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JUNE 1992



Koi keeping

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THE WORLD OF
CICHLIDS

Jewels of Lake Malawi

Exclusive series by Ad Konnings



Year of the Cat

A to Z of Catfish



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AQUARIUM

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As I see it

THE EDITOR

Iwould sincerely like to welcome readers to our new monthly fishkeeping magazine.

You may notice the absence of frills, freebies and gimmicks - our simple intention is to provide first class reading for aquarists everywhere.

I would also like to take my spot in this first issue to thank our UK and international contributors for helping to provide the magical ingredients to make Aquarium a world beater.

Famous names and professional fishkeepers have come together in a combined effort to produce a monthly alternative for discerning aquarists. From the word go it has been my real intention to bridge serious fishkeeping and aquatic science topics with a blend of enthusiasm and a healthy mixture of beginners information.

My twenty years reading and thirteen years writing for many other magazines has certainly given me an insight into what is required of a good fishkeeping magazine. I put great store in design and layout although these factors should naturally follow on from good original material.

I can promise you that these factors will have priority - and, most importantly, I sincerely hope you look forward to the next issue as much as everyone here.

Remember, this is YOUR magazine. We welcome your views on Aquarium and look forward to receiving suggestions, letters, photographs - in fact, any constructive comment!

Happy fishkeeping.

David Sands

NEWS



Lynwood Fishhouse - where the Nitra Ghost water treatment system was first imported into Britain.

The hidden nitrate danger in your tap water.

High Nitrates = High Costs To Fishkeeping

IN SOME water areas tap water contains high levels of nitrates, up to 50 ppm is the EEC limit. Even low levels can be a nuisance in aquaria.

A survey by the Red Tailed Catfish Club first linked high nitrates to fish health problems. Survey editor and AQUARIUM editor David Sands examined over two hundred survey forms before the direct link between skin shedding, coughing and itching by captive *Phractocephalus* (red tailed catfish) was made to high nitrates.

Prior to this discovery fishkeepers had been treating their catfish for parasitical infections!

High nitrates possibly suppress fishes although this is still being investigated by the RTCC survey.

When George Hudson of Lynwood Fishhouse heard

that high nitrates can have an adverse effect on tropical freshwater and marine fishes, he looked around for a commercial solution and has introduced *Nitra Ghost*, a tubular resin exchange unit, into the UK market.

Nitra Ghost's are recharged through salt and offer a reasonably priced way to ensure nitrates do not build up through levels in tap water.

If high nitrates do occur in your aquaria it is no good simply installing a *Nitra Ghost* and hoping the nitrate level will fall to safe levels. First, water changes are required and replacement water should be passed through the resin exchange unit to ensure nil levels are being returned to the aquarium.

● Details on *Nitra Ghost* from Lynwood Fish House on 081 391 2613.

A survey by the Red Tailed Catfish Club first linked high nitrates to fish health problems.

Sunrise over the system

ADVANCES in aquatic hardware do not come easy. Few products ever surface into retail outlets without a long period of research and development after the initial moments of inventiveness. Good products are not cheaply developed either and, in the 'catch 22' syndrome, can only be produced cost effectively when churned out in large quantities.

'A TECH' Water Management systems Ltd., has already produced the *Aquaswitch*, a superior splash proof cable tidy and *Aquastat*, a digital electronic thermostat which can control and monitor temperatures accurately in aquarium systems. This alarmed unit has many features including splash

...simulate the changing currents created by tidal movements in nature...

proof housing and hooded switches to keep out salt and water.

'A Tech' has also produced the *Aquasurge*, a reef surge simulator which can be used to control power heads and so create intermittent water currents in marine systems. Flows of water produced in this manner simulate the changing currents created by tidal movements in nature and thus encourages coral and anemone growth.

Not content with these developments 'A Tech' has now produced the ultimate in lighting control, *Solar System*. This lighting control unit enables the fading and brightening of fluorescent tubes, something that has always been a problem to lighting engineers.



Aquasurge: used to create intermittent water currents in an aquarium.

Fluorescent tubes contain a gas or gasses and these are 'fired' to create lumens. 'A Tech' has found the exact electronic technology to dim a light tube to just 10% of its brightness. Over a selective period of time the tube brightness can be increased gradually to 100%. This effect creates an artificial sunrise and sunset for any aquarium.

Fishes do not respond well to being put under an immediate spotlight nor do they appreciate suddenly being plunged into darkness. Any fishkeeper who has seen fishes dart blindly around the aquarium after lights have been switched on will be able to confirm such observations.

The *Solar System* is undoubtedly designed for marine systems although the unit could certainly be used on freshwater tropical systems. The expense of such innovative technology will not deter marine aquarists who have already invested heavily to provide their fishes with the ideal captive environment.

Fishkeeping needs to advance and products such as the *Solar System* are at the forefront of the 21st century hobby.

Watch out for a full review in a future issue.

● *More details from A Tech Water Management Systems Limited, at PO Box 18 Aylesbury, Buckinghamshire, HP18 0UG and specialist retailers.*



A family discuss the merits of the Kingfisheries hexagonal aquarium display at the '92 Ideal Home Exhibition.

Stan's first Ideal Home

STAN KEMP, of Kingfisheries at Beckenham in Kent, decided to brave the thousands of daily visitors and display three special aquaria at the 1992 Ideal Homes exhibition at Earls Court, London.

A large marine aquarium, a fancy coldwater display and a hexagon tank completely stocked and aquascaped caught the eye of many passing visitors. Youngsters dragged adults over to the displays and Stan was kept fairly busy throughout the fourteen day exhibition.

Stan says that it is difficult to say how successful the show was because the 'seeds are sown' in a great many minds and this can result in new fishkeepers for years to come.

Filtration facts

Springflo filter medium, from Spirex Aquatic is a thin mineral/plastic composite in ribbon form previously only available in 16.5 square metre packs.

Now Spirex has increased the size range to include 2.5 and 5.5 square metre sheets to enable this excellent filter medium to be incorporated into smaller box filter units employed by many pondkeepers.

Spirex also states that "a



Springflo filter medium: increased range.

colour change, from white to green, has been made to advertise its environmental friendliness."

● *For more information contact Spirex Aquatic on (0527) 821601.*

FREE Aquarium Ads for Readers

Have you got surplus aquatic equipment that you would like to sell? Are you trying to buy some second-hand equipment? If you have then the AQUARIUM FREE READERS ADS. are just what you've been waiting for!

For a limited period only AQUARIUM is pleased to offer readers a chance to place a classified ad. for FREE! You may place an advertisement for any item which you wish to sell, up to a maximum value of £100, or a wanted advertisement, at no cost. So why not make some money on that redundant aquarium? Get it advertised. Fill out the coupon on page 95 and send it in.

● *Please note this free offer is only open to private individuals with no trade connections.*

Going for gold

The humble goldfish, brought home in a jar from the local fair, has been the beginning of many a long and lasting love of fish and aquatics. Often dismissed as unimportant or unworthy by some serious fishkeepers, the Goldfish remains one of our most reliable, attractive and economic subjects for beginner and expert alike.



Many accomplished aquarists have embarked into the wonderful world of fishkeeping by keeping a goldfish in a glass or plastic bowl.

We all know in our heart of hearts that this is no life for a happy fish but the hobby starts there for many people.

Some goldfish survive many years in captivity hovering in the centre of a small light trapped universe.

Ideally the gold fish deserves a posh tank complete with filters, plants and an ornament/wood decoration round which to swim. If you own a goldfish in a bowl – promise yourself (and the goldfish) – that you will save up (borrow or work towards) to buy your little friend a spacious new home.

Many parents ask for tips on looking after a goldfish or two in a small bowl or tank:

Ten top tips

1 Do not overfeed. Two or three flakes per fish per day, not crumbled as fine food simply disappears.

Twice a week offer something different – ideally a couple of frozen peas (yes really!) and a tiny piece of shredded prawn – squashed.

Remember children innocently overfeed – sometimes more than once a day and this pollutes the water and can kill the goldfish.

2 Change a little water often, about a

pint, replacing it with luke warm tap water from the hot tap. This is 'fresh air' to your goldfish.

3 Shade part of the bowl/tank so that light is not coming in from every angle. The goldfish really doesn't want light coming in at it like something out of *Close Encounters*

4 Live plants (strands of pond weed) are very welcome to a happy goldfish. In nature the goldfish (in its carp form) feeds on greenery and it's an important part of their diet.

COLDWATER AQUARIUM



- 5 Filter sponges, etc. should be rinsed in warm water (or aquarium water removed for the purpose) as chlorine in cold tap water will kill the good bacteria which in turn helps to filter the water.
- 6 Don't overcrowd. One fish to one bowl unless the bowl is large and two fish to a small tank. Plenty of room equals a happy home.
- 7 Don't allow plants to decay. Replace dying plants regularly.
- 8 Only have a light layer of gravel on the bottom of the bowl/tank - excess

allows stagnation.

- 9 Keep bowl or tank in a shaded place, not in the window or on the television set. Green water is created from excess light and excess nutrients.

Do all these things and:

- 10 Talk to your goldfish calmly and slowly and if your goldfish could smile back, I'm sure it would do!

Treatments

Remember serious infections should be

treated carefully. Growths or fish damage should be treated quickly although cysts need to be removed by a vet with specific fish knowledge.

Small amounts of tonic salt (tea spoon per two to three pints of water) combined with Fin Rot, Myxazin, Fungi-stop, etc. remedies will treat most problems providing the water conditions and diet are satisfactory.

Some of the best aquarium displays seen have consisted of show quality fancy goldfish. For colour, movement and overall visual quality a fancy goldfish community takes some beating.

The main rules are:

- 1) Not to overcrowd.
- 2) Heat water to 70 - 76 degrees F.
- 3) Combine bogwood with a good show of large plastic plants to obtain 'good effect'.
- 4) Aerate the water with large air stones.
- 5) Undertake regular water changes - 25% per two weeks.

More to come

Look out for our special features on coldwater fishkeeping. We will have guest writers offering expert opinion and good advice.

William Robert Stevenson □



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POOF PICTURE. Aquarium and by David Smith

Jewels OF Lake Malawi

The first part of this exclusive new series by AD KONNINGS takes us to Lake Malawi - ninth largest in the world - and home to some of the most beautiful freshwater tropical fish known to man.

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AD KONNING's name is now synonymously linked with cichlids following publication of his many books on the subject.

Originally from the Netherlands, Ad lives and works in Germany although you would rarely find him there! He is currently in Central America researching his favourite topic...

Ad Konning, known as a 'passionate cichlid lover', has frequently travelled to Tanganyika and Malawi in search of cichlid species from the vast African Rift Valley Lakes. He has published extensive works related to Central and South American cichlids together with huge tomes on cichlids from the Lakes Malawi and Tanganyika.

Most cichlids of the genus *Aulonocara* are commonly known as Malawi Peacocks; a few others, which were thought to belong, until recently, to another genus *Trematocranus*, are better known as Malawi Butterflies. The trade names bestowed on these fishes suggest that they are among the most beautiful cichlids that have been exported from the lake. This is certainly true, but even more important is that the males keep their colours in the aquarium and that all species are fairly easily maintained.

The main characteristic that places all of these cichlids into one genus is the possession of enlarged sensory pits on the head. These pits are covered with a membrane that has a similar function as the eardrum: they register waves (i.e. motion in the water). These enlarged versions of the cichlid's acoustic system are sensitive enough to detect the tiny movements of invertebrates moving around in the sand. Although the fish may not see its prey it can surely hear it! When foraging, *Aulonocara* hovers a few millimetres above the sand and remains motionless. It carefully listens to the sand and when it has detected and located a moving insect-larvae or crustacean, it captures the prey by a quick bite in the sand.

The genus *Aulonocara* can be divided into several groups in which species share a habitat-preference. The best known species and mostly exported are the rock-dwelling Peacocks which have received numerous tradenames.

The second group consists of the cave-dwelling *Aulonocara*. It is not known whether more than one species with many geographical races is involved or if several species make up this group. The cave-dwellers received the tradename of Malawi Butterfly.

The third group is collectively called "Ostande Type *Aulonocara*". They live on the sand near rocky regions. The fourth group includes the sand-dwelling *Aulonocara*.

Malawi Peacock

The first species exported as an aquarium fish (in the early sixties) and traded as the Malawi Peacock is a rock-dwelling *Aulonocara*. Its scientific name was thought to be *Aulonocara* *huilssae*, the type species of the genus. This name remained stuck to the blue Malawi Peacock and to many other Peacocks exported later. Interestingly, *A. huilssae* is one of the two species (out of more than 25 species known to date) which have never been exported from the lake. Males of the Blue Malawi Peacock

(the one that was exported as the first) are characterized by an entirely blue body and red ventral fins. They were collected by Hennie and Peter Davies on the Mozambique coast near Likoma Island. It may have puzzled aquarists why Davies exploited such a remote population of a blue Peacock while it must have been known to them that the southern part of the lake (Maleri Islands, Mbenji Islands and the Eastern coast south of Masinge) and the coast at Nkhata Bay all are inhabited by beautiful *Aulonocara*. Stuart Grant, currently the only exporter in Malawi, gave a plausible explanation. In the early days there were no compressors to facilitate diving at deeper levels. They were introduced by Stuart himself. For Davies' fishermen, equipped with snorkel and mask only, it was almost impossible to collect Peacocks without having them decompressed. All Peacocks need decompression as almost all live at levels deeper than 7 meters. The locality in Mozambique, however, supported a population of Peacocks which were so near the surface that they could be collected without decompression. In order to avoid travelling all the way up to this area, the Davies's released a load of Malawi

Peacocks near their fish-station at Cape Maclear. They are still present in this area and I have found them up to three meters from the surface. Although this Blue Peacock has not been officially described or specified to a species, it is very likely a geographical race of *A. huilssae*.

Other rock-dwelling *Aulonocara* have been exported, e.g. from Mbenji Island the so-called Blue Regal, from the Maleri Islands the Yellow Regal and the Chiumba *Aulonocara* from Chiumba. In fact, every rocky coast north of Cape Maclear supports a variety of species of the rock-dwelling group of *Aulonocara*.

The rock-dwelling Peacocks live in sometimes large communities. Males

THE WORLD OF CICHLIDS



A. sp. "Chitande Type North" at Likona Island.



A. cf. HANSBAENSCHI at Domwe Island.
This is the variant that was initially exported
as "*Aul. nyassae*".

have a territory which consists, normally, of a nest excavated under a rock. Such caves are almost always at the level where the rocky biotope meets the sandy bottom. The females gather in foraging schools and are normally found on the sand a few meters away from the rocks. Males forage on the sand as well but remain within one metre of their cave. When threatened, male and female retreat under the protection of the rocks. The cave-dwelling group of

Aulonocara prefers the darkness of caves. In the southern part of the lake, especially around the Nankumbia Peninsula, the cave-dwellers are found in the upper five meters of the rocky habitat. At more northern locations *Aulonocara jacobfreibergi*, the best known cave-dweller, is found at deeper levels. The Malawi Butterfly was previously known as *Trematocranus jacobfreibergi* for some years now it has been assigned to *Aulonocara*. ➤

*Malawi Butterflies are among
the most beautiful cichlids
that have been exported
from the lake*



A. NYASSAE at Muziri Reef, The "Reef"



► Males *A. jacobfreibergi* occupy a cave or, when the cave is sufficiently large, several males have a territory along the wall of the cave. It seems that the most dominant male occupies the darkest spot in the cave. Females forage on the sandy bottom of the cave or outside on the sand. *A. jacobfreibergi* has a lake-wide distribution but around the Nanidumba Peninsula it occurs in the densest populations. It is nowhere a very

common cichlid. At northern locations only a few individuals can be seen during a one hour's dive, and only when one knows where to look for them.

The third group in *Aulonocara* consists of small cichlids which are normally found at depths beyond 15 metres. While the Peacocks of the rock- and cave-dwelling groups reach a maximum size of about 12cm in the wild, the "Chitande Type" *Aulonocara*

usually stays under 10cm in length. Males have a weakly defended territory consisting of a shallow dip in the sand or a cave under a rock. The "Chitande Types" are mostly found over the sand, frequently metres away from rocks. Females, which have a silvery coloration (the rock and cave-dwelling species have beige or brown coloured females) gather in large schools over the sand. When threatened they form a tight



A. STUARTGRANT at Moleja

school on the sand and rarely seek protection among the rocks. Most *Aulonocara* breed throughout the year, at least males in breeding coloration are seen the year round. It is however, possible that some species among the "Chitande Types" have a restricted breeding period.

The name "Chitande Type" is derived from the first *Aulonocara* of this group that became known among aquarists. It was collected at Chitande Island, near Chilumba in the northern part of the lake. It was traded under the names Northern Peacock and Chitande *Aulonocara*. The cichlids from this group are characterized by having a rounded head. In general, "Chitande Types" live at deeper levels than the rock- and cave-dwelling *Aulonocara* and also their populations are not as dense as those from the rock-dwellers. These could be the reasons why the "Chitande Types" were discovered much later. Even so, they have been observed at most rocky coasts. Most populations, however, are too thin or too deep to be exploited economically by the exporter.

Some of the "Chitande Types" that have been exported are the Chitande *Aulonocara* (*A. Ethelwynnae*), the "Chitande Type Masinje" from the east coast near Masinje and the "Chitande Type North" (not Northern Peacock) from Likoma Island. The fourth, sand-dwelling group among *Aulonocara* contains the largest species in the genus. The largest *Aulonocara* is *A. rostratum* (*A. macrochir* is a synonym) and it may grow to a size of about 25cm. It has a lake-wide distribution and is regularly

exported as an aquarium fish.

