MAY 1985 85p

AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers

(Colour Feature)

Lake Tanganyikan Synodontis Catfish

SPOTLIGHT: **The Bandit Catfish**

£1000 in prizes in Atlantis Competition

COVER STORY

One of twenty species known, *Pterygoplichthys gibbiceps* (Kner 1854), the Sailfin Suckermouth, is the best known and regarded amongst catfish enthusiasts. Originally described from a specimen collected in the River Negro, this ornately patterned fish from the armoured or plated family of catfishes, the *Loricariidae*, has a wide distribution throughout the Amazon basin. Kner's holotype measured 20" in total length (500mm) but aquarium imports are usually much smaller, between 4"-7" (100mm-175mm), and if given a fairly large aquarium to move about in, will grow to 15-"18".

All the members of the genus *Pterygoplichthys* have large dorsal fins which can identify them from the 120 species of *Hypostomus* known. The former has between 11-16 dorsal rays (including the hard spine) whilst the latter never has more than 8.

Feeding *Pterygoplichthys* should bring out the chef in the owner, they require prawns, shrimps, chopped earthworms, lettuce, peas and pellet food. Finally, the identification of many individuals from this huge family, of over 600 species is shrouded in nomenclature problems.

CONTENTS

AQUARIST

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Hofuf Drainage Ditch

Mystery fish of Saudi Arabia

Part 2

by William Ross

Not Such Mystery Fish Of Saudi Arabia would be a more appropriate title for this article. When I put pen to paper for the original publication, I had made extensive enquiries into the occurrence of *Oreochromis mossambicus* (Peters, 1852) at Hofuf oasis in Eastern Saudi Arabia. No sooner had the article been published in May, 1984 when I was given a lead that steered me to King Faisal University, Hofuf and to a meeting with Dr. Mohammed Shahjahan Howlader. This gentleman may have been responsible for the introduction of *O. mossambicus* to Hofuf.

It is wrong for me to refer to Hofuf oasis; Hofuf is the principle town of the Al-Hassa oases. Al-Hassa oases consists of many naturally occurring springs which have recently been cemented in and fitted with sluice gates to facilitate the collection and distribution of the water. There are reputed to be 1,624 Kms. of concrete irrigation channels and 1,520 Kms. of earth ditches to facilitate drainage; all of this comes under the control of the Al-Hassa Irrigation and Drainage Authority. This authority was experiencing great difficulty in keeping the wells and channels clear of aquatic plants and algae. They had been employing a large work force to continually go round clearing the aquatic vegetation from the waterways; this was both time consuming and costly. At a meeting between the authority and Dr. Shahjahan, the possibility of using fish to control the weeds and algae was discussed. This was followed by some research into which fish would be suitable.

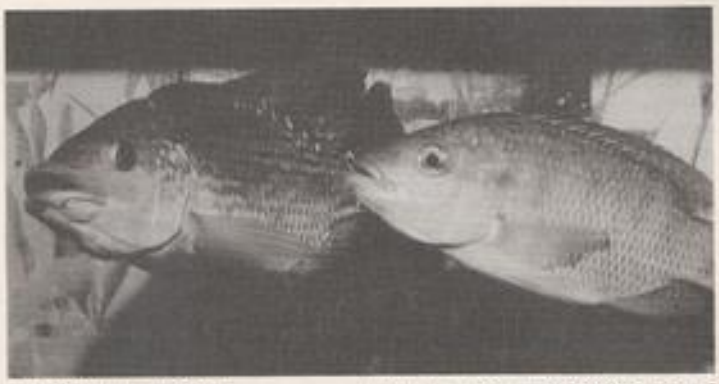
In 1981 it was decided that *O. niloticus* (Linnaeus, 1758) would be the fish of choice. A small shipment of these was obtained from Taiwan, and was delivered to Saudi Arabia via Dacca. These fish were introduced into the irrigation side of the waterways, i.e. the wells and concrete channels, not the drainage ditches. Oreochromis are prolific and soon became established at Al-Hassa. After some time, Dr. Shahjahan had suspicions that the fish were not all *O. niloticus* and enquiries elicited that his

Male *O. mossambicus* × *O. u. hornorum*

supplier also had *O. mossambicus* on his establishment at the time of supplying the fish for Saudi Arabia. To me it appears that the original shipment of *O. niloticus* was contaminated with *O. mossambicus;* this is possibly what happened; but then we have the most informative letter by Mr. Peter Dickinson in 'Our Readers Write', October, 1984. Also, I recently saw two Tilapia like specimens collected in the Hadramaut, South Arabia, which had been delivered to the British Museum (Natural History) for identification. Knowing that amongst the large expatriate work force are a number of people from countries where Tilapia are cultured for food, I am quite sure some of them are not beyond doing a little fish culturing of their own. These facts make me hesitant in recording *O. mossambicus* as originating from the Taiwan shipment of fish although this appears to be the most plausable explanation.

Prior to meeting Dr. Shahjahan, I had been investigating the Tilapia from the waterways of Al-Hassa. The first specimens I had obtained and bred were *O. mossambicus*. I managed to collect some of the different looking Tilapia; two specimens I sent to Dr. E. Trewavas, British Museum. She very kindly examined them and I hereby quote from her letter "These may be *O. niloticus* although they have not the model number (17) of dorsal spines. 16 is however occasionally found and is model in subsp. *vulcani*. I see no feature that would point to a mixture with *O. mossambicus*."

My main interest in collecting fish from Al-Hassa was to keep them in my aquaria and see if I could manage to get them to reproduce. In the original article I described the keeping and spawning of *O. mossambicus;* since then I have made a few more observations on these fish which may be of interest to other aquarists. When breeding these fish, I would remove the mother fish as soon as she released the fry from her mouth, usually 7th-10th day; I found I sustained a fairly high mortality amongst the fry. One female I had was very possessive with her babies; she did not let them out of her mouth until the 13th day. When threatened, this female continued to



Pair of *O. mossambicus*

collect the fry into her mouth and this continued up until the 26th day of brooding. Her method for collecting the fry was very interesting. She appeared to give a signal and the fry would pack themselves into her mouth. Another feature of the brooding female was her colour pattern. She became more distinctively marked and from my observations I believe these could be warning colours. I had placed a Tilapia hybrid female in an adjoining aquarium and when the hybrid saw the nursing mother she moved as far away from her as the aquarium would permit. On the 28th day I found the nursing mum brooding eggs; this is a phenomenon I have observed with Oreochromis. Females will make a nest, lay eggs and then brood them in spite of not having a mate. The fry left with their mum have had less mortality and appear to have grown quicker than those removed at 7-10 days.

Whilst making enquiries about the Al-Hassa Tilapia I formed a friendship with some of the fish farm staff. These people were all very helpful and kindly passed some Tilapia fry on to me. I managed to raise a pair of *O. niloticus* which were part of a consignment of pure *O. niloticus* from Stirling University. *O. niloticus* spawn and mouth-brood similarly to *O. mossambicus*. Having only one pair, I had to keep a glass divider in the aquarium most of the time or the male's continuous aggressive advances on the female would have resulted in her early demise, as it eventually did when I was trying to spawn them. I feel that the ratio of at least three females to one male is a necessity with Oreochromis; this way the male's attention is divided and no one female takes the brunt of his advances.

I also acquired a few small Red Cherry Tilapia *O. mossambicus*/*O. u. hornorum* (Trewavas). I was unsuccessful in raising a pair of these although I feel a small one which died was possibly a female. However, I did manage to spawn a male with a female *O. mossambicus;* this was a young female spawning for the first time and only produced one living baby. This fry grew into a very nice light coloured, deep-bodied fish.

As I was collecting fish to send to the British Museum for identification, I included some specimens from the main drainage ditch. It is on the banks of this waterway that the two fish farms of Al-Hassa have been established. Again I quote Dr. Trewavas "Two of these, the pale ones, might be *O. aureus*. The dark one is more like *O. niloticus* in pattern of caudel fin and number of dorsal fin-spines (17), but the number of soft rays is rather low (11). Phenotypes of hybrids might look like this or they might be the respective species." Another specimen agreed with the determination as *O. aureus*. I mentioned in the previous publication that fish culture centres at Al-Hassa were using hybrid stock *O. niloticus*/*O. aureus*. I feel the Tilapia in the drainage ditch originated from escapees from these centres; therefore, we have two separate populations of *O. niloticus*.

The fish introduced into the pre-irrigation water (wells and channels) by Dr. Shahjahan and those from the hybeid stock in the post irrigation water (drainage system). I have some young fish collected from the drainage ditch in my aquaria at the moment.

Mullet were first mentioned from Al-Hassa by Erdman in 1950, there was no scientific name given; searching the literature up until 1983 these Mullet remained unnamed. In May, 1984, I ventured in my opening paragraph to suggest they could be *Mugil macrolepis*, I would like to take this opportunity to put the record straight. Along with the Tilapia specimens sent to the British Museum I included some Mullet. Mr. Jim Chambers did me the honour of looking at them and diagnosed *Mugil cephalus*, Linnaeus, 1788.

In the past I have collected and maintained Mullet in aquaria with a water salinity of 1·2 parts per thousand. Under these conditions they survived for upwards of 18 months but their growth remained stunted.

Gambusia affinis holbrooki, Girard, 1859. This is the one remaining mystery fish of Saudi Arabia. Gambusia have a great reputation as destroyers of mosquito larvae. For this purpose they have been distributed throughout the warm, temperate and tropical zones of the world in an effort to control the larvae of malaria-carrying mosquitos.

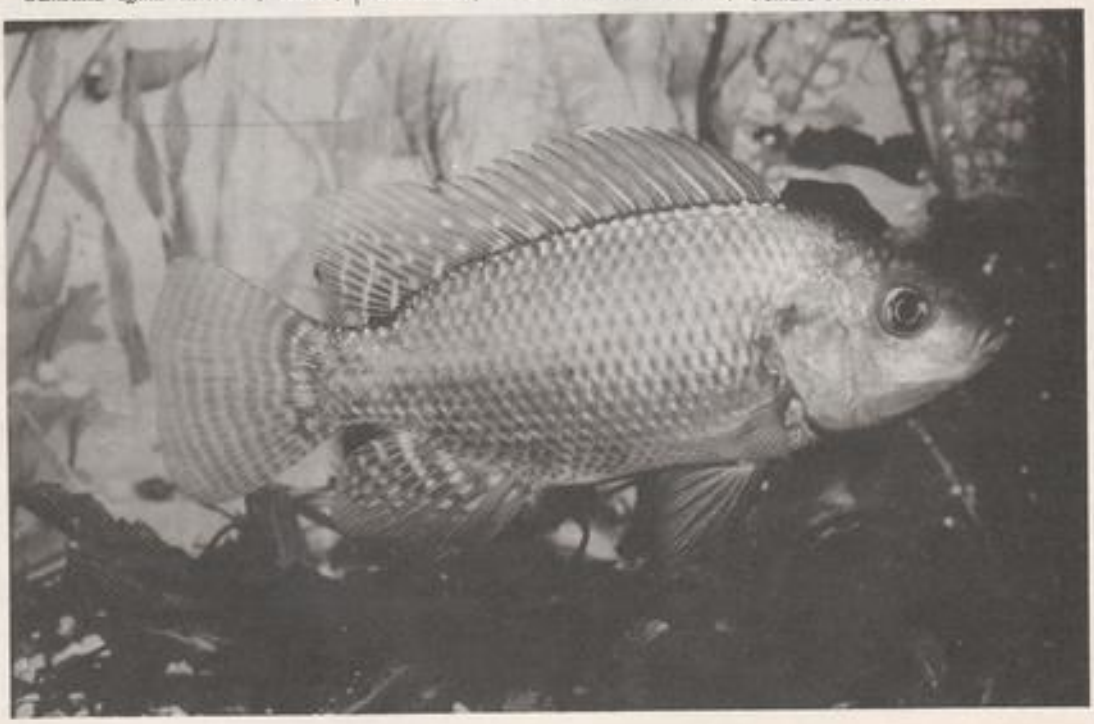
G. a. holbrooki was imported from Egypt prior to 1950 by Dr. R. H. Daggy. These were used to establish colonies in the Qatif area and at Yabrin oasis but no mention of Hofuf. I reside close to Al Qatif; over the past seven years I have spent a great deal of time there, but as yet, I have found no evidence of Daggy's Gambusia. Unfortunately I have been unable to visit Yabrin, therefore I have no first hand information on fish populations at that oasis.

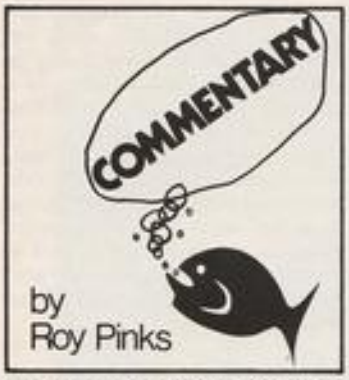
On good authority, I am assured that there has been no attempt to establish Gambusia at Hofuf for malaria control. Apparently this fish was on sale to the aquarium hobby around 1977. If one is permitted to jump to conclusions, I would say this is the probable source of the Al-Hassa Gambusia.

Male *O. niloticus*

Since discovering the Tilapia and Gambusia at Al-Hassa in March, 1983, I have had some very interesting experiences, not only in collecting and keeping these fish under aquarium conditions but in meeting many people who have kindly helped me with my investigations. I am indebted to Dr. E. Trewavas, Dr. Mohammed Shahjahan Howlader, Mr. J. Chambers and last but not least my wife, Irene, for her help and encouragement.

Female *O. niloticus*





I AM repeatedly disappointed by the way many fishkeepers finish off their garden pools. It would seem that so much energy has been expended on excavating the hole and inserting a liner or a preformed model that none has been left for the all-important matter of the actual environment. I am always being shown photographs by proud pond owners who have merely sunk a fibreglass preform into the ground and littered the edges with rocks of varying size.

Worse still, plastic waterfalls and similar units have simply been clipped to the main pool with little or no effort to disguise their limits, and their artificiality stands out like a sore thumb. To get the right idea of what a pond should look like, simply look at a natural one. The first impression is that of a sheet of water, and the edges are defined more by the elements than by man. Plants and bushes will be dotted around it, and as often as not plants will be visible here and there in the water.

Overall there is a subtlety of composition which is less easy to reproduce in your garden than you may imagine: this is because the natural pond is merely a mass of water settled in an impermeable soil-like clay, and its margins will vary from day to day and from season to season. Even if you had suitable soil in your garden you would not be tolerant of these differing levels of water, so a compromise has to be struck.

For some reason those who have built their ponds from concrete seem to get nearer to natural configurations than those who have employed plastics. I think the answer here is that the former are temperamentally less in a hurry to see the fish swimming about than the latter, but this is no excuse for shoddy planning.

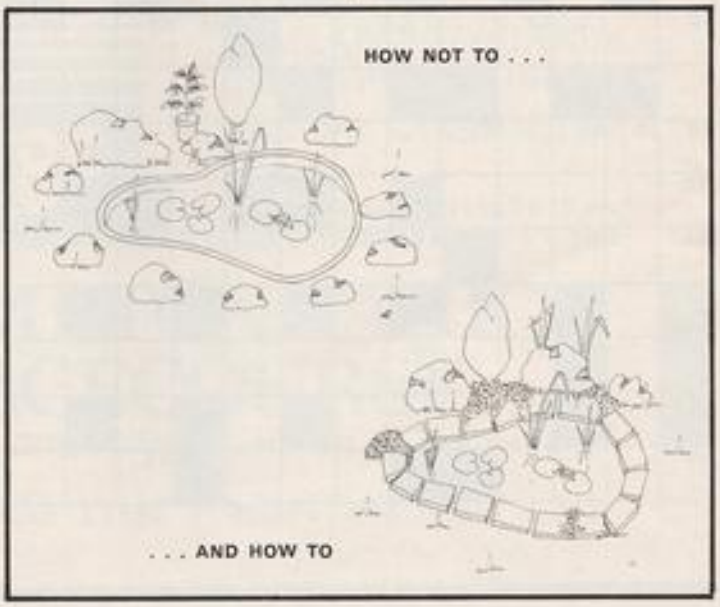
In fact, since those who use "convenience" pools have saved so much time over their construction, they can surely devote a little more effort to providing them with an elegant finish. There is little doubt that black butyl liners are the best bet after concrete, as their colour gives an impression of ageing right from the start, and it is not difficult to contrive a reasonably informal edging.

This, of course, applies to any of the sheet materials, but those made from blue or green plastic never really lose their man-made looks, especially the expanse between the waterline and ground level. This can in fact be painted with black bitumen, which soon weathers, but it is not altogether satisfactory.

Whilst many successful informal pools have been made from these substances, they are really most suited to formal arrangements, where straight lines predominate. When informal shapes are attempted, a generous overlap should be allowed from the edge of the pool into the surrounding ground in order that small pockets may be made for marginal or mud loving plants. Such will help to break up the general outline, and will complement the plantings directly into the surrounding soil of carpeting plants like aubretia or periwinkle. These should be situated in randomly placed pockets beside the pool, which should in turn have been planned for before placing in position the paving or other flat stones which help to anchor the liner.

Some pondkeepers prefer to have these stones overhanging the water, but I think it preferable to have the edges more or less flush with the butyl, as they then look less obtrusive and are certainly safer. Some architects use concrete and cement to finish off the plastic lined pond, in which case it is easier still to imitate nature by avoiding the otherwise inevitable ring of heavy stones.

