

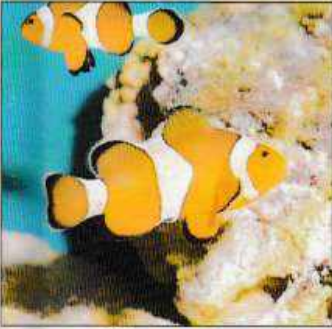
NEW!

AQUARIUM

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THE COMPLETE FISHKEEPING EXPERIENCE

JULY 1992



Magnificent Marines
AQUA feature



Secret Shell Dwellers
The World of Cichlids



Corydoras
The Ultimate A-Z Continues



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AQUARIUM THIS MONTH

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Cover Picture
A pair of super blue discus by Arend van den Nieuwenhuizen

AQUARIUM

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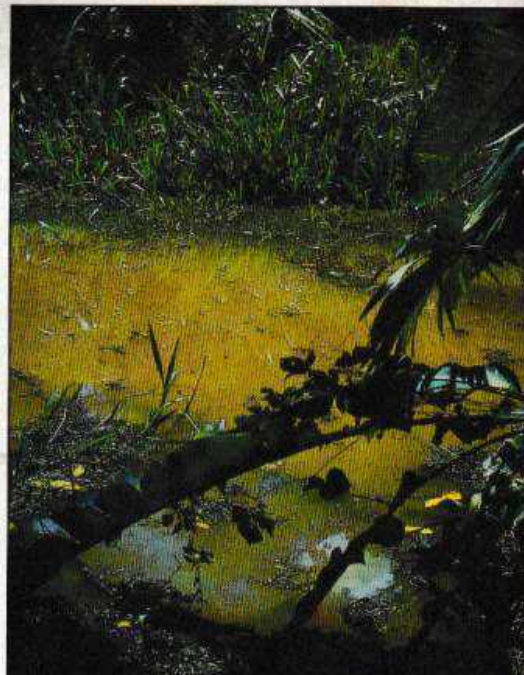
*As I see it*

THE EDITOR

Welcome to the second issue of *AQUARIUM*. Judging by the initial response from readers, both consumers and retailers, there has been a need for fresh ideas in a fishkeeping magazine for some considerable time. I plan the magazine to be 'National Geographical' meets 'Fishkeeping' but I have to introduce ideas gradually. Your support will ensure the success and eventual result. I am grateful for the offers of support from prospective contributors and look forward to publishing more refreshingly different articles in the near future.

I intend to support the trade with regards to promoting news and information about new technology products in our hobby. There is a need to provide space in a good fishkeeping magazine to show off new developments, especially those that bring high technology into the industry. It takes a great deal of research and development, marketing and money to launch new products. I believe AQUARIUM should support any individual or company which chooses to push forward in product development to make fishkeeping better for everyone involved within it.

AQUARIUM has a wealth of information within its pages and we hope you will always enjoy the content. Please do not hesitate to contact me if you can see ways that we can enhance our service. It is only through your comments and continued commitment to AQUARIUM that we can offer a real alternative to established publishing. matter. Vote with your newsagent and we can promise you an excellent read in all future issues.

David Sands*Trouble in Thailand*

The New Scientist recently published news from Thailand suggesting fishes are having a rough time at the moment.

Molasses seeping from a sugar mill has caused massive pollution along 600 kilometres of rivers in northeast Thailand. Three tributaries of the Mekong river have been polluted and this has devastated fish stocks. In turn this is threatening the future of communities living on the river banks who are already suffering because the local water supply is restricted because of a severe drought. Bacteria in the polluted rivers have consumed all the dissolved oxygen in the water effectively killing fishes and other freshwater animals.

The New Scientist reported the following in its May 9th 1992 edition:

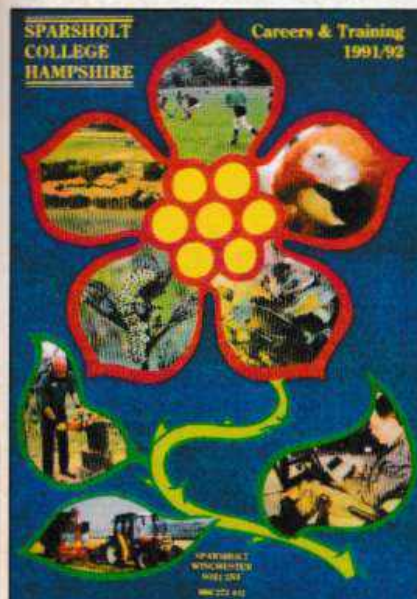
Scientists say recovery of fish stocks will be hindered by the

construction of a dam on the Mool river 5 kilometres upstream from the Mekong river. Its tributaries are home to 141 species of fish.

'Nothing can compensate for the loss of these species,' said Wijai Simachaya, of the ministry's pollution control department, 'It is clear that the polluted water has killed most of the fishes that are about to breed. Dissolved oxygen levels upstream of the river were measured at 5 milligrams a litre while below they had fallen to between one and zero.'

This report comes hard on the heels of Dr. Tyson Roberts's paper given at last year's 'Threatened World Of Fishes conference', held in Den Haag, Holland. Dr. Roberts announced that his survey of fishes had revealed the likelihood of double the number of known species being discovered in the Mekong river.

AQUARIUM asks: who knows if some are not lost already?



Talking Shop

Sparsholt College in Hampshire are holding an Aquatics Trade Conference on Monday 29th and Tuesday 30th June with international speaker Ed Taylor, a former editor of Tropical Fish Hobbyist Magazine and UK speakers Peter Wheeler, Bill Heritage and Gordon McGregor-Reid, now curator in chief of the North of England Zoological Society, Zoological Gardens, Chester.

● Details can be obtained from F. Fielder Sparsholt college, Sparsholt, Winchester, Hampshire, SO21 2NF (0962) 72441

THE AQUATICS TRADE CONFERENCE

Monday 29th & Tuesday 30th June 1992



"TALKING SHOP" AT SPARSHOLT COLLEGE HAMPSHIRE

- A MEETING PLACE FOR DISCUSSION OF THE CURRENT ISSUES AFFECTING THE AQUATICS TRADE

Biolife

Canadian company Rolf C. Hagen have never been afraid to produce products to make fishkeeping simpler. They produced the first 'pick up and plug in' aquarium system which the trade had called out to have for many years.

Now, through its subsid company Rolf C. Hagen (UK) Ltd., a new technology product is about to revolutionise the filter market. BioLife 35 and 55 (the recommended

gallage for each system is in its name) are described as "wet/dry" filtration systems complete with an integrated pump and heater.

The units come complete with an excellent instruction leaflet which explains the various filter methods, including the trickle chamber and mechanical and biological filtration sections incorporated into this 'innovative product'.

The filter units can turnover between 82 and 98 gallons per hour (with air introduced) with wattages barely able to turn the dial on your electricity meter of 4.5 to 5.5 watts with a 100 or a 200 watt heater incorporated into each system.

The idea that this prevents heater breakage by larger fishes particularly appeals and, together with the fact that the element is concealed and therefore fishes cannot burn themselves on an exposed unit, should mean BioLife is a winner.

A product review will be undertaken shortly and the performance of this unique design from Rolf C. Hagen will be detailed for AQUARIUM readers.

The retail prices of £69.95 and £89.25 should not deter the fishkeeper looking to simplify the equipment required in a new aquarium. For further information contact Rolf C. Hagen (UK) Ltd., California Drive, Whitwood Industrial Estate, Castleford, West Yorks, WF10 5QH. Tel: (0977) 556622.