Jumbo Blue

The sand-dwelling *Aulonocara* forage from the sand where they are usually seen in groups or schools. *A. rostratum* and an undescribed species which I have named "Jumbo Blue", are sometimes seen solitary as well. The sand-dwellers *A. guentheri* and *A. nyassae* live in small schools in the southern part of the lake. Their groups consist of one dominant male, which has a nuptial coloration, and non-breeding males and females. *A. guentheri* roams through the upper layers of the sandy habitat while *A. nyassae* seems to be restricted to layers

Always bear in mind to house only one species of each group in the same aquarium.

deeper than 20 metres. Males of neither species have ever been observed defending a territory. Males of the other three sand-dwelling species, i.e. *A. rostratum*, "Jumbo Blue" and "Blue Gold Sand", defend a territory on the sand. Males *A. rostratum* congregate in breeding colonies and dig large crater nests. These nests are about two to three metres apart. Females move about in foraging schools, far away from the males, which stay at their breeding grounds. Females enter only the males' breeding area to spawn. ➤

A. STUARTGRANT at Utsiya. Traded as Utsiya *Aulonocara* or Platysoid Peacock

All Peacocks need decompression as almost all live at levels deeper than 7 metres.



A. STUARTGRANTI at Ubioga. Traded as Ubioga *Aulonocara* or *Placidus* Peacock.

► *Aulonocara* sp. "Jumbo Blue" probably has a lake-wide distribution as it was found at several different localities around the lake. Males dig deep craters which sometimes look like a tunnel. Males of *Aulonocara* sp. "Blue Gold Sand" defend very shallow dips in the sand as their nest. Females of both these species occur in small groups or are solitary.

Although there are still more species in this rather large and varied genus, the four main groups have now been mentioned. In this context it is important to understand that at one locality one can find more than a single species of *Aulonocara*. In fact, a representative of each of the four groups is found at many places. For instance at Chitande Island near Chilumba one may encounter *A. jacobynsbergi* in caves in the shallow part of the rocky biotope and find the rock-dwelling *A. stuartgranti* (Chilumba *Aulonocara*) when the rocks meet the sand at a depth beyond 7 metres. A little deeper, at around 15 metres, one finds *A. eifelburgense* (Chitande *Aulonocara*). Swimming away from the rocks onto the sand one may see an occasional "Jumbo Blue" and *A. rostratum*. So, in contrast to previous beliefs, several members of this beautiful genus can be found together.

Aquarists wishing to maintain several Peacocks in one aquarium have a plethora of species to choose from. Always bear in mind to house only one species of each group in the same aquarium. Then only we prevent

hybridization among the closely related but different species.

A last word on the geographical variation within certain (rock-dwelling) species is in order. Although it is scientifically accepted that several cichlid species (including Peacocks) exist as geographically separated populations having differences in the male coloration, it is wrong to house males of one population with females from another with the excuse that it is the same species after all. We hobbyists should understand that we have a great responsibility in preserving nature's variety, which is undermined when we would hybridise between different races of one species. So, be aware of what kind of species and from which locality your Peacocks are and keep them clean. It is our contribution to the conservation of nature.

ESSENTIAL AQUARIUM DATA

- House one species group only to prevent hybridization
- Keep more females than males to prevent bullying
- pH range 7.5-8.5
- Hardness 100-250ppm
- Temperature range 23-24°C
- Diet Gamma Shrimp/shredded prawn, finely chopped bloodworm, fly larvae and a good quality carnivore and herbivore flake.

THE WORLD OF CICHLIDS



A. ETHELWYNSAE at Chitande Island.
Traded as Chitande, Anisocoma or
Northern Peacock.



A. JACOBFREIBERGERI at Namkhumba Peninsula.



The bronze corydoras should never be underestimated. This delightful species is the perfect community aquarium corydoras thriving when kept in shoals of three or more. Domesticated specimens readily spawn in the most basic aquaria.

Year of the Cat



Words and pictures by Aquarium editor DAVID SANDS

THE A-Z OF AQUARIUM CORYDORAS

A comprehensive review of Corydoras. The most consistently popular of all aquarium fishes.

Corydoras belong, according to scientific classification, to the family *Callichthyidae*. This compact family of closely similar genera contains the most popular of all aquarium catfishes in the history of fishkeeping and is best known through the numerous species of *Corydoras*. They are small freshwater tropical fishes, well suited to community aquariums where they are considered to be ideal 'bottom feeders'.

In the 'old days' fishes given the tag 'bottom feeder' (associated with *Corydoras*) would mean that they would be relegated to

wastes of other fishes.

Corydoras, in nature, feed on tiny invertebrates such as micro-crustaceans, larvae, small terrestrial insects and aquatic debris. It's hard to imagine such a recipe ending up on the bottom of any aquaria.

Natural diets can be imitated through good quality flaked food and frozen foods such as Gamma shrimp and daphnia. Special 'tit-bits' such as finely shredded shrimp or finely chopped earthworms. The best time to feed is late in the evening, for although they are not totally nocturnal, *Corydoras* are more active in a half light.

In aquaria when *Corydoras* search for food missed by other fishes they, and other substrate dwelling fishes, play an important part in sustaining the balance of a community tank. Despite this factor aquarists should make sure that food, with reasonable substance, is regularly fed to catfishes and other bottom feeders just before the daily 'lights out' time.

These small catfish, as

fish in nature and as such need to be kept in reasonably large numbers.

Choosing which species of *Corydoras* to stock in your aquarium depends totally on the availability at your local retail shop and in turn their wholesale/importer supplier. *Corydoras* are frequently imported from South America in very large quantities to both Europe and America, although there are times, such as in the rain season, when catfishes and most tropical fish are difficult to collect.

Over 120 species of *Corydoras* have been detailed to science since the description of the first species *Corydoras punctatus*. Bloch, working on the description of many fishes in his collection described the Sunnam fish as *Cataphractus punctatus*, but the now familiar generic name *Corydoras* was recognised officially by Dutch scientist Bleeker in 1862, only after he had separated the name from other *Callichthyidae* member, *Callichthys* and

been exported from Ecuador, Guyana, Paraguay and Peru. The latter country has sporadically been a major exporter to Europe and North America.

***Corydoras aeneus* The Bronze catfish**

The best known species from these countries is undoubtedly the bronze catfish, *Corydoras aeneus* which is one of the most widespread species in the genus. The bronze catfish has been recorded from the top of South America on the island of Trinidad to the far Southern Brazilian waters.

More importantly for fishkeepers *Corydoras aeneus*, very popular with the beginner to fishkeeping, has been farm raised in the Far East and the United States. Because of this captive breeding the bronze fish catfish is available year-round.

Few experienced enthusiasts would confess to being captivated by this catfish which is considered 'common place', even though it remains extremely popular amongst newcomers to the hobby. This lack of real popularity with serious enthusiasts is a pity because wild caught specimens display a richer yellow and bronzed body than the paler coloured commercially bred forms.

The bronze catfish is fairly easy to encourage to breed in aquarium conditions and is therefore an ideal species for the new-comer to fishkeeping. The bronze catfish can be sexed even when it is only half-grown as females grow larger and are generally more robust. As with most species when viewed from above, the male is slender and has a more pointed outline in comparison with the female.

Corydoras axelroffi is a delicate species on import but once established this delightful catfish is a wonderful addition to a community aquarium.

the poorly understood role of scavenger.

Scavengers were sometimes thought to survive in aquaria by feeding on the excess food, available through overfeeding more to the upper-water levels. The extreme example of that a few ill informed fishkeepers exert that substrate would survive on the

with all genera within the family *Callichthyidae*, possess two rows of 'armoured' scutes or plated scales which flank their bodies. Nature has provided all the callichthyids with these overlapping plates to protect them from predators. It may have other uses too, as it is not unknown to find healthy *Corydoras* in a tank stricken with disease.

Corydoras are shoaling

Hoplosternum

The closest relatives to *Corydoras* in the family *Callichthyidae* are *Aspidoras* mini-cory catfishes (almost a pigmy version) and *Brochis* the emerald catfishes (almost a giant version of *Corydoras*).

In the last few years the main exporting countries of *Corydoras*, and indeed the majority of tropical fishes from South America, has been Brazil and Columbia. Secondary collections have



THE A-Z OF AQUARIUM CORYDORAS



Black spot corydoras

Bronze corydoras

Scientific name: *Corydoras aeneus*
Distribution: Widespread
Size: 60mm
Additional information: Has various subtle colour variations in nature depending on the area collected. Extremely adaptable to a wide range of water conditions. Bred under aquarium conditions
Special features: Yellow to brown markings

Acre corydoras

Scientific name: *Corydoras acrensis*
Distribution: Acre, Brazil
Size: 30mm

Additional information:

Unavailable as an aquarium fish

Special features:

Similar to *Corydoras julli* except for eye mask

Agassiz's corydoras

Scientific name: *Corydoras agassizi*
Distribution: Brazil & Peru
Size: 55mm

Additional information:

Eye mask and dorsal mark similar to *Corydoras ambiacus* not bred under aquarium conditions

Special features: Uneven rows of spots

Black spot corydoras

Scientific name: *Corydoras ambiacus*

Distribution:

Peru & Ecuador

Size:

55mm

Additional information:

Dorsal mark not as distinct as in *Corydoras agassizi* adaptable to a wide range of water conditions. Not bred under aquarium conditions

Special features: body-dorsal mark

Persona corydoras

Scientific name: *Corydoras atropersonatus*

Distribution:

Ecuador & Peru

Size:

45mm

Additional information:

Spawning in aquaria delicate on import but a superb aquarium species once settled. Bred under aquarium conditions

Special features: fine rows of dots on body

Skunk corydoras

Scientific name:

Corydoras arcuatus

Distribution:

Brazil, Peru, Venezuela and Ecuador

Size:

55mm

Additional information:

Thrives in a bright chemistry water, soft to medium hard with a neutral pH in a lower



Black top corydoras

Persona corydoras



Asteroc's corydoras



THE A-Z OF AQUARIUM CORYDORAS



Adolfo's catfish

temperature range of 75-77 degrees F. Superb black stripe pattern on a white body gives it its distinctive common name. Bred under aquarium conditions but not an easy spawner. **Special features:** The black stripe

conditions can be ideal for smaller community aquaria. Imported under the name 'decker' as is its look-a-like *Corydoras toxoanus* also from Colombia. Bred under aquarium conditions. **Special features:** strong eye stripe

aquarium. Bred under aquarium conditions. **Special features:** Dorsal fin spot

continued next month

Axlerod's catfish

Scientific name: *Corydoras axelrodi*
Distribution: Colombia
Size: 45mm
Additional information: Can be very delicate on import but once settled into good water

Black top catfish

Scientific name: *Corydoras acutus*
Distribution: Peru & Ecuador
Size: 60mm
Additional information: Long snouted species found amongst imports of *Corydoras trilineatus* - sometimes referred to as *juli*. Happiest in a shoal in a large

Adolfo's catfish

Scientific name: *Corydoras adolfi*
Distribution: Brazil
Size: 45mm
Additional information: Beautiful orange head spot, black striped markings and eye mask makes this a much sought after catfish. Requires fresh, soft water with a neutral pH. Bred under aquarium conditions. **Special features:** The orange head mark

● All data for this series has been extracted from *Catfishes of The World, Volume One* (limited edition 1990 looseleaf reprint) which is available from Bee Bee Books, Sycamores, 4c Bannister Hall Drive, Higher Walton, Preston PR5 4DE, Lancs (0772 30869) Price £22 p&p included.

Agassiz's catfish



Friendly Fishes

It is hard to think of a topic more important to aquarists, once the tank has been filled with water at the correct chemistry and temperature, than which fishes can live together. Amanda Jane offers some advice.

I have lost count of the number of unsuspecting fishkeepers who have purchased a 'baby' oscar, bullhead catfish, severum, firemouth or shark catfish, etc... only to find the fish grew and began to dominate (or even eat) an otherwise healthy group of community fishes. A two inch oscar has the potential to grow to nearly a foot in length, the bull head two feet, a one inch gold severum has the potential to attain half a foot and more, the firemouth is born with territorial aggression in its blood and the shark catfish, apart from requiring brackish to saltwater in its life history, can also grow to two feet in length.

No, it probably didn't say that the shark catfish could

grow to two feet on the tank when you purchased it, but all the facts mentioned are true. It is not always the fault of the retailer as some customers insist that they like a particular fish without regard to its attainable size and general disposition.

There are many size and behavioural levels of fish communities, even the largest, most predatory fish will co-exist with other suitably large and robust species.

A suitable example would be large oscars (*Astronotus*) (pronounced astro-no-tus). Providing they are given enough space, the correct quantity of water volume should be 25-50 gallons per fish, and more than adequate filtration (undergravel/internal power filtration combined with external filtration). Oscars will live happily with silver dollars, tinfoil barbs, large suckermouth catfishes and certain other robust cichlids, such as eartheaters and other South American species (*Chaetobranchopsis*, (Cheet-o-brank-opsis) *Acarichthys*, (Ack-a-rik-thees) *Geophagus* (Geo-lay-gus) and *Gymnogeophagus*)

(Gym-no-geo-lay-gus).

None of these fishes could be considered for inclusion in the standard community aquarium containing guppies, platies, neon tetras and small gouramis. This otherwise suitable community of large fishes would uproot and eat plants, snaffle the occasional fish and cause havoc at feeding time by forcing smaller fishes to take a back seat as the food descended the water levels.

The so-called Oddball fishes are the biggest lure for many fishkeepers. Now, whilst Birchies *Polypterus*, elephant nosed fish *Gnathonemus* (nath-o-neemus) and African anabantids, *Ctenopoma* (pronounced ten-a-poma) would hardly be ideal for the community aquarium, yet together, they would make up a fascinating group of fishes to keep in a special aquarium.

Right design

Providing the right aquascape (aquarium design) has been brought into the aquarium layout then such fishes would thrive.



Polypterus, primitive 'snake-like' fishes from Africa live in swamp conditions. They predate on...

COMPATIBLE COMMUNITIES



The South American Ghost Knife fish is extremely territorial and should not be kept in pairs or with 'gentle' fishes.



predate on snails and crustaceans and therefore belong in a community aquarium containing robust, larger species.

COMPATIBLE COMMUNITIES



Shoals of larger South American Characins are ideal community fishes.

► The aquarium should have a river sand or peat moss substrate, although the latter tends to be easily disturbed by foraging fishes, and should contain dead, beech tree branches or bogwood for the fish to associate with as they establish territories.

That does not mean *any* odd ball fish could then be introduced into the same aquarium. A South American, black ghost knife fish, *Stenarchus* (sten-ark-us) would harass an elephant nosed fish during the hours of darkness and it would fret and simply waste away.

To add to such problems

two of the same fishes could cause all kinds of problems if they are not compatible. Some fish tolerate each other in large shoals because no one individual could dominate another as they would be lost in the mass. Put two of the same into an aquarium and 'all hell could be let loose' as the dominant fish tries to knock 'seven bells' out of the poor sub-dominant fish.

In aquaria there is no escape for a fish that is being bullied. It is an arena. In nature, the loser of such battles for dominance can flee to safety. Where can it go in a fish tank but back into the ring?

The ghost knife and the elephant nosed fish are

perfect examples of this problem in that they are both extremely territorial and live under a pecking order. In nature elephant nosed fishes may be in shoals of a thousand or more, therefore, if you want to maintain such as species in captivity make sure the aquarium conditions are correct and that the numbers you purchase are enough to break down the one to one pecking order (four to six should be enough).

Feeding becomes even more important in an aquarium with unusual fishes. They often have specialised feeding habits and specific dietary requirements. It is essential that such fishes are offered a wide range of foods,

from greens to shrimps and earthworms together with a good quality flaked food or pellets for larger fishes. A broad diet should be rotated. Feed frozen peas and shrimp one day, pellets on another, carnivore flake on another then fast one day and feed chopped earthworms, flake and so on.

Water quality should be maintained at all times. Regular water changes, especially via the use of a gravel cleaner, are so beneficial to the fishes, comparable to fresh air to a person who has inhaled acrid smoke...

In future issues **COMPATIBLE COMMUNITIES** will discuss various community groups of a wide range of sizes.



COMPATIBLE COMMUNITIES

Ctenopoma actirostre. The leopard bushfish.

numbers and inclinations. Each month a special group will be featured. The subjects may range from killifishes to knife fishes with plenty of real surprises inbetween.

Any experienced fishkeeper who wishes to pass his or her ideas based on actual fish communities are welcome to write into AQUARIUM and recall the ups and downs of their particular set up.

Readers should note that they should feel free to request specific groups of fishes be dealt with and we'll try to find a way to get round to them. □

Gnathonemus. Elephant nosed fishes are rarely kept in ideal conditions.



David J. Price and John Rundle guide us through the activities of the Plymouth and District Aquarists' Pond Keepers' Society

The Plymouth society was founded in 1948 by a local school teacher placing an advert in a newspaper for anyone interested in the aquatic hobby to attend an inaugural meeting to form a society. From those small beginnings the present society has grown. The last 44 years have seen many changes in the hobby, and the society itself has experienced its ups and downs in terms of membership. Today the society is flourishing, and looks forward to continuing success.

Finding a suitable meeting place at a reasonable cost can be a problem for any society. In Plymouth, we are fortunate to have a fine meeting place. At present meetings are held on the first and second Tuesdays of each

month at the Plymouth Electrical Sports and Social Club, Armada Street. The first meeting is the more formal, consisting of lectures and slide shows given by either our own club members or by guests from outside. The second meeting is centred around the table show where members hope to win trophies which are presented at the end of the year. Members mingle and chat about the hobby at this meeting whilst the fish are being judged. At each

meeting there is a raffle and auction of fish bred by club members and other aquatic items.

On the programme

The society aims to produce a varied programme throughout the year which will appeal to both the beginner and the more advanced aquarist, the 1992 programme includes lectures and slide shows on cichlids, catfish and local marine fish; slide shows by the photography section and by

Fishes by the Sea



Peter Burgess on his fish collecting trip to Borneo; "how to do it" talks on breeding fish and setting up furnished aquaria and aquascapes; quizzes; a fish judging competition; and a video of our last open show.