The preformed pool is probably the most maligned of the whole family, and not without reason! It is not intended to be dropped into a hole, with the flat surround visible for all to see. At the very least these would benefit by having turf laid right to the edge, but as in the case of the types mentioned above, some thoughtful



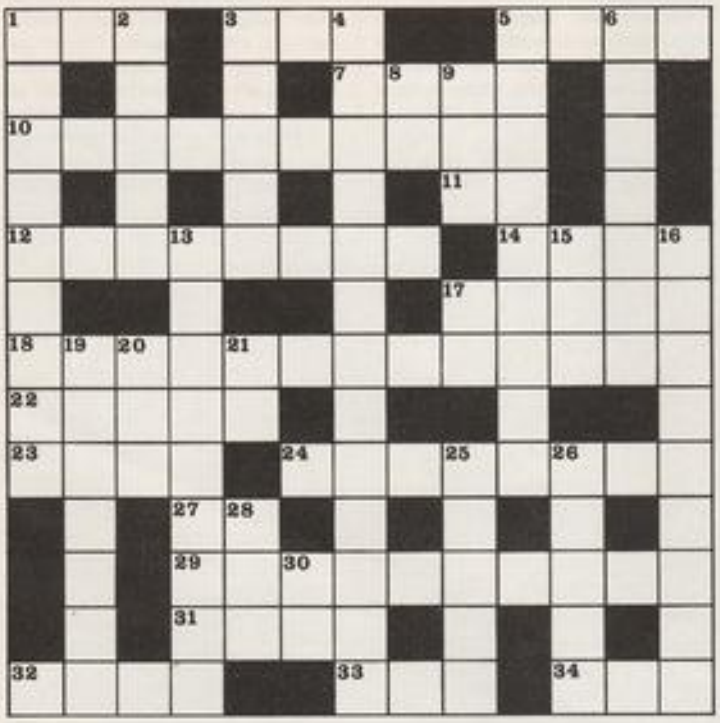
concreting can work wonders by both covering up all the plastic and providing receptacles for plants or bulbs.

I have referred to pockets and receptacles for plants as though they were the easiest of things to make. In fact it is quite difficult to achieve exactly what you want without seeing the finished pool in your mind's eye and *then* featuring the pockets during construction. You should allow at least 12 in. of soil for most plants, but if you can achieve a free root run by penetrating the plastic at strategic points, so much the better.

When it comes to selecting plants to straggle into the water, don't waste money on those choice but short lived species; rather invest in some periwinkle, aubretia, snow in summer and creeping jenny. These may rampage somewhat, but they will give you a good start and very rapidly transform what starts off as just a water holder into a really attractive garden pool.

Rockery must be very carefully planned, so that the lines of strata are parallel. It goes without saying that all must be bedded into earth, and this means that no spaces should be seen between rocks: the latter fault is difficult to avoid if oddments of rough stone are used, and it is a wise though costly precaution to buy large, selected, stones from a specialist firm accustomed to the landscaping business. As in the case of tanks, the larger the individual stones, the better, as it is surprising how much of each goes underground during the construction process.

CROSSWORD *by Isis*



CLUES

Across:

1. Young Fox (3)
3. Python (3)
5. Rodents (4)
7. For Tea (4)
10. Then a Coot I mixed up with a sea anemone (10)
11. Perhaps (2)
12. Inch Gars making loud noise (8)
14. Central African country/Lake (4)
17. *Hoplias malabaricus* (5)
18. 'E, can I run a Race, says Pope (7, 6)
22. Large Still Waters (5)
23. Plant Support (4)
24. What you do to temperature, before transferring fish (8)
27. Alternative (2)
29. Carp Clue 10 not Red Herring for Zander (10)
31. He wishes to be Unknown (4)
32. Lake Trout for Tea? (4)
33. Girl's name (3)
34. Shorthand Senior Citizens? (1, 1, 1)

Down:

1. Absorptive filter materials (9)
2. Loach (5)
3. As many plants are bought (5)
4. I sequit Anna, i.e. discover Anemone (7, 6)
5. O, Free Carl to build up in shallow Tropical Seas (4, 5)
6. It may be called Warou (3, 4)
8. Interjection of surprise (2)
9. Coloured Carp (3)
13. Morsel or a Tooth-Ache (4, 5)
15. Vandal (3)
16. Spain made this Catfish type? No, the flag gives it away (7, 2)
17. Made (2)
19. Rhetoric at Fish Meetings hides whiskered friends (7)
20. Supplement (3)
21. To Be, for He (2)
25. Colorado Ski town and tree (5)
26. Where you might find a South American Carnival? (2, 3)
28. Flow (3)
30. May be limited, or Cobalt (2)

Solution on page 43

Helping Hand

by Nick Lushchan

The story behind Helping Hand

THERE has been considerable interest among readers of Helping Hand concerning the background to the series. So much so that I thought that a "background article" was in order.

The title, Helping Hand, came quite naturally. As all disabled folk know, when you have been burdened with a disability, you have to rely on others to help you come to terms with your predicament; you must accept the true facts that you are unable to carry out the same functions as before the disability and, therefore, have to rely on a **Helping Hand** until you have readjusted to your new way of life.

"What made me start this series?" Well, it was a mixture of John Dawes, and a number of encounters with trade people regarding the fishkeeping hobby.

This all goes back to 1982 when I was housebound and took up the hobby. After reading a number of books and discovering that they contradicted one another, I felt that, talking to someone, would enable me to ask questions and have them answered on the spot instead of having to look in yet another book.

A letter to the fishkeeping press was, therefore, drafted containing my feelings. I was surpeised when John Dawes replied with a 'phone call. During the conversation, we found that we lived near each other and so arranged to meet at my home.

Upon meeting and talking fish and the hobby in general, a friendship developed, and it was at this point that I was confronted with John's proposition with regards to disabled fishkeeping. John had been looking for someone to cover the disabled sector of the hobby for a long time.

He was in no position to do so himself because it is impossible to simulate the difficulties a disabled person has to overcome. John felt that the fishkeeping magazines, and the hobby in general, had done very little for the disabled aquarist and was amazed at the number of problems I was confronted with and had to overcome in order to enable me to carry on with fishkeeping and still have the same pleasure and satisfaction as everyone else. This was a challenge. I have always enjoyed a challenge, but to write for the *Aquarist & Pondkeeper*? This had to have a little more thought.

During the time I was thinking things over, I encountered more problems. For example, a visit to a fish farm was on the agenda (these trips were organised by my family to help me come to terms with my disability). On arrival at the fish farm, my wife was unloading the wheelchair, when someone came over and said, "Don't bother to get the wheelchair out because we are busy. Could you come back during the week when things are quieter?" I was fuming! All the way home we talked about this; if it happened to us, think of the number of disabled people that have had this said to them but had not done anything about it. So the decision was made for me, rather than the other way round.

Accepting John's offer worked out well. He was able to start his long awaited thoughts for the disabled fishkeeper, and at the same instant have the magazine play its part.

I felt that if no other disabled person was prepared to come forward and run the series, I had to have a go.

Now the page has been obtained, it is up to you to keep it going with your contributions regarding fishkeeping for the disabled.

Main objectives of Helping Hand

1. To form a communication link with fellow disabled aquarists through which we can share experiences, problems, solutions, views, theories and anything else we can think of concerning the hobby.
2. To make people aware that disabled aquarists *DO* exist.
3. To encourage shops to make arrangements for the disabled in the form of making their premises more accessible for users of wheelchairs.
4. To encourage the trade to include the wheelchair logo when advertising in local and national advertisements (and in their own advertising material) if they are able to cater for disabled aquarists.
5. To make manufacturers aware of and sympathetic to our needs regarding equipment.
6. To compile a booklet listing names and addresses of premises that cater for the disabled aquarist. This would then be passed on to Disabled Clubs and individuals informing them on the premises that they are able to visit in or out of their locality.
7. To establish in the future (depending on responses) a National Register of Disabled Fishkeepers with a central point of control.

I would love to hear from you on any of the above topics or on any others you would like to discuss. Please enclose a s.a.e.

27 Hungerford Road, Rugby House, Calne, Wilts. SN11 9BH

Good health and happy fishkeeping.

I have designed a tank and stand for the disabled. It will be on show on the S.L.A.G. stand at the Aquarian Fishkeeping Exhibition.

Press Release

New technology products for the 1985 pond season

N.T. Laboratories Ltd., manufacturers of the NEW TECHNOLOGY range of aquarium products are pleased to announce the availability of the following products in large (100 ml) sizes for use in ponds:

New Technology ICHCIDE, popular general anti-parasite remedy. 100 ml will provide a course of treatment for up to 3,000 litres, 650 gallons. Half dosage should be used when the pond contains sensitive fish such as orfe.

New Technology AQUASURE, water tonic and conditioner, essential when filling or topping up ponds. 100 ml will treat 1,000 litres, 225 gallons.

New Technology AQUACLEAR, ideal for the control of algae and blanket weed. 100 ml will treat approximately 11,250 litres, 2,528 gallons.

AQUAZORB used in pond filters will prevent dangerous build up of toxic ammonia.

The New Technology range of freshwater test kits: pH, Copper, Hardness, Nitrite and Ammonia are ideal for checking pond waters enabling the user to provide the very best conditions for their fish.

All these items are available for the 1985 pond season.

N.T. Laboratories Ltd., Newington Enterprise Centre, Wardwell Lane, Newington, Sittingbourne, Kent ME9 7BS. Tel: 0795 843802.

The Aquametric System An innovative design from Plasticall

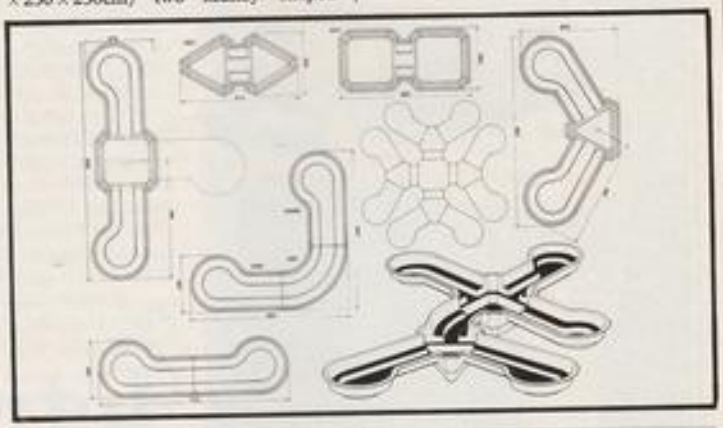
PLASTICALL is a Dutch company with many years experience manufacturing a comprehensive range of glass fibre polyester ponds. Their five star range provides the answer to almost any 'water garden' landscape requirement. However, when the dimensions exceed 5 metres this poses transport problems yet there appears to be a need for larger sized ponds made from the ideally suited glass fibre polyester. Thus drawing from past experience, **Plasticall** designed the Aquametric System.

The system consists of several components in an arbitrary fashion to give an unlimited choice of combinations.

The Aquametric System, as with the standard 5 star range of pools, allows the application of all kinds of **Plasticall** accessories, such as: marsh plant containers, side rails, islands, bridges and the hedgehog safety ledge. The following component shapes are available: one square component (250 × 250cm) one triangular component (230 × 230 × 230cm) two kidney shaped components (length 385cm) and one bend (260 × 260cm). The bends even allow the construction of a circular pond around an island. The connection component and the end partition complete the system.

These various parts and components of the Plasticall Aquametric System offer garden architects an unlimited choice of options for the design of personalised water gardens, using an indestructible material: glass fibre polyester.

Enquiries to: Plasticall bv, (Department AP15p) 76a Stamford New Road, Altrincham, Cheshire WA14 1DA.



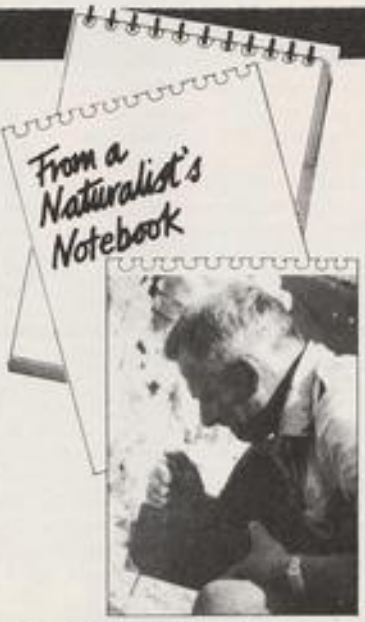
Lotus announce a new baby

THE Lotus Otter range of submersible pumps has long been one of the most popular products in water gardening. Now the Chesham-based company announces a new member of the Otter range—the Baby Otter Fountain Kit.

With a recommended retail price of £29·95 (including VAT), the Baby Otter Fountain Kit gives a fountain jet to a maximum height of 40 in, falling within an 18 in diameter, giving a compact display. The fountain jet is adjustable for height, making it suitable for even the smallest pool layout.

The new pump's high impact plastic body, unobtrusive in dark green, is resin filled for safety and all rotating parts are removable for cleaning or replacement. The Baby Otter Fountain Kit is supplied complete with strainer, flow adjuster and fountain jet.

Lotus Water Garden Products Ltd, 260-300 Berkhamsted Road, Chesham, Bucks. Further information: Patrick Mackreth, SPAN, 8 High Street, Wendover, Bucks, HP22 6EA. Tel: Wendover (0296) 624887/624891 624941.



by Eric Hardy

AQUARISTS have long been interested in blind cave tetras, Congo blind barbs and various varieties of native trout developed under local conditions of food, pH and lack of light in caves. A ghostly, almost white form of common trout inhabits the permanent darkness of upper parts of the stream in the Ogof Ffynnon Ddu cave-reserve near Penwylt in Powys. Also other caves in South Wales and rarely in some Mendip Caves. It does not respond to light. On the other hand, bullheads in some Welsh and Yorkshire caves are not pale like this. Dr. G. T. Jefferson of University College, Cardiff, an authority on them, tells me.

The Welsh National Museum sent me their new issue of "Nature in Wales" which details the fauna of Ogof Ffynnon Ddu, including the colourless aquatic grub of the cave-gnat *Speolepta leptogaster*, the largest British cave-shrimp *Niphargus fontanus* and many blind white isopod crustaceans, *Proasellus cavinicus*, related to water hog-louse, which is also in the Hirnant tributary of the Wye in north Brecon.

The latter was first found in Britain in a Hampshire well in 1930 and has a smaller form in the Mendips.

Aquarists have kept as a scavanger the pinkish-white blind cave tetra, *Anoptichthys jordani*, since Basil Jordan first collected it, the first known blind characin from the small La Cueva Chica cave in the Rio Tampaon Valley of Mexico. Since then, another was found in Kentucky. There's also the Congo blind barb, *Caecobarbus geertsi* from Africa. The blind tetra, some 2 inches, probably originated from the blind Mexican cave-fish *Astyanax mexicanus*, a characin discovered in 1936 from east Mexico and southern USA. It has rudimentary, useless eyes, sometimes no eyes, and almost a colourless body slightly tinged green on the sides. It is sexed by the larger, stouter female. Well fed on live food at evening before spawning in slightly alkaline water, pH 7·2 to 7·4, it needs at least a 10-gallon tank, about 80°F. Two males kept with one female provide more fertilised eggs. After swimming around the tank for inspection following their introduction, they court side by side, up the airstream, until at the top flip their tails and the semi transparent, non-adhesive eggs fall down. This is repeated for several hours, then the spawners are separated. Methylene blue is added to colour the water medium blue and avoid egg-fungus. Eggs hatch in 24 hours; 24 hours later they have absorbed the egg-sack and are free-swimming and need feeding on brine shrimps. Each eye-socket is marked by a black spot, absorbed later, showing they evolved from fish with normal eyes. They are very susceptible to white spot.

Blind fish manage to swim around a community tank without bumping into anything, probably sensing by their lateral line.

Plant Collecting Penalties

Many readers will have noticed in January the conviction of two dealers in aquatic plants who were fined £250 at North Walsham Magistrates Court for collecting over 100 plants of water-soldier from the Nature Conservancy's Ludham Marshes reserve in the Bure Valley, Norfolk. Two points to remember are: Maximum penalty for uprooting wild plants without authority under Section 13 of the Wildlife and Countryside Act has been doubled to £1,000. Under the Privy Council the NCC had special powers for prosecution for trespass on reserves without evident damage, following warnings. Water-soldier is very easily propagated in pools because of its proliferation of underwater stems; in fact it often becomes a nuisance choking ponds. A friend in the business, by arrangement with local farmers, stocks their field-ponds with his water-plants and recovers the surplus growth for his customers. The legal position differs on a reserve where there is a ban on collecting. It would not apply if in the course of deepening dykes or digging drains plants were unavoidably uprooted. It applies to open countryside with public access.

The ghostly white cave-trout from Powys

Though one frequently finds water-soldier as an aquarist's reject in pond and canals all over the country, it is native in few places outside calcareous Norfolk Broads. Because most plants are female or hermaphrodite, increasing vegetatively, never fruiting, some of us doubt if this is a native plant, though claimed so in the border dykes of Upton Broad and in Cambridge fens. It is declining on the continent and in Britain. There is only one species.

Drop the name *Cnemidophorus lemniscatus* at your next coffee-morning and social-climbers will stare with astonishment and gather around to meet the newcomer. It's a small, striped lizard of the abundant order Teiidae from tropical America, which arrived recently on a ship at Liverpool and extended our list of alien ship-borne fauna. The National Environment Research Council has granted £5,617 for a Bangor University biologist to research the hormone and nerve-regulation of circulation in ice-fish; £3,000 for an evolutionary study of European *Triturus* newts, and £8,378 for a Sussex university biologist to study the competitive aspects of frog and toad larval-development. For years, radio-active isotopes have been used to mark aquatic animals. NERC has established a service laboratory at Merlewood, near Grange-over-Sands, to supply more acceptable stable isotopes of nitrogen to replace them. Later it will extend to stable carbon, oxygen, hydrogen and sulphur isotope-markers.

Man's Best Friend

Dear Sir,

In summer 1985 Chichester District Museum is mounting a major temporary exhibition on pets, under the title of 'Man's Best Friends'. The exhibition will look at man's treatment of his domestic pets, some of the reasons for the close relationship between man and his animals and some of the social functions fulfilled by dogs, cats, monkeys, birds, fish and other exotic or unusual pets. Displays will include dog collars, bird cages and perches, aquaria, and other related items as well as reproductions of some of the multitude of paintings that include domestic pets of all sorts. Pets of famous people and the Royal Family will, we hope, be included in the exhibition.