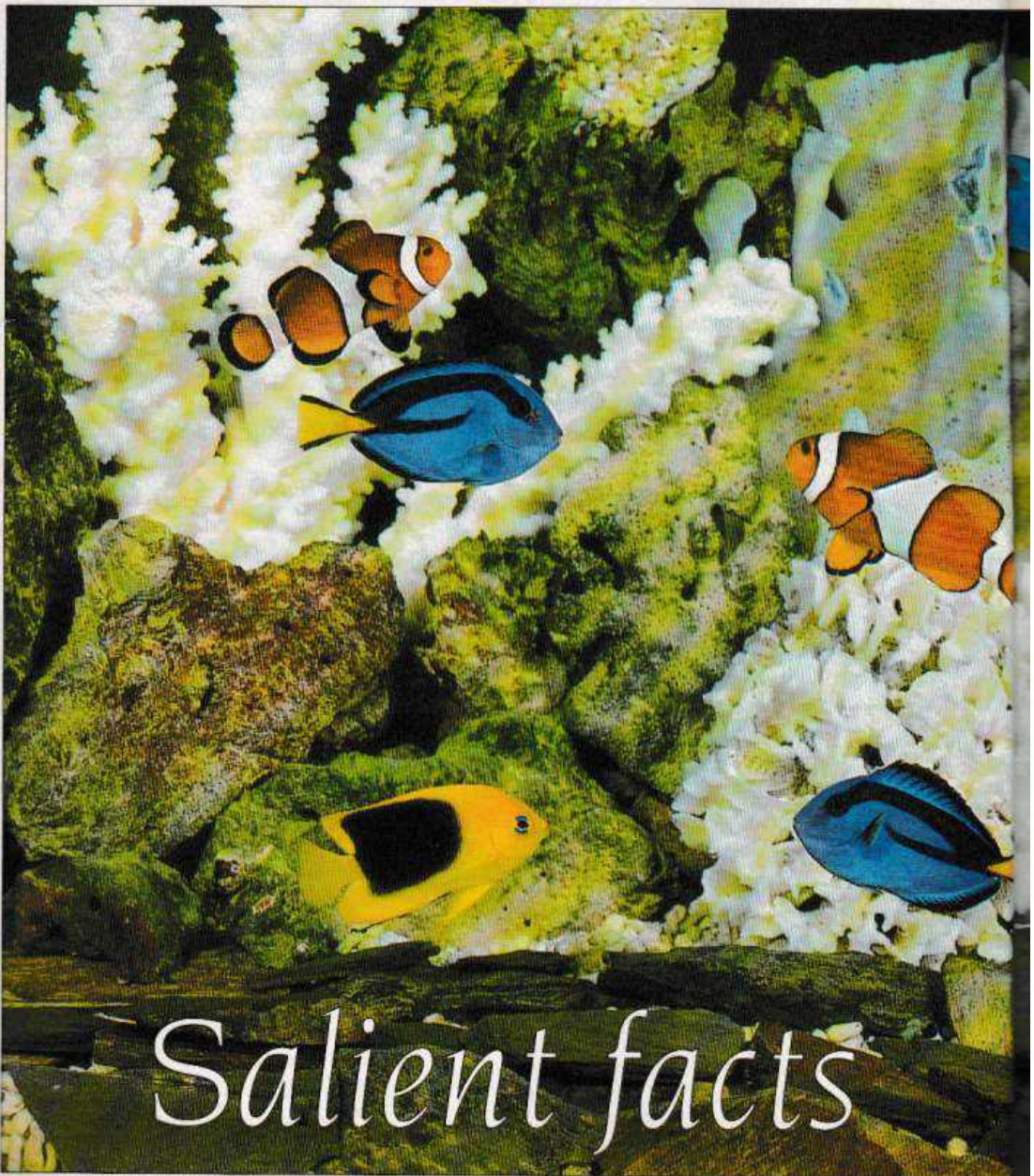


Photo by Max Gibbs, The Godfish Bowl, Oxford, A Community of Tropical marine fish

Salient facts

Both marine fishes and invertebrates require an environment closely simulating the conditions found on a coral reef. How close can an aquarium measure up to this?

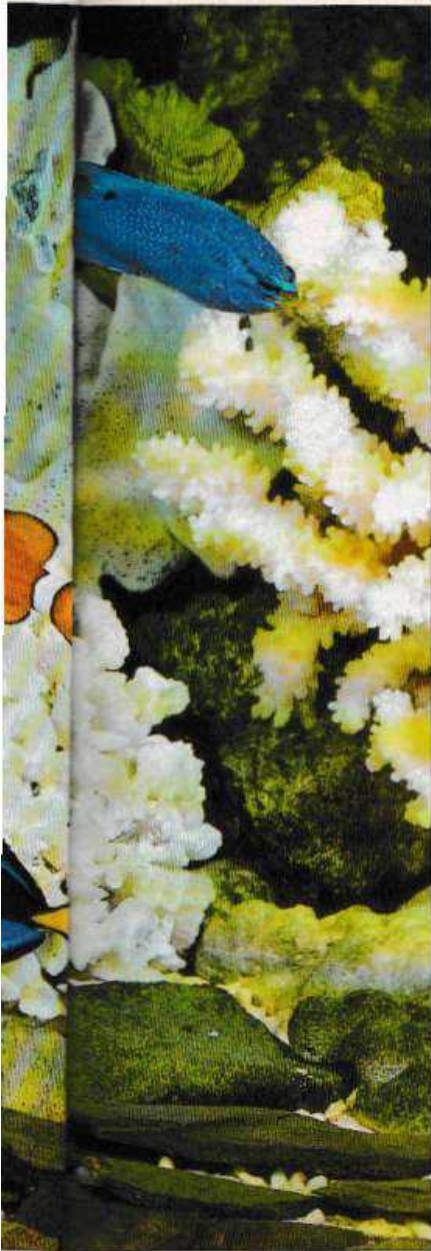
Taking special care of the quality of water in your aquarium can certainly help. Chick Holland offers some practical advice.

The water surrounding a coral reef is continuously subject to massive water movements and oxygenation through wave surges and turbulence. Brilliant sunlight stimulates corals to flourish and food is borne along by variable currents and twice daily tidal changes. Millions of minute creatures make up the plankton chain, a vital part of the ocean's life support system. A lunar cycle of tidal changes ensures that current variations occur

during the hours of daylight and darkness, so fish feeding patterns depend on the state of the tide.

The most advanced aquarium system in the World cannot begin to re-create these conditions but fishkeepers can make sure their aquaria are both clean and efficient. Water quality within the marine aquarium is essential and dependant on several key factors:

TROPICAL MARINE



● *Aquarium manufacturer and keen hobbyist for over 15 years, Chick Holland learned to look after marine fish and inverts 'the hard way'. Born in Tenterden Kent, where keeping sticklebacks in a jar was the height of technology at the time, as a seven year old Chick moved to the ancient Cinque Port of Rye in East Sussex (by the Sea), and began many years of learning about marine creatures and how to look after them.*

His early career included 12 years as a fishing net manufacturer and trawler skipper/owner before learning to Scuba dive and qualify as an aircraft pilot. Chick has dived on many beautiful reefs including those in Hawaii, the Maldive Islands and the Florida Keys, and so has earned his qualifications in fishkeeping through practical experience. He makes no attempt to 'lose' people through using terms and names which they cannot understand and is always willing to discuss both problems and remedies with both newcomers to the hobby and established fish-keepers.

In his career Chick has made many friends in the fishkeeping industry and has therefore a deep reservoir of information on which to draw.

His Company, Lahaina Aquarium Systems Ltd, based in Morayshire, Scotland manufactures a comprehensive range of aquariums with both built in and 'Remote Life Support Filters' and his unique designs include a 'tidal System' to simulate the environment found both on a Reef and in a Rock Pool. He has been granted two patents by the U.K. Patent Office and his aquariums are sold and installed worldwide.



Photo by Lahaina of one of their own tank cabinets

*Purified fresh water;
Salt Mixture;
Evaporation and specific gravity;
Water movement;
Biological, mechanical and chemical
filtration;
Protein skimming;
Feeding;
Ozone.*

A brief look at each point in turn will help evaluate the state of Aquaria and allow you to make any necessary

changes to benefit the inhabitants.

The water

The basic element and essential requirement in marine aquaria is the freshwater used for mixing the synthetic salt mixture. Raw tap water can contain many pollutants and additives which if introduced into the aquarium can build up to alarming levels if action is not taken to correct the situation. An analysis of tapwater can be requested

from your local water authority and a sample drawn from your coldwater in a thoroughly cleansed glass container will, when presented at their local offices, hopefully, galvanise them into action. Dependant on where you live, the quality of the tapwater will vary considerably, so an accurate analysis is a must. Various filters are available to remove the pollutants, the best of which is the R.O. (reverse osmosis filter). This filter provides virtually pure water and is ►

► capacity and turnover the same quantity of water to avoid uneven flow in the filter. One drawback in this system is that of an uneven draw rate through the filter plate which if the filter bed is not syphoned and cleaned on a regular basis, leads to compacting of the filter bed and inefficient flow, which can in turn lead to 'dead areas' of waterflow. An alternative method is to use two powerheads purely for water movement and leave the uplifts connected to the air pump. The powerheads can be positioned at different levels and angles so that currents carry food to all of the tank inhabitants and any dead areas of water behind rocks etc. are eliminated. An ideal method of operating a powerhead is to use an electronic

variable current "Wavemaker" which alternates each pump in turn for a desired period of time giving the effect of surging waves within the aquarium. By experimenting with this system and using a good quality *DUAL* channel 'Wavemaker', water quality is elevated and a higher dissolved oxygen level is obtained.

Biological, mechanical and chemical filtration

Biological filtration is the process used in nature for converting toxic ammonia and nitrite to the less harmful nitrate, which in itself can be removed from the aquarium water in several ways: water changes, anaerobic de-nitrification, assimilation by plants and algae. In

aquaria fitted with undergravel filter plates, the accepted substrate is a layer of crushed cockle-shell or crushed coral covered with a layer of coarse size coral sand and separated with a non-toxic good grade gravel tidy. This method is efficient in allowing a built up of the beneficial bacteria necessary for the conversion process. However, one obvious drawback in this arrangement is that the undergravel filter will draw dirt and detritus as well as uneaten food etc. into the substrate where a limited amount will be bio-degraded by the various bacteria present in the substrate. The majority of the unwanted matter will remain trapped in or under the filter substrate and will eventually cause a problem in the form of a reduction in