The table shows serve a variety of purposes. They allow members to learn about and to gain experience in the showing side of the

Shows and exhibitions are an excellent way of bringing your society to the attention of the public. This lion fish (Pterois sp.) was shown in one of the several displays by the Plymouth Society at a local hobbies and pastimes exhibition.



AQUARIUM CLUB CALL



Photo by P. Buryan

hobby. A beginner shows in category "A" and, when they have obtained five prize cards, they then show in category "B". In this way, novices are encouraged to bring their fish along without feeling they are up against people with years of experience. A person

progresses from "B" to the "Premier" category by obtaining five prize cards in the "B" class, breeding ten broods of fish (at least five different species), and either giving two talks or writing two articles for the club magazine. Table shows are also used to train members

Garden ponds are popular with several of our members, and water lilies provide a focal point in any pond. "Attraction" is a free-flowering, hardy water lily which stays open when it is raining. One of the best rods to have in your garden pond.



Photo by W.L. Rundle

Cryptocoryne plants are normally only seen submerged and, in this form, are often very difficult to identify. In tropical Asia they grow as marsh plants or submerged plants. They can be identified by the flower, but flowering normally only occurs when they are grown semi-emersed. This specimen was grown by club member Bill Rundle. This species with a bright yellow spathe is *Cryptocoryne evae*.



Photo by W.L. Rundle

Poptella orbicularis - a showy characin from the Amazon. This fish is not always readily available, but is one which is well worth having in your tanks. It breeds readily and has proved to be very popular with local aquarists in the South West.

TV Cats

*'A Club for all catfish enthusiasts.'
Chairman and leading light for the Association of Aquarists Malcolm Goss explains why 'catfish are cool' in the Thames Valley area.*



*The gentle giant, *Megalodon*, Malcolm's favourite catfish! Still a rarity amongst South American imports although juvenile specimens have been available in recent years.*



The Siluriformes (Catfishes) hold many forms of magical species grouping together an extremely large and diverse number of fishes. Over 2000 species are known to science, many living in the most extreme habitats. It is little wonder aquarists everywhere want more information about the catfishes in their keep.

Mother of snails

The members of the Thames Valley Catfish Group (an area group of the Catfish Association of Great Britain) write their own magazine and hold quarterly meetings for the benefit of all catfish enthusiasts. Members are always keen to show other 'catfish crazy aquarists' their fishes and share information.

One of my favourite catfishes is a *Megladoras irwini*. This giant tortoiseshell patterned catfish, whilst known to science for many years, is still rare to see in captivity. Amongst the many catfish I keep, this member of the Doradidae family is my pride and joy.

I bought this catfish when it was only two and a half inches long and now, two years later, it has grown to fourteen inches. The aquaria for my *Megladoras* measures 5ft x 2ft x 2ft and contains many live plants, mostly *Cryptocorynes*, in flower pots. The substrate is of white sand enhanced by a large piece of bogwood behind which it likes to hide.

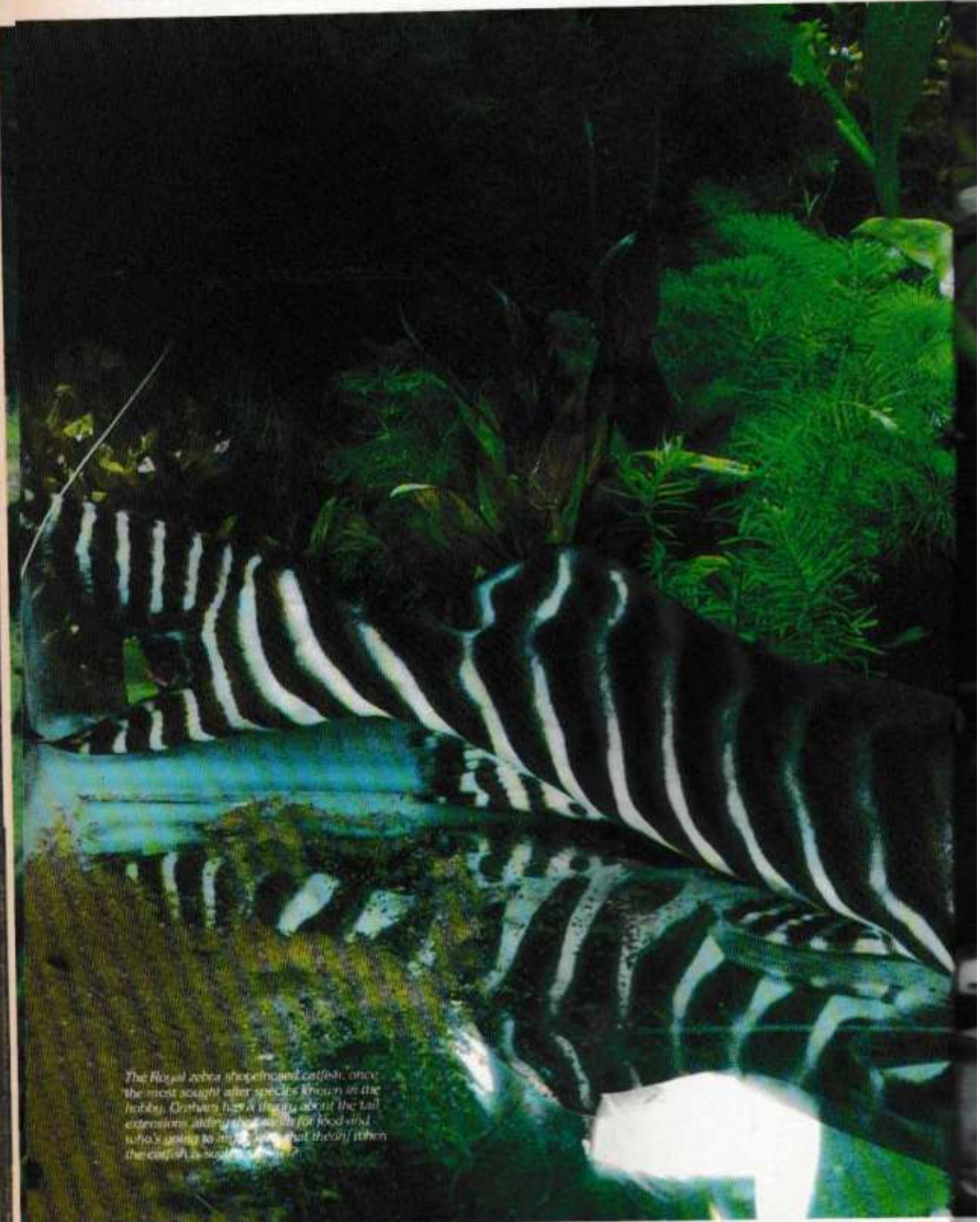
Many other catfish share this aquaria, including an 'Alligator plecostomus', four 'Driftwood catfishes', two *Synodontis angelicus*, plus many smaller catfishes such as *Brochis splendens* and an *Ancistrus spp.*

Although the typical catfish environment (the natural habitat) is far from ideal during the dry season - with a general lack of food and less space in which to escape predators - survival is the name of the game. However, fishkeepers still have the obligation to treat captive fishes as well as possible and as close the to optimum within the limits of aquaria.

My tank is a furnished aquaria where you might expect to see shoals of characins, not catfish. To see a dozen or more *Brochis* swimming past the front glass disappearing and reappearing into a background of plants is only a small part of a fascinating scene. Then there are snails. Oh! Did I not mention the snails? Who wants snails? Well the common name for *Megladoras irwini* is 'Mother of Snails' as this catfish just loves them as a food.

Royal zebra

Although catfish enthusiasts probably 'know better' many aquarists believe



The Royal zebra shoefin and catfish, once the most sought after species known in the hobby, Critham has a theory about the tail extensions aiding the fish for food and who's going to attack (what the catfish when the catfish is suddenly out of the water).



► catfishes are dull coloured, whiskered fishes that live in the darkest corners of their aquaria, not to be seen. Graham Cook, Thames Valley's PRO, stocks his six foot aquarium with a *Merodontotus lignosus*, a truly colourful and flamboyant catfish. With its vibrant vertical strips it is often seen swimming in midwater, its magnificent barbels stretching out in front and its wonderful streaming extensions to the caudal fin. Graham believes these incredible caudal extensions aid the Royal zebra catfish to sense food. These predatory catfishes live in very fast waters in nature. Graham uses two large external power filters to create a fast flow of water through his aquarium.

Care about your catfish

Not all TV Cats members keep large catfishes. Alan Sykes devotes his whole fish-house to keeping and breeding many species of *Corydoras*. There are over 130 species of *Corydoras* known to science from the family Callichthyidae. Their size ranges from one inch to some species which reach nearly four inches. These catfishes have an excellent peaceful nature making them ideal for the community aquaria. Alan feels it is sad when these wonderful little catfishes are bought singularly or even in pairs, in their natural habitat they shoal together in many hundreds. He urges hobbyists to buy a shoal of at least six for the benefit of the catfishes and a real plus is watching them swimming together through the plants and over the substrate in your aquaria.

Menu of the day

A *Pseudacanthicus spinosus* keeps Tim Allen's aquarium glass free from algae. Tim is the club secretary and keeps many catfishes. He says as well as eating algae, Tim feeds his *P spinosus* and many of his larger catfish with a menu of prawns, crab sticks, whitebait, trout and catfish pellets.

Meeting place

The Thames Valley Catfish Group meets quarterly in Amersham, Buckinghamshire on a Sunday afternoon. Tim always books two speakers so members have a variety to listen to. Live catfish are often on offer at meetings plus the release of the latest 24 page magazine. There is a real welcome for catfish enthusiasts, beginners and experienced fishkeepers, who can make it to the meetings. Why not ring Tim on 0844 238041 or Malcolm on 0494 722786 and check out the next meeting dates. □

The Complete Aquarium

Amanda Jane presents a special review of AQUARIUM'S own contributing vet expert Peter W. Scott's book published last year.

There are table top picture books, there are scientific text books but which reference work should the aquarist beginner or the enthusiast turn to for a browse or a serious read?

Dorling Kindersley are known for producing authoritative, easy to read serious guides such as *You and Your Dog*, *Fish or Cat*, etc, so it came as no surprise when Winchester-based fish vet Peter Scott was commissioned to write a special aquarium book. Peter had already contributed a great deal to zoo vet David Taylor's *You and Your Dog*, a tremendous reference work if you are a dog owner.

The publishers brought in photographer Jane Burton for specialised fish photography. Our very own editor was asked to write up species data for the various community

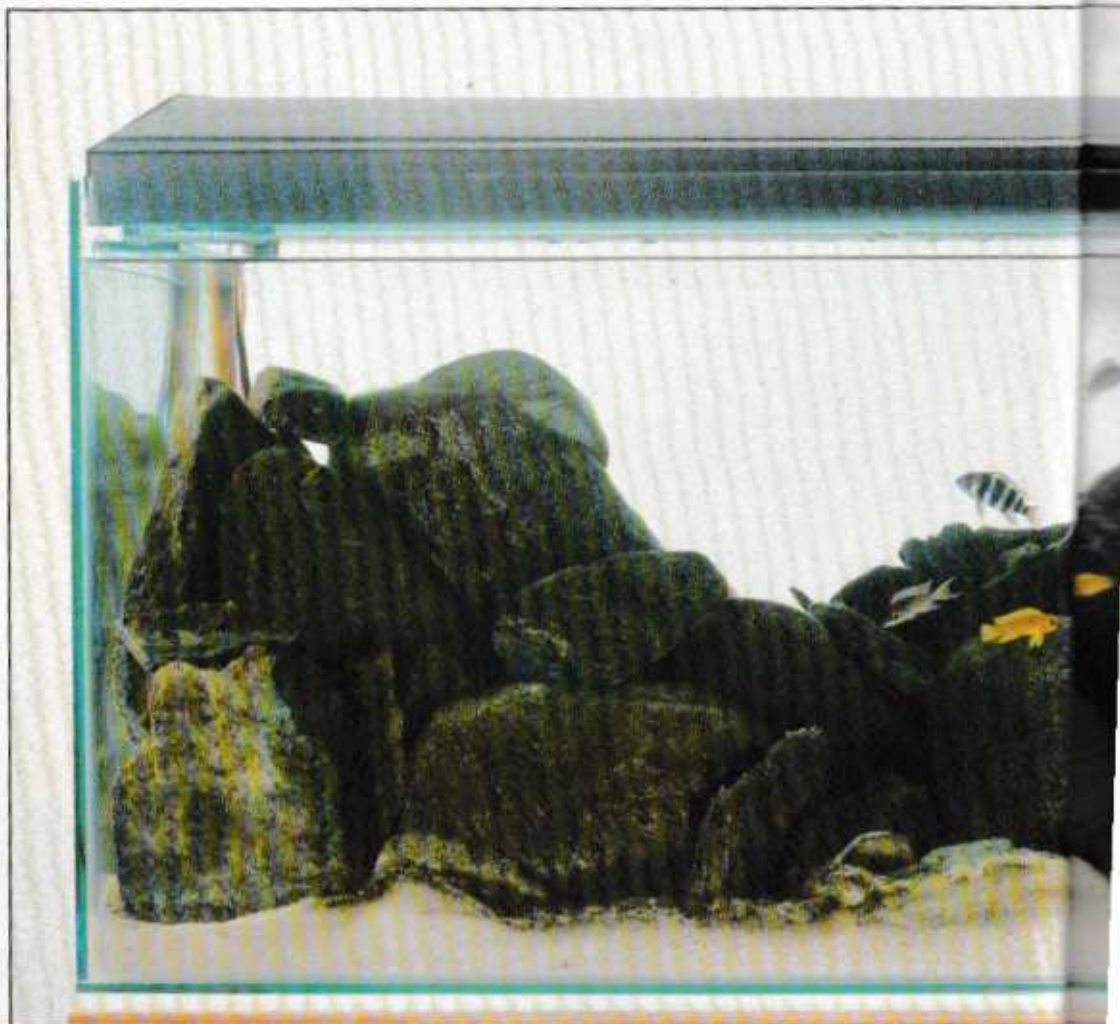
selections.

The initial proposal was to set up actual aquaria with different aquascapes and fish selections, ranging small freshwater tropicals to reef fishes. The task tested author, photographers, editors and contributors alike but were the team successful?

I am frequently asked to recommend a 'complete' book to guide the novice or to make fishkeeping suggestions to the developing aquarist.

Any books which professes to be 'complete' have to pass a strict test as the 'world of fishes' is extremely complex and difficult, if not impossible, to deal with within the covers of single book.

The Complete Aquarium cover wrap states that the book is a practical guide to building, stocking, and maintaining freshwater and marine aquaria.





The finished tank. British Rock Pool.

limited is in the range of species covered in the fishes section.

The Aquarium Atlas represents a new genera of pocket sized works which combines the work of the best fish photographers in Europe with the vast experience of Hans Baensch who, with his father, saw the first flaked fish food produced.

Three volumes exist in German language editions and sadly, only the first volume has been produced by Tetra Press. This beautiful book set the trend for 'Atlas' style books and is a credit to everyone involved in its production.

The Complete Aquarium was produced with a different approach in mind. Various fish communities are brought together in a range of aquascapes, from an Amazon rain forest stream and acidic pool, Asian backwater, Zaire river rapids, Central American rocky lake, West African floodplain swamp, mangrove swamp to a Hawaii coral reef and British rock pool to name just a few.

The book begins with discussions on water taking into consideration all the chemistries of various water habitats and takes into considerations the various aspects of fish biology and

finishes with tank and water management, chemistry, filtration, heating and lighting, aquarium plants and a general 'trouble shooting' section.

Does the book work?

I really 'love' the design, 'cheeky' fish cut outs and outlines. The opening sections are marvellous with views of habitats and space to discuss man's influence and conservation. The origins and design of the fish would enhance any fishkeeping book.

Planning the tank follows with the freshwater community aquarium from start to stocking.

The only problem I have is that the names of some of the fishes are incorrect. This occurs several times throughout the book suggesting a rush to reach the finish after such a mammoth task.

The picture of *Corydoras julii* relates to another species although I could forgive the editors and author as many species appear similar.

The finished tank reminds me of my first venture into the community aquarium all those years ago!

Lines are drawn down to the fish within the picture of the aquarium lead

to name text above the picture. In this first example a Cosby/Opaline gourami is said to be a Leeri or pearl gourami whereas the real pearl gourami on the far right is not pointed out. I bet it was difficult for the author to see all the fishes in the original transparency and much easier when the picture was enlarged.

The Tanganyikan Rocky Lake section makes me want to set up a tank immediately!

For those fishkeepers with an eye for the aquascape closer to home the British rock pool looks simple but exciting. The problem here is keeping the system well lit and cool... believe it or not that can be difficult in the Summer.

The marine aquarium suggestions appear realistic and more like the above average saltwater systems ordinary fishkeepers are likely establish.

The end sections are well designed and thoughtful although the aquarium plant section is rather lightweight especially when compared with its predecessors.

There is a very useful appendix to understanding water chemistry and biological filtration and a glossary to

BOOKS AND VIDEOS

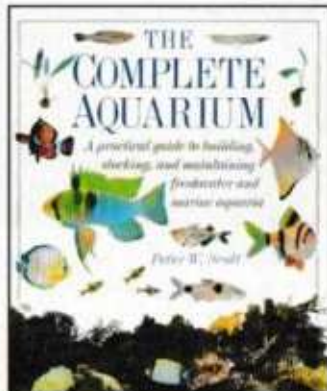


terms. Finally, the bibliography lists some great books, most of which are in the serious aquarist's library.