Whilst we have traced and are able to borrow items from various national museums I would be delighted to hear from any private collectors of this type of material, both antique and more recent. As the most famous nation of pet-keepers it seems surprising that there has been no previous exhibition of this kind. It is intended that 'Man's Best Friends' should be primarily an entertaining exhibition, looking at the whole subject of pet keeping from new and interesting angles.

Any information supplied will be treated in confidence as required and the greatest possible care taken of photographs etc. Should your readers have any objects I would be grateful to receive a brief description, any associations with famous people and approximate size. Items loaned to the exhibition, which will run from 15 June to 28 September, will be fully insured and transport expenses would be paid by the museum.

Yours sincerely,

DAVID COKE.

Curator,
Chichester District Museum,
29 Little London,
Chichester PO19 1PB.

Koi are tougher than supposed

My blood boils everytime I read articles in *The Aquarist* about Koi. I started keeping fish 65 years ago with a 1 lb jam jar and some frogs' spawn, graduating through homemade aquariums heated by gas. Now keeping only Coldwater fish in about a ¼ acre of ponds. Spawning goldfish, fantails, orfe, tench and golden rudd each year for sale.

I am an Arthur Boarder fan, having met him and bought many Fantails from him until he was forced to give up breeding them. I remember Hilda Allan, both at Alexander Palace and her home, so am not exactly a new starter. I first bought Koi in 1970 and was a founder member of the Koi-Keepers Society, until it got too expensive with glossy booklets instead of duplicated newsletters.

Koi are Goldfish! Goldfish are Carp. As far back as 1653, Isaak Walton said "Carp are the pigs of the river and love to wallow in mud". Why all this halabaloo about filters and clear water? I do not use pumps or filters in any of my ponds, and have Koi that I bought in 1972 still in perfect health. Most of my ponds are crystal clear naturally but some are green pea soup and some muddy brown, depending on how many and the variety of fish in them. I try to clean out each pond once a year, but sometimes they can go as long as two years. I believe *clear* water, as against *clean* water is only for humans so they can see their fish. Simply, if a pump is needed for aeration, there are too many fish in the pond. Fish in clear water are easily scared and will dash about and injure themselves.

I like my Koi in 20 ft. × 7 ft. × 3 ft. deep ponds, however, 12 in. Koi have overwintered in 9 ft. × 6 ft. × 18 in. and spawned the following year. We usually have 6 in. to 9 in. of ice in the winter, two years ago we had 12 in. and fish survived.

As I do not believe young Koi are fully hardy, as sold today, I do not overwinter outside the first year. In fact, do not recommend keeping outside under 6 in. this far North. One other 'rule' I lay down is, never move Koi into a smaller pond, or they will jump out. If they are to be moved, put in same size or a larger pond.

I sometimes wonder if the people who write about Koi are all accessory dealers or wish to scare people off keeping Koi. Treat them as goldfish that grow bigger, and forget about 5 ft. or 6 ft. deep ponds with one third as filters.

FRANK GREGORY
Gregory Water Garden
Jarrow
Tyne & Wear

Tomorrow's AQUARIST

£1,000 PHOTO-FIT COMPETITION SPONSORED BY 'ATLANTIS'

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

OVER £1,000 worth in prizes to be won this month in our exciting Photo-Fit Competition sponsored by 'Atlantis', the new and extensive range of aquarium products!

All you have to do is study the accompanying cut-up photographs of fish and identify the species (common names will suffice) by fitting the relevant picture for your age group together in your mind.

Send your answers in to reach us no later than Friday 7th June. Mark the envelope clearly on the top left-hand corner with the words PHOTO-FIT COMPETITION and don't forget to enclose your name, age and address (IN BLOCK LETTERS PLEASE!).

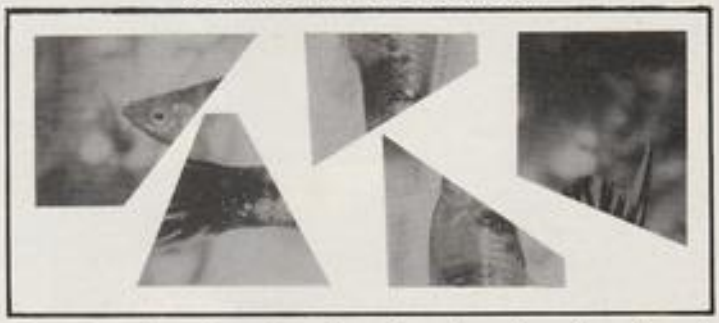
The first correct entry for each age group drawn from the bag on Saturday 8th June will win the following superb prizes. **In addition, the first 500 entrants will each receive an 'Atlantis' Digital Aquarium Thermometer.** Don't waste any time. Make sure that your entry is among the first 500 received!

THE PRIZES

1. **Under 16 Age Group:** A 24 in. × 15 in. × 12 in. Aquarium, Hood and Stand, **plus** the following products from the **'Atlantis'** range: Power Filter (X300), Air Pump (B500), Heater-stat (150 Watts), Digital Thermometer, Airline Tubing (3 metres), Box of Filter Carbon, Filter Wool, Aquascene (24 in. × 15 in.) aquarium background, Magnetic Algae Cleaner, Aquarium Net (3 in. × 4 in.) and an assortment of Artificial Aquarium Plants.

TOTAL RETAIL VALUE: OVER £110

UNDER SIXTEEN SECTION



★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

OVER SIXTEEN SECTION

2. **Over 16 Age Group:** A 36 in. × 15 in. × 12 in. Aquarium, Hood and Stand, **plus** the following products from the **'Atlantis'** range: Power Filter (X500) Air Pump (B600), Heater-stat (200 Watts), Digital Thermometer, Airline Tubing (3 metres), Box of Biological Ceramic Filter Medium, Filter Wool, Aquascene (36 in. × 15 in.) aquarium background, Magnetic Algae Cleaner, Aquarium Net (4 in. × 5 in.) and an assortment of Artificial Aquarium Plants.

TOTAL RETAIL VALUE: OVER £140

DON'T DELAY. SEND US YOUR ENTRY TODAY.

Colour Pattern-Sharing in...

Lake Tanganyikan Synodontis species

My interest in *Synodontis* developed shortly after my obsession with *Corydoras* changed to a less stormy affair.
In common with most catfish enthusiasts I encountered this large group of African, naked or scaleless fishes through a fairly common Nigerian species, *Synodontis nigrita*, Cuvier & Valenciennes, 1840. This spotted, grey black *Synodontis* is invariably described as an upside down catfish by retailers because of its juvenile similarity with *S. nigriventris*, David 1936 (a dwarf species from Zaire which spends a great percentage of its swimming time inverted).
My brief interest in *Synodontis* encouraged me to pay a record sum for a tropical catfish (in 1977-78) when I felt unable to pass by one of the then early rare specimens of *S. angelicus*, Schilthuis, 1891, to be available. The asking price of this attractive black/white spotted catfish from Zaire is now a mere 20% of the price I once paid, but in the present economic climate I can see why.

A few years on I came across a dwarf species, *S. petricolor* almost 'a miniature' *Synodontis multipunctatus*, Boulenger 1898 (both species are endemic to Lake Tanganyika) in colour pattern. This white tipped, black marbled beauty graced my Lake Tanganyikan cichlid aquarium. It glided in and around the rockwork at feeding times and was the pride of my special community.

Any real interest in Lake Tanganyian *Synodontis* subsided until research was necessary for my second catfish volume.

Written and illustrated by David Sands

Seven species are found in Lake Tanganyika, all but *S. nigromaculatus*, Boulenger 1905 are endemic, in sharp contrast to Lake Malawi in which only one (endemic) species is known to occur, *S. jassae*, Keilhack, 1908.

Lake Tanganyika is 12,700 square miles (Lake Malawi is 25% smaller) 200 miles long and 5,512 feet deep which makes it one of the deepest lakes on earth (second only to Lake Baykal in Russia which is 6,525 feet deep). With such awesome statistics it is not surprising this Lake has a few faunal tricks in its upper reaches, indeed the fish fauna of Lake Tanganyika, although predominantly made up of cichlids, comprises some very interesting catfish.

The majority of discoveries are quite recent, although the best known species *S. multipunctatus* was described by Boulenger in 1898. This bright and active catfish (most are dull in pattern) has been imported in thousands in recent years and is, as the scientific name implies, extremely spotted, almost on an abstract basis with no two specimens having identical markings. The dorsal fin is black on its leading edges and the caudal fin has a black stripe on each lobe. Few catfishes can rival this species in its pattern, which although basically monochrome—is almost sepia. In recent years some astonishing information has been published relating to a 'cuckoo' style spawning between *S. multipunctatus* and Lake Malawi mouth-brooding cichlids in aquaria.

S. dhonti. (Photograph by Lee Finley) In juvenile pattern this species could easily be confused with *S. multipunctatus*

Synodontis multipunctatus. The most widely distributed species in Lake Tanganyika and imported in great numbers

S. granulosus. (Photograph by Lee Finley) The rarest import from Lake Tanganyika with a current asking price of £750·00

S. petricolor. The smallest species in Lake Tanganyika and certainly very rare among imports

S. eurystoma. Darker than *S. petricolor*; juvenile specimens could easily be mistaken for the latter

It seems that the *Synodontis*, excited by the hormone increase during cichlid spawnings, dash in between the egg fertilising activity, eating eggs whilst scattering a few of their own. These are picked up by the cichlid, presumably in mistake for their own (even though the egg size is smaller in *Synodontis*). A great deal has been written on this subject by an American catfish enthusiast, Lee Finley, in American journals and through my supplements to Volume II of Catfishes of the World. If any reader should wish to know more about this interesting behaviour I will gladly pass on the contact to my stateside friend.

The rarest Tanganyikan species (in the import sense) is *S. granulosus* also described by Boulenger at the beginning of the century (1900). In straight contrast to *S. multipunctatus* which is a mainstay export from the Burundi district in the North Eastern part of Lake Tanganyika into Zaire, *S. granulosus* is a great rarity. I once knew this species *only* from Lee Finley's photographs in Freshwater and Marine Aquarium (USA) until the Northern Area Group Show of the Catfish Association early this year—when a North West retailer exhibited a young specimen. The grey body and black fin borders means the white tips of the dorsal and all other fins stand out like no other species.

S. nigromaculatus, Boulenger 1905, also found in the Zaire basin is the only non endemic species in Lake Tanganyika The strange point of this is that Pierre Brichard in his book, "Fishes of Lake Tanganyika" (TFH, 1978), did not list this species as occurring but mentioned *S. melanostictus*, Boulenger 1906 (as an endemic riverine species).

This species was placed in synonmy with *S. nigromacuatus* by Professor M. Poll in his revision of *Synodontis* published in 1971.

Whilst I am sure this species will have been imported, it is possibly mistaken for *S. acanthomias*, Boulenger, 1899, because definite identification has yet to be made.

The great surprise amongst the Lake *Synodontis* species is undoubtedly *S. dhonti*, Boulenger, 1917. In adult life (16 in. (400mm) total length) this species is a uniform grey, yet in juvenile livery would quite easily be mistaken for *S. multipunctatus* or even a completely distinct species. In 1959 H. Matthes actually described a new species, *S. irsacae* from a specimen of *S. dhonti* only 127mm in standard length, 142mm total length (5 in - 6 in).

Lee Finley's pictures (forwarded to me for use in the "Catfish of the World" series) have been identified by Professor Poll (preserved material was also confirmed as *S. dhonti* by Poll).

It would be tempting to suggest few specimens of *S. dhonti* have been imported but it can only be wondered how many have been available only to be mistaken for *S. multipunctatus*. Lee stated in 1981 "sporadically available through commercial channels in batches of mixed Lake Tanganyikan *Synodontis* for a number of years, but until now without correct identification. . . ."

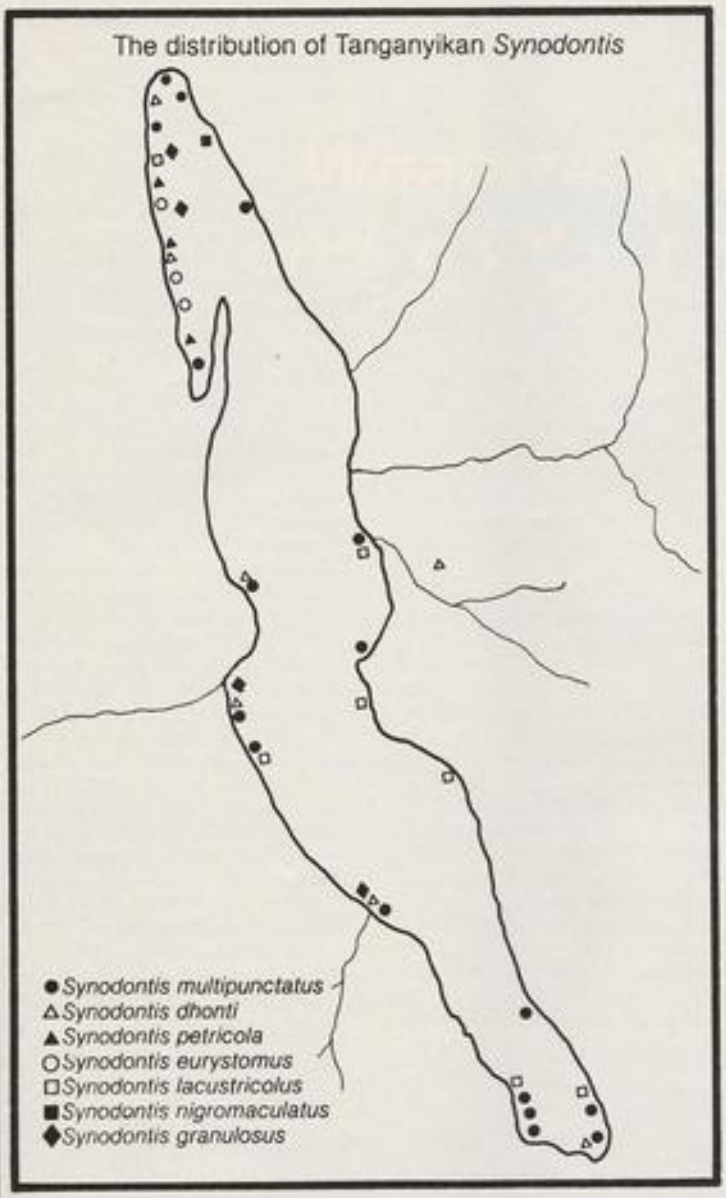
The description of one Lake species is credited to Professor Poll, *S. lacustricolus*, first recorded in 1953, which in adult form resembles the adult shape of *S. dhonti*. It has a longer head, wider mouth and has an even scattering of small spots. The holotype measured 555mm (22 in. TL), total length 455mm (18 in.) standard length—the largest specimen recorded was a huge 24 in. in total length. Professor Poll did not compare these two similar sized and shaped species but chose to compare *S. lacustricolus* with *Hemisynodontis membranaceus*, Geoffrey St. Hilare, 1809 and *S. dhonti* with *S. petricola* and *S. eurystomus* (both a great deal smaller than *S. lacustricolus*). I am not aware that any specimens of *S. lacustricolus* have been imported for European or American aquarists.

Without doubt my favourites from the Lake are *S. eurystomus* and *S. petricolor*, both described by Matthes in 1959 and the most recent species discovered. Both are small by normal *Synodontis* standards but *S. petricolor* is dwarf, the holotype measured just over 3 in. (82mm) in standard length, whilst the overall length (including the tail fin) is recorded to be 4 in. (101mm). This miniature catfish has a wonderful colour pattern, not unlike that of a leopard —the black fins are high lighted by pencil-thin white stripes and the body is unevenly but pleasingly spotted. In my experience *S. petricolor* is much rarer than other 'Zaire species' much publicised in books and magazines. I have seen hundreds of *S. angelicus* and *S. flavitaeniatus*, Boulenger 1919, but in the past 10 years, not *even* a handful of *S. petricolor*.

At the British Aquarist Festival (1984) one retailer offered *S. petricolor* but on close examination I felt sure they were actually juvenile *S. eurystomus*. This species is found alongside *S. petricolor* at the northern most part of Lake Tanganyika. The body coloration of both species is not a great deal different, *S. eurystomus* has a darker 'leopard' pattern and the edges of the fins are not as distinctive (in *S. petricolor*, the black and white is brilliant, whereas in *S. eurystomas* the meeting of the monochrome pales).

The adult size of *S. eurystomus* is greater than in *S. petricolor*, the holotype measured 5 in. (126mm) in standard length, 6 in. in total length (148mm if the caudal fin is included). At this size, *S. eurystomus* has a flattened, almost oblong shaped head; adult specimens of the two species would be very difficult to confuse.

Most of the Lake Tanganyikan species of *Synodontis* are known to feed on algae, insect larvae and assorted crustaceans and molluscs (snails and shrimps). This diet is not too difficult to reproduce with the advent of many retail



fish shops offering frozen foods. The range of frozen food (developed for marine fishes) can ensure catfishes and cichlids are offered the correct balanced diet: cockle, mussel, gamma shrimps and mysis are ideal.

Professor Poll described Lake Tanganyika 'marine like' because of its ionic qualities (the high pH). The isolation a lake creates requires fish to adapt; more so with Lake Tanganyika because of the wide range of habitats and ecological niches within it. The pH of the water is recorded in Brichard's book as 'in excess of nine' with the German hardness 10°. Staeck and Link (1982) record the pH range to be 7·5-9·2 with the total hardness between 23°-29°.

The rocky shores are strewn with large boulders which are worn down by the waves into stones and smaller pebbles. Sometimes the water slopes are steep, even the shallow sand floors can fall away to several hundred feet. In this environment cichlid species and, to a lesser extent, catfishes, have adapted and speciated; some utilise the sand floor as habitat whilst others form territories around the sunken boulders. The lake contains one of the richest assortments of foods, freshwater plankton, both phytoplankton (plants) and zooplankton (animals) (according to Brichard)—many species of algae, sponges, molluscs and crustacea. The full ecology of the Lake has yet to be understood; why Lake Tanganyika should contain seven times as many *Synodontis* species than Lake Malawi could absorb a thinking mind for a long time. That Lake fauna adapt well to aquaria life should be encouragement enough for aquarists to try a cichlid/catfish community aquarium. If that is not enough, take a second glance at the photographs in this article (especially pause at the exceptional *S. petricolor*) and then read "Fishes of Lake Tanganyika" by Pierre Brichard. I cannot believe any aquarists could not be tempted.

