, and in places makes up 20 per cent of the fish biomass, no mean feat for a slender fish of 20 cm maximum length! Others seem to be less successful—two white piranhas (*Serrasalmus rhombus*) were caught in an (abandoned!) swimming pool in South Miami, the survivors of

several after an unusually cold winter.

The walking catfish (*Clarias batrachus*) has spread rapidly and continuously since its first escape in the mid-1960s. It is an undemanding fish, capable of withstanding almost deoxygenated conditions and moderate salinity; it is also able to tolerate desiccation, as well as migrating overland during rainy periods. In the dry season catfish tend to aggregate in numbers in small ponds and kill most of the animals in the pond in a few weeks.

At least eight species of cichlid fishes have become established, while others have been found. One of them, the South American black acara (*Cichlasoma bimaculatum*) is the most widely distributed exotic fish in southern Florida, and is the only exotic in the Everglades National Park. Courtenay *et al.* have found that in the Fort Lauderdale area it is the dominant fish, comprising 64 per cent of the total fish biomass. In one canal it formed 80 per cent, but elsewhere its contribution to the fish biomass ranged from 5 to 30 per cent. An African cichlid, the blue tilapia (*Tilapia aurea*) is now found over the greater part of northern Florida. This cichlid was claimed by the news media to be an excellent food and game fish, and was quickly spread by fishermen to other areas from its original site of introduction dating from 1961. Unfortunately it was found to be practically valueless as a game fish, and is only now being evaluated as a food fish. It has proved to be an extremely effective competitor for the native fishes, and in many eutrophic lakes now dominates the fauna.

Courtenay and his colleagues document these and the remaining exotic species in detail, but have little to say on the effects of this biological pollution on the native fauna. Undoubtedly it has been considerable, and possibly the full effects have not yet been established. They do, however, propose some remedies to stem the flood of new exotics, most particularly in drawing attention to the state statutes which already forbid the release of non-native species. Enforcement of such statutes from the outset would have prevented much of this pollution and it is greatly to be hoped that action now can contain the problem to its present, already serious limits.



# FOR THE HERPETOLOGIST'S BOOKSHELF

by Andrew Allen

THIS MONTH I review two fine volumes upon the general biology of herpetiles, eminently readable accounts ideal for the intelligent layman.

Firstly there is *The World of Reptiles and Amphibians* by Robert Mertens, Harrap 1960. Last time I tried to obtain a copy this book was out of print, and it probably remains so. But I have consulted it in several public and university libraries, and access should not be difficult. If you see one on the second-hand shelves—snap it up.

The book is good, written by the most eminent European herpetologist of recent years. It is of large format, a balanced blend of solid text and glossy photos. The numerous illustrations are of high quality for their date, but do not attain the standards set in certain recent books. The text—at least in translation—is not classical prose, but reads fairly easily without tough technical terms or modern jargon. Chapters range across general biological topics and diversity of form at an easily comprehensible, but not insultingly simple level. Naturally one finds no reference to advances made during the past decade, and the information is slightly dated. But many of the facts are timeless, and this remains a pleasing and useful book.

I recommend even more strongly *The Life of Reptiles* by Angus d'A. Bellairs, Weidenfeld and Nicholson 1969. It comes as two handsome volumes, total cost £7 (and doubtless more by the time you get to the bookshop!), or a new paperback edition about half the price, and warrants a niche in the bookcase of the discriminating.

This book is comprehensive and authoritative. Bellairs has earned an honest reputation in the herpetological world, his original papers are painstaking and

well written. One is always pleased to meet books by scientists who have spent a lifetime of research in their field, authors whose qualifications are obvious and unassailable. In 590 pages he amasses a rare galaxy of facts, coherently organized along major lines of thought. Anatomy, embryology, taxonomy, sex, psychology and behaviour all pass under scrutiny at a level comprehensible to the layman but sufficiently rigorous to please the expert. An unusually well selected bibliography will lead those still dissatisfied deep into the literature.

And ever and always the account remains readable, simple English without pretension or jargon. The book is part of a "Life Of . . ." series in which the authors appear to have been chosen not only for their scientific competence, but also ability to popularize without pain. One feels no temptation to turn aside when Bellairs describes structure of the nervous system, or other subjects that many authors miraculously manage to transmute from fascinating biology into mental lead. And he does not cram the text with references to his own papers at the expense of others, a rare virtue in scientific writing.

This all results in a book head and shoulders above its fellows, one of the best half dozen herpetological works yet penned in our language. It can be used both as a reference book, and as pleasurable browsing material. I can criticize only the mundane black and white plates, several of which have appeared elsewhere. Really superlative illustrations do exist today. But though they would have enhanced the effect, doubtless they would also force the price up into a very rarified bracket beyond the means of workaday people like you and me. Now I await avidly a work of equal stature upon the Amphibia.



## THE BRITISH AQUARISTS' FESTIVAL

will be held this year at Belle Vue Zoological Gardens Manchester on  
**SATURDAY 11th OCTOBER and SUNDAY 12th OCTOBER**

**FURTHER DETAILS SHORTLY**



## from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarist societies for inclusion on this page should reach the Editor by 5th of the month preceding the month of publication.

**RESULTS** of the home furnished aquarium competition of the **New Forest A.S.** were: Tropical: 1, B. Higginson; 2, D. Harding; 3, J. Jeffery. Coldwater: 1, D. Harding; 2 and 3, L. Menbennett.

The main item of the March evening meeting was a talk by D. Harding, giving tips to members who wished to show their fish at open shows. Table show results were: Barboras: 1 and 4, J. Jeffery; 2, R. Travers; 3, B. Higginson. Cichlids: 1, B. Higginson; 2, M. Aust; 3, J. Jeffery.

Prospective new members are welcome at meetings on the third Monday of each month. Further information can be obtained from the secretary, R. Travers, 6 Auckland Avenue, Brockenhurst, Hants SO4 7RS.

**MEMBERS** of the **Suffolk Aquarist and Pondkeepers Association** enjoyed the main item at the March meeting which was an F.B.A.S. taped lecture with slide illustrations. The lecture was about barbs—a species kept by many members.

**THE** societies forming the **Midland Aquarist League** held their annual general meeting in March. After hearing of the withdrawal of one society from the league, the remaining six, namely: **Coventry Pool & A.S.**, **Goodyears End A.S.**, **Bedworth A.P.S.**, **Nuneaton A.S.**, **Hinckley D.A.S.**, and **Rugby Fishkeepers**, decided to invite three other interested societies to join the league. It was decided to alter the style of the shows by staging bigger competitions with more scope for outside participation. The first show of the season is to be held on Sunday, 11th May, at Bulkington Parish Hall, Bulkington, Nr. Nuneaton.

**OFFICIALS** elected at the **Tay Valley A.S.** recent annual general meeting for the forthcoming season were:—president, P. Deans; vice-president, J. Hopkins; secretary/treasurer, B. Q. Deans; Members, J. Anderson, G. Chalmers.

The Society meets fortnightly, Monday evenings at 7 p.m., at the Y.M.C.A. Hall, Constitution Road, Dundee, and new members will be given a warm welcome. The society is looking forward to the coming season, particularly now that the **Scottish Inter-League** has been formed.