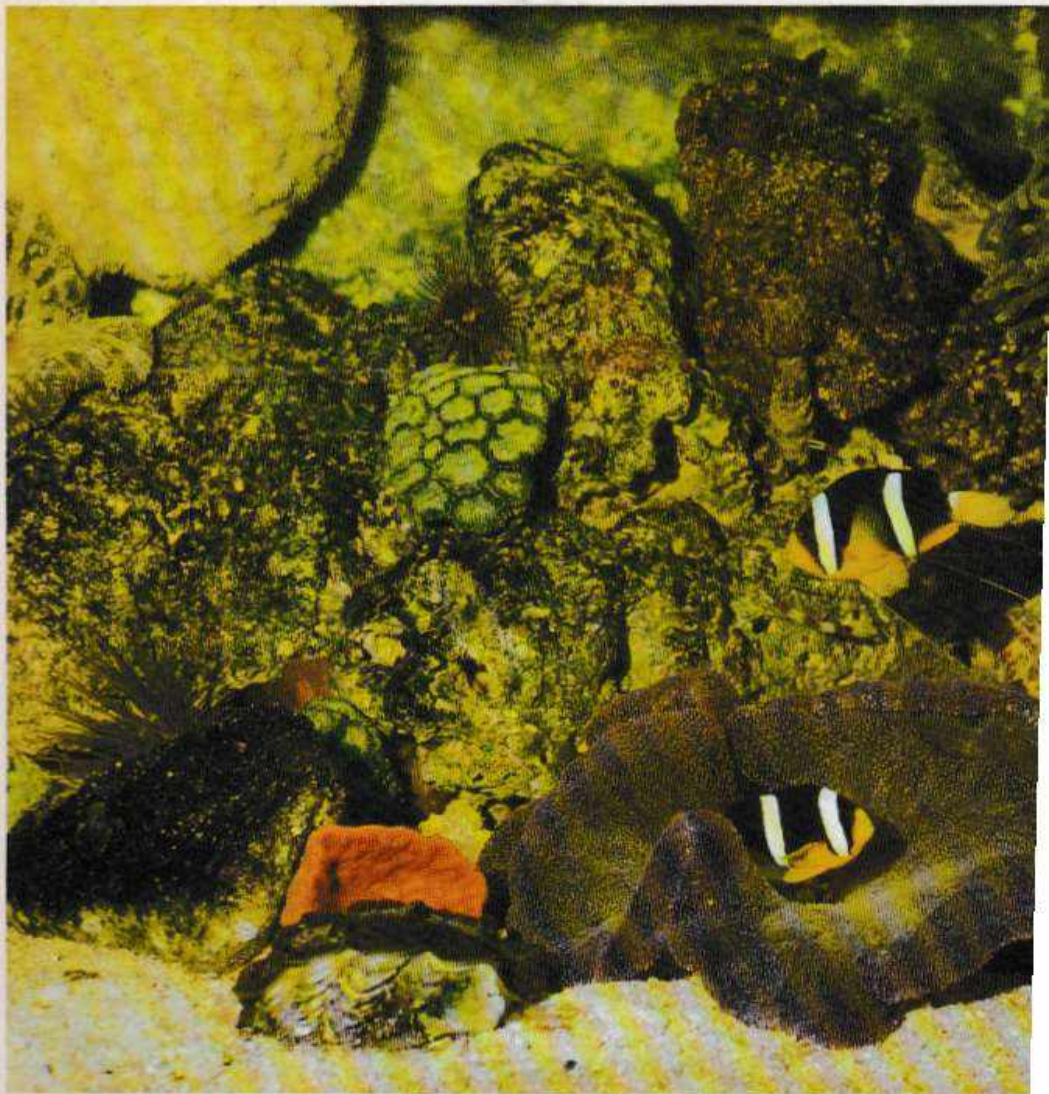


Photo by David Banks of a marine tank

TROPICAL MARINE

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oxygen levels (anoxia) within the substrate. If left unchecked the substrate will tend to harden and compact increasing the risk of reduced biological activity and consequently a failure of the life support system. Increasing levels of ammonia and nitrite will cause stress to the aquarium inhabitants and this can become quickly apparent with both fish and inverts, showing signs of sickness. Sea anemones in particular will tend to close up and shrink, refusing to feed in the normal manner. This symptom is often confused with a need for more intense lighting which as you will appreciate will be of little or no benefit in an aquarium with a detritus laden substrate. It is most important then to remove as much of this detritus as



Photo by Lahoma of one of their own tank cabinets



possible by gravity suction cleaning into an external powerfilter as part of our routine maintenance schedule. A recent break-through in filter technology is now being imported into the U.K. by LAHAINA and this is a purpose designed under-rock or under-gravel plate, size 11 $\frac{1}{4}$ x 15 $\frac{1}{4}$ called *System 3*. World patented, the filter successfully removes dirt and detritus from *underneath* the filter plate on a continuous basis, similar to the LAHAINA bottom scavenging system T.B.S. used on our larger reef aquariums since 1988. The filter promotes a truly healthy environment for miniature reef aquaria, and helps to eliminate detritus and mulm, doing away with hours of syphoning and cleaning. *System 3* Filters can be powered with both air driven uplifts and powerheads, with best results being obtained by attaching the filter to an external power-filter or similar. Because of the unique design, this filter is being incorporated into LAHAINA Reef Aquariums and will be used in conjunction with a wet/dry *Integral* or *Remote* trickle filtration System.

Mechanical filtration

Removal of debris – dirt and detritus from the marine aquarium is necessary to maintain a stable environment and is best accomplished by using an external power-filter filled with nylon filter wool, which successfully traps the finest particles for later removal from the filter.

Chemical filtration

Absorbing and adsorbing of compounds that can cause a yellowing of the aquarium water, can also be easily accomplished using the same external filter which has convenient lift out partitions to hold a good quality marine grade activated carbon. This should be replaced every 4 – 6 weeks as once the carbon is saturated it is possible to re-transfer some of the unwanted compounds back into the water.

Protein skimming

Another inexpensive but extremely important device that greatly improves the water quality in the marine aquarium is the counter-current of a protein skimmer. A limewood air diffuser (or injected air mixed with the salt water) creates very fine bubbles which are forced upward by the rising air pressure within the skimmer body. Proteinacious foam is formed as protein and various other organic compounds adhere to the surface of the bubbles. This brown coloured foam is collected in a removable cup or can be drained automatically out into a separate container for eventual disposal. Effective skimming, particularly that created by using the excellent *Tunze* venturi skimmer, is a great aid in preventing stress to the fish and inverts, and can be instrumental in elimination of the *Toxic Tank Syndrome* which can wipe out a marine tank overnight.

Feeding (or over-feeding) in the

► marine aquarium is unfortunately all too common. In an aquarium housing large marine fish, a varied diet of brine-shrimp, squid, and peeled and chopped whole prawns can be fed once a day and should be limited to a small quantity easily consumed by the fish. If any food falls to the bottom of the aquarium without being eaten, then over-feeding has occurred. In mixed reef aquariums containing mainly inverts and a few small fish, feeding should be confined to every second day and then only a very small quantity of brine-shrimp, squid and finely chopped prawn. Half a teaspoonful is usually sufficient with a pinch of marine flake being added on alternate days. A lettuce leaf strapped to a piece of dead coral can be fed every other day to supplement the dietary requirements of algae grazers, such as yellow tangs and pygmy angelfish etc. Emphasis must be placed on *under* - feeding rather than *over* - feeding and this will help to ensure that the fish and inverts stay healthy and the tank clean.

Ozone

The careful use of ozone in the marine aquarium can have a beneficial sterilising effect on the water, by killing off unwanted bacteria and oxidising nitrite into nitrate. Ozone should be introduced to the water through the contact chamber of a protein skimmer, with the outlet of the skimmer directed into a compartment containing

activated carbon, to remove excess ozone. The design of some types of integral air driven protein skimmers, make this impossible therefore caution should be exercised as ozonised water fed directly back into the aquarium water can have a damaging effect on delicate gill tissues in both fish and invertebrates. *Very small* quantities of ozone are required to control growth patterns of both viruses and unwanted bacteria, so always err on the *minimum* not the maximum amount. Too much ozone can affect the essential nitrifying bacteria in the biological filter and a prolonged amount of ozone in the air can cause sickness and headaches. Ozone in a clean and well maintained aquarium can be very beneficial and can raise the Redox potential to a pre-determined level. If a Redox controller is employed however, the use of ozone can and will create a false impression that all is well. It will continue to adjust the Redox level irrespective of a deterioration in general water quality due to a malfunctioning biological filter. Accumulations of dirt and detritus can result in poor water flow through the filter. Ozone will help to restore the Redox level after feeding and I strongly suggest that if ozone is going to be used in the aquarium that a good quality Redox meter be purchased in order to monitor the desired levels. Using ozone in a deteriorating aquarium is irresponsible as the temptation is present to just keep 'turning up the

knob'! Ozonation is not to be 'played with' and is not absolutely necessary in the marine aquarium. The old maxim applies, 'when in doubt, leave it out'. Due to the inherent characteristics of the undergravel filters to gradually deteriorate in performance, the continued application of ozone should be avoided, whereas in reef type aquaria with an integral or remote life support system, which has a *controlled* means of removing detritus, a much tighter control over the oxidation/reduction process can be achieved. There are numerous advantages to 'stepping up' to this modern approach to marine fishkeeping which is only limited by the higher cost involved with the initial purchase of this type of system.

Heating

Glass Heaterstats should be situated near a power-head outlet or anywhere that the heat can be circulated around the aquarium. *Always* switch a heaterstat off by unplugging it at the mains supply before getting your hands wet or putting them into the aquarium.

Much more can be said about maintaining a improving the quality of water within marine aquaria, particularly in relation to the modern *Hi-Tech* approach using external wet/dry trickle filters. I will endeavour to look at this in detail in future articles. I hope you find these comments useful, in the meantime

Happy Fishkeeping. □



Photo of Tropical marine fish



Photo by David Sands

Discus represent the ultimate challenge in fishkeeping

Discus Delight

Amanda Jane takes readers through the essential points to consider when planning to set up the ultimate display aquarium: a discus community

Few Aquarium readers will not have looked enviously at a display of discus at some stage in their fishkeeping hobby. Some will have already ventured successfully into discus keeping knowing how delightful it is to keep the 'King of the Amazon' in an ideal aquarium.