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ON THE TEST BENCH

by Ian Sellick

Sera

In the October 1984 A&P I reviewed the Sera 800ER power filter; an excellent power filter that is competitively priced and very powerful. Having used one for nearly a year now, it is remarkable how little attention it has needed; I would thoroughly recommend it.

Last year, Sera caused a stir in the aquarium world by launching in the UK their Bio-Denitrator, a biological filter in reverse. In essence, this system takes nitrogen compounds and converts them to harmless nitrogen and oxygen (as CO_2) which escape or are used in maintaining the bacteria that operate the system.

The process takes place in the *absence* of air and slowly, so a fast flow rate is not possible, but with these rules adhered to, the system should work effectively. Although in normal biological filtration ammonia and nitrite are converted to apparently harmless nitrate, even this can be toxic to fish at too high a concentration (usually reckoned to be of the order of 50ppm, but variable depending on fish species). Although much is used by algae and plants, there is still a high proportion that remains free in the water, and needs removing by regular water changes (along with other chemicals that may build up).

The Bio-Denitrator, by removing nitrate enables water to last longer between changes, an especially important consideration to marine aquarists. The system consists of a series of chambers that are fed by a T-piece from the outlet side of the Sera Titan power filter such that the flow is only about ½ gallon *per hour*.

The number of chambers can be any multiple of three per 12 gallons of tank water, with a minimum of 6. A c50 gallon tank (say a 5 ft. × 15 in. × 18 in.) will therefore require 12 chambers with a somewhat increased flow rate of about ¾ gallon per hour. While at this flow rate the tank contents will take about 2½ days to circulate through, Sera claim that in this time, 12 chambers will decompose the nitrate originating from feeding over 50g of flake food.

The Bio-Denitrator, like all biological filters, takes some time to establish, and at least 3 weeks should be allowed before assuming it is working efficiently. The denitrification bacteria cannot work without the presence of a food source (there is none, or at least very little, in the power filter outlet water), so they need to be fed with Bio-Nip tablets produced by Sera.

This is a new concept, potentially a very useful one, and can be recommended as an adjunct to biological nitrification and power filtration.

For the 5 foot (50 gallon) tank above, the cost of twelve canisters would be about £45, plus the power filter if one was not already operating. The Bio-Nip tablets are about a pound for a month's supply, so the system is cheap to run. The saving in seawater once the system has matured in the marine aquarium could be deducted from the initial cost, making it even better value for money.

Nitrate test kit

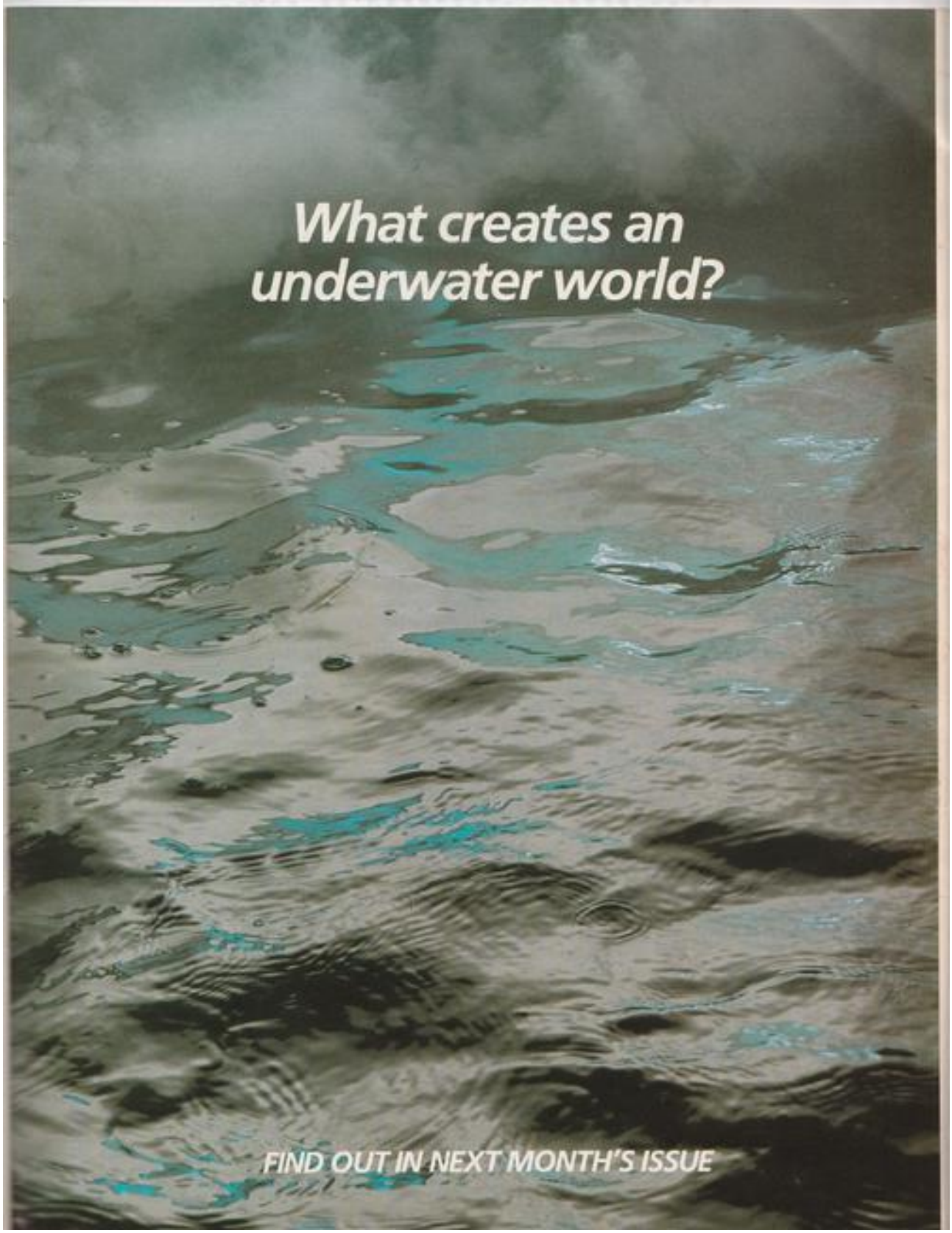
In order to see if your Bio-Denitrator is working, or to monitor generally your nitrate levels, Sera produce a nitrate test kit. This is a complex test kit that involves the reduction of nitrate using a finely powdered metal (supplied) and several reagents. A supply of distilled or deionised water is also necessary should the sample to be tested need diluting to bring it within the range of the test kit (tap water contains, in many, areas appreciable quantities of nitrate), and to wash out the vials after use. The instructions are easy to follow; each test takes about 10 minutes to perform, including the various waiting and shaking times.

The kit will last for about 50 tests, but is quite expensive at over £10. However, this is only about 20p a test, so the per test cost is quite reasonable.

The very positive readings I obtained for Bristol tap water have made me wary of using it for water changes (apart from the choloramines and other nasties I already know to be present): perhaps I need to invest in a big Bio-Denitrator for my water storage tank!

This is a very useful addition to the available range of test kits.

Sera products are distributed by Aquatic Live Foods of Hitchin and should be available through all good aquatic shops.


What creates an
underwater world?
FIND OUT IN NEXT MONTH'S ISSUE

Coldwater Jottings

by Stephen J. Smith

THE month of May always seems to herald the busiest and most important time of the year for many serious coldwater fishkeepers: in particular those of us who enjoy breeding and rearing our own fish.

I shall discuss spawning procedures and raising fry in next month's Coldwater Jottings. In the meantime it is important to consider making preparations for providing one of the essential ingredients in the successful development of fry—live foods.

Brine-shrimp (*Artemia salina*) is a traditional favourite among coldwater fish breeders, and newly hatched brine-shrimp should be administered as soon as the fry are large enough to accept it.

The natural habitat for *Artemia* are salt lakes and marshes, where the salt content is much greater than that of sea water. The eggs are the size and colour of fine sand grains, and remain viable for many years when kept dry (i.e., when the salt lakes are evaporated). However, the onset of moisture triggers-off the hatching process, for the *Artemia* to continue their life-cycle.

One of the main attractions of *Artemia* is that it is a completely safe supply. There is no risk of parasites or diseases being introduced into the rearing tanks as in the case of live food caught in natural ponds, for instance.

Raising *Artemia* is a simple matter. Tall sweet-jars have been used traditionally, and there are several manufactured brine-shrimp hatchers available. One of my favourites is the type marketed by 'Hykro', which has the advantage of being very compact and is an extremely clean and easy method of producing newly-hatched brine-shrimp.

The Hykro—Brine Shrimp Hatcher

This is a simple device for hatching brine-shrimp and a first-class piece of equipment for any aquarist who is considering rearing his own fry. The Hykro hatcher works on the principle of newly-hatched brine-shrimp being attracted to light, thus they are separated from their shells, which are not easily digestible by the more immature fry.

The kit consists of a shallow bowl the bottom of which has a number of annular divisions, forming three circular troughs and a central 'cup'. A transparent separator sits on top of the troughs as in the diagram (A) and a close-fitting lid with a hole in its centre clips on top of the assembly. A spoon-shaped sieve is then rested within the hole and into the 'cup' at the centre of the bowl.

To use the hatcher, it should be placed on a level surface, in good light but out of direct sunlight and away from radiators. The bowl should be filled to a marked level with clean tapwater, and this then poured into a plastic pop-bottle or similar which will serve as a measuring device and a mixing unit. A satchet of aquatic salt is provided with the kit, and a measured amount of this is added to the water in the bottle. Close the bottle and shake until the mixture is completely dissolved.

Using the measuring-spoon provided measure into the outer 'trough' of the hatching bowl a quantity of brine-shrimp eggs, which are also included within the kit, and ensure that they are distributed evenly around the 'trough'. The transparent separator' is then placed onto the divisions and the cover replaced. The brine mixture in the pop-bottle 'mixing unit' is carefully poured into the bowl through the hole in the centre of the lid.

The strainer is then placed in the centre of the unit. With 24-48 hours, depending upon temperature (betwee 6477°F) the first *nauplii* (newly-hatched brine-shrimp) will appear. As light attacts them they make their way to the aperture at the centre, swimming over the divisions in the bowl and under the transparent rings, leaving their shells behind.

To remove the *nauplii* for feeding to the fry, simply lift out the strainer and rinse the contents carefully under a running tap before immersing the strainer into the fry aquarium to allow the *nauplii* to swim free. Within seconds the fry will be chasing the *nauplii* and devouring them voraciously. Return the strainer to its position at the centre of the hatcher and within a few hours a new supply will have appeared.

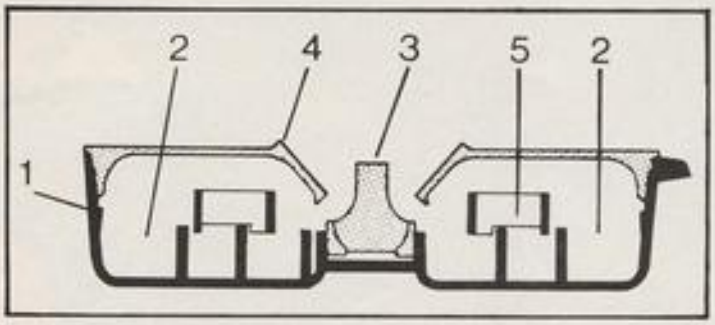
Between two and four days' supply of *nauplii* will be provided from each 'charge' of eggs, after which the hatcher should be emptied, cleaned and re-charged. A number of hatchers, stacked at progressive stages of development, is recommended to ensure a continuous supply; the top hatcher of the stack—where there is most light—being the one from which the food supply is taken.

Shell-less *artemia* are available as an alternative to the eggs supplied with the kit, and these work most successfully with the Hykro hatcher. In addition, even the unhatched eggs can be fed to slightly more mature fry quite safely.

A traditional method of raising *artemia* is by means of tall sweet-jars, and I find this an ideal method of producing more mature brine-shrimp for fry which have reached a later stage of development and can accept larger foods more readily.

Sweet-Jar method for hatching Brine-shrimp

A number of glass jars—sweet jars are ideal—are best used to form a battery with a continuous supply. On no account should metallic containers be used. Fill them with a saline solution using two teaspoons of



The 'Hykro' Brine-shrimp hatcher. This provides an excellent means of producing newly-hatched brine-shrimp for raising fry. Only four parts make the hatcher simple to use: 1. Bowl with annular divisions: 2. Outer compartment, around which eggs are placed: 3. Strainer with handle: 4. Close-fitting lid with centre aperture: 5. Transparent ring-insert

marine or aquatic salt to each pint of water. Add a teaspoon of eggs to the solution and stand the jars in a tank which contains water at a temperature of approximately 80°F. Polystyrene containers are suitable providing that they have been thoroughly washed and do not leak. Otherwise, shipped or redundant aquariums are ideal.

Strong aeration should be applied to each jar to keep the eggs on the move. In 24 hours or so the eggs should begin to hatch. The brine-shrimp are collected by straining the water through finely woven cloth which is then swilled in the fry aquarium. Shell-less eggs are preferable although more expensive. Many aquarists believe that fry can choke on the hard shells, though I have never experienced any problems of this nature. Food especially prepared for invertebrates can be administered to the brine-shrimp in the jars to help raise them to larger proportions for more mature fry.

The bellies of the fry—which are still quite transparent at the younger stages—will be seen to turn red as the *artemia* are consumed. The novice aquarist should not be alarmed as this is the natural colour of newly-hatched brine-shrimp anyway. Also, the small amount of salt in the brine-shrimp is considered by some aquarists to be dangerous. My feeling is that at such low concentration it can do no harm to the fry. However, it is not advisable to feed developing fry solely on brine-shrimp. A varied and balanced diet is essential for healthy growth, and alternative live foods such as *daphnia* and whiteworm should be introduced as soon as the fry are large enough to readily consume these.

NEXT MONTH

Beginners Guide to Koi
(Colour feature)

Introduction to Koi

Spotlight
Ulrey's Tetra

Language of Fishes
New Series

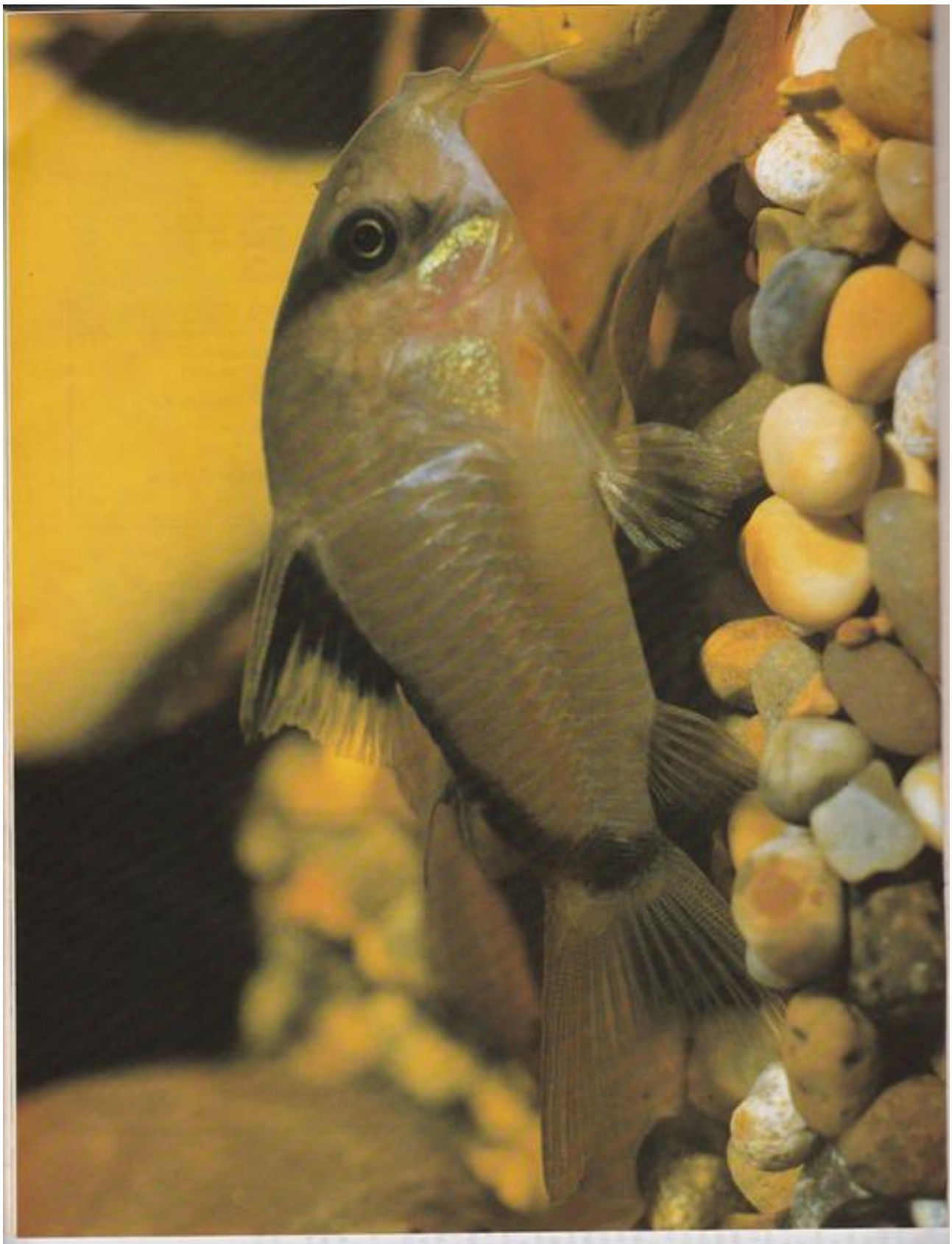
Answers to Crossword

Across:
1. Cub
3. Bos
5. Ratx
7. Cake
10. *Actinothoe*
11. If
12. Crashing
14. Chad
17. Hotel
18. *Acrossa corrosa*
22. Lakes
23. Stem
24. Equalise
27. Or
29. *Lucinperia*
31. Anon
32. Chat
33. Ann
34. OAP

Down:
1. Charcoals
2. *Bosia*
3. Bunch
4. *Actinia equina*
5. Reef Coral
6. The Uaru
8. Ah
9. Koi
13. Sore Molar
15. Hyn
16. *Diosoma sp*
17. He
19. Catfish
20. The
21. Is
25. Aspen
26. In Rio
28. Run
30. Co.