**THERE** was a good attendance at the February meeting of the recently-formed **Winstan Mill A.S.** Also present were four guests and there were three speakers. After a long discussion on various aspects of keeping and breeding of tropical fish, D. B. Hickman, president of the **Killingworth A.A.**, then gave a slide show which concerned several species of tropical fish, after which the meeting closed. An invitation is extended to anyone wishing to join the society which meets on the first and third Tuesday of each month at 7 p.m. at Winstan Mill Village Hall (back room), Winstan Mill, Blaydon.

**THERE** were 147 entries at the **Dunlop A.S.** table show, split up into 22 classes. The two judges were T. Tasker and C. Norton of the **Sandgrounders A.S.**, Southport. Class winners and exhibits were as follows: H. Roberts, Guppy; S. Jenkinson, Red Swordtail; A. Turner, Liberty Molly; P. Carroll, Lace Gourami; A. Davies, Rasbora Elegance; B.

Lilley, Danio; A. Roche, Vermivorus Cichlid; G. Smith, Kribensis; T. Hampton, Butterfly Fish; K. Sey, Green Swordtails; R. Millett, Black Acaras; T. Hampton, Brochis; P. Read, Pimelodella; Mrs. J. Roche, Horse-faced Loach; T. Hampton, Checker Barb (Best in Show); T. Hampton, Bleeding Heart Tetra; D. Shaw, Sea Horse; R. Armstrong, Flying Fox; R. Armstrong, Rainbow Shark; Mrs. A. Carroll, Green Sailfin Molly (Ladies); Miss G. Riding, Green Swordtail (Juniors); T. Hampton, six Fitzmouthe Panchax (Breeders).

**THE** **Bracknell A.S.** have commenced the year with an interesting and varied programme, two of the highlights being talks with slides, one by Henry White & Co., from Herndon, on Characins, and the other by Ron Forder, of Unbridge, on plants. A new venue has now been chosen, and from April the society will meet on the second and fourth Monday in each month at the club room, above the Red Lion Public House, High Street, Bracknell. Visitors and prospective new members are welcomed at all meetings.

**THE** results of the **Weymouth A.S.** inter-club show with Bridport A.S. were: 1, M. Medway; 2, J. Fancy; 3, B. Dalley; 4, J. Brookes. Weymouth was presented by J. Jeffery with the inter-club trophy which was donated by B. Dalley. Table show results were: Corydoras: 1, 3 and 4, Mrs. P. Carter; 2, J. Fancy. Tropical Catfish: 1, Mrs. J. Dalley; 2 and 3, B. Dalley; 4, J. Fancy.

**TABLE** show results at the March meeting of the **Llanswit Major A.S.** were as follows: A.O.V. Egglayers: 1 and 2, R. Newton; 3, Master John Edwards; 4, S. Nelson. A.O.V. Livebearers: 1 and 3, Master John Edwards; 2, G. Lewis; 4, S. Nelson. The results of the Miles Thomas Cup awarded annually were: G. Lewis, 35 pts.; H. Chick, 18 pts.; J. Thompson, 16 pts.; Master John Edwards, 13 pts.

While the judging was in progress members were entertained with a very informative slide lecture on fresh water fish in Wales, their habitat and the best way of caring for these fishes was given by P. Langhelt, the scientific officer from the National Museum of Wales.

**AT** the March meeting of the **Gloucester A.S.** the thirty members attending heard a lecture from J. Powell on Coldwater Fishkeeping with a slant towards Nishiki Koi Carp. The business discussed comprised of suggestions from members on the forthcoming open show. Results of the monthly table show were: A.V. Coldwater: 1 and 2, F. Timmins; 3, Mrs. M. Gray; 4, K. Gill.

**RESULTS** of the six-a-side competition held by the **Evesham Fishkeepers** in March were as follows: 1, Gloucester Aquarists; 2, Evesham Fishkeepers; 3, Cotswold Aquarists; 4, Stroud & District Aquarists; 5, Gloucester Fish & Social Club; 6, Bishops Cleeve Aquarists; 7, Malvern Aquarists. Best Egglayer in Show: K. Baker (Evesham). Best Livebearer: G. Dixon (Gloucester A.S.).

A very informative lecture was given by Mrs. Beryl Ryan and the day was a great success. The next six-a-side will be held by Stroud A.S. in the Autumn.

**THE** **Horsforth and District A.S.** members' show was held recently. Best fish in show award went to the winning junior, Master M. Irwood, and the other results were as follows: Anabantids: 1, Mrs. P. Wood; 2, P. Smith; 3, Miss J. Helm. Barbs: 1 and 2, A. Hardcastle; 3, B. Runnacles. Catfish and Loach: 1 and 2, A. Hardcastle. Characins: 1, J. Dunn; 2, C. Corns; 3, B. Runnacles. Cichlids: 1 and 2, J. Dunn. Livebearers: 1, S. Newsome; 2, C. Wood; 3, J. Dunn. A.O.V.: 1, C. Corns; 2, Mrs. P. Wood. Juniors: 1, Master M. Irwood; 2 and 3, Master S. Newsome.

**AT** the March meeting members of the **Stroud and District A.S.** were shown slides of last year's B.A.P. which were taken by Gordon Churchill of Yate. This programme was enjoyed by all present. Table show was for Swordtails and the result was: 1, T. Owens; 2, S. Amor; 3, R. Furniss.

Meetings are held on the second Tuesday of the month at Upland Sunday School, 7.30 p.m.

**THERE** was a good turn-out for the **Lincoln and District A.S.** March meeting and the evening started off by a small talk on Barbs by the president, H. Kuhn. The fish were judged by F. Toyne of the Sheaf Valley A.S. and the winners were as follows: 1, Mrs. Evans; 2, Mr. McLeod; 3, Mr. Pickering; 4, Master Evans. The winner of the Renshaw Trophy was Mrs. Evans. Mr. and Mrs. C. Sellars, Lincoln members, won the following prizes at the Don Valley A.S. open show: 1st and 3rd prizes in the Dwarf Cichlid Section; 1st and 2nd prizes in the Angel Section; 1st prize and Best Fish in the Show with a Malawi Cichlid.