But, yes, does the book work? *The Complete Aquarium* is a lovely book in every sense, it is substantial without being too weighty, and fairly concise. If you have never seen the book pop in to your local aquatic retailer or WH Smiths and take a quick look, I can

guarantee that you will find the layout exciting and revealing. Go on, buy a copy for the one you love; even if it's for yourself.

The Complete Aquarium retails at £16.95 and is available from good aquatic stores and bookshops.



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VIDEO REVIEW

Amanda Jane takes a close look at two recently released videos which examine life in the seas and establishing aquaria



Exploring the Sea

Exploring the Sea

AIMED at educating children up to 12 years of age on fundamental issues of Sea Life the content of this video is suitable for use in the National Curriculum.

Exploring the Sea begins by clearly explaining the simple and yet complex lifesaving water cycle – how rainfall is created and how it returns to the sea.

Fish migration, breeding, evolution, biology and habitats are covered in detail. It also discusses how tides and currents are created, their effect on the habitat, how they can present problems to the creatures and how some have

over come these problems. Also explained is fundamental biology, such as how a fish swims, including fins and body movement, breaths and is affected by temperatures. How fish 'see' is also covered.

Exploring the Sea examines the food chain, and man's effect on it, by way of over fishing and the effects of industrial pollution.

Excellent photography is presented throughout the video and the commentary is clear and precise.

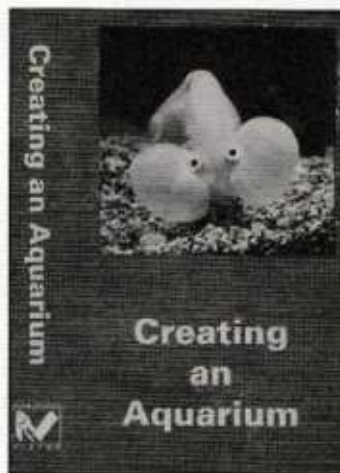
Exploring the Sea is enjoyable to watch and can be an excellent vehicle for introducing children to the ocean and the creatures that live within this environment. Pollution is covered positively and I am sure will encourage children to understand such problems and even investigate further.

I recommend this video to any parent who has to entertain enquiring children. Part of the 'Exploring Series' by Renaissance Vision, (£10.99).

Creating an Aquarium

IDEALLY suited for the beginner, this video, discusses everything necessary to setting up and maintaining a healthy tropical freshwater, coldwater and tropical marine aquarium. The dialogue assumes no prior knowledge (bad habits included) of fishkeeping by the viewer. It clearly discusses filtration processes, types of filter and equipment required for each type of aquarium. Medicines and tests necessary to keep the aquarium healthy are also covered.

Plants, position of the tank, aquascaping, stocking levels, compatibility and the introduction of fish are just some of the many other topics clearly discussed together with important maintenance routines.



Creating an Aquarium

Creating an Aquarium

I enjoyed the 'how to sections' of the film where it was possible to see someone fitting equipment and such like because many of these tasks are simple for the experienced fishkeeper but not always so for the beginner.

The dialogue is rather wooden and over laboured in parts but the viewer is left in no doubt that fishkeeping can be wonderful providing the basics are understood and mastered. If you know anyone who wants to set up an aquarium for the first time – buy them this video – it will help them understand a great deal. The retailer does not always have the time to go over points whereas you can watch the video over and over again until any aspect has been fully understood.

Renaissance Vision (£14.99) Available from good aquatic stores or direct from Renaissance Vision 9 Capitol House, Heigham Street, Norwich, NR2 4TE (24hr telephone service (0603) 260280). □

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SATURDAY & SUNDAY

AQUARIUM '92 EXHIBITION



All your favourite fish & a

Tropical, Marine, Coldwater fish and big beautiful displays are just a few of the attractions at this exhibition

This year, for the first time, the exhibition is being organised by Argus Specialist Exhibitions in conjunction with the Association of Aquarists to ensure the continued growth and future of the event.

This promises to be an exhibition for all fishkeepers, beginners and experts alike - with plenty to see and buy for the growing number of enthusiasts

- Competition entries, lectures, 'Help and Advice' section by the experts and a large number of trade stands selling a wide range of aquatic goods. There is also a creche so that Mum and Dad can wander around and enjoy the show.

Whether you are a newcomer to fishkeeping or a fish owner wishing to keep up with the latest developments in the hobby, don't dare miss this event of the year!



OPENING TIMES

SATURDAY JUNE 6TH
10am - 6pm

SUNDAY JUNE 7TH
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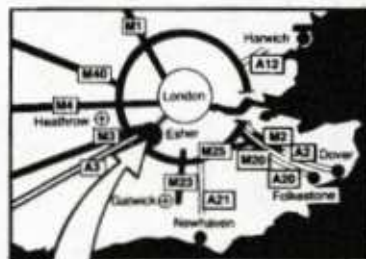
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F The Price: £34.50 each guest each night for a twin/double room (£16 single room supplement) including full English breakfast. price includes VAT.

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Argus Specialist Exhibitions

Sandown is just 15 minutes from the M25 and national motorway network and 35 minutes from central London. By British rail Esher station is in the immediate vicinity.



CONCENTRE, ESHER, SURREY



Acanthurus leucosternum
Common Name: Powder Blue Tang
Range: Indo-Pacific
Habitat: Large Reefs
Size: 200mm in captivity
Temperature Range: 25 degrees C
Identification Patterns: Yellow dorsal rim crowning the blue body.
Additional Information: Powder Blue Tangs are extremely territorial and our picture shows two fishes squabbling over territory despite being housed in a 100 gallon aquarium. They thrive on a varied diet including vegetable flake, shrimp and blanched lettuce.
Breeding Details: Captive breeding is unknown although it is likely that pairs form and eggs are scattered during mass spawnings.



Centropage leucurus
Common Name: Flame Angel
Range: Hawaii and Western Pacific Ocean
Habitat: Coral reef outcrops
Size: 90mm
Temperature Range: 25 degrees C
Identification Patterns: Superb bright red body with several black distinctive vertical stripes. Yellow tail, blue fin edges towards the tail.
Additional Information: This dwarf species, the jewel in the crown for any marine community, is ideally suited to smaller rock aquascaped invertebrate aquaria. Although expensive to purchase the Flame Angel is a much better buy than the larger angels because of its small adult size and beautiful colour. They enjoy finely shredded shrimp, good flaked food and live brine shrimp.
Breeding Details: Aquarist spawnings have occurred but fry require microplankton which is difficult to provide in captivity. Marine rotifers, suitable for the fry of clown fishes and damsel fishes, is too large.

TROPICAL MARINE

Davulius tripunctatus

Common Name: Domino Damselfish

Range: Widespread in the Indo-Pacific

Habitat: Juveniles form large schools whereas adults, as with clownfishes, pair off and become extremely territorial. They can also take over an anemone or soft coral outcrop.

Size: 75mm

Temperature Range: 25-26 degrees C

Identification Patterns:

Single white spot on a black body.

Additional Information:

Individuals can be aggressive towards other aquarium occupants although this gregarious character combined with an overall tough outlook makes them ideally suited to new set-ups.

Breeding Details: Pairs can be kept out of a small group (the balance of damselfish should be removed) and spawning mops are offered to the fry, some success can



Amphiprion melanopus

Common Name: Red and black anemonefish

Range: Indonesia, New Guinea, Queensland, Solomon Islands, New Caledonia, Fiji Islands and Marshall Islands

Habitat: Juveniles possess two white stripes and school over soft corals but pairs live within and alongside a single anemone on the reef.

Size: 100mm

Temperature Range: 25-26 degrees C

Identification Patterns:

Darkening white band behind the golden orange body marked with a large black body patch.

Additional Information: An aggressive clown species which can be kept in smaller marine communities provided the companion fishes are robust.

Breeding Details:

Spawning have been recorded in aquaria.



Newcomers start here...

KEVIN FOX,
author and
Yorkshire wit
explores the very
basics of
fishkeeping for
the beginner.

Hill and a very warm welcome to our new magazine. Within these covers you'll find material written by some of the finest and most experienced aquarists in the world. All of them assembled together purely for your edification and enjoyment. So, where does that leave me? Actually I'm the office cleaner with pretensions to be a writer. So every night, when all the office staff have been put back into their cupboards, I sneak into the editor's office and tap-in to the company computer system where I leave my humble offerings.

It's going to be my job to introduce newcomers to freshwater tropical fishkeeping. In future issues

I'll be looking at the various steps the intrepid beginner will have to take before he or she ends up with whatever it is that pressed their 'start button' in the first place.

Speaking of 'start buttons' who, where or when did your fishkeeping interest begin? I can remember quite clearly, almost as though it were yesterday when my interest was first aroused.

The year was 1959 and I was seven years old and attending Sycamore Primary School in Nottingham. One day our teacher - Miss Hanley - thought that we'd learn quite a bit about aquatic creatures if our class set up and maintained an aquarium.

From the minute the angle-iron framed two-foot gleaming glass tank with grey slate bottom was carefully set up on a bench I was utterly fascinated and completely hooked and have been ever since.

Our school tank boasted the rather unique (for that time) feature of an undergravel filter system. This consisted of a

rectangular arrangement of plastic pipes with elbow joints which were pierced with holes, and a 'thingy' (airlift) tube in which we stuck some rubber tubing from the airpump. None of us, Miss Hanley included, knew how the undergravel filter worked; but it did and so we left it well alone. In actual fact there are fishkeepers today who do not fully understand the undergravel filter (U/G) system. Traditionally the newcomer is pushed towards this system as it apparently requires 'minimal maintenance' and is quite simple to set-up and use. Yet, the U/G system is a very sophisticated filtration method indeed which involves many scientific disciplines such as physics, chemistry and biology. No I'm not trying to put you off U/G filters. What

in exactly the same way as you or I. So, the first 'rule' is: whatever and however your initial interest is aroused, please DO NOT go rushing to your nearest aquatic dealer and spend a small fortune on fishkeeping equipment which will almost certainly either be the wrong items, or worse, totally unnecessary ones. Next read everything you can lay your hands on regarding the subject of fishkeeping.

There is a bewildering array of aquatic equipment which can and often does look so wonderful in its clear plastic bubble-pack. It is also often very expensive as well. I want you to make the best possible start in your new interest, so that you gradually build up a fascinating and beautiful underwater ecosystem which will entertain and educate you for many years to come. Rushing around now, buying equipment and fishes can very easily spoil this, especially when all those pretty fishes you bought die within days. Nothing succeeds like success: dead fishes aren't exactly a successful start to the hobby, so any deaths (and there will be a few) must be kept to an absolute minimum. Following the advice given in this magazine will ensure that you get off to a flying start.

Tanks

To begin let's start with the most basic item it is difficult to manage without: the actual tank itself. I refer to an empty aquarium as a tank. 'The tank' only becomes an aquarium when it is filled with a substrate, such as gravel, various plants and of course fishes. So at this stage we are talking about tanks.

The old angle-iron framed glass tanks have long since passed into history although you may still see the odd one at a car boot sale. Today's tanks are mostly made by

*Please do NOT
go rushing to
your nearest
aquatic dealer
and spend a
small fortune*

I am trying to do (and will continue to do so in future columns) is to make certain that you know what you and your equipment are doing, and prevent your fishes simply surviving rather than thriving.

Fishkeeping

At some stage you'll reach a decision and decide that you would like to have an aquarium of multi-coloured fishes of your own. How you come to this decision doesn't really matter, it's what happens once this decision has been made which is crucial because you are dealing with living creatures who have just as much right to live out their lives peacefully and as naturally as possible



ACQUATIC AQUARIOS

two methods: injection moulded acrylic plastic and all-glass (no metal frame). Each have their advantages and disadvantages, but in truth practically all aquarists (the name for people who keep fishes) use all-glass constructed tanks as they are so cheap, strong and can be had in a variety of shapes such as rectangular, square, tall-and-thin, long-and-narrow, triangular, even hexagonal. They can even be made to any shape or size you require, tailor made to fit into an alcove in your home perhaps.

All-glass tanks consist of a thick glass bottom plate onto which are stuck the back and front glasses and both sides. The adhesive used to stick all the pieces of glass together is rather interesting. It's called *silicone sealant*, and is very, very strong without being brittle. In fact it actually does 'give' a little as the tank is filled with water and the pressure on the walls begins to mount. It goes without saying that this adhesive is totally waterproof, and chemically inert to both plant and aquatic life forms. To give you some idea of just how strong silicone sealant is I once dropped a 30x30x30cm. (12x12x12 inch) exhibition tank which shattered. All that is except the joints which were still firmly retained by the adhesive.

Although you can have an all-glass tank built to order, they mainly come in a range of fixed sizes, such as 90cm long, 45cm deep and 30cm wide (tank measurements are usually given this way; length, depth and width).

So which tank is going to be the best for you? This isn't any easy question to answer. For example, you could be restricted by the space available in your home to a certain sized tank. On the other hand you may want to create a special purpose aquarium, such as a one species biosphere, breeding tank, etc. As a

newcomer to the hobby, traditionally you'll probably start with what's called a Community Aquarium. This is simply an aquarium which holds various fishes from around the world, rather than a single species. The best thing to do is to

As a newcomer, you'll probably start with what's usually called a community aquarium

buy the biggest tank you can afford, not forgetting to add the cost of a suitable hood, stand and equipment to your total budget.

A fully fitted-out aquarium weighs a great deal indeed. For example our 90x45x30cm aquarium will hold 121 litres (26 UK gallons) of water. Now, a gallon of water weighs approximately 4.53kg (10lbs) so our filled aquarium will weigh 117kg (260lbs) which is quite a weight. On top of this you've also got to add the weight of the gravel, the hood, lighting assembly etc. so you can add another 10% to the total, ending up with an average weight for this size tank of 128kg (286lbs)! Weights in this region require careful handling.

Once the aquarium is created on no account should any attempt at moving it be made. You'll either break the tank, or your back! Further, positioning this kind of weight needs careful consideration. Of course with concrete floors there's no problem, but where there are floorboards and you're using one of the metallic skeletal stands where all the weight is concentrated on the metal legs, then you have to



ensure that they will be able to carry this sort of load. You could position the legs carefully over a joist, or (as I do) make some hardwood blocks around half an inch thick and six inches square to support the metal legs of the stand. Don't use chipboard, which, if wet, can crumble and un-balance your aquarium. Also remember that floorboards are much stronger nearer to the walls than they are in the centre of a room.

Plastic tanks

In the past plastic tanks received rather bad press. They scratch quite easily and are prone to cracking and splitting. However, today's generation of acrylic tanks has overcome virtually all of these problems. This type of tank is very much aimed towards the newcomer as they are often sold as a complete biosphere - heater, light and filter - such as the *TropiQuarium* distributed by the Rolf C Hagen (UK) company; but more of these types of aquarium later. Size varies from 30cm (12in) up to around 60cm (24in), which is about the maximum water pressure and weight that this type

of tank can contain.

Many knowledgeable aquarists use plastic tanks as breeding tanks, growing on tanks to raise baby fishes until they are big enough to introduce into a Community Aquarium, and as a hospital/quarantine holding tank. So, although some people may tell you that all plastic tanks are rubbish they can fulfill a useful role within fishkeeping.

Stands, cabinets and cushions

Having acquired the tank of your choice you now have to place it on something sturdy enough to carry all that weight. Your finished aquarium wants to be at around the same height as your television set. This makes watching your fishes very easy on the eyes and on your head. Whatever you decide to stand your tank on (skeletal stand, a specially constructed 'bench' or a custom built cabinet) you must not position the tank directly onto the support without some form of cushion between the bottom glass of the tank and the supporting surface. Any slight imperfections on either surface can cause

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► 50ppm nitrate content, this can quite legally be passed onto the consumer. Humans may find this sort of level tolerable whereas marine organisms cannot cope with what are to them are virtually unknown toxic compounds. I say 'compounds' because a high level of nitrates usually reflects an equally high level of other toxins such as phosphates and sulphates. Whilst water companies remain within the law there is little the aquarist can do to improve the situation. It is, therefore, up to us to treat our own tapwater and make it into a suitable substance with which to work. This means using one of the many mains tapwater filters now available to the hobbyist; either resin-based or reverse osmosis. The former is relatively cheap and rechargeable but will only remove a small selection of compounds; the latter is relatively expensive but will remove practically every harmful (and not so harmful) compound, giving exceptionally pure water.

The second source of excess nutrients develops within the aquarium itself. Feeding a particularly high fish and/or invertebrate content results in water rich in dissolved organics which act as an algal fertilizer. This also has the added effect of reducing aquarium water

quality and making life for sensitive invertebrates distinctly uncomfortable; borne out by the fact that the questioner's corals are not looking as healthy as in previous months.

With a greater understanding of what causes this it is time to explain the problem, how best can it be treated?

The tank in question is a reasonable size for marines and holds approximately 26 gallons nett – a great deal less than most people would have imagined. Therefore, working on an ideal stocking formula for a mixed fish/invertebrate aquarium of 1" of fish for every 6 gallons, it is clear that the tank is grossly

overstocked at 14" of fish (a conservative estimate). The true stocking level should be nearer 4-5"! It would be advisable, in this case, to reduce the amount of fish by a considerable quantity. By maintaining such a high level of fish stocks, water quality is always going to be in a precarious position as far as the invertebrates are concerned and their waste products generate an unacceptable level of algal 'fertilizer' on an almost continuous basis.

Water changes are barely adequate at 10% each month, especially using tapwater already contaminated by 25ppm of nitrate. I would strongly

recommend the use of one of the tapwater filters already mentioned and increase water changes to 15-20% each fortnight. This will continually reduce the amount of nitrogenous compounds by dilution and help to maintain optimum water conditions for invertebrates and fish alike.

In addition, fitting a protein skimmer and an external canister filter packed with marine-grade activated carbon could be seen as essential equipment; for whilst the protein skimmer will remove large quantities of organic waste, the carbon filter can almost eliminate non-organic toxins.

pH is a little low at 7.9 but regular water changes as suggested will soon restore this to a more acceptable figure of 8.2 to 8.3.