OSCAR

G. Robinson



SPOTLIGHT

The BANDIT CATFISH

Corydoras metae

Written and illustrated **by David Sands**

WHEN a well known Corydoras species is without identity problems, is fairly readily available in South American imports, and is not one of the two bread-and-butter species *Corydoras aeneus, C. paleatus,* a writer's work is made a great deal easier.

Corydoras metae named by Eigenmann in 1914 after the River Meta, Colombia, has been available in good numbers in recent years.

This light-tan bodied catfish has a black eye stripe and a dorsal lateral band which travels from the base of the dorsal fin back to the caudal peduncle (base of the body before the tail fin). This distinctive pattern sometimes attracts Bandit Catfish as a 'trade name'. When I first encountered it in 1975 (one of 110 species of small armoured/scuted fishes which have always been popular with all aquarists) I found it to be slightly delicate. The same was often said about the Skunk Catfish, *C. arcuatus,* another light tan bodied fish from Peru. It has been speculated that the Andean waters (distinctly 'white' in comparison with the lower Amazon waters which are black) are more alkaline, high in mineral content and often cooler than central Brazillian waterways.

In a recent paper describing a new genus of Catfish, *Aposturisoma* Isbrucker, Britski Nijssenand Ortega, 1983, information on the water chemistry of a Peruvian water was given. The River Huacamayo at Uguaytia, Peru was tested by Dr. H. Franke and an unexpected pH reading of 7·7 and a temperature of 27·5°C (82°F) was recorded. Whilst I am not aware of a *Corydoras* biotype with this detail, it does suggest catfish enthusiasts' dogmas should be questioned from time to time. I suspect the problems of high losses, gut infections (the red blotch disease dreaded by *Corydoras* collectors) etc. were due to bad handling in export and upon import. Colombian imports have been numerous across Europe since 1980, following the decline of Peruvian imports, because of the political changes and the fluctuations in the fortunes of a major Peruvian collector and an English importer. This upsurge in Colombian shipments has meant *C. metae* has become readily available together with *C. delphax* Nijssen & Isbrücker, 1983, *C. habrosus,* Weitzman 1960, *C. melanotaenia,* Regan 1913, and other interesting species.

These current imports have provided a less delicate species; either our knowledge of keeping catfishes has improved greatly or the exporters have woken up to the awful losses incurred by poor conditions and improved the holding and packing facilities.

The aquarist can only be described as the winner if either or both reasons are relevant and correct because *C. metae* is a delightful species. Several aquarists *have* spawned the Bandit Catfish, the basic factors required are a good sized group of adult specimens, a neutral water condition and a balanced diet of livefoods and shrimps (gamma shrimp is ideal) well washed and blended Brineshrimp, whiteworms, bloodworm and *daphnia.* Mature female specimens are clearly rotund, whilst males are typically small and slender. The number of eggs produced is small by comparison with many of the 20/25 species spawned (15-30 eggs) but the size of the egg is marginally larger than *C. aeneus* etc. The fry have an attractive speckled pattern which sadly fades in the semi-adult fish (after several months).

If you encounter *C. metae* in your local retail shop remember it is always best to purchase between 3-6 specimens (the more the merrier) because *Corydoras* are shoaling fish and will thrive in a group.

Most retailers do offer a price on several specimens; it never hurts to ask in advance.

C. metae has a similar colour pattern to *C. melini,* Lonnberg and Rendahl, 1930, and *C. panda,* Nijssen & Isbrucker, 1971. *C. melini* was first collected on the border between Colombia and Brazil, in the meeting of the River Papuri and River Uaupes and has the same eye stripe as *C. metae* but the dorsal lateral band runs down into the caudal fin. The much sought after *C. panda* is from Peru and shares the eye stripe with *C. metae* and *C. melini* but can easily be distinguished from them by lacking the dorsal lateral stripe which is replaced by an attractive caudal peduncle spot which has made this very rare species much sought after. Whilst rarity has its obvious attraction availability, a distinctive colour pattern and an excellent community fish rating means *C. metae* will long be a firm favourite amongst aquarists with more than just a passing interest in catfish.

Your questions answered...

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Every query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. Please indicate clearly on the top left hand corner of your envelope which department you wish your query to go to. All letters must be accompanied by a S.A.E. and addressed to:

Your Questions Answered, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex TW8 8BN.

TROPICAL

Dr. David Ford

Tropical

burton's mouthbrooder...

I would be very grateful if you could give me some information on '*Haplochromis Burtoni*', 'Burton's mouthbrooder'.

I would like some information about the best aquarium environment for these fish; how big do they grow?

At what size are these fish mature, and is it easy to breed these mouthbrooders?

I have never kept mouthbrooders before although I have had, kept and bred other cichlids, I have bred *Pelvicachromis pulcher*. I have found that these kribensis breed very easily in a community tank, but, I have found it very hard to breed these fish when they are on their own, why is this?

Astatotilapia burtoni is Burton's Mouthbrooder (also called Burton's Nigerian Mouthbreeder and is often confused with *Haplochromis wingati* the Nigerian Mouthbreeder).

They are aggressive fish, best kept alone or in an aquarium with similar sized fish. Typical African Cichlids, they like a warm tank (78°F) and in clean water of neutral or even slightly acid pH. They are not from the hard water lakes and will breed readily. The females are slightly smaller than the males (4 inches fully grown), and she mouthbroods the eggs.

Feeds on any foods but include vegetable flake or some water plants for the fish to nibble on.

Reference: your comments on Kribensis—it is best to have a shoal of these fish (not brother/sisters) for true pair bonding. If the pair are isolated they will breed regularly (plant pot ideal) for years. Remember to remove one family before the next are due (fat female) or they will kill the older fry to make room for the new brood.

pictus cat...

Having returned to fishkeeping after a few years break I have set up a 36 in. × 15 in. × 12 in. tank with the following fish: 6 angels, 5 neons, 3 guppies, 3 black mollies, 3 swordtails, 2 pearl gouramis, 2 serpae tetras, a red-finned shark, a sucker loach and a pictus cat. Filtration is undergravel.

1. Is my tank overstocked?

2. I am familiar with the habits of all the fish except the pictus cat which I fell for and bought blindly. Could you provide some information on this cat?

3. The female black molly recently dropped about 25 fry all at different stages of development, from almost undeveloped eggs to fully formed fry. Why did this happen and was it a mistake to "trap" her?

1. You have 24 community fish in the 36 in. tank, which is about right. More information in the enclosed booklet.

2. The "Pictus Cat" is not a common name. You could mean *Leiarius pictus* but probably mean *Pimelodus pictus* or Spotted Pimelodus. It is a peaceful fish, ideal for community tanks. Accepts most waters and temperatures of 72 to 78°F; all foods are taken. Unlike many Pimelodus it is not nocturnal, so you will see it in the daytime.

3. Moving a pregnant fish causes stress that often leads to shedding of the developing fry. Your Black Molly literally suffered a miscarriage. Personally I do not like "traps"—if you want to breed fish, set up a proper breeding tank. **D.F.**

Coldwater

use of well water...

I have a well in my garden which is about a 100 years old. The water seeps in from rain water, etc. and it is crystal clear. Do you think it would be safe to use this water in my pond which is 25 × 16 feet and contains various coldwater fishes? Also where could I get the water analysed?

It is impossible for me to say whether the well water would be safe to use in your pond. Personally, I would not do so but stick to tap water. However, as you have a number of fishes, I suggest that you use a suitable container, fill it with well water and put a fish in it. Leave for 24 hours and if the fish is in no trouble the water should be safe. To get the water analysed you could get in touch with your Water Company or failing that the local Council Offices.

COLDWATER	PLANTS	KOI	MARINE	DISCUS
				
Arthur Boarder	Vivian De Thabrew	Hilda Allen	Graham Cox	Eberhard Schulze

fish-proof plants . . .?

I have a coldwater tank with some fancy goldfish. It is well planted but the fish keep eating the leaves from the plants. Can you suggest how I can stop them?

Hornwort, *Ceratophyllum demersum*

You could try one or two different species of plant. *Vallimeria spiralis* is one which I do not think they will eat and another is *Ceratophyllum demersum*. It is evident that your fishes are in need of vegetable matter. Try them with green lettuce leaves which have been chopped up or scalded. You may find that the plants will then be left alone.

feeding tadpoles . . .

I have some frogs' eggs in a small fish tank in the garden. When tadpoles hatch, how can I feed them please?

Tadpoles feed on soft vegetable and animal matter. They are very good scavengers but as they have no teeth they can only manage soft foods. You can use boiled cabbage and lettuce leaves, using the soft parts only. As they grow they can be given mashed earth or white worms. An average bunch of spawn should provide very many tadpoles and a small tank will not hold them for long. A plastic washing-up bowl would be better. You may have to change the water every three days as it could become very polluted. Keep the tank covered to prevent birds, such as blackbirds, from picking the tadpoles out as they come up to breathe. You must provide something for them to climb out on when their tails disappear. Release them in the wild in long grass on a wet night.

breeding goldfish . . .

I have a pair of Calico Fantails and a pair of Orandas. I have been trying to get them to breed but all my efforts have been in vain. I have fed them on everything I can think of, raised the temperature of the water and have artificial spawning medium on the bottom of the tank. Often the female will chase the male but there have been no eggs. What can I do to get them to spawn?

It is not necessary to get the water too warm. You must realise that the warmer the water the less oxygen will it hold and if there is one thing which will encourage the fishes to spawn it is well oxygenated fresh water. Also, goldfish do not normally spawn on the bottom. They prefer to find the shallowest water possible and will actually go out of the water to spawn on floating plants. I have never used artificial spawning medium but nests of Hornwort floating on the surface and these nests have been used very well, the fine leaves holding the eggs firmly.

Are you sure that you have true pairs? You can find out quite easily. You state that the males have the tubercles on the gill plates and that the females are very swollen in the body so try hand-stripping. Get your hatching tank ready with nests. Wet the hands and hold the female in one hand, belly uppermost and with the head facing the wrist. With the thumb and forefinger of the other hand apply gentle pressure towards the vent. The eggs should stream out easily. Do not use too much pressure or you could damage the fish. Move the fish around in the water to spread the eggs. Then repeat the process with the male. You should see the milky white milt flow out into the water. Swish the tail of the fish among it to wash it around the eggs. If no eggs appear or you get milt from both fishes, you will know that you have two males in each 'pair.' **A.B.**

Koi

tawny owls and herons . . .

I have lost a few medium-sized Koi recently; they just disappeared from my pond. My neighbour tells me that an owl often sits on my house-roof and I wonder if this could be the culprit?

Personally I have never heard of a European owl that takes fish, but the local Wildfowl Trust said they have heard that the Tawny owl has been known to take fish near the surface of the water but had never witnessed this for themselves. I believe your problem is much more likely to be a heron, these predatory birds become ever more venturesome into urban areas as their natural habitats are polluted or bull-

dozed out of existence to make room for people.

A single heron can soon clear a whole housing estate of fish once it discovers fish-ponds. Your only remedy may be to net your pond over completely, and if the net can be raised in the centre by being laid over a pole or plastic pipe laid across the pond to give a ridge-tent effect, this will be far more acceptable than one simply stretched flat to obscure vision beneath it when viewed from a distance.

Deep ponds, with straight sheer sides are rarely troubled by visiting herons who do not stand in water that is much more than 2 ft. deep.

(*Ed.*—My brother's goldfish were taken in numbers by a Tawny owl.)

algae . . .

Since starting with small Koi in a properly arranged pond with continuous under-gravel filtration providing good quality and generally clear water, I now have an increasing problem with algae and particularly the blanket-weed variety.

My Koi are now between 12 and 18 inches in length, and apart from algae the filtration system appears self-maintaining even after three years. Is there any advice you can offer to reduce the algae problem?

This is a perennial query which is regularly answered to individual readers, but with the approach of spring and summer it is opportune to publish your letter as by April the pond can be treated with an aquatic herbicide before the blanket-weed becomes a real nuisance.

The difficulty is that this product is only supplied in expensive 10kg sacks, more than enough to treat 350,000 gallons of water, and as the safe treatment for fish is at the rate of one ounce per 1,000 gallons it is an advantage to belong to a Society where local members can share out the large quantity economically.

Any chemical that will deal with the growth of algae will also inhibit other plant life, and it is advisable to remove lilies for two weeks or so.

The herbicide gives the impression of being slow-acting for the simple reason it takes time to be absorbed, but it is long lasting and very effective against blanket-weed at the height of summer. The secret lies in treating the pond in the Spring, that is before the weed 'takes off' with the rising water temperature.

I have safely used CLAROSAN for the past four years and gratefully acknowledge the advice given by the local River Authority in the first instance. It is available, or may be ordered, from local Corn and Agricultural Merchants, see *Yellow Pages*.

Lilies can be sensitive to algicides and should be removed during treatment

The microscopic-type algae causing green water are usually kept under control by an adequate area of biological filtration equal to about one-third the surface area of the pond. This form of filtration also converts dangerous nitrites into less harmful nitrates and in my opinion is invaluable.

However, the achievement of good quality filtered water being returned in a highly oxygenated state, does tend to promote the growth of algae in water fertilised by the waste-products and excess protein resulting from the large amounts of food necessary for growing Koi.

Photosynthesis by strong sunlight is another contributory factor to the growth of algae, and some shading of the pond is useful and will protect the Koi themselves from the damaging ultra-violet rays when highly-coloured fish are kept in near crystal clear water.

The mains water in different parts of the country and used for partial changes or topping-up does materially affect the growth or not of algae, and in my own district there appears to have been a marked increase since the switch from borehole to reservoir water, fed by low-lying rivers flowing through arable farmland.

Perhaps there may be food for thought in my reply, so many variable factors occur in fish-keeping but there are few problems that cannot be overcome by good husbandry and common sense, with a little ingenuity for good measure.

H.A.

Marine

partial water changes . . .

I have just started to keep marine fish again. Could you please tell me how often I should change the water (partial) and how much should I change at a time? I would also like to know if I should prepare the water in another tank or could I mix it in with the fish?

1. *Partial seawater changes.* Once captive seawater of any description (natural or synthetic) is stocked with living creatures, i.e. animals such as fishes and invertebrates and plants such as bacteria and algae, there begins an inexoeable process of deterioration in the life-supporting capacity of that seawater.

No matter how much calcium and magnesium carbonate material (i.e. corals, shells, living rock, coral-sand, cockle-shell, tufa rock, etc.), there is in the system, this steady decline from the original pH value of 8·3-8·4 down to increasingly less-alkaline lower values, proceeds with steadily increasing momentum. Most marine aquarists of course decrease this steady acidification process by regular once or twice weekly additions of non-toxic pH buffering preparations. These regularly applied water treatments slow down the water quality deterioration quite noticeably but eventually a stage is reached whereat the addition of these buffers only produces an improvement for a few hours rather than days or weeks. A 25% to 33% partial seawater change has become necessary.

The universally-accepted tests for determining when such a partial water change is necessary are threefold as follows:

Either (i)—the usage of 'Seabuff' improves the pH for only a few hours before it again collapses to the unacceptably low level of 7·7-7·8; OR

(ii)—the *nitrate* content (NOT *nitrite* content) of the seawater increases to more than 25 ppm. if you are culturing delicate species such as the Regal Angelfish (*P. diacanthus*) and Moorish Idol (*Z. cornutus*) or to more than 50ppm. for marine species of normal hardiness; OR

(iii)—the phenol content of the seawater increases to an unacceptably high level. Luckily phenols impart an unhealthy and unattractive yellowish discolouration to captive seawater, and so no test kit is necessary. My own test is simple and F.O.C. as follows: Take two clean empty milk bottles and stand them side by side on a sheet of pure white material, e.g. plastic, ceramic tiles or a plate or even a sheet of plain white paper. Fill one bottle with plain, cold tapwater and the other with seawater from your aquarium. Now, looking vertically down through the liquids onto your white background, you should find that both liquids are colourless. If there is even a hint of yellow about the seawater sample your tank needs a partial water change and, *ideally*, some marine-grade charcoal in a box filter to supplement the U/G filtration.

Clowns and other robust species will tolerate highish nitrate levels before a water change becomes essential

2. *Preparation of new seawater.* By the very nature of their chemical constituency, all correctly-formulated synthetic seawaters liberate substantial and potentially toxic amounts of carbon dioxide during the first few minutes after the salts are added to the tapwater. Whilst I am well aware that some (reckless!) marine aquarists mix up their replacement seawater in the same tank which the creatures are living in, it is not a good idea except in dire emergencies. A domestic plastic refuse bin holds 20 gallons of [illegible] seawater and is an excellent [illegible]

G.C.

Discus

'white worms', off-colour fish, rubbing and snails . . .

I have been keeping Discus for 10 weeks. I have a 36 × 14 × 14 inch tank. Half of the tank is run with an undergravel filter, the other half is peat and gravel. I have three small Brown and four small Turquoise Discus. The pH is about 6·5 and the KH 2. I also have an Oxydator in the tank. Is this a good set-up? If not how can I improve it?

I have a few queries, so please can you help me:

1. Recently I have noticed that there are a lot of minute little white worms about 1½mm long. Most of the worms tend to stick to the glass and also float on top of the water. How can I eliminate them?