**RESULTS** of the **Retford and District A.S.** first open show were as follows: Best Fish in Show awards went to Mr. and Mrs. Holmes of Castleford, Guppies: 1, Mr. and Mrs. B. Chester (Retford); 2, D. and M. Laycock (Sheaf Valley); 3, R. Marshall (Northampton). Plantes: 1, Mr. and Mrs. Blades (Cresswell); 2, D. and M. Laycock (Sheaf Valley); 3, S. Hall (Aireborough). Medlles: 1, Mr. and Mrs. Holmes (Castleford); 2, Mr. and Mrs. Bowles (Rhonda); 3, Mr. and Mrs. Caldwell (Scunthorpe Museum). Swordtails: 1, H. Preston (Southend); 2, Mr. and Mrs. Holmes (Castleford); 3, G. Allen (South Humberston). A.O.V. Livebearers: 1, B. Jackson (Doncaster); 2, K. Asher (Doncaster); 3, Mr. and Mrs. Richardson (Scarborough). Small Barbs: 1, Mr. and Mrs. Fletcher (Doncaster); 2, Mr. and Mrs. Povey (Sheaf Valley); 3, Mr. and Mrs. Holmes (Castleford). Large Barbs: 1, B. Chapman (Long Eaton); 2, Mr. and Mrs. Tyson (South Humberston); 3, W. E. Neville (Grantham). Small Characins: 1 and 3, Mr. and Mrs. Richardson (Scarborough); 2, Mr. and Mrs. Copley (Doncaster). Large Characins: 1, Mr. and Mrs. Stevenson (Sherwood); 2, Mr. and Mrs. Roberts (Doncaster); 3, Mr. Frisby (Hull). Minnows and Danios: 1, Mr. and Mrs. Richardson (Scarborough); 2, Mr. and Mrs. K. Clarke (Retford); 3, N. Carr (Doncaster). Barboras: 1, Mr. and Mrs. Bull (Derby); 2, Mr. and Mrs. Gilding (Retford); 3, Mr. and Mrs. Copley (Doncaster). Breeders Livebearers: 1, 2 and 3, K. Asher (Doncaster). Breeders Egglayers: 1-10: 1, Mr. and Mrs. Stanton (Sheffield); 2, Mr. and Mrs. Fletcher (Doncaster); 3, Mr. and Mrs. Gilding (Retford). Breeders Egglayers 11-20: 1, Mr. and Mrs. Gilding (Retford); 2, Mr. and Mrs. Fletcher (Doncaster). Goldfish and Comets: 1, Mr. and Mrs. Bull (Derby); 2, Mr. and Mrs. Richardson (Scarborough); 3, Mrs. Frisby (Hull). Shubunkins and Fancy Goldfish: 1, 2 and 3, S. Hall (Aireborough). A.O.V. Coldwater: 1, Mr.

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and Mrs. Blades (Cresswell); 2, Mr. and Mrs. J. Brett (Retford); 3, Mr. Frisby (Hull). Tooth-caps: 1 and 2, G. White (Scunthorpe and District); 3, Mr. and Mrs. Richardson (Scarborough). Pairs (Egglayers): 1, Mr. and Mrs. Holmes (Castleford); 2, Mr. and Mrs. Fletcher (Doncaster); 3, D. and M. Laycock (Sheaf Valley). Pair Livebearers: 1, Mr. and Mrs. Bowles (Rhondda); 2, B. Jackson (Doncaster); 3, Mr. and Mrs. Feasey (Doncaster). A.O.V. Tropical: 1, Mr. and Mrs. Feasey (Doncaster); 2, Mr. and Mrs. Gliding (Retford); 3, Mr. and Mrs. D. Caldwell (Scunthorpe Museum). Tropical Marines: 1, A. Mawson (Workop). Mini Jars: 1, 2 and 3, R. Harlow (D.R.A.S.). Plants, Tropical: 1 and 3, Mr. and Mrs. Stanton (Sheffield); 2, K. Prendergast (Boston). Ladies Class: 1, Mrs. Copley (Doncaster); 2, Mrs. Blades (Cresswell); 3, Miss J. Asher (Doncaster). Novice Class: 1, Mr. and Mrs. Williams (Rhondda); 2, M. Jackson (Workop); 3, D. Hill (South Humberside). A.V. Female Livebearer: 1, Mr. and Mrs. Feasey (Doncaster); 2, K. Williams (Rhondda); 3, B. Jackson (Doncaster). A.V. Female Egglayer: 1, A. Jackson (Workop); 2, Mr. and Mrs. Fletcher (Doncaster); 3, T. Sands (Boston). Dwarf Cichlids: 1, G. White (Scunthorpe and District); 2, N. Blenkin (Beidlington); 3, Mr. and Mrs. B. Cougill (Retford). Angels: 1 and 2, Mr. and Mrs. Sellars (Lincoln); 3, Mr. and Mrs. A. Binns (Scunthorpe Museum). Rift Valley Cichlids: 1 and 3, Mr. and Mrs. Sellars (Lincoln); 2, Mr. and Mrs. Fletcher (Doncaster). A.O.V. Cichlids: 1, Mr. Wressell (Scunthorpe); 2, T. Hope (Hartlepool); 3, Mr. and Mrs. Simkins (Long Eaton). Corydoras: 1, Mr. and Mrs. Copley (Doncaster); 2, Mr. and Mrs. D. Caldwell (Scunthorpe Museum); 3, W. Blandell (Doncaster). Sharks and Foxes: 1, Mr. and Mrs. Stanton (Sheffield); 2, Mr. and Mrs. D. Vallance (Retford); 3, T. Hope (Hartlepool). Bottles and Louches: 1, Mr. and Mrs. A. Binns (Scunthorpe Museum); 2, Mr. and Mrs. Davies (Doncaster); 3, Mr. and Mrs. D. Caldwell (Scunthorpe Museum). A.O.V. Catfish: 1, Mr. and Mrs. Holmes (Castleford); 2, S. Hall (Aireborough); 3, Mr. and Mrs. Williams (Rhondda). Fighters: 1, Mr. and Mrs. Feasey (Doncaster); 2, Mr. and Mrs. Lake (South Humberside); 3, A. Mawson (Workop). Small Anabantids: 1, Mr. and Mrs. D. Davey (Scunthorpe and District); 2, Mr. and Mrs. Davies (Doncaster); 3, Mr. and Mrs. Norton (South Humberside). A.O.V. Anabantids: 1, Mr. and Mrs. Blades (Cresswell); 2, K. Lancaster (Doncaster); 3, Mr. and Mrs. Stevenson (Sherwood).

THE West Midland section of the **British Cichlid Association** held its tenth meeting in March and were entertained with a Rift Lake Cichlid slide show. P. Bough gave the commentary, explaining the sizes and details of each fish and made a most enjoyable evening. Sandwich refreshments were supplied by Mrs. J. Johnson and R. Dawes. Raffle prizes consisting of some young Lake Malawi Cichlids were won by K. Hill, L. Saunders and R. Jinks. Meetings of this new section are held at the Midland Vaults, Upper High Street, Wednesbury, at 8.00 p.m., the second Tuesday of every month, all will be made very welcome.

IN February, members of the **Hounslow and District A.S.** competed in a five-way match at Hendon in an attempt to keep the fine trophy which they won at this match last year, but on this occasion they were narrowly beaten into second place. The results were as follows: 1, Bethnal Green A.S., 469 points; 2, Hounslow & District A.S., 462 points; 3, Hendon A.S., 443 points; 4, Runnymede A.S., 443 points;

5, Tottenham A.S., 422 points. The Hounslow A.S. also entered nine fish in the overpill class and here again they were beaten into second place. However, everyone who attended the match had a very enjoyable time, the highlight of which was a lecture on Characins given by an authority from the British Museum.

DURING the monthly meeting of the **Mid-Sussex A.S.** Ian Mathieson judged the table show as follows: Pairs (Livebearers): 1, Ann Holmes; 2, D. Soper; 3, D. Bottams; 4, D. D. Ancombe. Best Junior: D. Ancombe. Corrected result for Egglayers: 1 and 3, Ann Holmes; 2, R. Todman; 4, Mrs. Bottams. Best Junior: C. Bottoms. Best Novice of the Evening: R. Todman.