These days fewer discus are imported from the Amazon. Instead, many beautiful strains produced in the USA, Germany, Thailand and Singapore, are available to fishkeepers willing to spend expensive amounts for a high return in terms of pleasure.



TROPICAL FRESHWATER

Wild discus carry diseases; are almost always severely stressed during capture, export and retail; and require soft, acidic water conditions; together with copious amounts of live food in order to thrive. Farmed discus, however, are more adaptable to tap water conditions - appear less likely to break out in obscure infections - and seem to be less stressed by handling.

Different strokes

Mixing discus from different areas can be dangerous as one dealer discovered when mixing

German discus with newly imported Singapore red discus stock. It appeared that the German blue discus were less resilient to a certain bacteria than the Singapore stock and the previously healthy German discus suddenly became dark and quite obviously stressed. Isolation of the slightly larger German discus back in an original aquarium saw the problem resolved but not before the loss of two specimens!

Sometimes individual fish do not thrive in aquaria whilst others in the same conditions appear healthy and bright eyed.

This could indicate a

fish at the bottom of the pecking order which is being bullied. It could also be the first fish to succumb to stress related to an incorrect diet, poor water quality, disease, weak specimen - or even a combination of all factors. This dark bodied specimen should be rehoused into another aquarium containing a couple of small angelfishes to act as dither fishes.

Housing discus

Once the ideal aquarium is established (deep and fairly long) and the filters are mature (from an existing set-up or

transferred from a dealer's healthy system) discus selection can commence. The strong pecking order behaviour that exists in discus means it is preferable to introduce a group at the same time. If six or more juveniles are purchased from the same batch they are likely to be brother and sister and this may not contribute to good off-spring should a

A shoal of discus at the centre of a healthy fish community



Photo courtesy of Tetra Information Centre



Both photos by David Searls

A breeding pair of discus

- ▶ spawning occur in the future. Different discus sizes can be introduced together although the larger fishes will take charge of the aquarium territory and food.

The addition of wild stock with domesticated discus should not be attempted unless full confidence in keeping discus has been achieved.

Despite the advice and offerings of some 'discus experts' I have found it useful to include more

robust, healthy feeders in amongst new discus introductions. These 'pushy' fishes, such as young severums or angels will rise for food almost immediately and this can 'give' the more nervous discus some encouragement to feed. As these fishes grow and become too boisterous at feeding times they can be removed, healthier and larger, and sold back to the retailer!

Ideally the aquarium should be lit on one side only - shade a grolux tube at one end if a dark/light effect is difficult to achieve

in an existing system.

Add a good sized shoal of six to eight *Corydoras schwartzi* or such like

It is advisable to give newly introduced fishes a day or two in room light and darkness

species and any excess food which may fall to the substrate will soon be eaten.

It is always advisable to give newly introduced fishes a day or two in room light and darkness in order to encourage the newcomers to investigate and discover their new territory and 'positions' within the group.

With so much opinion about 'ideal water condition' chemistry I would hesitate to offer exact conditions. A temperature range between 79-82 degrees F and a pH range between 6.8-7.5 has worked well for me. Too hot aquarium water combined with too low pH will reduce oxygen levels

to stress inducing conditions. A neutral pH combined with 80 degrees F will see domesticated discus through captive life.

A low hardness can be achieved by mixing rain water with tap water if you do not live in a reservoir served area. The mix should never be greater than 50-50% and ideally should be 75% tap water/ 25% rain water, which should be aerated before use.

There are also many ideas on filtration. I have had great success with external power filtration and a light scattering of river sand on the substrate (no undergravel). I usually combine an external filter with a trickle system above the water level. I *always* aerate the aquarium

separately using a reliable air pump.

Discus diet

I believe in feeding discus a little, often. It is possible to feed growing discus ten times a day without

wild fish and will thrive on shrimp, bloodworm, carnivore flake and chopped earthworms. However, Beef heart, used excessively in high temperature aquaria, is a source of severe bacterial fin rot, etc. and should not be relied upon as a sole protein source.

It is essential to monitor the pH and *nitrites*. A fall in pH or a rise in nitrites indicates the need for a good sized water change. Store fresh water overnight in a barrel.

In future issues of Aquarium other fishkeepers will write about breeding discus, disease treatment and wild strains. In the meantime your contribution/ comments would be appreciated. □

There are many ideas on filtration

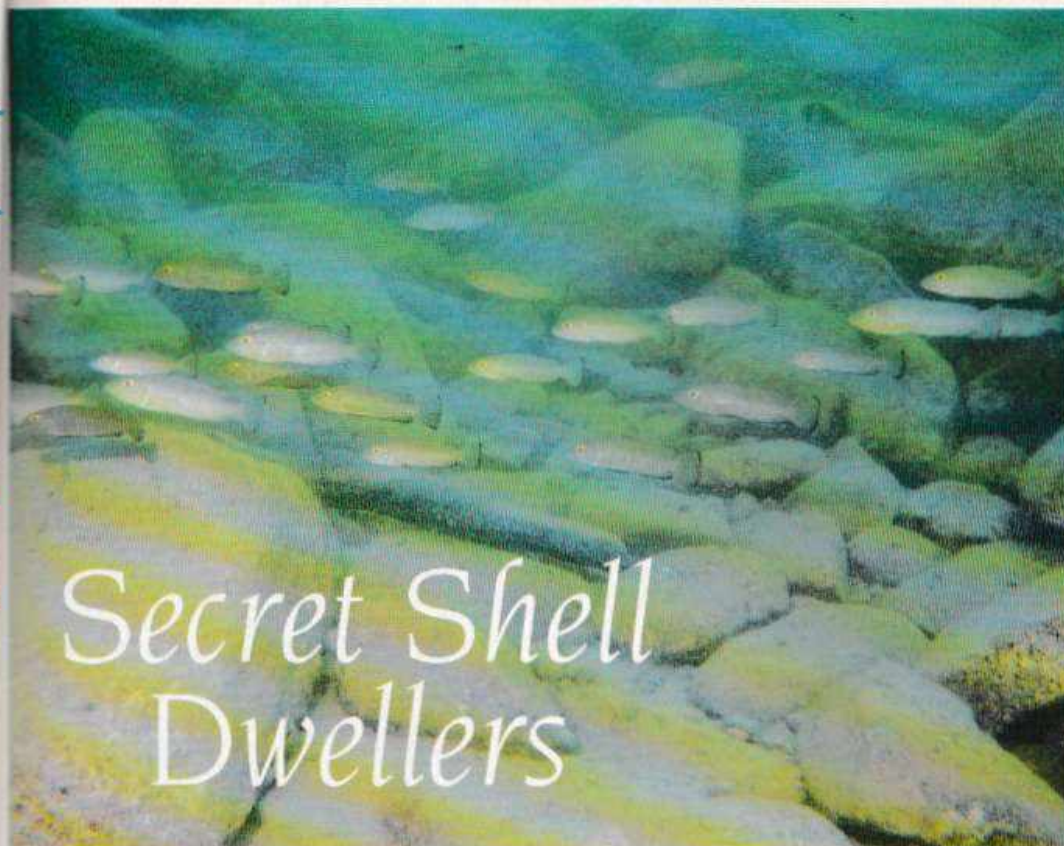
overfeeding. Small amounts of a rotated diet will encourage good growth.

Domesticated strains are generally more adaptable to foods than



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Lamprologus callipterus school in large packs and devour everything in sight

Ad Konings, cichlid expert, examines a special group of fishes that need 'a shell for a home'

Lake Tanganyika, one of Africa's rift lakes and second deepest lake in the world, is best known for its rich assembly of cichlid species. Almost all cichlid species present in the lake are endemic in that they are not found anywhere else in the world. The Lake is geologically very old—it has been estimated that it developed more than 20 million years ago—and was, from its early stages, isolated from the other drainage systems in Africa. Over millions of years the fauna of the lake has developed, independently, into the rich and varied aquatic communities known today.

About 200 cichlid species are known to inhabit the lake's waters, most of them specialized for a certain environment. The great number of different species found at

any particular locality suggests that many different niches were developed. A niche can be understood as the environmental requirement or compatibility of a species; it encompasses characters such as structure, type of food, depth and the type of spawning-site, etc.

As regards the brooding technique, the cichlids in Lake Tanganyika can be divided into two main groups: the substrate guards and the mouth-brooders. All substrate guards affix their eggs onto a hard, mostly rocky, substrate and hence are mostly found in a rocky environment. The majority of the substrate guards are small species and need the protection of the caves amongst the rubble and rocks. Except for some larger fish predator species, all substrate guards are cave brooders. Not only for breeding purposes but also for their own protection (and that of their offspring) these cichlids need the security of the caves and crevices that such an environment provides them with.

A shell for a home

In general, the shell of a mollusc degrades (a better way of saying it dissolves) rather rapidly after the animal has died. However, in Lake Tanganyika, because of the high water pH (alkalinity) a rapid degradation of the empty shells is prevented. To preserve them further more calcite is deposited onto the shells making them thick and hard. Only mechanical degradation of such calciferous shells occurs. This means that empty shells provide a home for any fish that is able to fit in it. Although there are many different species of molluscs in the lake (most of them endemic), only a very few species are large enough to offer shelter, when empty, to cichlids.