2. One of my smaller Turquoise Discus is always in a corner and very dark in colour, it is very thin also. I have taken it out and have kept it in a separate tank. Its colour has brightened but it is still very thin as it eats very little. How can I fatten up this Discus?

3. A Brown Discus has developed fin-rot, I am using Myxazin to treat the whole tank. Is this the correct treatment?

4. Sometimes the Discus seem to rub themselves against the gravel or rocks but no white spots or parasites are visible. What is wrong with them and what treatment should I give them?

5. The tank also has a few snails, what can I do to kill the snails without harming the fish?

I have never really liked the use of undergravel filters especially with Discus Fish; also, I have never understood the point of using peat beneath the gravel in an aquarium. Is it meant to help to acidify the water; is it meant to help the plants or for what other reasons has it for years been advocated to be used in this way? I am sure the hobby has advanced in recent years so that there are simpler ways of making the water more acidic; equally, there are today several additives to be mixed with the sterile gravel to activate a healthy plant growth—products like Brustmanns' Terra Bona, or Ferrogan, or Duplarit-G. To improve your set-up: use an outside power filter, your Oxydator will turn your substrate into a biological filter without it ever becoming clogged up, many times more efficient than the best U/G filter could ever achieve without also hindering the growth of the plants which is one of the main complaints of this type of filtration.

The little white worms are often found in a protein-rich water and are the result of overfeeding and lack of maintenance. They are quite harmless as far as the Discus Fish are concerned, except that they will give the whole aquarium a 'messy look.' Paradise Fish and Gouramies will eat them; Duijn recommends the use of ammonium nitrate and I would have thought that one of the copper-based water conditioners like Coppick or Coppersafe would also eliminate them.

When Discus Fish stand away from the rest it is always the first sign that something is not right; when they also go dark, whatever it is has already gone too far. Usually, if it is only one fish and not the whole shoal, then it cannot be the environment but must be the fish. Often they suffer from some sort of internal parasites and the only course of action should be to increase the temperature to 95 degrees and administer a medication. To keep such a fish going, which is unwilling to take any food, would be the addition of Aquabiofood U, a liquid food which has worked wonders in cases like that.

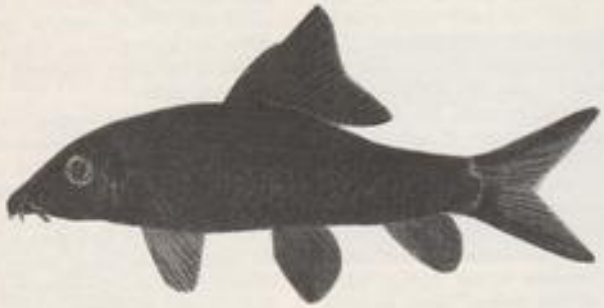
Since there is fin-rot in the tank as well as an irritant which makes the Discus Fish rub themselves against the gravel or rocks, this confirms that your aquarium is not run properly: inadequate filtration, not enough water changes and possibly even too much feeding. Change your habits and you will find that this will all disappear. Coppersafe will also rid your aquarium of your snails.

E.S.

Labeo

The Red-tailed Black Shark

by Jack Hems



THE Labeos, an interesting genus of the cosmopolitan family *Cyprinidae* (Carps), are widely distributed across Africa and south and south-east Asia inclusive of the islands. They differ from the typical carps in quite a few respects. For one thing, the upper jaw overshoots the lower jaw and conceals the ventral opening of the mouth. Furthermore, the fleshy lips are fringed, extensible and modified to form a sucking disc. In some carps, barbels are absent; but in the genus *Labeo* one or two pairs are present. These are short and, in some species, hidden among the labial folds. The snout bears a few or several tubercules. Then again, a characteristic of the jaws are horny ridges ideally adapted to rasping soft algal growths (a favoured food) from such objects as submerged pieces of wood or stone or broad-leaved underwater plants. Other foods sought after—in the fish's natural state—are small crustaceans, aquatic larvae, and various organic wastes (flesh and vegetable) which are retrieved from the interstices of the pebbles or sludge-covered bottom. Incidentally, this habit of poking their snouts about the bottom has earned the genus, in Africa, the common name of mudsuckers.

The body is moderately or pronouncedly elongate in shape and clothed with medium to small scales. The dorsel fin varies in size and outline among the many different species; but in some species (particularly among the species popular with tropical fish keepers) it bears a marked resemblance to that of a typical shark. This, then, together with the extremely flexible and widely forked caudal appendage, explains why they have been given (by aquarists) the popular name of sharks as, for example, Harlequin Shark, Rainbow Shark, and so on. Yet not all 'sharks' belong to the genus *Labeo* or, for that matter, the family *Cyprinidae*. For instance, the strikingly garbed Siamese Shark is a catfish (*Pangasius sutchi*) from Thailand.

To return to the genus *Labeo*. Labeos range in size from a finger's length to about 3 ft. Large-growing Labeos can weigh more than 7 lb and put up a great fight if taken on a hook and line.

The most commonly kept and, undeniably, one of the most spectacularly coloured 'sharks' is *L. bicolor*, best known as the red-tailed black shark. Its metropolis is the middle and lower reaches of the river Mekong (and many of its tributary waters and inflows). The Mekong has its source in Yunnan, China, and wends its serpentine course through Thailand until it discharges itself into the South China Sea.

In soft water that inclines to acidity, the body of *L. bicolor* is garbed in an intense matt black. The dorsal, anal and ventral fins are of the same ebony hue. The pectorals are clear; but the caudal fin is of an arresting blood-red colour. Young (small) *L. bicolor* show little promise of the visual splendour to come. The body is more of an indeterminate grey than dusky in hue, and the red in the caudal fin is not deserving of the adjective intense. Be this as it may, young fish make rapid headway in size and colour if they are kept in the right set up. (Mention of size, brings to mind that the maximum length attained by a red-tailed black shark, that is in the home aquarium, is in the region of 6 in. Another point of interest is that, ordinarily, the life-span may extend for upwards of ten years.)

It seems hardly necessary to reiterate that, *L. bicolor* looks its best in a tank filled with soft and non-alkaline water maintained at a temperature in the lower to middle seventies (°F). The floor should be carpeted with a regular grade of inert grit and, placed on top of this, to provide hiding places which, by the way, the red-tailed black shark returns to every so often when it is not cruising about in the lower levels of the water, saturated branches of dried-out elder or alder, some scatterings of fresh fallen or torn-off (end of season) beech or oak leaves (washed in clean water as a precautionary measure against their dissolving out toxic substances picked up from the atmosphere), and the usual clumps of genuine water plants grouped against the ends and back of the tank.

Because *L. bicolor* is essentially a bottom or near-bottom feeder, it will suck in a lot of the water-weighted flake food (provided for other fishes) as its discends from the surface. Every

Continued on page 52

ACID WATER

A CAUTIONARY TALE

by Dr. David J. Price

About a year ago, I began to experience problems with the health of the fish in a 5ft. × 15 in. × 12 in. tropical tank. First, let me describe the tank set up. It contains a shallow layer of natural gravel, a few rocks, and some pieces of plastic drainpipe. There are no plants and the only light is natural daylight. The tank is fitted with an Eheim power filter containing aquarium wool and Eheim filtration material. No chemical filtration is used and the filter is cleaned when the wool becomes dirty, usually about every two months. Approximately one fifth of the water is changed weekly and replaced with tap water. I have measured the pH of this on several occasions and it has always been around the neutral mark. A Rena 301 pump also provides aeration. The fish are fed mainly with Aquarian flake food and graded trout pellets. This is supplemented with live food, meat, peas, etc. Temperature is kept at 74°F.

What about the fish? Well, by any standards the tank was heavily stocked. At one time, it contained the following: one 12 inch *Leptobarbus*, three 6 inch pink-cheek barbs, three 4 inch *Rasbora cephalotaenia*, two 5 inch algae loaches, three 8 inch *Synodontis* catfish, three 5 inch *Hoplosternum* catfish, two 6 inch *Callichthys* catfish, one 4 inch bumblebee catfish, two 4 inch *Mystus* catfish, one 4 inch flying fox, plus smaller fish such as *Ancistrus* catfish, several species of rasboras, tiger barbs, kuhli loaches and various others.

With the exception of the *Leptobarbus*, all the fish were purchased as young 1 to 2 inch fish. Growth rates were obviously good. Danios, tiger barbs, and *Hoplosternum* catfish all grew to maturity and were spawned without any further conditioning. Several of the fish took prizes at shows. There was no disease and no deaths which could not be attributed to old age. Thus, although the tank was crowded, the fish were obviously very healthy. Apart from a break when moving house, the tank had been set up in this way for five years.

Twelve months ago I started having sporadic outbreaks of disease in the tank. This resulted in the death of several fish. Different fish were affected in different ways and at different times. The pink cheek barbs had fin and tail rot which proved difficult to cure, several catfish suffered from fraying barbels, one of the *Synodontis* developed open sores on its body, several fish suffered from loss of appetite and frayed fins.

At first I did not realise that anything was seriously wrong. It was only after several months when a number of fish had died that I began to investigate further. No new fish had been introduced for some time, fish exhibited different signs of disease, and fish were affected at different times. The cause of my problems did not appear to arise from anything contagious. Many of you will have probably realised by now that the signs described indicate stress as being the cause of the problems. Bacteria and fungal spores are present all the time in the water. Healthy fish can normally resist these. If a fish becomes stressed, however, then its defences are weakened and bacteria and fungi can invade the fish resulting in disease.

So why were the fish stressed? I thought that perhaps diet was having an adverse effect. High protein diets (trout pellets) can cause problems in some fish if fed over a long period of time. Furthermore, food quality, and in particular the vitamin content, deteriorates with time. I had had the trout pellets for quite some time so maybe that was the problem. A change of diet however brought no improvement.

Water clarity was good but I nevertheless decided to check nitrite and nitrate levels. Reichenbach-Klinke (1973) quotes levels of 100-300 mg/litre for nitrate and 10-20 mg/litre for nitrite as being dangerous. My water contained 12 mg/litre of nitrate and 0·3 mg/litre of nitrite. Obviously I was well within the safety limit for these two factors.

It was at this stage that I decided to check the pH. With hindsight, I should have done this before. I knew, however, that the tapwater was neutral, and, as I had been using it for my weekly water changes, I had not seen pH as being a problem. The pH reading gave me a shock. It was 3·3. I can assure you that the reading was an accurate one as it was checked on two different scientific pH meters, both of which had been calibrated against standard solutions.

At this point it might be worth briefly saying what pH is. A pH reading of 0 to 7 means the water is acid, 7 is neutral, and between 7 and 14 is alkaline. This, however, is just a convenient scale to use. A value of pH 5·0 is actually 10 times more acid than pH 6·0. Most freshwater fish exist between the range pH 6·5-8·0. Some fish may prefer a slightly lower level of pH 5·5 and Rift Valley cichlids prefer a slightly more alkaline pH of 8·5. Some lower lethal levels which have been quoted are pH 4·0 (perch), 4·8 (trout), 4·9 (pike and tench), 5·0 (carp), and 5·6 (stickleback).

The level of pH 3·3 in my tank was

obviously an extreme one. It was 1,000 times more acid than the normal lower limit of pH 6·5. No wonder I had problems. What caused the drastic drop in pH? Remember I was doing regular weekly water changes. I do not know the answer. Perhaps several factors contributed. Here in the southwest of England the water is very soft, and contains few substances capable of buffering the water. (A buffer is simply a substance which tends to lessen a change in pH which would otherwise occur as a result of added acid or alkali.) There are no plants in the tank. Plants would also tend to provide a buffer to the system by taking in carbon dioxide during the day for photosynthesis. Fish respiration produces carbon dioxide which could make the water more acid. However, against this is the fact that the aeration provided should allow sufficient gaseous exchange to take place.

If any reader has any suggestions as to what was making the water acid, I would be pleased to hear from them. The most puzzling aspect is why I should suddenly have had this drop in pH after several years without knowingly changing any of my water management practices. As far as I know I was not doing anything different to what I have been doing for the previous 4 or 5 years.

Having identified the problem, it was a simple matter to remedy. A small amount of sodium bicarbonate was added to the tank and a handful of limestone chippings placed in the filter. This raised the pH to 7·0. Within a couple of days there was a marked improvement in the health of the fish. They became much more lively and interested in food. I hope now that my problems are over. A weekly check on the pH value should prevent a recurrance.

I have written this article as a warning. If you are experiencing unexplained fish losses over a period of time then consider whether or not your fish are stressed. Wedemeyer *et al* (1976) have written an excellent book entitled 'Environmental Stress and Fish Diseases'. The book is published by T.F.H. in their 'Diseases of Fishes' series. Apart from pH, several other factors may result in stress. Wedemeyer *et al* list the following:

1. **Chemical:** Water chemistry, pollution, diet, waste products.
2. **Physical:** Temperature, light, sounds, dissolved gas.
3. **Biological:** Fish density, compatability with other fishes, swimming space, micro-organisms, parasites.
4. **Procedural:** Handling, netting, feeding methods, disease treatments.

Regarding water quality, there are several excellent test kits on the market. Regular use of one of these should ensure that at least you will not suffer from the problems which I had.

Reference:
Reichenbach-Klinke, H.-H., 1973. Fish Pathology. T.F.H. Publications, Inc. Ltd.

Labeo

Continued from page 50

so often live food such as whiteworms, gnat larvae or *Daphnia* should be given. Failing live food, scraped raw red meat is recommended as a supplement to the basic greens (algae) and dried food. (Blobs of cooked spinach or scalded lettuce make a good substitute for algae.)

The aquarist is warned not to buy more than one *L. bicolor* for inclusion in a smallish community tank. The reason is not difficult to explain. Two red-finned black sharks placed in the same tank will engage in a fight every time they meet. The less dominant or weaker of the two will have a hard time: it will be driven away from food; it will be kept away from parts of the tank favoured by its bossy companion and, in course of time, will die from repeated bruising of its body and an inadequate diet.

All the same, in large tanks, thickly stocked with plants and good hiding places, trios or more or *L. bicolor* can live together without much, if any, harm done. Breeding is not unknown. In well-grown fish (3 in or more) of about the same age and length, the female may be distinguished by her heavier build, and the desire to couple denoted by enhanced coloration in the caudal fin of the male and the noticeably swollen sides in the female. The bloated appearance of a roe-filled female is particularly apparent just prior to egg-laying. Egg-laying takes place, after some chasing in all levels of the water, in clumps of plant, among stones, or in fissures of rock or 'caves'.

According to the late Brian Walker, writing in *Sharks and Loaches* (T.F.H. Publication Inc), *L. bicolor* is a less prolific spawner than most cyprinids and less than a hundred eggs are deposited at a spawning. After spawning is over, the male drives the female away from the eggs and, presumably, guards them from molestation until they hatch out. This they do in about three days (at a temperature of about 80°F (27°C). Fry should be free-swimming about three or four days later. At this time, the male should be removed from the tank and the fry left on their own to feed on micro-organisms such as large infusorians, dust-fine dried food and, later, small *Daphnia* or brine shrimps.

L. bicolor makes a safe occupant of a community tank stocked with the less aggressive or trouble seeking cichlids, barbs, and inoffensive characins. It is of the utmost importance, though, to desist from introducing very small *L. bicolor* into a community tank unless there is plenty of bottom cover in the way of plants or water-logged slivers of wood or this fish, too, will become too fearful of attack to venture from its chosen cover and so go seriously short of food which, in a matter of weeks, will lead to an early demise.

A-Z of the Aquarium

Y Chromosomes

In mammals, including man, there are two chromosomes, designated X and Y, which are responsible for determining the sex of an individual. Females carry two X chromosome, in each cell, while males have one X and one Y. The Y chromosome, therefore, is responsible for determining the maleness of an individual.

XX (female) cells are said to be *homogametic*, while XY (male) cells are *heterogametic*.

Some organisms, such as certain insects and birds, exhibit the opposite genetic arrangement in that the females are heterogametic and the males homogametic.

In fish, both situations, and others, apply. However, the terminology takes on a new and potentially confusing twist.

Where homogamety is characteristic of the female sex, the chromosomes are denoted in the usual way, i.e. XX. Males of such species are, therefore, represented as XY. The Guppy (*Poecilia reticulata*) is such a species.

Carefully controlled crosses have shown that the Guppy Y chromosome resembles that found in humans in that it carries relatively little genetic information. Among the few genes found on the Y chromosome are those responsible for the elongation of the lower rays of the caudal fin (bottom sword) and the occurrence of green body (trunk) colour.

If females are heterogametic, they are denoted as WZ, the males being referred to as ZZ males. In effect, what this does is give different labels to the X and Y chromosomes, thus distinguishing them from the XX = female/XY = male situation. One species that seems to fall within this category is the Mosquito Fish (*Gambusia affinis*).

The slight doubt expressed by the word "seems" is a reflection of the fact that sex chromosomes in fish are often impossible to identify as such. Added to this is the existence of polygenic sex determination in which the sex genes are not confined to the sex chromosomes but may be scattered throughout the whole chromosome complement.

Y or Z (i.e.) male-type genes can occur alongside genes responsible for, say, digestion or respiration carried on autosomes ("non-sex" chromosomes).

In some species, like the Platy (*Xiphophorus maculatus*), the situation is even more complex with XY and YY males and XX, WY and WX females making the Z "label" impossible to apply.

***Gambusia affinis* males may not have Y chromosomes**

Zoarcidae

The Eelpouts, or Zoarcidae, constitute a Family of marine fishes found in many seas stretching from the Arctic to the Antarctic. There are, at least, 28 genera and 65 species occurring in habitats ranging from tidal pools down to a depth of around 3,000 metres (a specimen of *Derepodichthys*, sometimes placed in a Family of its own, was collected from a depth of about 2,900 metres in 1890 off the coast of British Columbia).

Eelpouts are sometimes classified with the Blennies, Sandfishes, Weeverfishes and Jawfishes in the Suborder Blennioidei. However, they are regarded here as the sole representatives of the Suborder Zoarcoidei, following the classification proposed by Greenwood et al in 1966, on the basis of the joined-up nature of the dorsal, anal and caudal fins and the jugular ("throat") position of the pelvics, when they are present.