During the evening J. Burles gave a talk on structure and design of fishes which proved to be of great interest to members. For further information please contact B. Slade, Sandown, Bolney Road, Anstye, Haywards Heath (S3747), Sussex.

THE **Sittingbourne and District A.S.** started this year with a very successful social evening held early in January, at which wives and children were guests and at the second meeting there was a table show. Results were as follows: Cichlid Trophy: 1 and 2, R. Newman; 3, G. Wicks; 4, P. Floyd. Fighter Cup: 1 and 3, T. McDonald; 2 and 4, A. Sharp.

An interesting evening was spent in February with a look at some slides taken by Alan Sharp. Later in the month the table show results were as follows: Pairs: 1, A. Sharp; 2, 3 and 4, P. Floyd. Breeders: 1, A. Sharp; 2, Master Andrew McDonald; 3, Miss Diane McDonald; 4, B. Newman.

IN February the **Portsmouth A.S.** held its annual general meeting and a new committee was formed. The following table show trophies were awarded: Shubunkin Shield: E. Binstead; Twintail Shield: W. Evans; Labyrinth Shield: E. Binstead; Plant Trophy: Mrs. J. Stillwell; Breeders Cup Tropical: E. Binstead; Breeders Cup Coldwater: W. Ryder; A.O.S. Coldwater Trophy: E. Binstead; Table Show Points Trophy: E. Binstead; Junior Points Tropical: M. Parsons; Junior Points Coldwater: R. Bryant; Home Furnished Tropical: J. Stillwell; Home Furnished Coldwater: Miss W. Ryder; Home Furnished Junior: K. Curtis.

Two important forthcoming events in the society programme are the inter-club show to be held on the 25th May at the Portsmouth Community Centre, Malins Road, Buckland, Portsmouth and the open show and exhibition at the Wesley Central Hall, Fratton Road, Portsmouth. This will be open to the public from Monday, 4th August until Saturday, 9th August.

THE **Rhondda A.S.** entertained Llantwit Major A.S. to compete for the Glamafon Trophy recently and the result was as follows: Interclub: Livebearers: 1, A. and M. Smith (Rhondda); 2, 4, 5 and 6, A. Ibbertson (L.M.); 3, P. and S. Dewlan (Rhondda). Egglayers: 1 and 6, K. Williams (Rhondda); 2 and 3, S. Nelson (L.M.); 4, M. Williams (Rhondda); 5, A. Ibbertson (L.M.). Llantwit Major won by 22 points-20 points. Knockout (not counted in inter-club). Livebearers: 1, A. and M. Smith (RAS); 2 and 4, M. Williams (RAS); 3, P. and S. Dewlan (RAS). Egglayers: 1, T. Click (RAS); 2, A. and M. Smith (RAS); 3 and 4, M. Williams (RAS).

OFFICERS elected at the **Chester and District A.S.** annual general meeting were as follows: chairman, C. Bowyer; hon. secretary, J. Mycock, 14 New Park Road, Queensferry, Deeside, Clwyd CH5 1XD; treasurer, A. Dodd. Regular meetings are held on the third Thursday of each month at 7.30 p.m. in the Watergate Inn, Chester.

EARLY in March **Aylesbury A.S.** visited Dunstable A.S. for a twelve-a-side tropical contest, which was judged by A. Lusby. The Aylesbury club won the match comfortably by 857 points to 833. Recently Aylesbury have

been in competition on four occasions and after their first defeat have won the last three matches convincingly. Meetings take place fortnightly on Wednesday at the White Hart, Exchange Street as well as at any away meetings when they occur. Winners for the table show on points were: 1, B. Wiffin; 2, J. Sale; (equal) 3, S. March and D. Harms.

THERE was a very good attendance of club members at the **Brighton and Southern A.S.** meeting to enjoy a tape and slide show of a previous open show of the society and this was given by P. Todd. Results of table show held by the club early in March: A.O.V. Cichlids: 1, S. Feek; 2, 3 and 4, R. Maughton. Dwarf Cichlids: 1, S. Feek; 2, B. Sayers. Meetings are held on the first Monday in the month at K.T. Club, Franklin Road, Portslade, Sussex.

THE **C.N.A.A.** held a meeting at the **Blaenau Gwent A.S.** in March and this meeting was used to introduce the C.N.A.A. card at the same time to give encouragement to the home club.

Various talks were given by J. J. Edwards on formation of clubs and R. S. Wigg on the advantages and breakdown of the F.B.A.S. system. The number of members present was 85 and this included members from all the Welsh clubs bar two. Results of the table show were as follows: Egglayers: 1, P. Dewlan (RAS); 2, J. Edwards (L.M.); 3, Mr. Oakwire (NG); 4, Mrs. Puddy (NG). Livebearers: 1, T. Click (RAS); 2, R. Brown; 3, B. Puddy (NG); 4, A. Brown.

THE **Rainford and District A.S.** are in urgent need of information regarding the hiring of slide-film shows, and are willing to purchase any 35mm. slides depicting fish, plants. Details to R. Mylie, 13 Duxbury Close, Rainford, St. Helen, Merseyside. All letters answered.

THE Manchester section of the **Fancy Guppy Association** met on Sunday early in March, when members took part in a general discussion on guppies and allied interests. The Best in Show was won by Mrs. Young. The section meets at the Tudor Room, Longlight Hotel, Belle Vue, Manchester, the first Sunday in the month, commencing at 2.30 p.m.

OFFICERS elected at the **Amersham and District A.S.** annual general meeting were as follows: chairman, Mrs. W. Thompson; secretary, Mrs. P. Hearn, "Orchard End," Park Grove, Chalfont St. Giles, Bucks.; show secretary, D. Booker; treasurer, J. Berridge; publicity, K. North; librarian, Mrs. M. Daniels; other committee members, R. Stepto, S. Thompson, B. Jessop; R. Harper and P. Daniels. Lectures, film shows, outings and discussion groups are included among the year's activities.

Meetings will still be held on the first and third Wednesday of each month at Amersham Community Centre, 8 p.m. New members always welcome.

SPEAKER at the March meeting of the **Gloucester Fishkeeping and Social Club** was V. de Thabrew who gave a most interesting talk on the plants used in aquariums which are native of Ceylon. These plants which are highly prized by fishkeepers in this country are evidently a great nuisance in their original habitat, clogging up waterways and appearing, unwanted, in rice fields. Mr. de Thabrew described in detail each plant and its requirements for successful growth in a home aquarium. He also showed a film of underwater life off the shores of Ceylon.

Business discussed at this meeting included the recent six-a-side show held at Evesham which was won by Gloucester Aquarists. Table show winners were J. Bartlett, Mrs. J. Burke and M. Pocken.