Empty shells are thus an equivalent to the caves among the rocks and shell-dwelling cichlids are 'cave brooders' as are most other substrate guards. Empty shells, mainly of the snail *Neothauma tanganyicense*, are, however, found only on the sand and rarely among ►

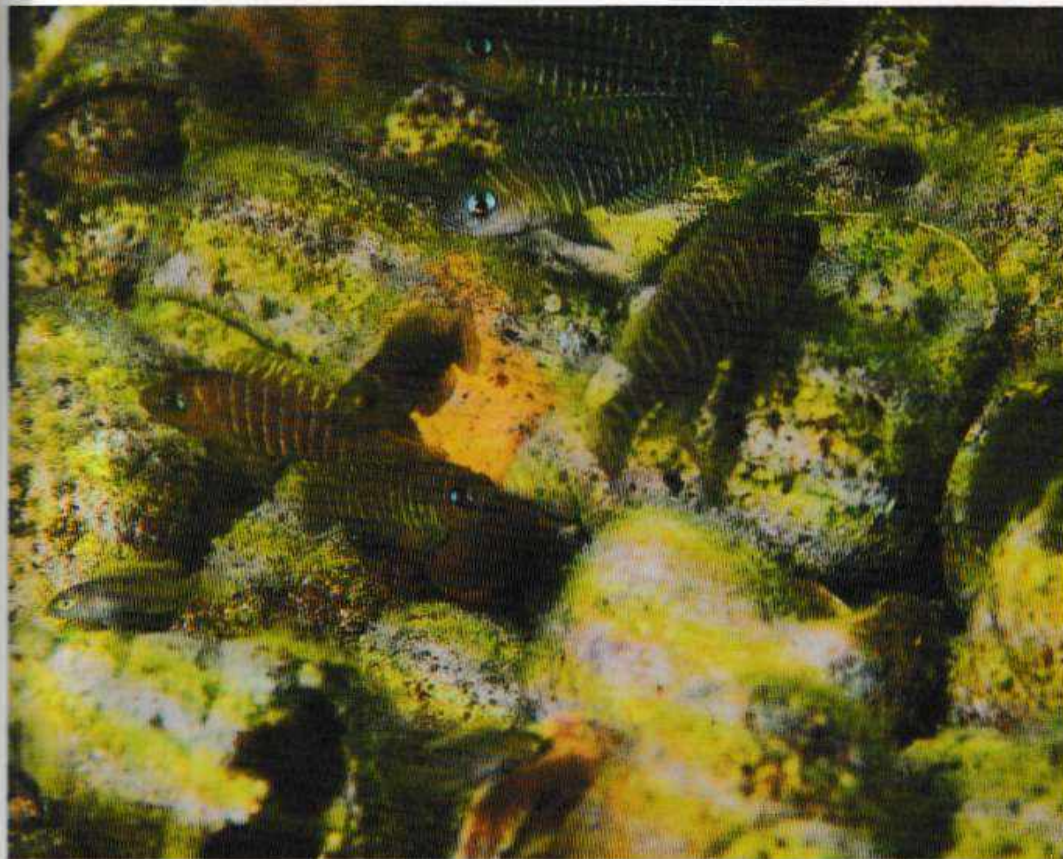
THE WORLD OF CICHLIDS



Neolamprologus brevis, a pair hovering over their communal shell



Lamprologus ocellatus



Neolamprologus multifasciatus, a colony at a depth of 25 meters near Cap Temboe, Zaïre

► the rocks. At many places, especially in regions deeper than 20 metres, large accumulations of empty and partly crushed shells provide a calciferous "rocky" habitat for a group of small, cave brooding cichlids.

Three different shell-biotopes can be distinguished. The large accumulations understandably offer the greatest living space but usually only one species dominates in the communities inhabiting such habitats. Most shells in such beds, which can have a thickness of more than one metre, are "glued" together by calciferous deposits.

A second shell-biotope consists of loose shells grouped together in a normally shallow habitat. During my survey I found such groups mostly in the upper 15 metres. It is possible that such shell arrangements are made by a cichlid (see later).

The third type consists of single, empty shells lying scattered on the sandy or muddy lake floor. These are normally found at depths deeper

than 15 metres.

The most important "requisite" a cichlid needs in order to profit from the protection an empty shell offers, is a size small enough to fit into it. As mentioned before, empty shells are found on the open sand, an area which would make easy prey of a small cichlid. There are species of which only the females are small enough to fit inside the shell whereas the males, usually considerably larger than the females, have to find shelter at another location.

Two shell-dwelling cichlid species are known of which only the females live inside the shell. The males, usually grouped in large packs, roam through the intermediate sand and rock habitat where they find protection in a shoal. Single males need the protection of the caves among the rocks. This may be the reason why females of these two species, *Lamprologus callipterus* and *Neolamprologus calliurus*, live in shells that are close to or in intermediate habitats. Females of

these two species never leave the protection of the empty shells. Males of *N. calliurus*, which can grow to a size of about 10 cm, visit the females (maximum size between 3 to 4 cm) and fertilize the eggs that a female deposits inside her shell. Juveniles remain at close range of the protective shells. Young females try to obtain an empty shell whereas males spread over the biotope, usually in groups. Although I have observed males defending a few females against competitive males, it doesn't look like that males hold territories for a long time.

Males of *L. callipterus*, however, defend their harem against conspecific males with great devotion. A loose set of empty shells near or in an intermediate habitat is normally defended by a large male *L. callipterus*. Males can grow to about 12 cm in length. Competitive males try to steal females from a territorial male in which they carry a shell with a female inside to their own territory! It is understood that a single shell ►

THE WORLD OF CICHLIDS



Neolamprologus calliurus, a male. This species is better known as "*Lamprologus Magara*"



Neolamprologus calliurus, a female near the same shells of the previous photo



Lamprologus callipterus, a male watching over its harem. In the right bottom part of the photo the tail of a female hiding in the shell is visible

with a female inside is quickly added to the collection of a male. It is therefore possible that such assemblies of loose shells are caused by the possessive nature of *L. callipterus*, which is a very common cichlid in the lake.

Single, isolated shells are inhabited by species of which the males are small enough to fit inside these as well. *Lamprologus ocellatus* is well known among aquarists and is such a small species. Males and females each have their own shell. Males have territories in which they protect the females against other males.

Although a shell provides a very secure protection against predators only large catfishes are known to crush such large shells and then only those in which a snail is present.

L. ocellatus hides its chosen shell under the sand. Male as well as female position the shell with the opening facing up and then scatter sand over it to conceal it from view. The entrance is cleaned of sand and remains the only visible part of the shell. Other species conceal their shells in a similar manner.

Members of another group of shell-dwellers dig a relatively large pit in which one (sometimes more) shell provides protection for the offspring. These species are monogamous and they use the empty shell mainly as a spawning receptacle. *Neolamprologus boulengeri* is known to be such a species. Males reach a size of about 7 cm whereas females remain about 5 cm in length. When disturbed the female usually takes refuge inside the shell whilst the male flees over the sand.

Neolamprologus brevis is the best adapted species for isolated shells. It is the only cichlid known thus far where both male and female reside in the same shell. Upon danger, the female, the smallest of the two (maximum size about 4 cm), enters the shell first and is then followed by the male, who has a maximum size of about 5 cm.

During a dive, I have observed a seemingly empty sandy area, where a single shell inhabited by a *N. brevis* pair.

The large shell beds in the southern half of the lake are predominantly inhabited by *Neolamprologus multifasciatus*. This is the smallest cichlid known to date. Males of this species do not grow larger than 4 cm; females are rarely bigger than 3 cm. The many shells in this type of biotope provide ample



Neolamprologus boulengeri, a female

space for such small cichlids. *N. multifasciatus* has also been found among small stones in the rocky habitat and many are usually found. *N. multifasciatus* forms a community of many pairs whereby each individual has its own shell(s) in which it retreats when threatened. Juveniles, which are all born inside the female's shell, wander through the cracks, crevices and small caves of the shell bed and find refuge inside any shell they chose. Youngsters are tolerated by all members of the community until they reach maturity. Aquarium observations indicate that pairs always stay together, but new pair bonds can be formed when the shells are re-arranged.

Food for thought

Shell-dwelling cichlids are predators, many of them feeding on plankton passing by the shells, others feeding on small crustaceans crawling over and in the sand.

Allotamprologus sp. "Sumbu Shell" is a small species, closely related to *A. compressiceps*, which inhabits empty shells often near colonies of *N. multifasciatus*. It is a piscivorous shell-dweller feeding on juveniles of other shell-dwelling cichlids.

There are also facultative shell-dwelling cichlids. These species use an empty shell only to protect their eggs. Some of these species are: *Neolamprologus caudopunctatus*, *N. leloupi*, *Telmatochromis brichardi* and *Lepidiolamprologus attenuatus*. The last species sometimes deposits eggs on the outside of the shell. The juveniles find protection inside the shell during the first phases of their life.

Aquarium Life

The shell-dwelling cichlids from Lake Tanganyika are among the easiest to keep in an aquarium. As may be anticipated they need very little space. Most of them can be housed together with a community of other

cichlids. The only need they have is at least one shell for each individual (except for *N. brevis*; here one shell for each pair is sufficient). Often the original *Neothauma* shells are available with the purchase of the wild caught shell cichlids. Snails (French escargots) or just their shells are available from some delicatessen shops. *L. ocellatus* requires a sand or fine gravel substrate to conceal its shell while *N. multifasciatus* digs so much that after a while all shells lie on the glass bottom of the tank.