This classification makes the common name of *Zoarces viviparus*, the Livebearing Blenny, found along the North Sea and Scottish coasts of Britain, inaccurate but is not likely to lead to the fish being renamed.

Although *Zoarces viviparus* can grow up to a total length of about 45 cm (c. 18 in.) or, perhaps, slightly more, most individuals measure 30 cm (12 in.) or less.

This species is usually found in tidal pools or under stones, often close to brackish water. It can be maintained in native marine aquaria on a diet of crustaceans or fish as long as the temperature is not allowed to rise into the "tropical" range for prolonged periods.

***Zoarces viviparus* The Eelpout or Viviparous Blenny found in British waters**

Mating takes place in late summer (August/September). As the common name Livebearing Blenny implies, the eggs are fertilized internally and are retained by the female up to the moment of birth.

The developing embryos are nourished by maternal secretions within the ovary. This combination of livebearing (viviparity) and embryonic nutrition within the ovary makes *Zoarces viviparus* a Viviparous Trophoderm, according to Balon (1984) in his classification of fish reproductive strategies.

The end result of this form of reproduction, irrespective of its label, is that the embryos increase dramatically in size and weight for several months.

By the time they are born in the following summer, the 100 to 200 young can measure up to 4 cm (over 1½ in.) in length and are well-formed, efficient hunters from the outset.

Young coloration

The Twin-spot Wrasse is the juvenile stage of the Napoleon Wrasse

FISH are often judged by the beauty of their coloration. This overlooks the fact that a fish's coloration has little or nothing to do with such "superficial" qualities.

Colour, like every other aspect of an organism's biology, is subject to intense evolutionary pressures. Any pattern or range of coloration that exists is, therefore, the result of constant refinements, carried out over numerous generations, which enable an individual, and the species it belongs to, to survive.

This is made possible to a large extent by the "messages" conveyed in the coloration. These may be concerned with concealment from predators (and prey), or may be used to communicate with other members of the same species in aggressive/submissive terms or in numerous other ways.

Young fish, particularly the offspring of species which scatter their eggs and afford them no protection whatsoever, often exhibit an almost total lack of pigmentation. Since such fry usually swim at or near the surface of the water, this type (or lack) of pigmentation effectively conceals them from predators both from above and below.

The young of some species go a stage further and develop localised areas of small spots which help to break up the body contours, thus making themselves even more difficult to pinpoint, particularly if they occur in large shoals.

In other species, such as the marine Angels (Subfamily Pomacanthinae), some Wrasses (Family Labridae) and other types of tropical coral reef fishes, juveniles generally have to live within territories patrolled by one or more adults. These adults are often aggressive towards members of their own species and will display antagonistically towards intruders or chase them away. If young fish were to possess the same coloration as adults, they would, obviously, be under constant attack. This problem is, however, neatly avoided with young Angels and Wrasses often appearing so different to the adults in coloration that it can sometimes be difficult for some aquarists to accept that they belong to the same species. Adult fish can, presumably, recognise the young of their own species but can read the "non-threatening" nature of the message emitted by their coloration and, therefore, tolerate them within their territory.

This is the intermediate stage of the Napoleon Wrasse

Zooxanthellae

IT is an inescapable fact that all life on Earth (and that includes rivers, lakes, seas and oceans), is dependent on green plants for survival. The main reason for this is that the chlorophyll (green pigment) that these plants possess allow them to absorb potentially toxic carbon dioxide during the hours of daylight and use it to build up carbohydrates which can then be oxidised, releasing energy to support vital metabolic reactions. The complicated chain of 'carbon-dioxide-bonding' reactions (called photosynthesis) produces oxygen as a by-product. Oxygen, of course, is the gas used up in respiration, both by plants and animals.

Zooxanthellae seen under the microscope. Photo: courtesy of The Coral World, Eilat, Israel

While plants are apparent virtually everywhere one looks on land, the opposite is often equally true of underwater environments. Coral reefs are a prime example of this. Yet, the plants *are* there—and in vast quantities. The difficulty is that the majority are not apparent.

The reason for this is that the bulk of these plants are unicellular algae which live in partnership (symbiosis) with a number of invertebrates. These algae are collectively known as Zooxanthellae, the 'Zoo' part of their name denoting their association with animals.

A symbiotic relationship is one in which both parties derive some benefit. In the case of Zooxanthellae, this is probably best illustrated by considering their relationship with stony corals, the organisms predominantly responsible for building reefs.

Zooxanthellae are Dinoflagellate algae, characterised, among other things, by the possession of certain photosynthetic pigments, the possession of two flagella (whip-like structures used in locomotion) and a large, distinctive nucleus. Where Zooxanthellae differ from other Dinoflagellates is that they live *inside* the soft tissue of coral polyps.

As the polyps carry out their metabolic processes, they release waste products, some of which (particularly carbon dioxide) are used up by the algal cells. In return, the polyps use some of the carbohydrate and oxygen produced by the algae in photosynthesis. Zooxanthellae also seem to improve a polyp's ability to secrete a calcareous skeleton. It has been estimated that up to 50% of the weight of a coral polyp can consist of Zooxanthellae. Another amazing statistic is that all Zooxanthellae appear to belong to a single species, *Gymnodinium microadriaticum*.

Company Profile

Escot Aquaculture

John Kennaway (left) chatting to clients outside the coldwater retail shop

MARCH 1st, 1985 was a red-letter day in the young life of Escot Aquaculture. It was the day that this Devon-based Company unveiled its new retail and wholesale facilities to members of the trade.

On March 2nd, the doors were opened to the general public offering an extremely wide range of freshwater tropical and coldwater fish and dry goods.

This major step towards entering the retail market was taken by the Directors, John Kennaway and John Clifford, after their encouraging success on the wholesale front with coarse and ornamental coldwater fish over a period of two years. What they discovered was that demand for their stocks exceeded all expectations, particularly on the ornamental side. So much so, that within a short time, they were selling thousands of young and mature Goldfish and Koi to an ever-increasing circle of clients. Recently, this trend has taken a further turn with substantial trade orders coming from places well outside Devon.

Escot Aquaculture are, fortunately, well-equipped both in terms of relevant experience and facilities to meet these heavy demands.

For a start, the Company is based within a magnificent 1,300-acre estate owned by the Kennaway family. This availability of land means that space has presented no problems whatsoever. In fact, the Company has taken over the complete site previously occupied by the estate's Home Farm. The extensive walled area originally available for crop production, along with its several large glasshouses, has proved an ideal location for the Company's own hatcheries, nurseries and fish farm.

The adjoining farmyard with its full complement of staff residences and outbuildings has also proved perfect for development with a charm all of its own that will be hard to beat. The going hasn't been easy but sheer hard work and artistic flair have brought a dramatic transformation to the yard.

By exploiting the existing layout of these buildings (some with open fronts), it has been possible to install long rows of outdoor holding troughs under cover. These hold thousands of gallons of filtered water and even more thousands of coldwater fish ranging from 2 in. Orfes to 18 in.-20 in. prize Koi. The fish come partly from Escot's own breed and reared stocks and partly from overseas sources personally vetted by John Kennaway, whose experience in fish farms in Europe, the Middle East and the States is proving to be a tremendous asset to the business.

The pond section was, obviously, not fully stocked at the time of our visit. However, there was already a range of large, deep interlocking ponds, plus a selection of smaller ones. The full complement, which includes ponds of all sizes and prices, was already on order. It was, of course, also too early for pond plants but, by now, one can expect the full range of marginals, floating plants and oxygenators since plans for these were well in hand on March 1st.

In addition to the above, there are three further sections, all under cover.

One of these is a large room with filtered holding troughs which are somewhat smaller than the outdoor ones but contain stocks of equal quality. Adjacent to this is the coldwater shop with a comprehensive range of goods, including aquaria, stands, pumps, books, foods, fish (in tanks) and Escot's own range of hand and pond nets, pellets and remedies.

Across the yard is the tropical retail shop, again fully stocked with fish, plants (in a most attractive cascade display unit) and dry goods.

John Clifford in the "Tropical" shop

Escot Aquaculture is open for business every day (including Sundays) from 10.00 a.m. to 8.00 p.m. For further details, contact John Clifford at **Escot Aquaculture, Parklands Farm, Escot Estate, Ottery St. Mary, Devon EX11 1LU. Tel: (0404) 822188.**

WHAT IS YOUR OPINION?

by B. Whiteside, B.A., A.C.P.

"CONGRATULATIONS on your *first* 21 years with *Aquarist*. I wonder what percentage of those keeping fish at present have been with the hobby for more than 20 years." These were the opening sentences in a letter written by Mr. Richard Bett, of Bridge House, Honingham, Norwich. He continued: "It seems that many take up fish-keeping, become quite fanatical about it, spend large sums of money, and then the interest wanes. I have met many people who have said, "I used to keep fish" and tell how many tanks they had—but sadly don't any longer!

"I bought my first goldfish in 1946 and since then have never been without at least one tank. I have never had more than six but somehow I feel that I shall always have an interest in the hobby.

"In your February column you refer to 'angelfish in photograph 1'. Those are not angelfish, any more than that tasteless, fizzy fluid the brewers try to sell us is beer! C.A.M.R.A. has done a great job in getting the real stuff made widely available. Let's have a new C.A.M.R.A. —Campaign for Real Angels. Let's get rid of those blotchy, droopy-finned creatures and return to the silver-bodied, distinct black-barred fish, which are much the most elegant and universally-recognised of all freshwater tropicals. It really is quite difficult—in this part of the world anyway—to find an angel that looks like it would have done 20 years ago. It is the same with other fish.

"I have some tiger barbs with strange, black patches where there shouldn't have been. When did you last see a black-ruby barb—we used to call them 'niggers', but I suppose I could go to jail for that now; anyway, when did you see one with such intense colouring that it looked as if it might explode? Or what about a bit of cherry colour in a cherry barb? I wonder if aquarists of many years' standing would agree that the quality of many of the commoner fish is not what it was. Perhaps we get what we pay for. After all, a few years after the war the purchase of a couple of angels and a neon wouldn't have left you the bus fare home out of a week's wage packet!"

I must say I find Mr. Bett's comments both stimulating and interesting. I think he has a couple of very valid points. I certainly think that the colours of many fish don't seem to be as bright as I remember them from several decades ago; or perhaps my memory for colour has faded. What I do know is that on numbers of occasions I've bought brightly-coloured fish, e.g. barbs, only to find, when I got them home, that the bright colours were due to purple-coloured or reddish-purple light tubes in the dealer's shop tanks. Under tungsten bulbs the fish were pale and uninteresting. I must also agree that many of today's 'fancy' fish, with flowing fins, are much less attractive and are often much more awkward than the original, wild species. I'd much prefer the old striped angels to the fancy ones—but the latter, with varieties of flowing fins and various colours through to so-called gold, are those most commonly available. I bought a pair of fancy zebras some time ago and I must say that their flowing fins are not very attractive now that the fish are large; and the feathery fins seem to hamper the fish while they swim.

I was chatting to my vet recently and he mentioned the term 'Bulldog' in connection with a type of cattle. He was making the point that man breeds *some* animals especially for specific deformities, and that such deformities occasionally bring with them other bodily weaknesses that produce fancy, ailing animals that are doomed to sickness. Perhaps we should encourage dealers to stock less-fancy varieties of fish by not buying them.

Of course, the other side of the problem is that many fish are now mass-produced—which may account for a decline in colour or shape—but the large number produced means that the price of most of our fish is quite low. It's rather like the production of battery hens: chicken is now relatively cheap to buy; but much of it is white, tasteless and amorphous. Eggs are similar in many cases. I'm also not at all keen on factory farming. I suppose we have to sacrifice our standards—moral and qualitative—if we want cheap fish; and cheap chicken and eggs.

I should like to hear from other readers on this topic. Perhaps Mr. Bett and I are just a bit older and more cynical than some. Obviously younger aquarists won't remember what fish were like in the 40s and 50s. I don't remember much about the 40s, although I started keeping my first fish then too. I've always had numbers of fish since then. My present six tanks have been in use for many years—two being originals that have been in use for 30 plus years.

My vet telephoned me this evening, rather late, with an interesting problem. Two teenagers had visited him recently with an ailing terrapin—I think its carapace had been affected by a faulty diet. The vet did not know much about terrapins but he gave the young people his advice and and did not charge them; and he did not record their name and address because there had been no charge. Next day the vet received a publication from the Royal College (of Vets) and, ironically, a letter in the publication dealt with—tarrapins' carapaces. He

was unable to contact the teenagers with the information because he did not have their names or address, so he wondered if I could help. All he knew was the town where they live. My rather dull suggestion was the names of a couple of pet shops in a nearby large town and a glance down yellow pages to get telephone numbers. Perhaps the vet may now be able to trace the owners of the terrapin through a pet shop—and, as you know, not all pet shops stock terrapins. It's a long shot but it just might work if dealers remember who bought terrapins from them. Please drop me a few lines about terrapins if you keep them. I know nothing about them; my closest encounter was with my long dead tortoise, Tojo, which occasional readers still mention.

The thought of plastic plants makes me a little nervous because I often have difficulty in giving away *live* plants that take over some of my tanks; indeed, earlier this week I gave young aquarist Gavin Meek a large bag of Indian fern and Java moss. "Don't expect me to plant them in my piranhas' tank!" was Gavin's witty response. A chewed hand might be even worse than a flooded bedroom and stairs. Perhaps Gavin will permit me to photograph his piranhas sometime soon.

Mr. Ray Love, of 211 Portsmouth Road, Cobham, Surrey, makes some interesting and valuable observations about plastic plants—and he gives a settable response to those of us who can grow live plants and who look upon plastic aquarium plants as we would look upon plastic pot plants or plastic roses. He writes: "My subject is plastic plants, a subject I know many aquarists have strong feelings about. I believe I am among the majority of aquarists in being unable to grow plants; and after 14 years of failure I finally admitted defeat and decided to try decorating my freshwater tank with plants from the Plantastic range. The result is, quite surprisingly, the most attractive tank I have had for some years, and yet a few months ago I would have thrown my hands up in horror at the thought of anything less than real plants. I agree that an aquarium stocked with healthy, growing plants cannot be beaten; but how many of us can achieve that?

"Many of the artificial plants available today are remarkably life-like, particularly when viewed underwater in clumps of different sizes. A newly-planted tank may look a bit garish for a day or two; but as algae and detritus gradually settle this is soon toned down. Particularly life-like species from the brand mentioned include *Hygrophila polysperma*, *Ambulia*, red *Myriophyllum*, banana plant and Indian fern. From a distance it is impossible to tell them from the real thing; and although close scrutiny reveals the truth, I still believe that the effect is better than a tankful of brown, decaying or straggling plants.

"Plastic plants are expensive; and although I spent over £25 decorating my 36 in. × 15 in. × 12 in. tank I do not consider this excessive as I could easily have spent that much this year replacing real plants as they decayed.

"Since I abandoned real plants I have had less algae in the tank and the nitrate level has fallen, as only growing plants use up nutrients and reduce these factors; whereas dying plants make matters worse as they decay. Plastic plants need less attention than real plants, though they do need to be removed and cleaned from time to time. I've heard people complain that artificial plants are boring because they are static; but, on the contrary, I would say that you can move plastic plants around as much as you like.

"Further advantages are that you can increase the viewing area by having a very shallow gravel bed. Lighting can be of virtually any type and need not be too intense. Exotic species such as banana plants and Madagascar lace plants can be 'grown'. Dead leaves do not litter the tank and block filter intakes. All in all I am very pleased with my plastic plants and I would recommend that any aquarist without green fingers swallow their pride and give then a try. One word of warning, though: do not mix natural and artificial plants. If you do the plastic specimens will be very obvious as leaves inevitably die off on the real specimens.

"The range named have a well-designed anchorage piece; but I do find that in about 25% of cases this becomes detached from the plant as soon as it is planted. After paying so much for them I find this rather irritating—though a dab of silicone 'glue' sorts matters out."

Well, I'm sure there will be many aquarists who will support Mr. Love's views. I'm very much in favour of real plants—but plastic plants that looked realistic would certainly be better than a bare tank. I've never seen the brand of plastic plant named by Mr. Love—possibly because I always head for the real plants when I'm in a dealer's shop. One manufacturer once sent me a single sample of a plastic plant. I tried it for some time. It's probably in the bottom of a wardrobe now; or well hidden in a forest of real plants. Certainly plastic ornaments can look very real. As a matter of interest, the photograph of the clown fish on page 65 of the March *Aquarist* is one of my photographs; and I'm certain that the 'anemone' in the photograph was a type of plastic plant or 'thing'; it certainly wasn't a living plant or animal. One other point about a photograph: Mr. R. G. Farrow, of 9 Wyndham Close, Birch Glen, Colchester, Essex, writing about the June 1984 issue of *W.Y.O.*, says: ". . . In the June edition you used a photograph in *W.Y.O.* and labelled it as *Plecostomus*. I wonder if this is correct. The fish appears to be an *Otocinclus*." (I don't have the issue to hand, Mr. Farrow, but if my memory serves me correctly you are correct: the fish was a little *Otocinclus vittatus* and not a *Plecostomus*. Obviously, on that occasion, my memory did not serve me too well! Sorry about that. Old age is setting in. I'm glad you noticed and corrected my error—even if it's taken me so long to unearth your letter.)

For next month please send me your opinions on (a) U/G filters; (b) breeding pencilfishes; and (c) lighting. Write soon!

BOOK REVIEW

Field Guide to the Waterlife of Britain. Principal consultants and authors *Dr. Frances Dipper* and *Dr. Anne Powell*. Published by Reader's Digest Association Ltd., 1984. Price £8·25.

There are 335 pages packed solid with information and illustrations in this excellent book. It is written, among others, by Dr. Anne Powell who is well known to *Aquarist & Pondkeeper* readers as one half of the Mayfly team responsible for the popular long-running series entitled "The Basis of Fish Health".