THE March meeting of the **Bristol A.S.** was taken up by a table show, the results of which were: Goldfish: 1, 2 and 3, W. Ham; 4, S. Lloyd. Orandas: 1, S. Lloyd; 2, J. Lewis; 3, J. Day. Fantails: 1, S. Lloyd; 2, J. Day; 3, G. Bell. Cichlids: 1, 2, 3 and 4, B. N. Bowden. While the judging was taking place a general

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discussion took place, topics included maintenance of ponds and how to ensure a good start for fry.

ON the 22nd March the Goldfish Society of Great Britain held its annual general meeting. A short question and answer session was held before the main part of the meeting with R. Whittington and W. Leach answering the questions and giving sound advice. Many good points were raised including the age-old theory on the wintering of Fancy Goldfish. Then came the reading of the reports and election of the officers. The seven elected were as follows:—treasurer, A. Law; show secretary, J. Herring; exhibition manager, H. Berger; assistant secretary, Mrs. D. Duffly; lay member, D. Graig; auditor, G. W. Fleming. W. Leach was elected to the position of vice-chairman. Several rules were amended and the annual subscriptions are to be raised in 1976. Eight fish were entered for "The most attractive fish by popular acclaim contest." The winner of the contest was W. Cook with his coloured Moor.

IN March the Blaenau Gwent Fish Club held a general discussion and the programme for the next few months was planned. On 13th May the club will act as hosts to North Gwent A.A. and on 27th May an aquascaping evening has been arranged. It is hoped to entertain the new Merthyr Tydfil A.A. early in June, and it is also planned to visit Belle Vue, Manchester, for the Aquarist Festival later this year. Eleven new members have been admitted since January. Everyone is welcome to come along and a special welcome will be given to juniors wishing to learn more about the hobby.

OFFICIALS elected at the recent annual general meeting of the Abingdon A.S. for the forthcoming year were: chairman, A. Wanson; show secretary, D. Higgs; treasurer, D. Tovey; librarian, S. Osborn; secretary (acting), D. R. Blundell of 23 Welford Gardens, Abingdon, Oxon OX14 2RN.

At a recent meeting, B. R. James of the Everglades Aquatic Nurseries gave a very useful and illuminating talk on the successful cultivation of plants. For the coming year all the F.B.A.S. aqua-talks will be shown and it is hoped to have a talk on different topics each meeting by club members. The meetings are held at the Barley Mow, Abingdon, every other Thursday, with the next meetings on 1st, 15th and 29th May. All aquarists welcome.

WITH a membership of 165, the Merseyside A.S. is now settled at the N.U.R. No. 5 Club, Deane Road, Liverpool, where there is spacious accommodation for more than 200. The subjects covered at the well-attended meetings this year have included the various types of aquaria equipment available, how to show and judge your fish, and a lecture and film show on water, by Mr. Payne, of the Liverpool Water Board, who answered members' queries on pH and the effect of chlorine.

At the first table show of the year in March, a junior member, Alan Ridpath, tabled the best fish in show. It was his first entry in any kind of show. The meetings in the near future include a talk on Killifish, on 13th May by a member of the British Killifish Association, a talk on diseases by Dr. A. Lewis, the well-known chemist and aquarist from Huddersfield (10th June) and an auction of members' surplus fish and equipment on 24th June.

Any visitors are most welcome to any of the meetings, so if you live in or are visiting the Liverpool area, you can be sure of a most enjoyable, friendly evening, on any alternate Tuesday.

The committee elected at the annual general meeting were: secretary, J. Bailey; chairman, F. Mullis; assistant chairmen, J. Taylor; treasurer, K. Parkes; assistant treasurer, D. Watterson; show secretary, W. Smith; librarian, A. Vassiere; news letter and magazine editor, Mrs. V. Parkes; exchange magazine editor, D. Wilson; committee members, Mrs. H. Hall and Payne, Eric Hardy, the Radio Merseyside Naturalist, and "From a Naturalist Notebook,"—since, is the president, and Michael D. Murphy,

the technical assistant to the Aquarium at Liverpool Museum, is vice-president.

THE East Anglian Federation of Aquarists held a show at Thetford in March which was well attended and attracted members from Norwich, Yarmouth, Ipswich, Ely, and of course, Thetford.

During February, an annual general meeting was held, and the following committee were elected: chairman, C. Williamson; treasurer, Mr. Austin; show secretary, D. Lacey; secretary, Mrs. R. Williamson; P.R.O. assistant secretary, A. Cook. Mr. Williamson thanked the old committee and the retiring chairman, W. Card, the founder member of the organisation.

THE British Aquarists Study Society held the first Spring Meeting early in March at the meeting room of the Zoological Society of London in Regents Park.

The subject of the meeting was a symposium on "The diseases of fishes." The speakers were Randolph H. Richards, Esq., Mrs. G. Sommerville and Ian H. Macrae, Esq., all of the Unit of Aquatic Pathobiology of Stirling University. The meeting was well attended by about one hundred people; the speakers were able to give this audience the very latest information on the subjects of both diseases and their cures. The lectures were accompanied by excellent slides which showed specimens and techniques of examination.

#### NEW SOCIETIES

THE North Avon A.S. was formed in October, 1974 to cater for aquarists living on the northern fringe of the City of Bristol. The Club has already an active membership of twenty-four, with new members joining as they hear of the society. Meetings are held on the second Tuesday of each month at the Little Stoke Primary School commencing at 7.15 p.m. Members include aquarists with several years' experience and some new to the hobby; new members are always welcome. For details contact the secretary, F. J. Moorman, 63 Bush Avenue, Little Stoke, Bristol BS12 6NL, or ring Almondsbury 642396.

THE Winstan Mill A.S. extend an invitation to anyone wishing to join their club, which meets at 7 p.m. on the first and third Tuesday of every month at Winstan Mill Village Hall (back room), Winstan Mill, Blaydon. The secretary is Mrs. S. V. Brown, c/o 58 June Avenue, Winstan Mill, Blaydon, Tyne & Wear NE21 6SA.

#### SECRETARY CHANGES

Littlehampton and Bogmor A.S.: A. E. Kirk, Conway House, 47 Beach Road, Littlehampton, Sussex BN17 5JG.

Blackpool and Fylde A.S.: Mrs. S. Welby, 38 Poulton Road, Carlston, Poulton-Le-Fylde, Blackpool, Lancashire. Phone Poulton-Le-Fylde 5050.

Ebbw Vale A.S.: M. J. Evans, 4 Beaufort Terrace, Ebbw Vale, Gwent.

Blackburn A.S.: Mrs. Jean Wolstenholme, 39 George Street, Great Harwood, nr. Blackburn, Lancashire BB6 7JP.

#### SHOW NOTICE

THIS year the Bristol A.S. have decided to split their two-day show into two separate shows of one-day duration. The tropical show will take place on Sunday, 6th July, and the coldwater show will take place on Saturday, 13th September.

Schedules for both shows will be available from the end of April from the show secretary, E. N. Rowden, 12 Stoneleigh Walk, Knowle, Bristol BS4 2RL, tel.: 775355, or from C. Summers, 6 Heath Gardens, Colpitt Heath, Bristol BS17 2TQ, tel.: Winterbourne 773833.