They can be fed on a wide range of foods spanning shrimp and various fine blended crustaceans, bloodworm, finely chopped earthworm and a good flaked food.

All imported species have been spawned in captivity and there seems to be no special trick required, apart from the right-sized shell, to induce breeding in these little fishes. They have proven to be a valuable addition to the cichlid aquarium. □



Corydoras araguaiaensis or known as 'harald schultz' until Aquarium editor, David Sands, described it in 1990.

Cats from Brazil

David Sands continues his comprehensive review of *Corydoras*. The most consistently popular of all aquarium fishes

Corydoras are not only popular with fishkeepers but also with scientists. Over the past few years at least ten new species have been discovered and some of them described by fish researchers.

One such species *Corydoras araguaiaensis*, (described as a new species to science by me in 1990) was mistakenly known to fishkeepers as *Corydoras haraldschultzi* for many years.

When the true *Corydoras*

haraldschultzi (first known to scientists in 1960) was imported into Europe from the Rio Guapore river region in the Brazilian Mato Grosso over five years ago, it was soon apparent to researchers that the catfish previously known and sold under the name 'haraldschultzi' was in fact a 'new', scientifically undescribed, species from the Araguaia river north of the Mato Grosso. Even now in some books and articles the two species are confused.

Once established in aquaria the Araguaia catfish is a superb community fish and will spawn in a healthy well-planted aquarium. They thrive on a diet of flaked food, finely shredded shrimp and bloodworm.

Corydoras armatus from

Peru, has rarely appeared in fish exports from South America. Its distinctively elongated dorsal spine makes identification a little easier than unusual in such a large group of species.

This small, 35-40 mm long species might be confused with a fairly new species, *Corydoras loretoensis*, a short spined species, which I will deal with when we get that far down the alphabet!

Corydoras amphibelus might be an imported species but the original, century old description is extremely difficult to link with species imported from Peru.

Snouted catfishes

There is a natural sub-group within the genus *Corydoras* and all species within have one distinctive characteristic in that they possess a long snout in comparison with other species. Scientists refer to them as the 'Acutus Group', a reference to *Corydoras acutus* a Peruvian long-nosed species featured in last month's issue of AQUARIUM.

Corydoras amapaensis is another 'snouted' species which belongs to the 'Acutus Group'. This species, from the Amapa region of Northern Brazil, varies more in body colour pattern than almost all other *Corydoras* species known. When it was first described to science the newly discovered specimens (illustrated in the scientific paper) displayed many of the variations. A colour form which displays an eye mask/dorsal lateral band has been bred on several occasions by aquarists.

The Amapa catfish enjoys live food (sometimes contaminated with leeches and parasites) and freeze dried tubifex, frozen bloodworm and shrimp, etc.

The original specimens of *Corydoras blochi*, yet another species belonging to the 'Acutus Group' of long snouted *Corydoras*, were collected in a tributary of Rio Tacutu (the Rio Branco system) and measured 37mm. Other material in museums has been collected in the Rio Orinoco system, Venezuela and from the Rio

THE A-Z OF AQUARIUM CORYDORAS



Corydoras blochi, secretive, but unusual for the catfish aquarium

Branco system, Rio Solimoes, Rio Amazonas, Brazil. There is a range of patterning in imported specimens with one kind being referred to a *Corydoras blochi vittatus* although this form may well be classified as simply a population form.

The snouted forms of *Corydoras* are sometimes spawned in aquaria although

the number of eggs and egg size are small by comparison with most species. In some species the egg numbers can be lower than twenty eggs in a single spawning which is low when compared with many smaller species. *Corydoras zygatus*, comparable in size with Bloch's catfish, can produce over 500 eggs in a single egg laying period!

Bader's and Bond's catfishes

Corydoras baderi could easily be confused with *Corydoras nattereri* from Southern Brazil because of the short lateral line pattern but this species occurs in Northern South America, being documented from Surinam rivers. Although rarely encountered by fishkeepers some specimens

have turned up in imports from time to time. They are undemanding in terms of water chemistry but prefer not to be included in extremely acidic water.

Corydoras bondi bondi: Bond's catfish, was originally collected by its namesake in the Rio Yuruari in Venezuela. The largest specimen measured about 35mm. It is not as popular amongst ➤

Corydoras baderi, rarely seen outside of home waters



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THE A-Z OF AQUARIUM CORYDORAS



Corydoras armatus. Easy to distinguish from other species because of its high dorsal spine

► catfish enthusiasts as the sub-species *C. bondi coppenamensis* which is thought of as more attractively pigmented.

Although the largest specimen of *C. bondi coppenamensis* collected measured 50 mm it is unlikely this size could be equalled by an aquarium

specimen. The easiest method to distinguish this species from *C. bondi bondi* is that the latter is not spotted as clearly on the head. Both species have been bred under aquarium conditions and the fry appear adaptable to a wide range of water conditions.

Brazilian bearded catfish

Corydoras barbatus from Southern Brazil, is perhaps the most beautiful species of *Corydoras* available to aquarists.

Imported specimens always appear healthy and superbly coloured but

sometimes they have been starved during the period of collection and export. It is important to examine the ventral region to check if the stomach area is not concavely grooved. It is important to avoid specimens displaying a hollow ventral especially if it is accompanied with red

Corydoras bondi, has been bred under aquarium conditions



THE A-Z OF AQUARIUM CORYDORAS



Corydoras barbatus (Rio Korm) males have distinctive cheek bristles

gills which is a clear sign of a serious bacterial infection. Larger specimens are more vulnerable than juveniles; the latter prove much more adaptable to life in captivity.

The two contrasting habitats for *Corydoras barbatus*, flowing boulder-littered rivers and acidic,

sand bottomed lagoon pools shows the adaptability of this species in nature.

The Rio de Janeiro form inhabits the flowing river environment and this white snout striped catfish prefers neutral waters with plenty of water changes. The Sao Paulo form appears to prefer soft, acidic waters

although it can be maintained and spawned in higher pH ranges.

Corydoras barbatus, known as the bearded catfish because mature males possess cheek bristles, thrives on a diet based around shredded shrimp and bloodworm with a dash of flaked food. □

● The data for this series is taken from *Catfishes of The World, Volume one (reprint)*, which is available in a looseleaf edition with supplements from Dee Bee Books, 4c Bannister Hall Drive, Higher Walton, Preston, PR5 4DE (0772 30869).

Corydoras amapaensis, a long snouted species sometimes seen in Brazilian imports





David Ford/Photo by D. Sands

Ponds For Pleasure

If you have thought about filling that space in the garden that would be just perfect for a pond then read on. Dr. David Ford, of the AQUARIAN Advisory Service, and David Sands, write a series about the joys and jobs that 'spill out' of owning a water garden

No matter how beautiful your garden might be, whatever its style or shape, if you add a pond and a few colourful fishes you are creating a very special touch of magic.

Part of that magic is light. The spinning patterns and reflections that play on shimmering water.

Include a fountain. Create a waterfall. Even water trickling over



WATER GARDENS



rocks adds another dimension to any garden - sound. The gentle, rhythmic melodies of moving water. Put the two together and the effect is stunning. You will find yourself spending many hours sitting by, looking at and listening to the new focal point of your garden.

Studying a pond can also be educational for children, especially the seasonal changes and the varied wildlife which a healthy pond attracts.

Creating a pond need not be expensive, especially if you can complete the basic work yourself.

Before you rush out, spade in hand, read this series of articles carefully. They will help you make the most of the potential of your garden and obtain the right kind of pond for your family; one that should provide many years of pleasure.

Type of pond

The first decision - before considering the size, style, or location of the pond is the type of pond and cost of the pond desired.

Basically there are two types of ponds - natural and ornamental.

Some gardeners enjoy the water and planting as the main feature - a natural pond. Others will want to see the fish clearly and close up and will obtain most pleasure from an ornamental pond. To watch beautifully coloured fishes darting through the water, playing and eating requires clear water. To achieve clear water it will need to be properly filtered.

Some people will be happy to have a bit of both - a natural pond with fishes and modest filtration.

Deciding which type of pond is wanted is very important. The style and depth and, of course, the provision you make for electrics and filtration will affect its location in your garden.

It is worth visiting watergarden centres, parks or even friends with ponds to help you find what would provide you with the most pleasure - and ponds are certainly for pleasure.

Where should the pond go?

Once the type of pond has been selected you should have an idea of where the pond must be located. Water has an attraction which draws the eye more than any other feature in the garden and it should therefore be used as a design element with discretion. In small gardens it is probably better to use a pond style in a formal way with other hard features such as sculptures. In larger gardens it is advisable to allow the pond to blend naturally into the landscape.

There are also a few basic rules you should observe. First keep your pond away from trees which lose their leaves. Fallen leaves quickly rot on the bottom of the pond and pollute the water. It is also best to look for a shady part of the garden. Too much direct sunlight, together with organics in the water, stimulates the growth of algae in the water.

If young children are allowed to use the garden you should ensure that the pond is fenced off until they ▶



WATER GARDENS

► are old enough to safely play alongside.