Referring to my initial statement, if the suggestions above had been followed from the outset, it is very likely that the tank would have remained acceptably clear of algae. As it is a relatively slow, but sure, improvement should be expected. In the meantime, continue to keep the offending algae clear of invertebrates by physical removal. I'm sure you will find that over the next few months the amount collected will diminish considerably until a reasonable balance is achieved. □





SCOTTfree



Winchester based vet, PETER SCOTT is one of the few in his profession to specialise in consultation and treatments of commercial fisheries and ornamental fishes. He has written several books and scientific papers. As official vet to the Red Tailed Catfish Club and its 150 members, Peter is asked to remedy some interesting problems.

This month he removes a pair of sunglasses from Felix, a 27 inch Red Tailed Catfish living in Reading, and asks, "How bright is it in your aquaria?"

Being offered the chance to write an unfettered column in a national magazine is a thrill, it is also a strange experience to censor yourself less others think that you are a bigger ego-maniac than you actually are – and I'm one of the bigger ones. The plan is to offer something of the flavour of a fish and exotic animal vet's month, building in information and personal views on the current scene. There are several areas which are well worthwhile opening discussions on, and I would be pleased to receive, through the magazine, comments on the various issues. I won't promise to reply personally but some of them will get through to future columns.

Strangely strange

This particular fish/exotic

animal vet has had a strange month, with odd visits to surgically sex parrots for aviculturists so that they can pair them up; an afternoon sorting through the photos taken by Jane Burton for my book the Complete Aquarium – Sparsholt College had asked me to sort out a lecture session for short courses on the 'eco-aquarium' and unfortunately I mainly have pictures of sick fish in my collection.

Koi Kalamity

Koi keepers are experiencing problems early this year with some very ugly ulcer infections developing. Many of these are extremely resistant to treatment because over the years the bacteria involved have been exposed to too many antibiotics. The backdoor route used by many koi keepers and some

dealers combined with irresponsible use by the original growers and shippers is the root cause of many of the problems now being seen.

My own basic approach with ulcers is a single radical clean-up with *Tamodine* and packing with *Orabase* under anaesthesia. I then hold the infected Koi in saline solutions with 5g salt/litre of water. This water has to be maintained in tip top quality and the fish left alone. The repeated treatment of ulcers every few days is counterproductive because it removes the new thin layer of skin which develops at the margins of the ulcer. I use antibiotics with them if the ulcer is large or if the fish is showing signs of generalised infection. The method of providing antibiotic will often be by injection at the time of



Koi need warm water for healing to take place.



► treatment followed up by oral antibiotics. I use long acting antibiotics by injection if the fish is off its food.

A problem often not appreciated is that koi are not strictly coldwater fish. They like warm water and this means that little healing occurs below about 15°C, probably none below 10°C. It is necessary to warm them up to allow healing, and before this can be done the infectious organisms in the ulcer need to be removed. The water quality has to be very good or bacterial blooms may occur and re-infect the fish.

February and fish farms

February is a relatively quiet month on trout farms except for the hatcheries, they will have been taking eggs in November and by February have millions of 1-3g fish. This year the problems have been minimal with a minor amount of the mysterious Rainbow Fry Anaemia Syndrome (RFAS). In the absence of a concerted effort by MAFF, the industry itself banded together and funded research over the last two years by myself and others into the disease and possible treatments. One of the worlds leading fish bacteriologists, Dr. Brian Austin at Heriot Watt in Edinburgh, has made a real impact in isolating the likely culprit - probably to be *Cytophaga psychrophila*, which has been around causing disease problems for a long time in bigger fish, but which seems to have extended its range.

Cytophaga psychrophila is related to those organisms which cause mouth fungus in livebearers and many problems in tetras. Classifica-

tion and reclassification has left many people confused, the group have been Myxobacteria, Flexibacteria, and are now Cytophaga. It may also be some time before the *psychrophila* bit is agreed. But a rose by any other name, etc.

This disease and its

Dr Brian Austin has made a real impact in isolating the likely culprit - probably Cytophaga psychrophila...

investigation show a manifestation of the government policy of industry funded/ guided research. No official project could be got off the ground, the farmers were told to organise something themselves. They banded together and used a questionnaire to get background information on the extent of

the problem and how it was affecting individual farms, they then targeted certain specific aspects. Because of this approach the result was produced quicker and cheaper than otherwise.

The reason that I labour this disease problem and its industry led solution is that in some way it could be a model for what the ornamental fish industry needs. The amount of research is pathetic considering the economic size of the industry. There are major disease problems worldwide in ornamental fish and despite the majority being farmed, many in very controllable situations the amount of serious work on diagnosis, treatment and prevention of disease is minimal.

I would like to use this column to throw down a glove, all of the magazines are very dependent on advertising and many of those advertisements are for medications. How about manufacturers using this column to let people know how their products are tested and found effective. Instead

Shades of a red tale

Felix, the 27 inch long Red Tailed Catfish kept by Derek Fisher in Reading, Berkshire, did a silly thing in January this year. We don't want to sound like *That's Life* or anything, but Felix swallowed a pair of sun glasses.

No, the catfish didn't leap out of the water and snatch them off Derek's face - it's not a performing dolphin (do they exist any more?) - the glasses accidentally found a way into the aquarium.

Although David Sands, editor of this magazine and illustrious founder of the Red Tailed Catfish Club, predicted Felix would regurgitate the non-edible item after two weeks, nothing happened. This was despite the fact that 90% of all non-edible items swallowed by *Phractocephalus* (such as

heater clips, suckers, wood, etc.) are regurgitated after a few days to a couple of weeks, and, despite Derek and his brother bravely trying

We don't want to sound like That's Life or anything but Felix swallowed a pair of sunglasses

to catch Felix to remove the glasses. Every time the catfish brought them up into its throat! They all got very soaked each time.

Care was taken over feeding and general water quality as David guided Derek and pet catfish Felix through

the trauma. Time to call in the official RTCC vet, that's me!

Red tails do this type of behaviour regularly, swallowing anything which falls past their nose, in most cases they bring the offending object back up again within a couple of days but now and again they don't. I have a 'semi-caramelised' heater/stat sucker sitting on my surgery trophy shelf which I removed from an 8 inch catfish. With the Scottish salmon conference (and its customary after effects) looming I only had a window on the Saturday afternoon to travel the 50 miles in each direction to see the fish.

I telephoned ahead to Derek when I was about 15 minutes away and he very efficiently transferred Felix from his tardis sized tank to a

small central heating vat on the living room floor. When we arrived I added benzocaine to the tank and kept Felix moving so that the level of anaesthesia could be assessed. After 3 false starts which resulted in bucketful quantities of water being splashed over all present by this leviathan. I laid Felix on wet towels and covered him so that he could be manually restrained if necessary. With a pair of forceps as a gag I tried rooting down the catfish's throat with long forceps but couldn't feel anything.

The next step was to roll Felix on his side and try my hand down his throat, whilst at the same time pushing the glasses forwards by external pressure on the stomach. Red tails for all the garbage they eat don't have the most

of a take the money and run policy, based on new wonder cures every season with outrageous medicinal claims. Lets have at least a semi-scientific evaluation.

Treatments which can be sold through the pet trade are strictly limited in terms of content, those which contain controlled drugs UK

How about manufacturers using this column to let people know how their products are tested and found effective?

at low/barely therapeutic levels, bought outside the UK are disappearing. All veterinary drugs are required to be examined by the independent Veterinary Medicines Directorate for Safety, Efficacy, Environmental impact and Residues. The first three of these are just as important

for the ornamental fish keeper as they are to a farmer of food fish.

Scott in Scotland

The Scottish Salmon Farming conference in Glasgow is always an event for serious fish farmers to attend, although the papers are perhaps of secondary importance the equipment and new developments on drugs, fish handling techniques, processing for food, etc. are very important to all involved in the industry. The most important and useful thing about the meeting is that it provides a gathering point for people who often work in very isolated but beautiful situations. I've been attending for about 8 years. As a social event to exchange ideas it is wonderful. The meeting attracts farmers from Chile, Japan, Norway, South Africa, British Columbia, etc. and everyone gets together over a dram or two. I even met up with an ex pharmaceutical rep. who is now setting up his own business, with a line in cardboard (biodegradable)

pet coffins.

Many 'greens' object to fish farming, claiming that it is spoiling the coast. I've no sympathy with this view, in most cases it is trendy townies with no concept of how nature works. In even the heaviest stocked lochs

In most cases of objections to fish farming, you'll find trendy townies with no concept of how nature works

the scale and grandeur of the Scottish landscape makes the impact of sea cages minimal. To bleat this way because your holiday spot, perhaps visited twice a year in the summer, is actually being used to provide employment for the highlands is poorly thought out. The people who care most about the highland (and the country in general)

are the people who live and work in it, not those who drive there at weekends to wear green wellies and drive their off-the-road Suzuki or Range Rover. □

● Readers are invited to write to **Peter Scott** with their fish problems. Although he cannot undertake to answer personally, interesting or topical letters may be featured in the magazine for the benefit of other readers. Write to: **It's a Vet's Life**, Aquarium, Argus House, Boundary Way, Hemel Hempstead HP2 7ST

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sk and that the could be e starts ketful eing sent by Felix on ed him manually ry. With s gag I se long feel

s to roll I try my st, whilst shing the external nach. garbage the most

spectacular of mouths and it is very inflexible, I managed to get my fairly large hand far enough to feel the glasses which came out in pieces, two lenses followed by the frame which had buckled and partially opened jamming them.

This was followed by a return to the tank and an uneventful recovery, the back of my hand showing quite impressive scratches which provided a talking point for a week or so.

Within four days of the event Felix was back to normal chomping away on earthworms David had recommended as a convalescence diet.

The event did bring back memories of my attempt to force feed a terminally sick killer whale some 5-6 years ago, that took a 4x4 hard-

wood plank as gag and 8 men with ropes, etc. while I lay on a foam pad, nose to nose with the whale with my arm down his throat - all because someone told us that the Japanese had done it successfully once! Almost losing my hand when the whale dislodged the gag was followed by abject failure. I reached the conclusion that you need arms as long as orang-utan to feed a killer whale and I still don't believe that anyone could do it without crawling inside - we have all by now seen the Japanese game show! □



ABOVE: I try to pull the glasses out with forceps but in the end (BELOW) was forced to use the 'hands on' method and reached into Felix's mouth. "It wasn't that sunny" moaned Felix after he had come round from the shot of Brevicaine!



● Thank you to Derek Fisher for the action photos!

London Zoo

Recent years have seen troubled times at Regent's Park but, despite all the economic trauma and the loss of Dr Chris Andrews to the American public aquaria scene, London Zoo aquarium bubbles on.

Brian Harris, of London Zoo, provides AQUARIUM readers with the low down on one of the world's oldest public aquariums

Despite the much publicised financial problems facing London Zoo the aquarium remains open to the public, though half of the temperate

freshwater exhibit is currently closed due to repairs being required in the service area.

Construction of the present aquarium began in December 1922 at massive cost of £5,500. On the 13th April 1924 King George V and Queen Mary visited the completed aquarium.

The aqua displays opened to the public on the 7th April 1924 when 4,068 people went to marvel at the creatures of the underwater world.

This was not the first public aquarium in the zoo. The first was opened in 1853 at a different site to the present one, which is situated under the large reinforced concrete hills that make up the Mappin Terraces constructed at the same time. The 'first' aquarium was not only the first in London Zoo but the first public

aquarium in the world.

The Mappin Terraces were divided into three sections, the upper terrace housed mountain sheep and goats, the middle terrace had a number of bears and wild pigs and a penguin pool was located at the foot of the terraces. Unfortunately these terraces have been closed for some years, though there are plans to redevelop them when funds become available.

The halls

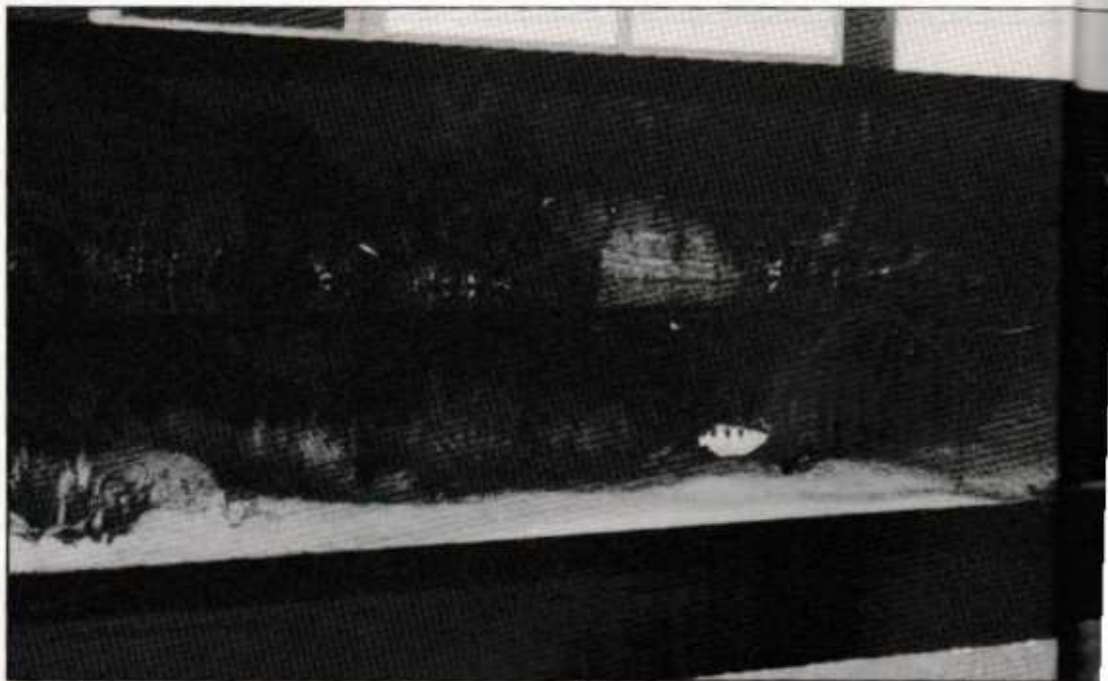
There are currently three aquarium halls containing around 100 tanks. These range in size from approximately 113 litres to over 23,000 litres. Due to the weight of the water the glass in the larger tanks is 3.2cm thick. Soon after opening some of the water levels had to be lowered as the water



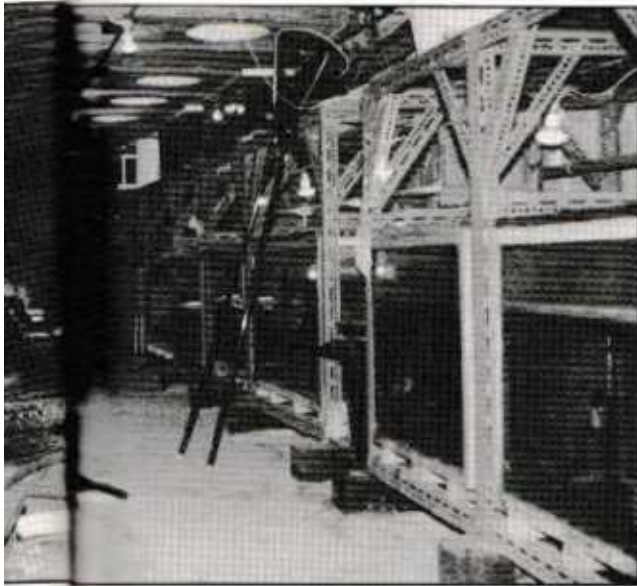
pressure was causing the glass to crack!

The majority of tanks are from the original construction. These are manufactured of slate slabs bolted together with a layer of

BELOW: The Brackish Mangrove tank with Archer fish and Mudskippers.



AQUARIUM FACTFILE



was a distinct disadvantage in 1924. Synthetic salt mixes had not been developed and thus the only way for those running the zoo to display marine creatures was to bring in natural sea water. This was accomplished by purchasing it from the General Steam Navigation Company. Ships pumped sea water into ballast tanks on their way through the Bay of Biscay on the return journey to the

had to be made to and from the docks during the night so as to avoid the London traffic. Four to five nights could pass before the required 115,000 litres of sea water was transferred to the aquarium.

On arrival a sample of the water was tested before the bulk of it was transferred into the large underground reservoirs. There the water was left to settle in the dark for about a month to make sure that no unwanted life forms were introduced into the display system.

To this day the zoo transports sea water by road tanker, however it no longer originates from the Bay of Biscay but from Lowestoft, thanks to the assistance of the MAFF laboratory. Road tankers load up from their storage tanks and make their way to London. It takes five

The 'first' aquarium was not only the first in London Zoo but the first public aquarium in the world.

London docks from Bordeaux. When the ships arrived at the docks the water was transferred to barges to carry it on to the zoo by travelling up the Regents Canal. On arrival the water was pumped through a 200 meter long hose pipe and into the aquarium reservoirs.

In later years the water was brought from the docks by road tanker and several trips

mastic to seal the joints.

Hall one houses 'temperate freshwater' which contains fish, amphibians and invertebrates from rivers, streams and lakes in cooler regions of the world, including our own native species. Pass through the temperate hall and you enter the sea water hall. This

ABOVE: On the left - access to display tanks, while reserve tanks may be seen on right.

contains both tropical and temperate inhabitants of the seas. Beyond these displays visitors move into the tropical hall where creatures from the tropical freshwaters of the world are on show. There is also an exhibit of brackish water mangrove inhabitants.

Bringing the sea to London
Being an inland aquarium

BELOW: Turtle tank in the Sea Water Hall.



AQUARIUM FACTFILE



Bottom illustration
 Shows various types of fish, birds, and other animals.
Feeding times
 10.30am, 1.30pm, 4.30pm
Visit the exhibits
 See the exhibits and the animals in the zoo.
Playground facilities & shopping
 See the playground and the shops.