SEVERN-SIDE AQUARIST ASSOCIATION  
THE Association was formed in 1970, because it was thought that a closer link should be forged between hobbyists in the area. It was felt that as the hobby has many facets, clubs should not be in isolation. Information gained by one group should be made available

to others. Useful information gathered from member clubs (judges, speakers, programme aids, etc.) are formed into information lists, that are circulated to all clubs in the association. Meetings are held quarterly in Bristol, when delegates are able to discuss and air their views on any subject relevant to raising the standard of fishkeeping. Judges are trained within the association and a judges and standards panel meets regularly to ensure all judges are kept up to date with alterations to fish standards, and to discuss all aspects of judging.

Any club interested in finding out more about the association is asked to contact one of the following committee members:—chairman, L. Littleton, 9 Little Stoke Road, Stoke Park, Bristol; vice-chairman, T. Short, 22 Caledonian Road, East Tipton, Bath; secretary, Mrs. D. Cole, Avignon, The Hill, Rambswick, Stroud, Glos., Tel.: Stroud 4504; treasurer, P. Baines, Weston-super-Mare; P.R.O., J. Cole, Stroud; judges and standards committee, secretary, E. Newman, 71 Somerdale Avenue, Knowle, Bristol BS4 1AE, Tel.: 777604; D. Noble, E. Short, L. Littleton, Mr. Eggar, R. Hyatt, H. C. B. Thomas and S. Daniels.

Each year a show is held in Bristol in which clubs belonging to the association may enter. A champion of champions class is held here. Show committee: L. Littleton, H. C. B. Thomas, E. Short, Mrs. Short.

#### AQUARISTS' CALENDAR

4th May: Hull A.S. Open Show will be held at the Blind Institute, Beverley Road, Hull.

10th May: Southend, Leigh and District A.S. Open Show, St. Clements Hall, Leigh-on-Sea, Essex. Club Pamphlet, Individual Pamphlet, Aquascapes, Marine and Junior Classes included. Show Secretary: Derek Durrant, 172 Trinity Road, Southend-on-Sea, Essex. Tel: 610576.

10th May: Port Talbot A.S. Annual Open Show. Schedules available from Show Secretary, A. E. B. Fouracre, 3 Cross Street, Velindre, Port Talbot, Glam.

11th May: Gloucester A.S. fourth Open Show at The Chequer Bridge Centre, Paiswick Road, Gloucester. Schedules from Mr. G. Perkins, 243 Bodiam Avenue, Quedley Court Estate, Tuffley, Gloucester.

11th May: Yeovil & District A.S. Annual Open Show. School Hall Martock in Yeovil, Som.

11th May: Bournemouth A.S. Annual Open Show to be held at Kinson Community Centre, Pelhams Park, Kinson, Bournemouth. Show Secretary: J. V. Jeffrey, 30 Brazemar Avenue, Southbourne, Bournemouth BH16 4JF.

11th May: The Midland Aquarist League Inter-Society and Part Open Show, Bulkington Parish Hall, Bulkington, Nr. Nuneaton. Details: P. Underwood, 59 Warwick Road, Kenilworth CV8 1HN.

17th May: Trowbridge and District A. & P.S. Annual Open Show at the Rowing Club, Bradford-on-Avon, Wilts. Show schedules from April onwards from S. Huntley, 49 Marsh Road, Hilperton, Trowbridge, Wilts.

17th May: South Park Aquatic (Study) Society fifth annual invitation coldwater show at the Wimbledon Community Centre, St. Georges Road, London, S.W.19. For details contact D. Herman (show secretary), 83 Cannon Grove, Fatcham, Surrey.

18th May: Gooles A.S. Open Show. Show Secretary: P. Shipley, 76 Jefferson Street, Gooles, N. Humberston DN14 6SJ.

18th May: Middleton and District A.S. Fourth Open Show will be held at Hollin Hill School, Hollin Lane, Middleton. Schedules later. Only members of recognised Aquarist Societies may exhibit. No independent entries can be accepted.

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**18th May:** Redcar A.S. Annual Open Show at Colham Bowl, Redcar. Schedules available from D. Lawrence, 65 Inas Road, Redcar, Cleveland.

**24th May:** Goldfish Society of Great Britain, Conway Hall, Red Lion Square, Holborn, London W.C.1.

**24th May:** The British Aquarists Study Society will be holding the second Spring Meeting at the meeting room of the Zoological Society of London in Regents Park. The speaker will be Dr. Keith Bannister of the British Museum of Natural History. His subject will be the River Zaire Expedition. The doors will open at 1.45 p.m. for the meeting to commence at 2.30 p.m. The tickets will cost £1.25p. This price includes the cost of tea. Tickets are available from P. Keens, Esq., Highcliffe, Old Hill, Woking, Surrey. All interested persons are very welcome to attend the Society's meeting.

**25th May:** Corby and District A.S.: Open Show, Corby Civic Centre, Corby, Northants. Show Secretary, A. Slow, 176 King Street, Kettering, Northants NN16 8QS. (Details and Show Schedule Mid-March).

**25th May:** Portsmouth A.S. Inter-Club Show at the Portsmouth Community Centre, Portsmouth.

**25th May:** Bridlington and District A.S. Second Annual Open Show, will be held at the Hilderthorpe Junior School, Shafesbury Road, Bridlington. Show schedules will be available shortly from Mr. M. Jordan, show sec., 86 Matson Road, West Hill Estate, Bridlington, North Humberside.

**25-26th May:** Mid-Sussex A.S. Annual Fish Exhibition, Park Centre, Burgess Hill. Phone Mr. W. Slade, Haywards Heath S5747 for details.

**27th May:** Billingham Half Moon A.S. Annual Show, Corporation Hall, Stockton.

**1st June:** Annual Open Show of Rotherham & District A.S. Schedules are now available from T. South, 16 Howard Road, Bramley, Rotherham, S. Yorks.

**1st June:** Havant and District A.S. Open Show to be held at the Merchiston Hall, Hornsea, Hants. Schedules, Mr. K. Taylor, 3 Hollybank Close, Cowplain, Hants. Phone Romanway 4140.

**1st June:** Newcastle Tropical F.S. Open Show will be held in St. John's Church Hall, Westgate Road and Granger Street junction, Newcastle upon Tyne. Schedules will be available shortly from L. R. Lawson, 84 Grosvenor Road, Jesmond, Newcastle upon Tyne 2.

**1st June:** Northwich and District A.S. Seventh Open Show at the Hartford Secondary Boys School, Chester Road, Hartford, Northwich. Judging to F.N.A.S. standards. Details from Show Secretary N. R. Thompson, 54 Grassmere Road, Frodsham, via Warrington, Lancs. WA6 7LQ. Tel.: Frodsham 32745.

**1st June:** Loughborough and District A.S. Open Show. Venue this year will be the Burleigh Community Centre, Thorpe Hill, Loughborough, Leics. Schedules from: Mr. I. Purdy, 10 Cleveland Rd. Loughborough LE12. Phone: 61715.

**1st June:** Cotswold A.S. First Open Show at Roxborough House Youth Centre, Nelson Street, Stroud, Glos. Show schedules available from the show secretary, K. Hodges, 31 Horns Road, Stroud, Glos.