In order to consider the impact of the pond draw a scale plan of the garden showing all the existing features, including the house, paths and major planting. Take a few

If children are to use the garden ensure that the pond is fenced off until they are old enough to safely play alongside.

photographs from all angles to provide an overall view of the garden. Photocopy the drawing of the garden half a dozen times - and try various designs and locations

using the photographs to help visualise the effect, until the exact scene has been created. If you do not feel confident or the scheme appears too ambitious consider contacting a landscape gardener who will, for a fee, either design or design and build, your pond.

Building your perfect pond

If a sunken pond style is chosen then there is a choice of either using a pre-formed fibreglass mould or using a pond liner. The fibreglass mould is the easiest, but it can be about double the cost of a pond liner. There is a limit to the shapes and sizes of fibreglass ponds available.

In either case, the hole prepared should be slightly larger than the final shape and depth. In the case of

pond liners, which can be easily punctured by stones in the soil below, it is important that the pond liner is laid over a couple of inches soft-sand. Make sure that the edge of the pond is level all around by testing it with a plank of wood and a spirit level. When level, overlap the liner at least 9 inches over the edge before covering with edging stones or flag. If people are to walk on the slabs they should be secured in a bed of mortar.

The soil removed can be put to good use alongside the pool to create a rockery feature. It is essential to put the good topsoil to one side to be used as cover for the subsoil when the rockery is complete.

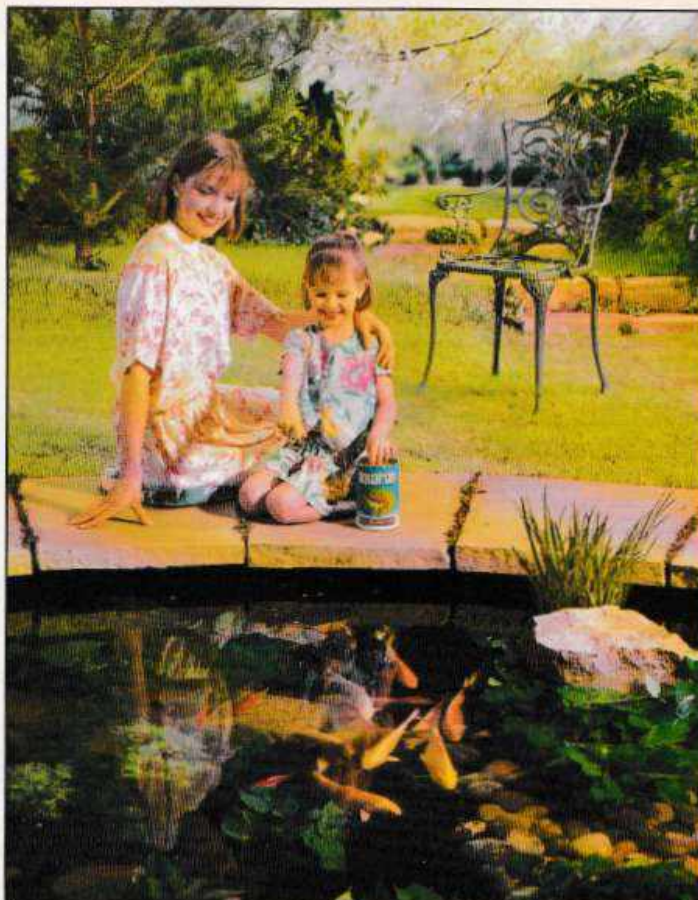
For a patio, or if the garden



WATER GARDENS

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Photos courtesy of the 'Aquarian' advisory service

a plank and spirit level.

The high level pond can be lined with butyl, again remembering to bed it down onto a few inches of sand.

It is best not to trim off the top of the pond liner until the pond has been filled. The weight of water will pull the sides down. The wall should be capped either with brick on edge, flat stone or capping block.

Studying a pond is educational for children, especially the seasonal changes and the varied wildlife a pond attracts.

The inside of a pond can be lined with a strong concrete mix. If you do this, remember to gently slope the sides outward to allow for expansion when the water freezes. The concrete mix should be reinforced with chicken wire and finally given 2 or 3 coats of a waterproofing paint.

At this early stage it is important to make provision for any electrical work or piping. External electrical work needs particular care and we advise that you use a qualified electrician.

This series is based on the AQUARIAN Advisory Service booklet 'Ponds for Pleasure' written jointly by David Ford and David Sands.

FURTHER INFORMATION

There are many books written on ponds and pondfishes and it is worth checking titles at aquarium shops or watergarden centres.

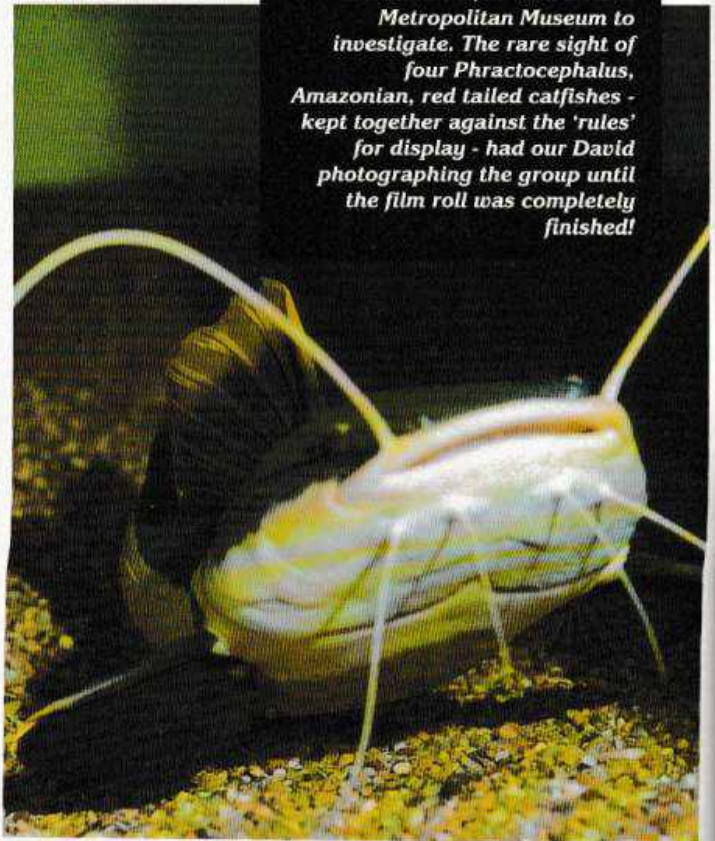
For specific information or questions contact the AQUARIAN Advisory Service, PO Box 67, Elland, W. Yorks, HX5 0SJ.

If you are really keen there are national Pondkeepers' Societies such as the British Koi Keepers Society, Midland Koi Association, Goldfish Society of Great Britain and the Northern Pondkeepers and Goldfish Society. Contact the AQUARIAN Advisory Service for addresses.) □



There is something very interesting going on at the Museum and Art Gallery in Bolton, Lancashire. Tim Henshaw, aquarium technician, encouraged AQUARIUM editor, David Sands, to visit Bolton Metropolitan Museum to investigate. The rare sight of four Phractocephalus, Amazonian, red tailed catfishes - kept together against the 'rules' for display - had our David photographing the group until the film roll was completely finished!

Red Tailed Catfish at Bolton Metro



The Red Tailed Catfish Club has published definite ideas about keeping more than one of these giant predatory catfishes together in the same aquarium. As a rule specimens kept together will fight continually. They are extremely territorial and can inflict incredible damage on each other when confined in a single aquarium.

The last few years has seen the import of hundreds of baby red tailed catfishes (two inch to six inch). The availability of these cheap and small specimens (previously wild caught specimens were large and expensive) has meant that even people with the smallest tanks can keep them and, worst of all, keep more than one if they have the inclination. This is situation is not too dissimilar to someone on impulse buying several St. Bernard puppies ignoring the factor of their eventual size!

Good retailers will always explain to the unsuspecting fishkeeper that red tailed catfishes can grow over three foot in captivity but that does not stop some people.

Public display aquaria

When it comes to display aquaria they are another 'kettle of fish' in that huge gallonage tanks are considerably less of an arena than modest sized home tanks. In large display systems juvenile *Phractocephalus* can be raised together even though a pecking order will eventually develop between the dominant fish and those beneath it.

Tim Henshaw recently provided the RTCC and AQUARIUM readers with some data on the four specimens Bolton Museum Aquarium are currently maintaining in a eight foot long, three by three foot aquarium.

On our editor's visit, David quickly noticed the pecking order between individual specimens in the group. He has reported that it was difficult to assess whether the dominant fishes were male or female.

When Tim offered the red tailed catfishes some food the fishes fed voraciously and after swimming around in a frenzy they were soon resting on the gravel with swollen stomachs full of beef heart.

(Note: The RTCC recommended diet for *Phractocephalus* is unshelled prawns, earthworms and trout strips or whole unboned fish when the catfish is semi adult.)

Bolton Museum Aquarium and its Red Tailed Catfishes

Bolton museum first acquired a red tailed catfish in July 1986. This was a 10" specimen bought from Aquatic Wholesale Supplies. There were many problems initially linked directly with settling the fish down and getting it to feed. After a few months of virtually starving the fish to allow its stomach to settle down, the feeding problem was solved and the fish started to grow. The catfish was maintained at a temperature of about 70 degrees F (this is cool compared to the RTCC recommended temperature of 80 F) and was fed on beef heart cubed twice a week.