Every living thing
 The Zoo is a home for many of the world's most interesting animals. The Zoo is a home for many of the world's most interesting animals. The Zoo is a home for many of the world's most interesting animals.

► trips to transport the 115,000 litres from Lowestoft to London.

Artificial sea salt mix has been considered, but when the idea was costed it meant the Zoo paying about the same. At present London Zoo only pays the transport costs so it was decided to continue to use natural sea water.

The workings, filters and equipment

Each of the halls has water circulation systems built in 1922. Water is fed into the show tanks from gravity tanks inside the top terrace. Pipes, that carry the water around the main systems, are made of cast iron, though those that carry sea water are lined with enamel to prevent corrosion.

Water flows from the show tanks to the filters, the first part of which is a long settling tank from which most of the solid waste is collected. The water then passes into large concrete tanks containing 45cm of sand and gravel beds where the mechanical and biological filtration occurs.

Crushed cockleshells were once used on sea water to act as a pH buffer. Beneath

made up of 227,300 litres of sea water and the balance freshwater.

There are modern systems in the exhibit aquaria with more specialized needs, such as the inhabitants of the coral reefs and brackish water mangrove displays.

Tank temperatures are monitored day and night and regular checks on water quality are carried out to ensure that the livestock have the best conditions we can provide.

Heating is provided on the main system by gas-fired boilers with steam pipes travelling through those tanks requiring heating. Each tank has a control valve to regulate the amount of steam going through the pipe. Smaller systems employ thermostatically controlled electric heaters.

A large compressor provides an air supply to all the tanks and a refrigeration unit is used to cool water when needed in the warmer months.

All of this is backed up by an emergency generator to keep the essential equipment going in the event of a power failure.

Tank temperatures are monitored day and night and regular checks on water quality are carried out to ensure that the livestock have the best conditions that can be provided.

Despite the problems

Life at the Zoo goes on whatever the problems the public may read or hear about. All keepers are proud of their exhibits and they are always striving to make their displays bright and as informative as possible.

All readers are encouraged to visit the aquatic displays at the Zoo. You're guaranteed a great day out. □

The halls are dimly lit to focus the visitor's attention on the exhibits.

the sand and gravel is a central pipe with smaller branches. The ends are sealed and slots cut along them allow the water to pass through into the central pipe where it eventually drops into the underground reservoirs situated under the sea water hall. From the underground pools the water is pumped back up to the gravity tank to start the journey all over again.

The estimated total volume of water in circulation is around 500,000 litres

AQUA feature

*Derek & Pat Lambourne introduce five exciting
Freshwater and brackish water fishes ideal for the
community aquarium*

Herotilapia argus Gmelin
1862
Common Name: Tiger Scat
Spotted Scat
Range: Tropical Indo-Pacific
Habitat: Fresh, brackish and
marine
Size: Approximately 200mm
Temperature Range: 17-21

degrees C
Identification Patterns: The colour varies depending on which part of the coast they come from. Sex distinctions are unknown.

Additional Information: The juvenile Spotted Scat should

really be kept in brackish aquarium (water to which salt has been added, 1/2 teaspoon/gallon) whereas adults thrive in a marine salinity. They are usually peaceful towards other fishes and will graze on aquatic plants. They will eat live foods

of all kinds, dried and frozen foods, lettuce and spinach leaves.

Breeding Details: Egg scatterers although captive spawnings are unheated in literature.





Anostomus anostomus
Linnaeus 1758
Common Name: Striped Anostomus
Range: Northern regions of South America, Guyana and the Amazon
Habitat: Rivers and tributaries
Size: Approximately 1-40mm
Temperature Range: 23-25 degrees C

Identification Patterns: Sex distinctions are unknown.
Additional Information: The Striped *Anostomus* thrive when maintained in groups in a fairly large aquarium, with plenty of hiding places, amongst larger community fishes. They eat most types of food and enjoy live food occasionally. Generally peaceful with species of the same size, but tend to nip the fins of smaller fish.
Breeding Details: Probably an egg scatterer although very little is known about the spawning habits of this species therefore the challenge is for all fishkeepers to attempt to spawn this attractive characin for the first time in captivity.

Hypheosobricon erythrostigma Fowler 1943
Common Name: Bleeding Heart Tetra
Range: Peruvian Amazon
Habitat: rivers and tributaries
Size: 70mm
Temperature Range: 23-25 degrees C
Identification Patterns: Red body spot, males possess elongated fins
Additional Information: Bleeding Heart Tetras are lively, free swimming, peaceful shoaling fishes. They thrive in fairly large, well planted aquariums and remain popular in that they are not fussy eaters.
Breeding Details: Strangely this popular community species is not spawned in aquaria although pairs should be conditioned and spawned in much the same way as the Diamond Tetra.



TROPICAL FRESHWATER

Poecilia latipinna Le Sueur
1821

Common Name: Sailfin
Molly

Range: Eastern States of
USA

Habitat: Pine lakes and small
rivers

Size: Approximately 100mm

Temperature Range: 25-28
degrees C

Identification Patterns: The
male has a beautiful 'sail like'
dorsal fin hence the common
name.

Additional Information:

Sailfin mollies are best kept in
slightly salted aquaria with
other livebearer species. They
like all types of foods and
algae, finely chopped spinach
or lettuce are a good
supplement for their diet.

Breeding Details: Keep
several females with a male in
a well planted aquarium
containing thick floating
plants. This species is closely
related to *Poecilia yelleri*
with which cross varieties
have been produced.



Moenkhausia pittieri
Eigenmann 1920

Common Name: The
Diamond Tetra

Range: Venezuela

Habitat: Lake Valencia

Size: Approximately 65mm

Temperature Range: 23-25
degrees C

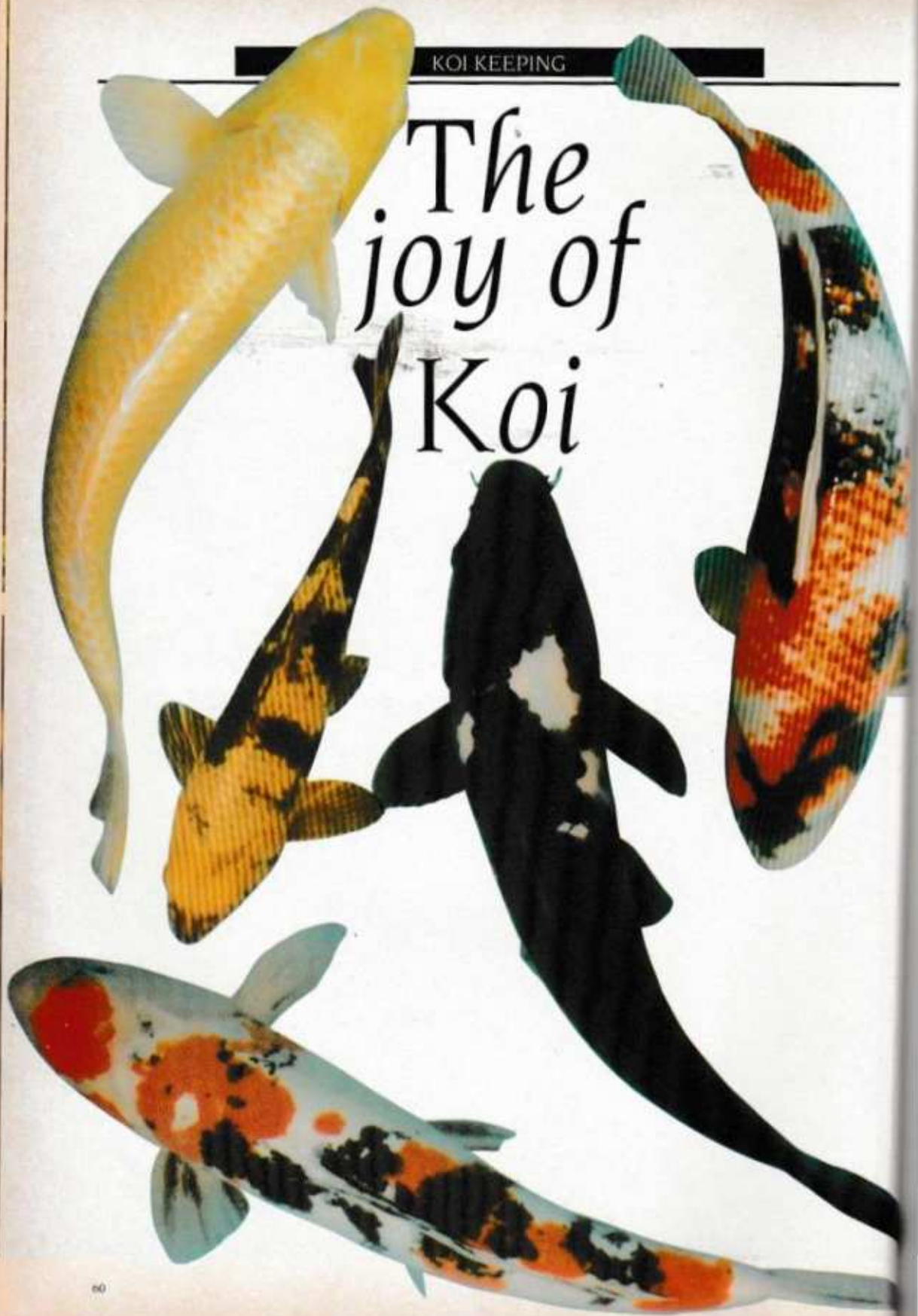
Identification Patterns: As a
juvenile this fish looks very
drab. However, when
maturing, the fin extensions
develop and the 'diamond'
like marks show on the body.

Additional Information: The
Diamond Tetra is a lively and
peaceful fish which will thrive
within a shoal. It will eat most
foods, including live foods
and aquatic plants.

Breeding Details: Requires
fairly soft water and a peat
fibre substrate in which to
scatter eggs. Parents should
be removed after spawning.



The joy of Koi



Of all the fish in domestic ponds and indoor aquaria.

Koi have consistently outperformed the rest in popularity and diversity.

Peter Waddington finds that Koi keeping is much more than a hobby - it's an addiction.

Koi is the Japanese word for carp and is pronounced 'COY' which is a reference to the MA-GOI (MA-GOI), an indigenous carp found in the area around the Caspian sea. This black, wild carp (Ma-goi) was introduced into China as a food fish. Crusaders returning from the Holy wars, introduced them to the monks in Europe for the same purpose.

Today, the carp in our rivers and lakes bear little resemblance to these early ancestors in that they have evolved into more deeper bodied fishes presumably adapting to changes in different environmental and climatic conditions.

Ornamental

The 'Koi' that keepers refer to are the coloured varieties kept for ornamental purposes as pets. These wonderful fishes originated in the Niigata prefecture of Japan, initially by accident in spawnings of Hirogoi, for food purposes, during the middle part of the 19th Century. The farmers in that area at the time retained any fishes showing the odd coloured scale as pets and attempted to produce greater areas of colour in future spawnings purely for personal enjoyment. It took many years however, before a 'coloured' carp or 'Hirogoi' as they were then known, was produced. During the following years the farmers pursued their hobby by trying to establish some rough-semblances of 'varieties'. During this period they could hardly have conceived that their hobby would, in later years, become 'a way of life' for many people the world over.

During 1919, 'Hirogoi' were 'unleashed' on the Japanese public at the Tokyo Taisho exhibition where all prefectures (countries) were invited to display goods, materials' etc., unique to their own areas. The carp farmers of Niigata chose to exhibit their 'Hirogoi' and transported them in leaky wooden containers by cargo train to Tokyo. Records state that many emergency stops had to be made en route to replace water losses. After the exhibition, their 'Hirogoi' were presented to the Emperor who wanted to maintain

them in the huge moat surrounding the Palace. One artist was commissioned during the show to paint the patterns of all the carp exhibited for future reference. In the ensuing years of war, the record was lost, many presumed for ever. However, about four years ago, the entire records, preserved in the original wooden box 'turned up' in a second hand bookshop in Tokyo. In this unlikely place my good friend Naoki (Davy) Takawashi stumbled upon these original records and purchased them immediately. I have seen this record on several occasions. The Koi of that period barely resemble the modern day

seriously and other areas outside Niigata began to breed Nishikigo. Areas such as Hiroshima, Kyushu, Shikoku and later Isawa and Shizuoka.

In the mid 1960's the first book on Koi was produced by Mr Miya of the Miyakoya Company, entitled 'The Best 100 Nishikigo'. I am proud to have a copy of that book today although the grade of all koi pictured would warrant little more than a cursory glance today by any self-respecting hobbyist.

Koi were first imported to the UK

I have always stated that Koi Keeping is much more than a hobby - it can be a drug - an addiction! - All be it a very pleasurable one.



The history of Koi colourforms can be traced through historical drawings.

descendants. However it is a valuable piece of 'Koi history' well worth preserving.

During the late 1940's the word 'Hirogoi' was dispensed with and a new word 'Nishikigo' (Nish-ki-goy) was introduced.

This translates roughly as 'coloured carp' or 'brocaded carp' and this title has stayed with Koi ever since. When keepers speak about 'Koi' in the UK, they are really referring to 'Nishikigo'.

The actual 'Koi hobby' in Japan did not really begin until the mid 1950's, following the invention of the polythene bag which aided safe transportation. By the mid 1960's most areas of Japan had 'Koi Fever' and many breeders began to realise the implications of what their predecessors had started.

As a result many new 'Nishikigo' breeders began to take production very

during 1968 by Mr Gooding of G H Richard & Company in London. Soon afterwards Mr Colin Roe of Shirley Aquatics, now owned by John Cook, introduced Koi to the Midlands, whilst Stapely Water Gardens of Nantwich, Cheshire first introduced Koi to the North.

Much has been said about the age Koi can live to, how big a Koi can grow and how much a Koi can cost. These are the usual questions asked by reporters or sensationalists.

It is said that a Hirogoi (red carp) known as 'Hanako' lived for over 230 years in a Japanese Monastery pond. This carp died in the early 1970's and age was determined by the number of 'growth rings' observed on a scale by microscopic inspection. The method used was not dissimilar to the way a tree is dated. However, this method of ageing was discredited several years later, as being totally inaccurate. These 'rings' occur regularly with temperature changes and fluctuations. The average life span of a Nishikigo is between 18 and 30 years providing they are kept in good conditions and fed correctly.

As far as size (length) is concerned, there are very few Koi that reach one meter in length. Maybe there have been some 100 or so that have exceeded this size, usually old males, of which some have been measured at over 105 cms. As far as Magoi are concerned, one specimen was netted by fishermen in Lake Biwa in Japan in 1988 that was 2

KOI KEEPING

► meters in length. It was transported to Kynshu Zoo Aquarium but died shortly afterwards, not being able to adapt to life in captivity.

As to the cost of Nishikigoi, there is no doubt that Koi are the most expensive fish in the World. The main reason for this is that there are no two exactly alike which makes each one quite unique. The majority of Koi on

experienced keeper. I doubt that any of the producers in these countries seriously believe that they can reach anywhere near the quality of production that is common in Japan. Today some breeders are in their fourth generation of Nishikigoi.

In future issues I hope to cover every aspect of Koi Keeping such as pond design and construction methods;

topics.

My involvement with Koi has spanned over twenty years and most of my early learning came from many mistakes, usually costly, at the school of hard knocks.

I have always stated that Koi Keeping is much more than a hobby – it can be a drug – an addiction! – All be it a very pleasurable one. □

'Nishikigoi' translates roughly as 'coloured carp' So when keepers speak about Koi in the UK, they are really referring to 'Nishikigoi'

sale are reasonably cheap ranging from a few pounds each, for small, pretty Koi. The larger Koi obviously incur far more



air freight charges which in turn pushes the final retail prices up quite significantly. Specimen Koi in Japan have been known to command very high prices indeed. Figures in excess of £175,000, whilst not being common, are not rare and a few have realised around £240,000.

I feel I must point out that these fantastic prices are very isolated instances for totally unique specimens.

Today, other countries are producing Koi such as America, Taiwan, Thailand, Israel, China and the UK. These Koi are far cheaper to buy than Japanese Koi, and quite rightly so, although they are ideal choices for the beginner or less

correct choice of filtration systems and understanding of their operation; the correct choice of pipework, fittings, water pumps, aeration methods; heating methods; flow rate requirements; the importance of accurate regular anti-parasite treatments; how best to medicate a sick or injured Koi; Koi varieties and patterns; Koi appreciation; netting techniques; transportation techniques; feeding techniques; management of water quality and make-up; breeding techniques; characteristics of certain bloodlines of Koi; showing your Koi; choosing your Koi, etc.

I think you will agree with me that, to Koi Keeping, that is an exciting list of



● Readers may wish to know a little more about our resident koi enthusiast, Peter Waddington.

Peter became interested in keeping Koi in 1972 and upon visiting Japan in 1977, became 'addicted' and never looked back. By 1980 he had quit a full time job in order to form 'Infiltration' trading from home. Two years later 'Infiltration' – now the 'company' – moved to warehouse premises at Golborne, Warrington and became the first 'Koi – Only' professional outlet in the UK.

Still trading there today Peter specialises in every aspect Koi keeping as a hobby including pond design, construction, filtration, specialised medications, breeding equipment, aeration, etc. As far as Koi are concerned Peter has selected and imported, arguably, the finest specimen Koi ever to be seen in the UK – 9 consecutive years of 'Supreme Champions' at UK National Shows' bear witness to this claim.

Peter started to write 'Koi Nichi' (Koi Crazy) in 1985 and today, the book is still being written.

As boss at Infiltration Peter spends his time between Japan and UK. His next visit will be his 63rd. (He admits to working a seven day week and loving every minute of it!)

Peter says he likes to discuss Koi and his lack of time for other more physical interests over a nice pint of 'Boddingtons' (Boddingtons to outsiders!)