**1st June:** Accrington and District A.S. Open Show at Antley Methodist Church Hall, Blackburn Road, Accrington. Note: New larger premises. Inquiries: S. Walsh, assistant show secretary, 133 Lammack Road, Blackburn, Lancs.

**1st June:** Arbroath A.S. Open Show, Community Centre, Arbroath. Details: T. Clarke, 3 Wardykes Road, Arbroath. Tel.: Arbroath 3355.

**8th June:** Sherwood A.S. Open Show to be held at Thoresby Miners Welfare Hall, Edwinstowe, Ollerton, Nr. Mansfield, Notts. Schedules from show secretary, Mr. J. Igoe, 25 Marples Avenue, Mansfield, Woodhouse, Notts. Tel: Mansfield 32249.

**8th June:** Sudbury A.S. Open Show to be held at St. Andrews Church, Church Gardens, Sudbury.

**8th June:** British Cichlid Association annual convention, Birmingham. Tickets £2.00 including lunch, from T. Green, 12 Greenwood Meadow, Chinnor, Oxford.

**14th June:** Dunmow & District A.S. Open Show, Foskes Hall, Stoufford Road, Dunmow. Show secretary, 31 Duggers Lane, Braintree Essex.

**14th June:** Kingston & District A.S. Open Show at Samon, Adult School, Benhill Avenue, Sutton, Surrey. Details from Show secretary, Mr. D. J. Mackay, 12 Victoria Road, Twickenham, Middx. Tel: 01-572 0632, daytime till 6 p.m.

**14th June:** Llanrwit Major A.S. (C.N.A.A./P.B.A.S.) Open Show to be held at the Town Hall, Llanrwit Major. Quality prizes awarded to all classes. Show schedules available March onwards. Details etc., J. J. Edwards, 'Glanafon,' Mill Park, Llanblethian Cowbridge, South Glamorgan CF7 7BG.

**14th June:** Whiteway and District Fishkeepers Society Third Open Show, Whiteway Community Centre, Kelston View, Whiteway, Bath, Avon. Schedules available from show secretary, Mrs. E. Daniels, 21 Haycombe Drive, Whiteway, Bath, BA2 1FG, Avon.

**15th June:** Gosport & District A.S. Annual Open Show, Details from L. Clarke, 37 Rowner Close, Rowner, Gosport. Tel: Fareham 80100.

**15th June:** Salisbury & District A.S. eleventh annual Open Show at the City Hall, Fisherton Street, Salisbury. Further details and schedules may be obtained from the secretary, Mr. R. F. Adams, 26 Bampton Road, Salisbury, Wilt, SP2 9DP or ring 0722-27453.

**15th June:** Swillington A.S. Open Show, John Smeaton School, Barwick Road (off York Road), Leeds 15. Further details from Mr. and Mrs. R. Hildrop, 1 Tree Gardens, Moortown, Leeds LS17 7EQ.

**15th June:** Taunton & District A.S. Open Show is to be held at the Corfield Hall. It is hoped to make the show schedules available in early April and these together with further details will be available from the Show Secretary S. Pearcy, Hillhead Cottage, Fryland, Taunton.

**15th June:** North West Section of the F.G.A. Open Show. Schedules can be obtained from D. Ormerod, 55 Barnes Avenue, Rawtenstall, Rossendale, Lancs.

**22nd June:** Hinckley and District A.S. 4th Open Show will be held at Westfield Community Centre, Rosemary Way, Hinckley. Schedules from: W. Fielding, 15 Council Road, Hinckley, Leics.

**22nd June:** Alfreton and District A.S. Annual Open Show to be held at the Adult Education Centre, Alfreton Hall, Alfreton. Details from the show secretary, B. Hickling, 'Parkview', 13 Coppice Drive, Eastwood, MG16 3PL. Tel: 077 37 5104.

**28th June:** Runnymede A.S. Open Show at St. Annes Middle School, Clare Road, Stanwell, Staines, Mx. Show secretary, D. Riley, 129 Kingshill Avenue, Northolt, Mx. UB5 6NY. Tel: 01-845 4169.

**28th June:** Nailsea and District A.S. Annual Open Show which coincides with the final day of Nailsea Festival Week. Further details and schedules may be obtained from the show secretary, D. Kenwood, 90 Slade Road, Porlished, Bristol. Tel: Porlished 849947.

**29th June:** Dunlop Aquarium Keepers Society First Open Show in Works Canteen, Speke, Liverpool, 24. Further details later.

**29th June:** Lincoln & District A.S. Annual Open Show will take place at The Drill Hall, Broadgate, Lincoln. Show secretary, G. S. Hill, c/o 36 Richmond Road, Lincoln LN1 1LQ.

**29th June:** West Cumberland Aquarists Club Open Show at the Civic Hall, Whitehaven, Cumbria.

**5th July:** Cardiff A.S. Open Show at St. Margaret's Church Hall, Roath, Cardiff. Details from B. Guy, 30 Lenton Road, Rummy, Cardiff.

**6th July:** Billingham A.S. Annual Open Show in the Community Centre, Billingham.

**6th July:** Grantham and District A.S. Open Show at Aveling-Barfords Social Hall, Arncliffe, Gonerby Road, Grantham. Show secretary, W. E. Neville, 32 Sharpe Road, Grantham, Lincs, NG31 9HW.

**6th July:** Lytham A.S. Annual Open Show to be held at Ansdell Institute, Woodlands Road, Ansdell, Lytham-St-Annes, Lancs. Show schedules from show secretary, Mr. Peter Ham, 1 Wyndene Grove, Preckleton, Preston, Lancs. Tel: Preckleton 633182.

**6th July:** Bristol A.S. Tropical Show. Schedules from show secretary, E. N. Bowden, 12 Stoneleigh Walk, Knowle, Bristol BS4 2RL. Tel.: 775355 or from C. Summers, 6 Heath Gardens, Coalpit Heath, Bristol BS17 2TQ. Tel.: Winterbourne 773833.

**20th July:** Alreborough and District A.S. Open Show will be held at Menston Community Centre, Main Street, Menston. Schedules from Show Secretary Mr. J. S. Hall, 34 Salisbury St., Colverley, Pudsey LS25 5PY. Tel.: Pudsey 74609.

**20th July:** Sandgrounders A.S. Annual Open Show at Meols Cop Secondary Schools, Meols Cop Road, Southport. Show Secretary: G. A. Waterhouse, 23 Moss Lane, Southport, Merseyside PR9 9QR.

**20th July:** Brighton and Southern A.S. Open Show, St. Barnabas Church Halls, Sackville Road, Hove, Sussex. Further details from B. Sayers, 11 Seaview Estate, Southwick BN4 4AS, Sussex. Tel.: Brighton 593851.

**20th July:** Goldfish Society of Great Britain, Conway Hall, Red Lion Square, Holborn, London W.C.1.

**1-2 August:** Hull A.S. (Hull Show "Aqualist Section"), East Park, Holderness Road, Hull.

**3rd August:** Tonbridge & District A.S. Open Show. Show secretary, S. Feast, 19 Bardley Road, Sevenoaks, Kent TN13 1XX. Sevenoaks 54998.