Dr. Powell and her co-authors have taken on a job of monumental proportions and have succeeded in producing a book that is colourful, easy to use, highly informative and interesting to read.

The range of species dealt with covers the small, beautifully sculptured Star Acorn Barnacle (*Chthamalus stellatus*), the huge Basking Shark (*Cetorhinus maximus*) and over one thousand species in between.

After two introductory sections, entitled 'Understanding Water Life', and 'How to Identify Water Life', the book launches into its main subject, the Water Life of Britain.

Organisms are grouped together according to criteria which are explained and illustrated in the early parts of the book. The approach adopted results in groupings which are not always absolutely in accordance with traditional taxonomic classifications.

As the authors point out, though, one of the principal aims of the book is to aid in identification. However, since many closely related organisms *are* quite similar to each other in appearance, discrepancies are not too frequent. For example, eels and lampreys are grouped together in the freshwater section as 'Snake-like Fish'. This particular grouping illustrates both aspects referred to above in that the two species of freshwater lampreys, *Lampetra planeri* and *L. fluviatilis*, are very closely related to each other but not to the eel, *Anguilla anguilla*. I have chosen this particular example because it represents my only significant adverse comment concerning this book. It concerns the acceptance, without qualification or explanation, of lampreys being true fish. As this is far from universally accepted, it should, in my opinion, have been mentioned.

Still, this does not detract in any way from the usefulness of the book. I was particularly pleased to see that there is a closing chapter dedicated to 'Observing and Conserving Water Life'. Included in this section are the following topics: Migration patterns among water animals, the problems of pollution, Conservation—observing the rules, How to study water life, Places to visit to see water life, and Useful addresses.

Despite the vast body of information contained in this book, the publishers have managed to pack it all in a volume measuring just 8 in. (length) by 6 in. (height). The resulting size of print may be a bit too small for some readers, but even they should benefit from this authoritative, attractive publication.

John Dawes

The Marine Aquarium Manual by *Maurice Melzak*. Published by B. T. Batsford Ltd, 1984. ISBN 0 7134 4232 8. Price £7·95.

"This book is all for people keeping organisms they can gather themselves from the shore. . . ." "There are many reasons . . . why it is preferable to keep organisms that are personally gathered."

These two quotes, taken from the introduction of this useful book say much more about its contents than the title itself which gives the impression that *all* marine aquaria are comprehensively covered.

This would be a tall order indeed for a book such as this which adopts a different and welcome approach to the marine hobby.

Although there is a section dealing specifically with tropical aquaria, entitled "Warm Water Systems", this only occupies about 10 pages, five of which are taken up with diagrams. The point is made, though, that the basic principles are the same as for all the other marine aquaria discussed in the rest of the book.

My own feeling is that it would have been better to have concentrated entirely on temperate marine aquaria, where there is a definite need for a book such as this manual, rather than to have attempted to cover everything. This would have provided fuller scope for the treatment of cooling units for temperate marine systems as well as allowing more extensive coverage of the use of natural seawater, composition of artificial mixes and the general maintenance of aquaria. All these and other topics are, however, tackled as well as major Phyla, from seaweeds to fish.

The full Contents List reads as follows:

I have long felt that coldwater marines have never received the attention that they so richly deserve. This book can be seen as a worthwhile step towards redressing the balance and should, therefore, be welcomed by the steadily growing body of hobbyists who are beginning to take a closer look at the varied, colourful and interesting organisms that exist around our coasts.

John Dawes

Meet the Societies

DARFIELD & DISTRICT AQUARIST SOCIETY

The D. & D.A.S. Logo

Pterophyllum scalare

Darfield & District Aquarist Society was formed in 1972 with the principal aims of:

1. Promoting interest in tropical, coldwater and marine fishkeeping;
2. Providing active competition for members;
3. Raising the standard of fish kept by members.

From the small nucleus of founder members, two (Bob and Penny Singleton) still play a very active part in the Society's affairs. Penny has been the Secretary for years (only the dedicated few last for any length of time, as any ex-Secretary will vouch for). Bob, a well-known judge, is a committee member of the Yorkshire Association of Aquarist Societies.

Darfield & D.A.S. may not be a very large society, but it certainly is an active one. For example, there is an Open Show, held at Darfield Junior School, plus two other "Mini" Shows every year. Fish auctions of surplus stocks owned by members take place during these "Mini" Shows and during the winter months at a few of the Society's monthly meetings.

These meetings are held on the first Thursday of the month at 8 p.m. in a private room in the Village Club, School Street, Darfield, Barnsley. All are welcome.

In addition to lectures and slide shows arranged to meet specific requests made by members, there is a "Set Class' Table Show every month. Points won at each meeting are then totalled up at the end of the year and a trophy is presented to the overall winner.

Trips are occasionally organised to places of interest and have included visits to Scarborough, Belle Vue, Matlock, Chester Zoo and the odd fish farm. The final outing every year is the Christmas Dinner get-together.

The Society competes regularly in both major Shows in the area, the Yorkshire Aquarist Festival and the British Aquarist Festival. Last year's tableau was very well received at both venues.

Early this year, members of the Society presented a series of lectures at local schools as part of their programme aimed at attracting young people into the hobby and eventually setting up a Junior Section.

Subscription rates: Adults, £1·00; Juniors and O.A.P's, 50p.

Apply to: Mr. B. Littlewood, 79 School Street, Darfield, Barnsley, S. Yorks. Tel: (0226) 752067.

OLDHAM & DISTRICT AQUARIST SOCIETY

The O. & D.A.S. Logo

Astronotus ocellatus

The Oldham and District Aquarist Society was formed in 1950 when a few enthusiasts met in response to a small advertisement in the local press.

Although today the total membership does not reach the heady heights of the early years, an enthusiastic nucleus of aquarists still meets fortnightly (on Tuesday evenings) at the "Angel Hotel," Shaw Road, Royton, Oldham. Proceedings start at 8.00 p.m. and include lectures, Table Shows, guest speakers and general discussion evenings (Natter Nights!).

In addition, there is an annual Furnished Home Aquarium competition judged by a local aquarium shop proprietor, the winner being awarded a trophy at the end of the year.

O.D.A.S. also runs its own Open Show every year and, whenever possible, enters the major Festivals.

A particularly interesting feature of O.D.A.S. is its Breeders' Award Scheme based on the standards and rules established by the Federation of Northern Aquarium Societies (to which O.D.A.S. has been affiliated since 1950).

The Breeders' Award Scheme was introduced on 1 January 1980 to:

1. Promote the breeding of fish and to encourage members to turn their talents to the art of breeding and rearing fish.
2. Encourage observing and close study of the aquarium, care, feeding habits, reproductive behaviour and the rearing of young fish to maturity.
3. Encourage an interchange of ideas and information in the hope that more and better quality fish will be seen and benched at Open Shows by club members in the future.

This exciting scheme has four grades of achievement, ranging from the breeding of "easier" species to the more difficult ones. This last category has the added challenge of requiring the members involved to lecture on all the species bred or chair an Open Forum.

As each grade is achieved by a member, he/she receives a Grade Card, plus a cash voucher to be used at a local aquarium shop.

Subscription rates: Single, £2·00; Family, £3·00; Juniors, £1·50.

Apply to: Mrs. Barbara Colley, 10 Chatsworth Street, Oldham, Lancs. Tel: 061-620 7607.

NEWS... From Aquarists' Societies

Monthly reports from Secretaries of aquarists societies for inclusion on this page should reach the Editor by 3rd of the month preceding the month of publication.

MAY

3rd May: WALTHAMSTOW & DISTRICT A.S. are pleased to welcome Keith Dean of the B.K.K.S. who is giving a lecture on "Koi Keeping and Ponds", commencing at 8.00 p.m., at the Grange Hall, Frederic Street, off St. James Street, Walthamstow, E.17. Anyone interested is invited to come along.

4th May: SOUTHEND, LEIGH & DISTRICT A.S. open show at St. Clements Hall, Rectory Grove, Leigh-on-Sea, Essex. Benching at any time during Friday night and early Saturday morning. The Club also runs trips to most open shows and meets on the first and third Tuesday of every month at St. Andrew's Hall, Southview Drive, Westcliff-on-Sea, Essex. Meetings commence at 8 p.m. All visitors are welcome and any enquiries should be addressed to the Secretary, Mr. F. Ray, 143 North Crescent, Southend-on-Sea, Essex.

5th May: I. & E. A.S. open show to be held at Monk's Dyke High School, Monk's Dyke Road, South Lincs. Benching 11.45 to 13.45. Judging Y.A.A.S. standard.

5th May: STRETFORD & DISTRICT A.S. open show is to be held at Hartford Community Centre, Canterbury Road, Davyhulme, Manchester. Further details contact Mr. G. Cummins, 16 Royal Avenue, Urmston, Manchester; telephone 061-748 8973.

11th May: BRITISH AQUARISTS STUDY SOCIETY, second Spring meeting at the Park Street School, Park Street, St. Albans, 2 p.m. to 5 p.m. Programme to be arranged.

11th & 12th May: AQUARIAN FISHKEEPING EXHIBITION Kempton Park Racecourse. Details and Schedules from, The Secretary, The Association of Aquarists, 7 Wheeler Court, Plough Road, Battersea, London S.W.11.

12th May: BOURNEMOUTH A.S. annual open show will take place at Kinson Community Centre, Pelhams Park, Bournemouth. Show schedules will be available after 1st April from the Show Secretary, Jack Jeffery, 13a Woodland Avenue, Bournemouth BH9 2DJ. S.A.E. would be appreciated.

12th May: YORK & DISTRICT A.S. are holding their annual open show at Recreation Hall, Wiggington, York.

12th May: MACCLESFIELD A.S. open show at Ryles Park County High School, Ryles Park Road, Macclesfield, Cheshire. Further details from: Mr. J. Merriman, 10 Grange Road, Macclesfield, Cheshire. Tel: 0625 615580.

18th & 19th May: SCOTTISH AQUARIST FESTIVAL Motherwell Civic Centre, Scotland. Details and Schedules from W. Bennett, 15 Coulter Avenue, Coltness, Wishaw, Lanarkshire ML2 8SZ.

19th May: ABERDARE A.S. 3rd open show at Aberaman Y.M.C.A. Schedules and further information available from Show Secretary, M. R. Williams, 298 Cardiff Road, Aberaman, Aberdare CF44 6UU. Tel: Aberdare 876604.

19th May: FOLKESTONE & DISTRICT A.S. open show at Capel Village Hall, Nr. Folkestone. Details and schedules from M. Keene, 77 Ashley Avenue, Folkestone, Kent.

19th May: LAKELAND A.S. 1st open show at Bryce Institute, Burneside, Kendal. Further details from Mrs. H. Jones, 10 Burton Road, Kendal LA9 7JA. Tel: 0539 28058.

19th May: BIMBI A.S.S. open show at Felling Community Centre, Crowhall Lane, Felling. Further details from Miss A. J. Ogden (Show Manager). Tel: 0632 699484.

26th May: CORBY & DISTRICT A.S. open show, Corby Civic Centre.

26th May: PORTSMOUTH A.S. Inter-Club show at St. Simons Rooms, Albert Road, Portsmouth.

26th May: BLACKBURN AQUARIST & WATERLIFE SOCIETY are holding their annual open show at West End Youth and Community Centre, Clayton Street, Blackburn, schedules on request s.a.e. please to Show Secretary, Mr. I. Jepson, 112 Redlam, Blackburn. Tel: Blackburn 62296.

26th May: TONGHAM AQUARISTS open show at Ash Parish Council Recreation Hall, Ash Hill Road, Ash, Aldershot. Schedules and further information from Andy Pearce. Tel: 0252 25686.

26th May: BRIDLINGTON & D.A.S. 12th annual open show at the Hilderthorpe Junior School, Shaftesbury Road, off Kingsgate, Bridlington. Schedules available from the Show Manager, Mr. M. Jordan, 12 Greenfield Road, West Hill Estate, Bridlington. Tel: (0262) 674109.

26th-27th May: Well worth a visit at the end of this month is the National Pet Show, held at the Royal Showground, Stoneleigh, Warwickshire. The hobby of coldwater fishkeeping will be well-represented, with a live display of fancy goldfish and information on feeding and rearing coldwater fish, mounted by the Association of Midland Goldfish Keepers. AMGK will also be holding a competition for goldfish keepers of all ages, and I look forward to meeting and talking with all coldwater hobbyists on the AMGK stand at the event.

JUNE

1st June: SWINDON A.S. 3rd open show at Park South Community Centre, Swindon. Schedule from show secretary, Mr. K. Curtis, 12 The Circle, Pinehurst, Swindon. Tel: 32920.

1st & 2nd June: MID-SUSSEX A.S. are holding a two day Exhibition and one day open show at 'The Martlets,' Burgess Hill.

2nd June: REDCAR FISHKEEPERS' SOCIETY open show at Redcar Racecourse. Details and schedules from S. J. Ives, 21 Hurst Park, Redcar, Cleveland TS10 2JQ. Tel: (0642) 477212.

8th June: LLANTWIT MAJOR A.S. open show (to FBAS rules), in the School Hall, Ham Lane, Llantwit Major. Details and schedules from Show Secretary, Mr. C. Turner, 146 Arran Street, Roath, Cardiff. FBAS Championship Trophy Class K.

9th June: CANNOCK & DISTRICT A.S. open show at Avon Road Community Centre, Cannock, Staffs. Details and schedules from Mr. A. Potts, 25 Oaks Drive, Cannock, Staffs. WS11 1BU.

9th June: NEWTON AYCLIFFE AND D.A.S. second open show at Elmfield Community Centre, Rowan Place, Newton Aycliffe, County Durham. Further details from: E. Hargreaves, 61 Shafto Way, Newton Aycliffe, Co. Durham DL5 5QN. Tel: 0325 316755.

9th June: BRITISH KILLIFISH ASSOCIATION open show at Collingham Memorial Hall, Collingham Village, Nr. Leeds. Details from Mr. M. Tomlinson, 6 Sissons Row, Middleton, Leeds LS10 4JZ. Tel: Leeds 775551.

9th June: J.C.B. AQUARISTS will be holding a bring and buy section of fish and aquatic equipment at the J.C.B. Social Club, Rocester near Uttoxeter. Everyone will be welcome. Fish will be booked in from 10 a.m. Auction to begin at 11.30 a.m. approx. For further information phone Alan Rothwell on 0782-317741.

15th June: NORTH AVON A.S. 6th open show at Hanham Folk Centre, High Street, Hanham, Bristol. Benching from 9.30 till 11.45 a.m. Specialist judges engaged. All enquiries to the Secretary, R. Cummins, 1 St. Annes Close, Cadbury Heath, Warmley, Bristol BS15 5EH. Tel: 0272 677898.

16th June: ACCRINGTON & DISTRICT A.S. open show, Harvey Street Community Centre, Oswaldtwistle. Enquiries to S. Walsh, 133 Lammack Road, Blackburn or C. Wallbank, 130 Burnley Road, Blackburn. Tel: 61765.

16th June: LINCOLN & DISTRICT A.S. open show at Ancaster Day Centre, Boundary Street, off Newark Road, Lincoln.

23rd June: The **BASINGSTOKE AND DISTRICT A.S.** open show will be held at the Carnival Hall, Basingstoke. For further details please contact the show secretary, Chris Ralph, 325 Abbey Road, Popley 4, Basingstoke, Hants RG24 9EH, or telephone Basingstoke (0256) 477757.

23rd June: SKELMERSDALE & DISTRICT A.S. intend holding their first open show at Westbank High School, Skelmersdale.

23rd June: PORT TALBOT & DISTRICT A.S. 15th annual open show at the "Four Winds Hotel", Aberavon Seafront, Port Talbot West Glam. Schedules from J. Egan, 53 Pentre Afan, Baglan Moors, Port Talbot, West Glam., S. Wales SA12 7RN. (s.a.e. please).

29th June: NAILSEA & DISTRICT A.S. 12th open show, to be held at Scotch Horn Centre, Nailsea, Near Bristol. Details available from Mrs. S. J. Kenwood, 11 Queen's Road, Clevedon, Avon BS21 7TH.

30th June: ROMFORD & BECONTREE A.S. open show to be held at the Parkside Community Centre, Goodmayes Lane, Goodmayes, Essex. Schedules from: Mr. B. Brown, 12 Tiptree Crescent, Clayhall Avenue, Ilford, Essex IG5 0SZ.

30th June: ST. HELENS A.S. open show at Rainhill Village Hall, Rainhill (off M62—Merseyside). Further details from Mrs. H. Stradman, 10 Ribble Avenue, Rainhill, Merseyside L35 6NT. Tel: 051 426 4213.

JULY

7th July: SCARBOROUGH & DISTRICT A.S. open show at Friarage School, Longwestgate, Scarborough. Further details from Mrs. J. Jones, 79 Pasture Lane, Seamer, Scarborough.

14th July: DUDLEY & D.A.S. open show at George Salter High School, Claypit Lane, West Bromwich. Further details from R. Hampton, 61 Wood Road, Lower Gornal, Dudley, West Midlands.

14th July: READING & DISTRICT A.S. open show at Southcote YCC, Coronation Square, Southcote, Reading. Further details from Mr. M. W. Loth, 12 Farm Drive, Tilehurst, Reading RG3 5EU.

21st July: SANDGROUNDERS A.S. open show at Meols Cop School, Meols Cop Road, Southport. Schedules from Mr. R. Baldwin, 10 Olive Grove, Southport, Merseyside. Please send s.a.e. or telephone 0704 41984.

28th July: ASHBY FISHKEEPING SOCIETY open show at Grange Farm Hobbies Centre, Scunthorpe. Booking in time 12.30 p.m.

AUGUST

10th & 11th August: YORKSHIRE AQUARIST FESTIVAL Doncaster Racecourse. Details and Schedules from Mr. N. Bullen, 11 Sherborgate Drive, Pocklington, Yorkshire YO4 2ED. Tel: 07902 3177.

SEPTEMBER

8th September: DARLINGTON A.S. 3rd open show, Eastbourne Comprehensive School, Darlington. Further details K. Rodway, Darlington 487581.