Shotgate Koi

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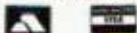
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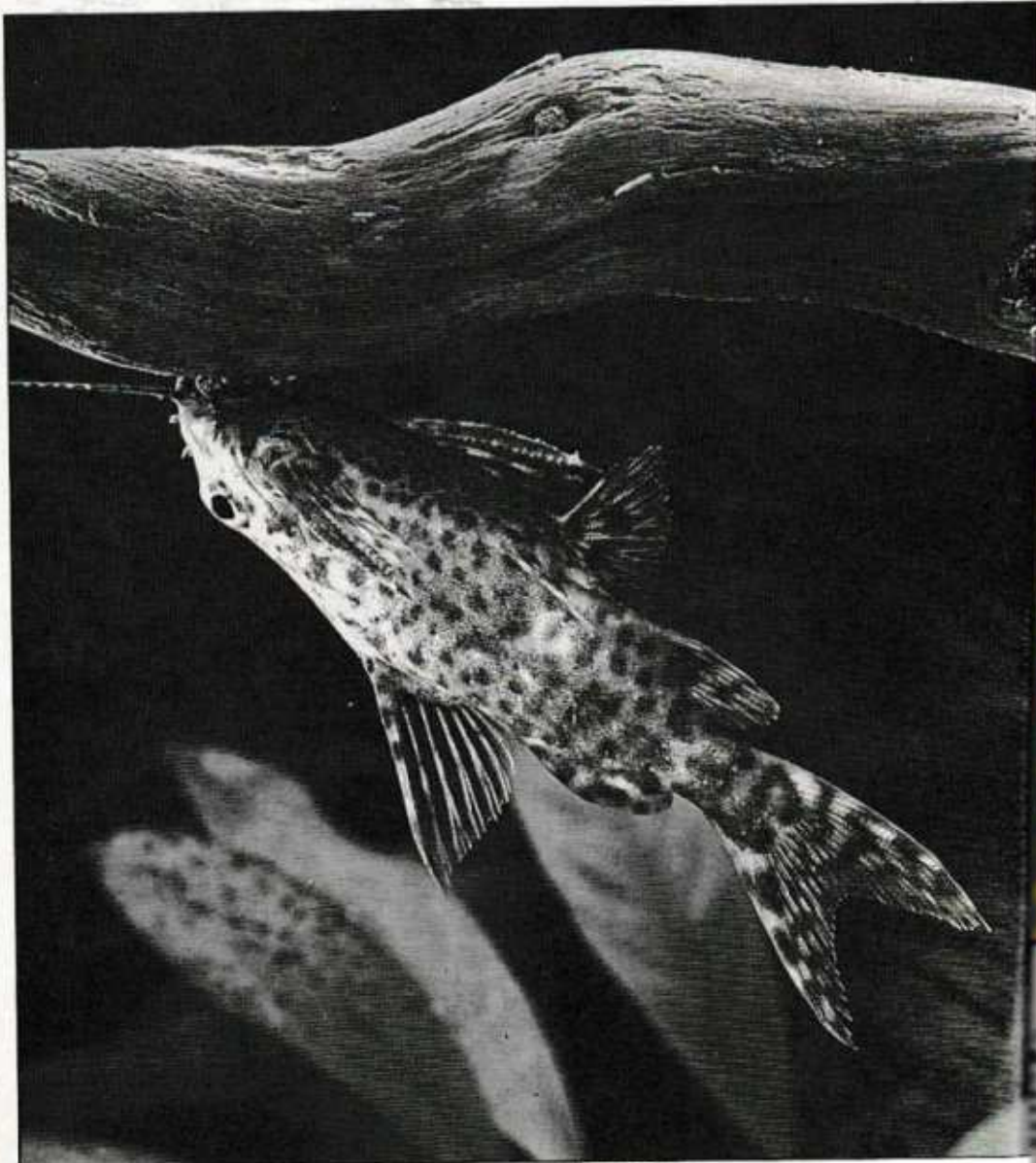
Photo CALL

Have you got an unusual picture of a fish? If so we'd love to see it.

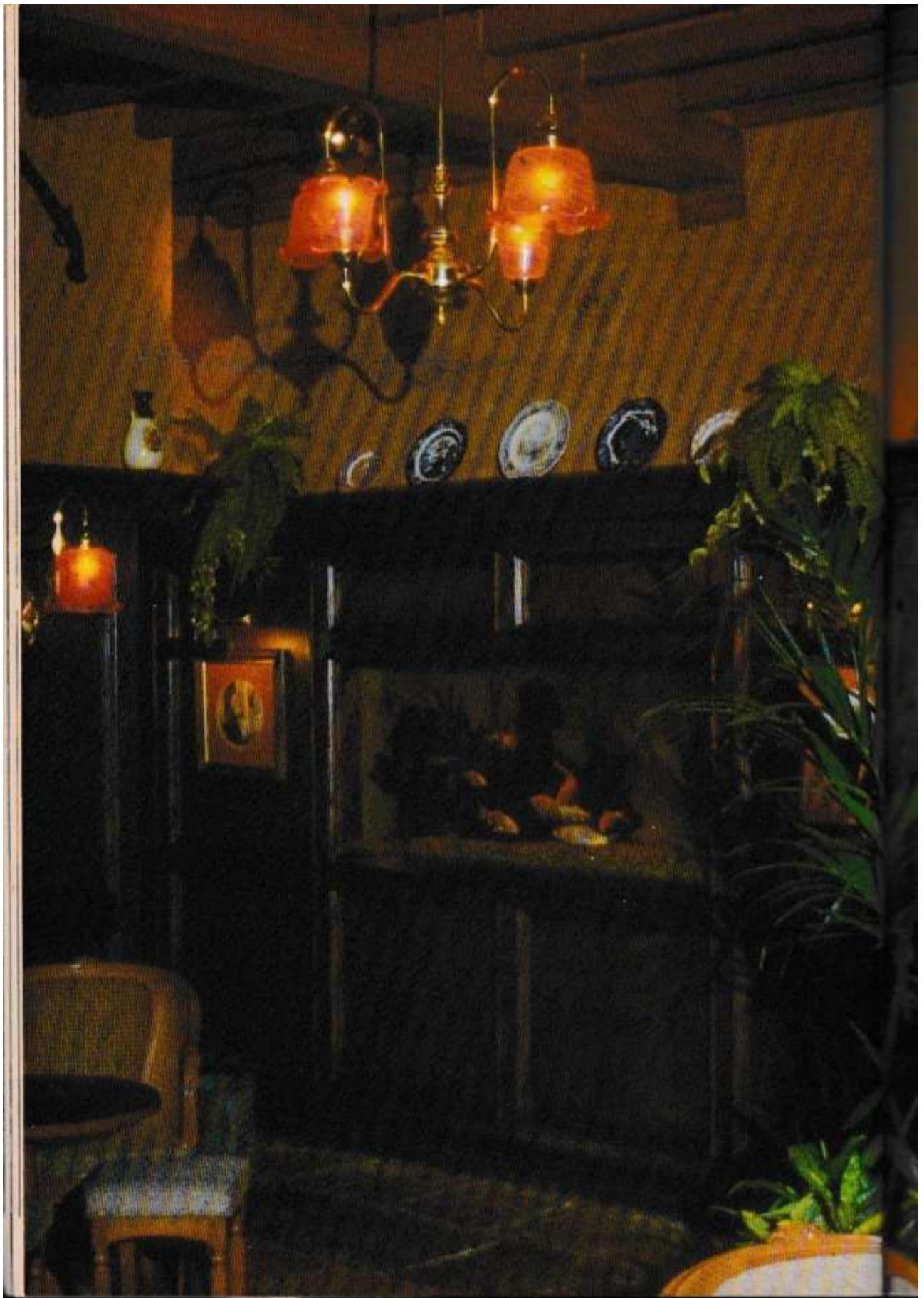
Synodontis nigricentris, known as the 'upside down' catfish is not from Australie! This dwarf catfish can be found in huge shoals in pools and rivers of West Africa and Zaire. A multitude of species are offered under its name and most of them grow quite large! The true 'upside down' catfish hangs around inverted to enable it to feed on surface insects and, not surprisingly, thrives in captivity in small shoals. This diminutive African catfish enjoys an aquarium with an abundance of floating plants under which it can take cover. Patterning on the under belly helps the 'upside down' catfish conceal itself from predators.

WIN £25.00

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'Just hanging around', photo by David Sands.



Someone else's baby

The 'sponsored' aquarium is the one installed in a Hospital or Hospice, Old Folks Home or Infant's School... the one someone-else has to look after! The soothing and decorative effects of aquaria in these environments are well known - and extremely beneficial - as long as someone is prepared to do the dirty work.



Dr DAVID FORD of the Aquarian Advisory Service examines some of the problems in looking after 'someone else's baby.'

The 'AQUARIAN' brand is often asked to sponsor an aquarium by Hospitals and Schpols and within limits we do whatever we can to help such organisations. However, it is not the setting-up of an aquarium that is the problem, but who is going to look after it thereafter.

An aquarium in places such as dentists' or doctors' waiting rooms is very useful as well as attractive because it is a proven medical fact that looking into that silent watery universe lowers blood pressure and slows the heart rate.

They look great in Hospices and Seniors' Resthomes with the fish

There's no doubt that a sympathetic aquarium display enhances a room with its soothing, restful effect.

becoming pets, helping to lighten problems.

Working offices are improved by the addition of an attractive collection of ornamental fishes.

None of these benefits are continued if the aquarium is not properly maintained. In fact a dirty aquarium, and especially if so neglected some fish become ill or die, becomes a source of stress not pleasure.

Hence *AQUARIAN* do not 'sponsor' aquariums unless we can guarantee proper maintenance. One way of doing this is to ask the local aquatic society to take over responsibility for the aquarium. With a care roster, and help from *AQUARIAN* by way of food and equipment, an aquarium, can be effectively sponsored.

I personally look after a couple of tanks in my local community, one in a hospital and one in an old folks home.

Woodfield Grange

Woodfield Grange is a nursing home for the elderly near my home in Yorkshire. The mother-in-law lives there and the family visit weekly. I can check the aquarium during the time spent at the home.

Each week it is sufficient to clean the front glass with a magnetic cleaner and return any plastic plants uprooted by the fish, which takes all of 2 minutes. Every other week the tank is cleaned properly, new plants installed and a waterchange done, but again this only takes minutes by the methods explained later.

Every month or two, the filter is cleaned and twice a year the polyester floss replaced... the ceramic filter and carbon are never replaced.

The tank is a 3 foot Tahiti on a metal stand with an external *Atlantis X500* powerfilter, fine gravel base with rock ornaments and all-plastic plants.

The first set-up was tropical with a heaterstat and shoals of tetras, barbs and Characins. However, some weeks later the old folks asked when the fish were going to be added! Only then did I realise that most of the patients were unable to see such small fish. So the fish were removed, with the heaterstat, and Goldfish added. Four fancy varieties were originally installed but it was found that gross feeding (and everyone wants to feed them, often several times a day) gave such growth the four fish soon overloaded the system. One was removed (to my pond) leaving just three fish - an Oranda, Veiltail and Shubunkin. Four years later these are nearly 6in and perfect specimens.

THE SPONSORED AQUARIUM



Easy clean system

- At home I place a plastic bucket with a bunch of plastic plants and rocks outdoors. This is filled with water and the rocks used to hold down the loose plants. About half a cup of household bleach is added (such as *Domestos*) and it is left soaking for two weeks (outdoors because of the chlorine smell). When the time comes to visit the

*...the one someone-else
has to look after*

Home, the bucket is drained and brought indoors for every item to be swilled clear of bleach under a running tap. Obviously it is most important that every trace is removed, but a tap running to waste will do this quickly and effectively.

The sparkling clean rocks and plants are placed in the cleaned-out bucket and taken with a second empty bucket, a siphon tube with gravel cleaner attached and a plastic pan scourer, to the home.

The tank lid is removed (and wiped clean) and the old plastic plants uprooted and dropped into the spare bucket. Algae-coated rocks are also removed and the bare tank given a Hoovering with the gravel-tidy. When about 1/4 of the total water is removed, it is topped with a mixture of hot and cold tapwater mixed to make it the same temperature as the aquarium water and treated with 'AQUARIAN' *Remedy No.2 Watersafe* to remove chlorine. The new plants and rocks installed and the lid replaced.

The bucket of dirty plants and rocks are then taken home for the bleach treatment for reuse in a fortnight. ►



Bleaching the algae and mulm coated rocks and plastic plants



The sponsored aquarium at Woodfield Grange Nursing Home - it is sited in the dining room

THE SPONSORED AQUARIUM

This method means the tank looks really new and fresh with just a few minutes work every other week. The fish are never removed. Moving large Goldfish causes much stress and can damage their scales or split fins.

A pot of 'AQUARIAN' flake food is left permanently by the tank for the nurses to feed the fish and a convenient light switch is used to turn it off at night - however, this switch is tucked away behind the aquarium out of sight of visitors. So too is the powerfilter and the silent 'AQUARIAN' Airpump.

Powerfiltration

The *Atlantis X500* is still going strong despite passing years, so it is retained.

The easy method of cleaning this filter is as follows.

The powerfilter is switched off and the outflow pipe removed... it is lifted to break any siphon. A length of tubing is fitted to the outflow nipple and the tubing threaded through the nearby window to the garden outside. The powerfilter is shaken vigorously to loosen all the mulm inside and the unit switched back on. The dirt all flows out to feed the garden plants!

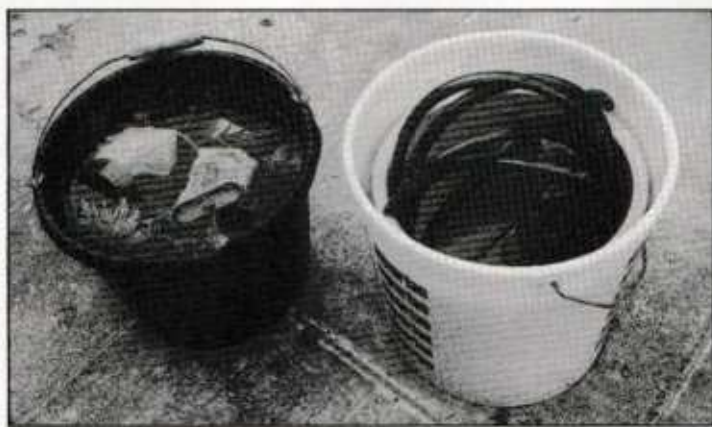
The unit is turned off again and the original pipe refitted. Pumping is then resumed. This means that the unit does not have to be moved, there is no loss of siphon action and the valuable nitrifying bacteria are all retained.

Just two or three times a year the filter is taken to the home's sink and cleaned out properly. It has three basket compartments, these contain ceramic pieces, carbon in a nylon bag (tights) and polyester floss to polish the water. The floss is replaced but the ceramic and carbon are just rinsed clean. This is done in a bucket or bowl of aquarium water or with hot and cold tapwater blended to the right temperature so most of the bacteria survive. If swilled under a running coldwater tap the chlorine and temperature shock may remove too many valuable bacteria.

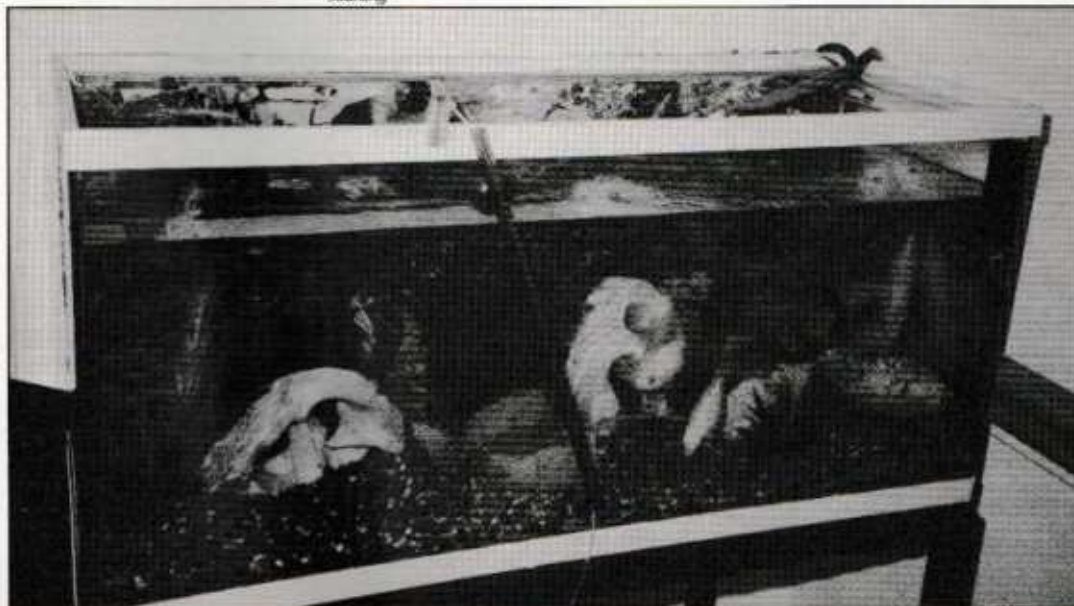
A tip here - the ceramic is heavy and fitting the baskets can be difficult. I tape the baskets together by wrapping one turn of electrician's plastic insulating tape around the join.

Rely on the bleach to clean the plants, do not rub or scrape the leaves or the plastic becomes scratched giving a key for algae to regrow too quickly. Stubborn stains on the rocks can be rubbed clean... a nail brush is effective, but not until after the bleach has been swilled away or spray may cause damage.