**4th-8th August:** Portsmouth A.S. Open Show and Exhibition will be held at the Wesley Central Hall, Fratton Road, Portsmouth. Benching on Saturday, 2nd August. Judging on Sunday, 3rd August. Schedules from J. Stillwell, 34 Salcombe Avenue, Copnor, Portsmouth, Hants PO3 6LD.

**10th August:** Grimsby and Cleethorpes A.S. Open Show Memorial Hall, Cleethorpes. Schedules from: Show Secretary—T. P. Walker, 51 Cheshire Walk, Grimsby, South Humberside.

**17th August:** Oldham & District A.S. Annual Open Show, Werneth Park, Oldham. Details from A. E. Chadwick, 341 Broadway, Chadderton, Oldham.

**17th August:** Newcastle Guppy and Livebearer Society, Second All Livebearer Open Show. Details to be announced later.

**17th August:** Stroud and District A.S. at Stroud Subscription Rooms as last year. Details from Mrs. Cole, 'Avignon', The Hill, Randwick, Stroud, Glos. Tel: Stroud 4504.

**17th August:** Huddersfield T.F.S. Open Show, Paddock Civic Youth Centre, Beech Street, Paddock, Huddersfield. Details from D. Hough, Flat 5, Sycamore Court, Sycamore Avenue, Golcar, Huddersfield. Tel.: Huddersfield 57147.

**20th August:** Hounslow and District Open Show will be held at Hounslow Youth Centre, Cecil Road, Hounslow. Show schedules and all relevant information can be obtained from E. Shepherd at 9 Moulton Avenue, Hounslow, Middlesex. Tel.: 01-570 6127.

**31st August:** The Castleford A.S. Second Annual Open Show at the Castleford Civic Centre, Ferrybridge Road, Castleford, Yorkshire.

**31st August:** Morecambe Bay A.S. Open Show at the St. John's Parochial Hall, Norton Road, Morecambe. Show secretary, Mrs. E. Booker, 18 Gringley Road, Westgate, Morecambe.

**31st August:** Stretford & District A.S. Annual Open Show, Salford Grammar School, Bailie Park, Salford.

**September:** Bishop Auckland A.S. annual Open Show. Details later. Show secretary, B. Minto, 111 Craddock Street, Spennymoor, Co. Durham.

**7th September:** Bethnal Green A.S. Open Show to be held at The Bethnal Green Institute, 229 Bethnal Green Road, E.2. Schedules and further details available from the Show Secretary, Sybil Hedges, "Koi Korum," 150 Ashburton Ave; Seven Kings, Ilford, Essex, IG3 9BL. Tel: 01-590 5239.

**7th September:** Killingworth Aquarist Association First Open Show at 'Communicare,' Killingworth, Newcastle. Schedules from,



D. B. Hickman, 14 Crumstone Court, Long-

meadows, Killingworth, Newcastle NE12 0SZ.

**7th September:** Wellingborough and District A.S. Open Show Weavers Sport Centre, Weavers Road, Wellingborough. Schedules from D. Hitchener, 1A, George St., Wellingborough.

**7th September:** Buxton and District A.S. Open Show, Pavilion Gardens, Buxton. Judges F.N.A.S., and points gained will be awarded to the League.

**13th September:** Malvern & District A.S. Second Open Show to be held at Barnards Green Cricket Club, North End Lane, Malvern. Schedules available later.

**13th September:** Bristol A.S. Coldwater Show. Schedules from show secretary, E. N. Bowden, 12 Stoncligh Walk, Knowle, Bristol BS4 2RL. Tel.: 775355.

**14th September:** Torbay A.S. will be holding its Seventh Annual Open Show at the Torquay Town Hall. Show schedules will be available from Mr. J. R. Davis, 43 Haddon Road, Torquay, Devon.

**14th September:** Three Counties Group 21st Annual Open Show run by the Basingstoke, Bracknell, Didcot, High Wycombe and Reading A.S.'s at the Reading University, with 50 classes which will include a 'specialist' Killie Show. Schedules from, R. Leslie, 29 Meadow Walk, Tylers Green, High Wycombe, Bucks, HP10 2DG, or M. Strange, 10 Loddon Court, Neville Close, Basingstoke, Hants.

**14th September:** Cleveland A.S. annual Open Show at the Guisborough Parish Church

Hall, Whitby Road, Guisborough (same venue as last year). Schedules will be available later, from the show secretary, R. W. Begg, 35 Tyreman Street, Lingdale, Saltburn, Cleveland TS12 3US.

**20th September:** Hounslow and District A.S. Annual Open Show at the Hounslow Community Centre, Cecil Road, Hounslow, Middx. NE9 6UJ. Phone Low Fell 877156.

**21st September:** Hucknall & Budwell A.S. Annual Open Show. Details to follow. NE9 6UJ. Phone Low Fell 877156.

**27th September:** Goldfish Society of Great Britain Open Show to be held at Sutton Adult School, Benhill Avenue, Sutton, Surrey.

**27th September:** North Gwent A.S. First Annual Open Show at the Leisure Centre, Ebbw Vale.

**28th September:** Newbury and District A.S. Third Open Show at the Plaza, Market Place, Newbury, Berks. Details and schedules from S. Canning, 6 South End, Thatcham, Newbury, Berks.

**October:** Chelmsford A.S. Date and venue to be decided.

**4th October:** East London Aquatic and Pondkeepers Association Annual Open Show.

**4th October:** Haslemere and District A.S. first Open Show, at the Haslemere Town Hall, Bridge Road, Haslemere, Surrey. Schedules and further details from show secretary, R. J. Hard, 6 Lower Hanger, Woolmer Hill, Haslemere, Surrey. Tel.: Haslemere 51812.

**5th October:** Scunthorpe and District A.S. Open Show. Venue to be decided. Schedules are available from L. Burr, 6 Saxby Road, Scunthorpe, South Humberside.

**5th October:** The Ealing and District A.S. Open Show. Details to follow.

**5th October:** Eboracrum Aquarists Open Show to be held at Nunthorpe Grammar School Hall. Enquiries to show secretary, Mr. A. S. Allison, 14 Bewley Street, Bishopthorpe Road, York.

**12th October:** Ilfracombe and District A.S. Open Show at the Ilfracombe Junior School, Princess Avenue as last year. Details from Mrs. S. Lipscomb, 8 Foxbears Road, Ilfracombe, N. Devon.

**26th October:** Doncaster A.S. Open Show, Brodsworth Miners Welfare Hall, Welfare Road, Woodlands, Nr. Doncaster. Benching 12-2.15.

**2nd November:** Blackburn Aquarist Waterlife Society Open Show, Windsor Hall, Blackburn. Details to T. Burton, 21, Henry Street, Rishton nr. Blackburn BB1 4JJ.

**22nd November:** Goldfish Society of Great Britain, Conway Hall, Red Lion Square, Holborn, London W.C.1.

**22nd November:** Fur, Feather & Aquaria Show, King's Hall, 39 Lower Clapton Road, E.5. Schedules and further details from Show Secretary, Sybil Hedges, "Koi Korner" 150 Ashburton Avenue, Seven Kings, Ilford, Essex, IG3 9EL. Telephone 01-590 3239.

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