Last, but not least, keep a sense of humour. Whilst cleaning aquariums in a public place you will be immediately surrounded by spectators one of whom is bound to say "He's picking the fish to go with tonight's chips". You then laugh as if you have never heard such wit before... □



The two-bucket cleaning system. One contains dilute bleach for two weeks soaking



Cleaning the sponsored tank

Somehow, in a zoology department in any major country in the world, there are scientists working on fishes. It may be in a multitude of subject areas such as behaviour, taxonomy, genetics, fisheries and ecology. **AQUARIUM** brings readers scientific news from around the world.



Enter the Royal Zebra

The Royal Zebra Plec'
This is an exciting catfish discovery amongst Brazilian imports which has been seen by enthusiasts over the past few years.

Recently, this black and white striped beauty has been given a name by Dutch scientists and catfish experts, Drs. Han Nijssen and Isaac Isbrucker.

The import of many weird and wonderful catfishes from the Belem area of Brazil has caused many catfish enthusiasts to scratch their heads when it comes to naming the newcomers. Even when armed with the latest heavy-weight books the names of new species cannot be found. These wait for scientists to formerly name. Common names prevail until this naming process has been completed.

One such fish, the Royal Zebra plec or 'Peckoltia' (incorrectly so-called), has been stunning fishkeepers for some time ever since it appeared on the cover of USA magazine *Tropical Fish*

Hobbyist.

Now, Nijssen and Isbrucker, in *Ichthyology Exploration of Freshwaters, Volume 1, no 4, March 1991* by Verlag, Dr. Friedrich Pfeil Munchen, has published a description of this beautiful black and white striped, dwarf suckermouth catfish as *Hypancistrus zebra*. The scientists created a new genus and species for the uniquely pigmented ancistrine loricatorid fish from Rio Zingu, Brazil (Pisces: Siluriformes: Loricariidae).

In this paper the authors did not compare this new fish to *Peckoltia* but state the following: *Hypancistrus*, new genus, is distinguished from all other genera of the tribe Ancistrini by the combination of the following characters: snout margin completely covered with dermal ossifications; presence of an anal and an adipose fin; absence of filiform teeth; premaxillary teeth considerably smaller than mandibular teeth; dorsal fin with six branched rays, the

last one split to its base; depressed body; absence of a membranous extension posterior to last dorsal fin ray, reaching to adipose fin spine; no very wide head; no extremely long evertible interopercular odontodes. Its type and only included species is *H. zebra*, new species, based on specimens collected in the Rio Zingu, Est. Para, Brazil.

Keeping the Royal Zebra in aquaria is not too difficult, though they require plenty of space when kept together as they are extremely territorial. They enjoy a water flow, created via a power filter spray or a large air stone and an aquascape of rounded boulders and sand.

Hypancistrus is undemanding regarding water chemistry and temperature, although a pH range of 6.8-7.9 and a temperature of 24-29 is about right for captivity. Feed frozen shrimp, peas, pellets and a good flaked food.

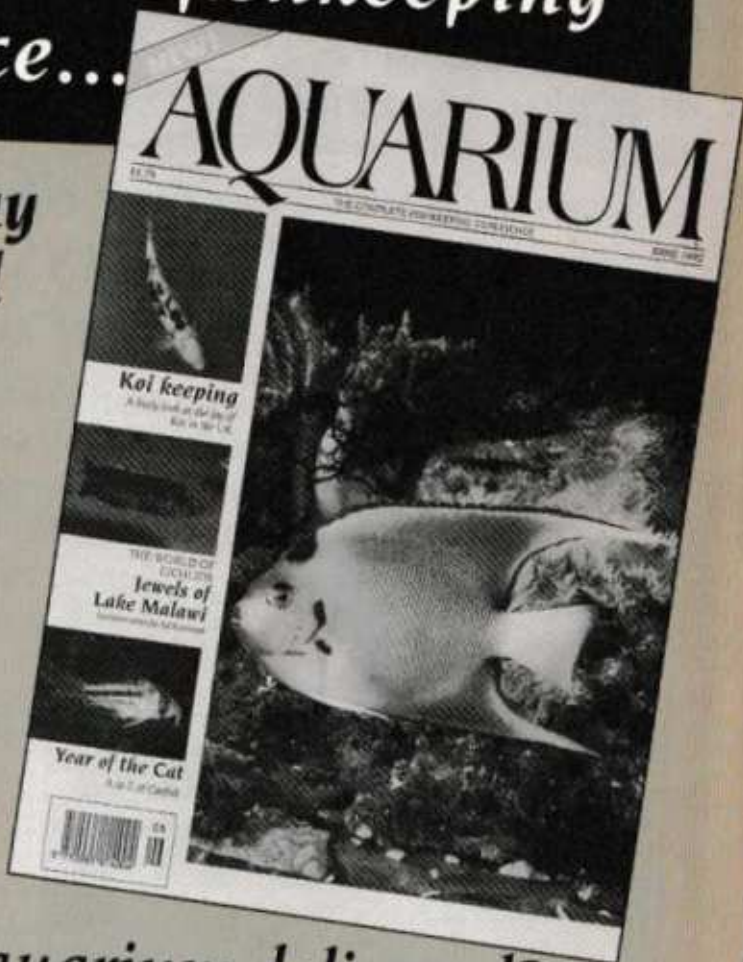
They may attain 80-100mm in captivity.

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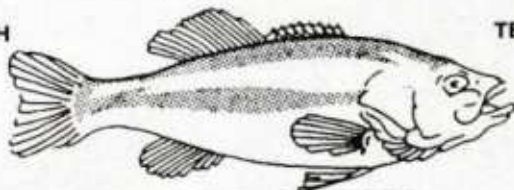
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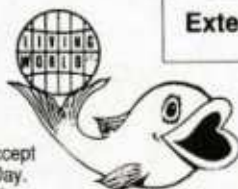
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AQUARIUM MAINTENANCE

The routine maintenance of an aquarium involves tasks that need to be undertaken daily, every 2-3 weeks or only occasionally. The table below summarises this information. Most of the tasks are self-explanatory, however, for others, a few comments may be helpful.

Feeding

Feeding fishes is perhaps the most enjoyable, and the most important task that needs to be performed on a daily basis. Always feed your fishes on a nutritionally balanced flaked food in order to encourage good growth, colouration and health. Fishes should be fed 2-3 times each day, but only with as much food as they will consume within 2-3 minutes. With tablet type foods, e.g. *Tetra TabiMin*, the fishes should show an interest in the food until it has all been consumed. If there are tablets laying on the gravel with no fish feeding on them you have added too much. Any excess food will accumulate at the bottom of the tank, where it may decompose and pollute the water.

While feeding your fishes you should learn to get to know the normal behaviour patterns of each individual fish, and so will be able to immediately recognise those that are behaving unusually or look different. Such behaviour is often the best indication of an unhealthy fish, or of a problem with the aquarium set-up which should be investigated further.

Lighting

Turning the aquarium lights on or off can lead to the fish becoming stressed, particularly the more sensitive species such as neon tetras and angelfish. Occasionally the sudden change in light intensity can startle fishes, causing them to dash about and collide with objects in the aquarium. This is particularly a problem in the winter months, when the



One of the key elements to successful fishkeeping relates to offering community fishes the correct diet in the right quantities.

room is often in darkness if the aquarium lights are not switched on. It can be overcome by turning the room lights on for 10 minutes or so, before turning the aquarium lights on. In this way the light intensity increases in smaller steps, so preventing the fishes from becoming startled.

Plant maintenance

Aquarium lights should be left on for 10-12 hours each day to encourage healthy plant growth. Plants in the aquarium grow at different rates and you may find it necessary to prune the faster growing species. Removing the top 2-3 inches of plants with stems is an excellent way of propagating these species, as well as encouraging the original plant to produce lateral shoots, giving it a more bushy appearance. This routine task can

be done at any time, but is considerably easier when the water level is reduced during a partial water change. This is also an ideal opportunity to remove any dead leaves from the plants. They not only look unsightly, but also decompose and adversely affect the water quality.

Sufficient light is essential for good plant growth. As a rough guide you should allow 15-20 watts of light for each foot of aquarium length. A reflective surface above the light will ensure that your aquarium receives the maximum benefit from the lighting, with little waste. In order for this light to reach the plants it is important to keep the condensation tray as clean as possible. Any dirt or algae on the tray may absorb certain wavelengths of light and adversely affect plant growth. On a more occasional basis it is necessary to change the fluorescent tubes (say every 10 months) because their light output decreases rapidly with age.

Remember aquatic plants will benefit from the addition of an aquarium fertiliser which can either be added at each partial water change, or in smaller quantities at more frequent intervals. If, for example, your aquarium requires 14ml of plant fertiliser every two weeks, it may be better to add 1ml every day or 2ml every 2 days.

ROUTINE MAINTENANCE TASKS		
Daily	2 Weekly	Occasionally
Check water temperature Check filter/air pump	Measure water quality Partial water change	Thin plants Replace fluorescent tubes for healthy plant growth
Check fish numbers/behaviour	Clean filter	Check electrical apparatus
Turn lights on/off	Clean tank	Clean air pump valves
Feed fish	Remove algae from glass Clean condensation tray Prune plants Remove dead leaves	

Californian born Michael Goulding enthralled a packed audience of fishkeepers in London in 1985 with his lecture detailing his encounters with the place he calls *The Flooded Forest*.

Michael fired the imagination of everyone in the hall that day with his stories and data relating to his years of living in the Amazon to understand the relationship of fishes with the forest.

He set a few imaginations running with his off the cuff statement that the Amazon was his aquarium. What a fantastic aquarium and an incredible range of species at his disposal!

Michael's twelve year affair with the tributaries and jungles of the Amazon lead directly to three famous text books. *The fishes and the forest*, *Man fisheries on an Amazon frontier* and *Rich Life and Poor Water*, a book about the Rio Negro.

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I encountered Michael Goulding's work for the first time whilst in Southern Brazil to catch catfishes in 1979. Dr Haraldo Britski, of the Sao Paulo Zoology museum, showed me the preliminary text to Michael's first book together with preserved material, including the very first specimen of the royal Zebra shovel-nosed catfish, collected during some of his Amazon work.

Sworn to secrecy until the book was published, I looked carefully at some of the text I had photographed on my return to England. Drawings of seeds, eaten by fishes and inadvertently dispersed by them along the miles of the Amazon rivers showed me more than a hint of the



Michael Goulding

The Amazon Man

original quality of Michael's work.

After meeting Michael in London I had to wait until this year to greet him again. In a leafy avenue of Hampstead I took up several half finished conversations again.

His twelve years in the Amazon is finished for the time being. He's finished co-operating with filming several television programs on the Rio Negro, the aquarium trade and on predators.

Now there's talk of a Cholera epidemic and wholesale mercury poisoning and he told me he thought perhaps it's time to take stock and write about his overview of the unique Amazon.

His experiences are unique although his observations follow on from a long line of explorers who have also been drawn by the mysteries of the tropics. Bates, Wallace and

Darwin stand in Michael's dreams and he is clearly inspired, rather than haunted, by these great men who 'grabbed the bull by the horns' and literally plunged into the mighty continent of South America.

Michael Goulding and I have a great deal in common. I have also been 'pulled' into South America three times in ten years. I consider myself more a visitor whereas Michael almost became the native.

In the past year or so Michael has concentrated on photography knowing well that even the most exciting text needs good illustrations. The sample of his underwater fish photographs shown to me during our meeting suggests that we are in for a real treat when these pictures are finally published. I would suggest without hesitation that they are the best I have ever seen.

Michael should be a regular contributor to AQUARIUM in future issues. Watch out for 'MICHAEL GOLDING: AN INSIGHT INTO THE AMAZON'.

David Sands □



BRIEF ENCOUNTER: Editor David Sands and Michael meet again.

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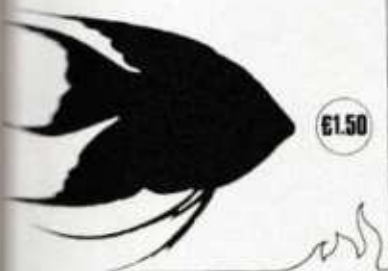
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Green ISSUES

John Chalmers, of Hobby Fish, has spent a lifetime searching for perfect plants and the ideal aquatic environment in which to cultivate the 'green aquarium'. Each month, John will guide AQUARIUM readers through the garden world of aquatic plants introducing new species, old favourites and dispelling a few myths on the way.

AQUARIUM PLANTS

The most common question I have been asked during fifteen years of amateur aquarium keeping and subsequently in twenty years as a professional aquarist is 'How can I get my plants to grow? They always seem to die off after a few weeks.' Common problems seem to include buying plants that are really house plants, i.e. dracenas and palms, using under-gravel filters and low-powered fluorescent lamps which admittedly give out a nice lavender colour but are useless for plant growth.

Despite the great strides in plant-growing techniques by German, Dutch and Danish aquarists the British and, for that matter the American, aquarists have remained embarrassingly backward. In part, this may be due to the fact that the general aquatic trade likes to restock their customers' tanks regularly rather than advising on purchasing a proper system which would provide all the requirements for a healthy, planted aquarium.

When visiting shops, I have never been impressed to see plants laid out on the counter in the hope that they will be sold over the weekend before they dry

While the growth of plants is a very complicated process, because most readers will not be qualified botanists, I will try to reduce the processes to those which can be understood by the layman.

out and die. Some of the better shops now have a series of large cascading tanks with good lighting. These tanks are easy to maintain but the plants cannot grow under these conditions for the simple reason that the cascading water flow drives out any CO₂ from the water and effectively suffocates the plants.

We shall explain in later issues how vital CO₂ is for plant growth.

Whereas we appreciate the attractiveness of these as merchandising aids, they are not the exemplar for your own planted aquarium. There is absolutely no need for plants to be treated as a throw-away item.

In later articles, I shall show how plants can be grown easily; some of my aquarist friends now complain about having constantly to prune them and some even swap cuttings for fish!

Throughout Europe, there are distinguished aquarists who have contributed to the development of aquarium plants in their nurseries and others who have developed systems to be sold for the home aquarium. I consider three people to be outstanding in their fields and I hope I can persuade them to contribute to this column by giving technical advice and by reporting their discoveries both from jungle expeditions and by developing new plants through genetic engineering and tissue culture propagation. They are Dick Mous from Holland, Holger Windelov from Denmark and Ludwig Dennerle from Germany. All three, although running successful commercial plant companies, are still dedicated water-plant enthusiasts. I invite letters, questions, criticisms, controversies from anybody who can contribute - whether amateur or academic or commercial.

Through these pages I hope to bring the water-plant hobby through a quantum leap to the standards enjoyed by our European colleagues.

While the growth of plants is a very complicated process, because most readers will not be qualified botanists, I will reduce the processes to those which can be understood by the layman. Sometimes we have to say, 'Well, it's difficult to explain and understand but we know if we do it like this, it always works!'

In the next issue I hope to have photographs and details of the green leopard, *Echinodorus schultzeri*, developed at Ludwig Dennerle's nursery at Vinningen, Germany, and, later, the Tropica marbled queen, *Echinodorus cordifolius*, developed by Holger Vinderlow at his nurseries in Hjortshøj in Denmark. I will unravel the mysteries of aquarium plant growing and explain the requirements for healthy plant growth as well as why the dimly-lit, heavily-aerated, under-gravel filtered aquarium does not provide ideal conditions. The advantages of organic-mineral substrates, cable heaters, CO₂ diffusers, nutrient fertiliser programmes and correct lighting to produce the underwater garden of your imagination will be revealed! □

A garden aquarium is a beauty to behold.



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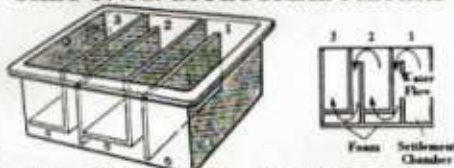
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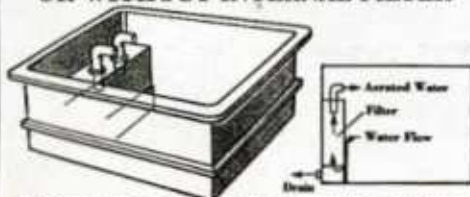
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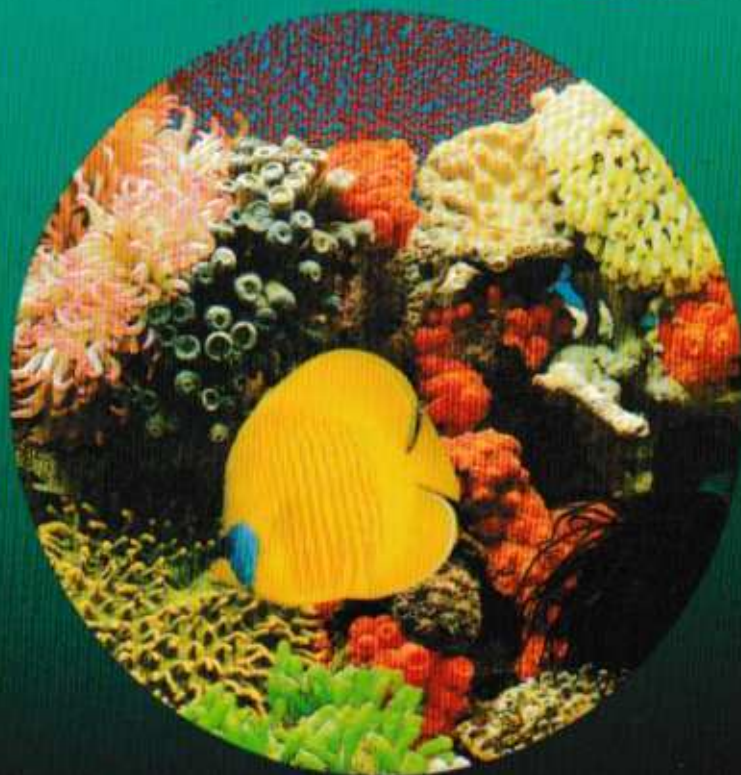
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