The red tailed catfish was put on display and lived happily with a



Pseudoplatystoma fasciatum, *Collosoma bidens*, *Myleus argenteum* and four *Pterygoplichthys* species.

Unfortunately during aquarium refurbishment there was a power loss on the heating circuit resulting in the loss of all fish except the *Pterygoplichthys*.

The red tail was greatly missed by the staff and it was decided to replace it - as well as all the other fishes lost. At this time, March 1990, there were a lot of 'fingerling' red tailed catfishes available and it was decided to try and rear four to sexual maturity in the same tank.

Baby reds

On the 6th of March 1990 the museum aquarium acquired four 1.5

inch long red tailed catfishes. These fish have now been kept together for over a year. They are now over 12 inches long and have developed their distinctive red tails.

The catfish were acquired from Wigan's Pier Aquatics via Chester Zoo. They were housed in a 4ft tank for one month and fed initially on live daphnia followed by frozen blood worm and frozen 'mysis' shrimp. During this period the catfishes were fed daily and kept at temperatures of about 78-80 degrees F. At this time the catfishes showed definite aggression during feeding time. Each fish had its own den plus a certain area in which it foraged.

At this stage in rearing the catfishes were not given much cover - just 2 to 3 small stones to sit beside or under. The substrate was pea gravel with under-gravel filtration employed.

April move

At the beginning of April 1991 the four catfishes were moved to a 5ft x 15" x 18" tank. Again they were given very little cover, merely a few rocks in strategic places. It soon became apparent that the fish preferred to shelter under something.

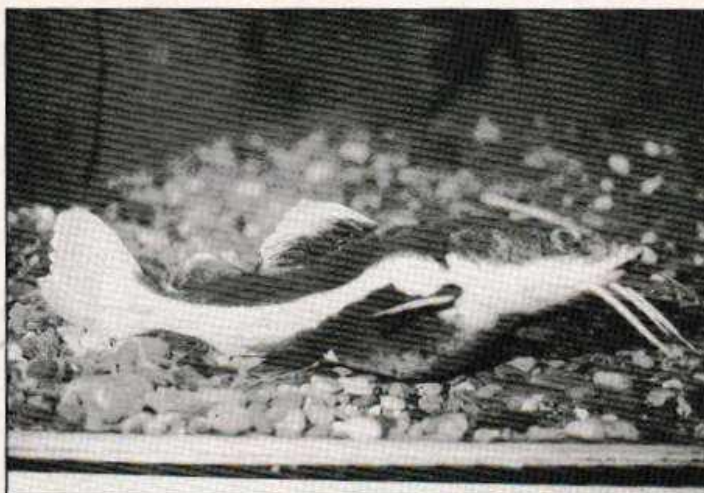
At this time the fish were still being fed on frozen mysis shrimp on a daily basis.

During the early part of May the growing red tailed catfishes were introduced to fine minced beef heart to which a 'vionate vitamin supplement' was added. By the end of May the catfishes were sufficiently large enough to require a 6ft x 2ft x 2ft tank.

Over the first month behavioural patterns suggested certain catfish preferred certain tubes

The new aquarium contained a pebbled substrate. In this system undergravel filtration was not used instead an external power filtration (Eheim 1215) used. A 10" air stone was placed at one end to ensure water circulation.

One problem was to create new, artificial and acceptable homes for the fish. Some time ago a similar problem at Bolton aquarium was solved (for lobsters) by using 4" diameter field drains. These were introduced into the tank and the red



tailed catfishes immediately took up residence. The field drains were placed in pairs in the shape of a 'V' so that the inhabitants could be seen and could swim in and out easily.

Over the first month behavioural patterns suggested certain catfish preferred certain tubes. Often two red tailed catfishes, occasionally three, would be found in the same tube. By now the catfishes had grown in

excess of 8" long. They were now fed three times a week on minced beef heart, each piece being about 1cm cubed.

By early October we noticed that while one fish could easily fit into a single tube, two fish together found the land drain diameter a rather tight fit. One catfish was injured attempting to fight its way into a drain already occupied by another. The eventual

solution was to employ larger bore drain tubes. The up graded tubes are 9" in diameter and allow for all four red tailed catfishes to enter into one tube if they find the need to do so.

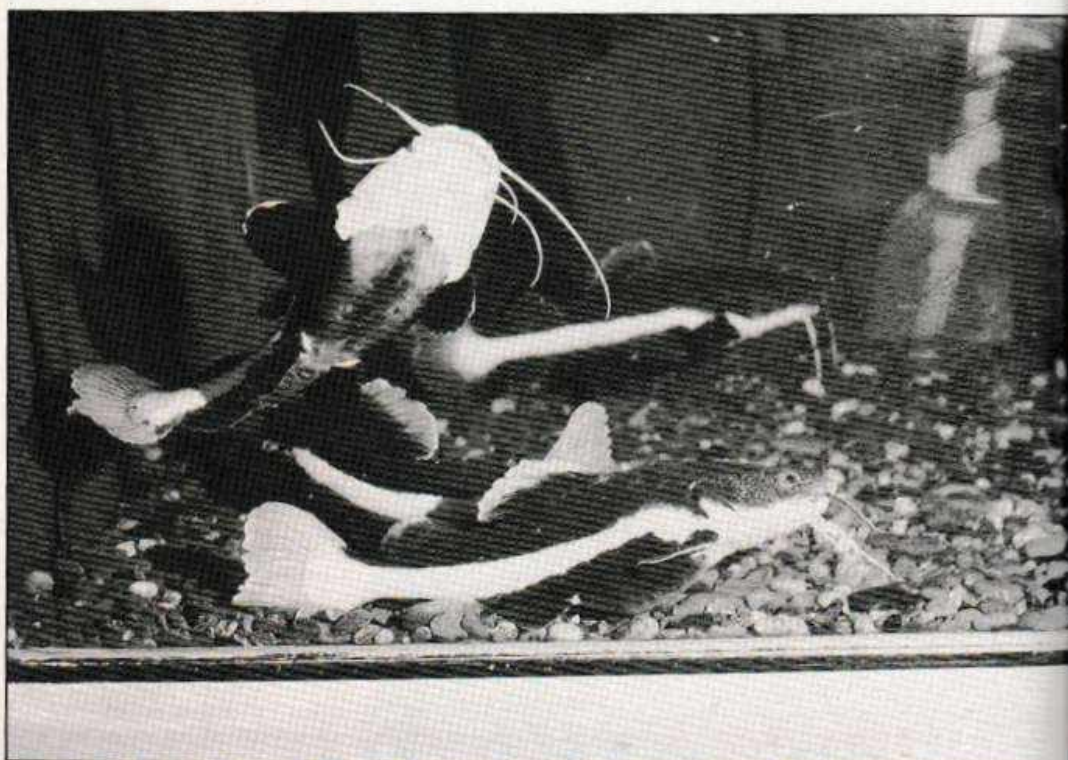
The aquarium layout was also changed in that two tubes have been put together to form a 9" x 24" cave.

General catfish information

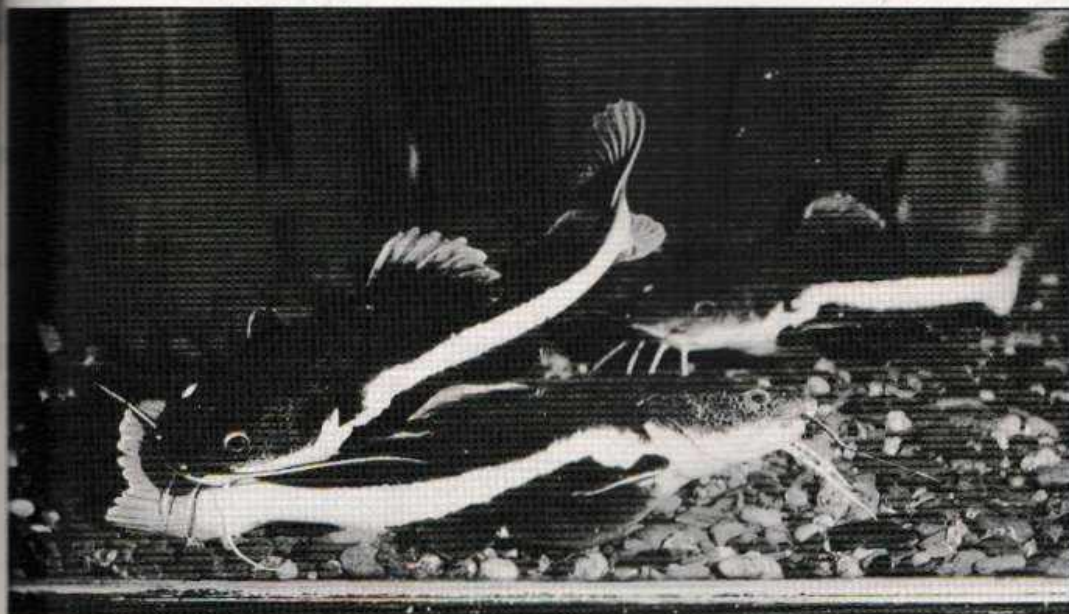
There are two red tailed catfish colour types of the four specimens maintained at Bolton Museum. Two display a jet black body coloration whilst the other two are slate grey with pronounced black spots on the

Maybe an organisation like the RTCC needs to look into the possibility of returning some of these catfishes back to nature

head. This colour difference, according to 'Exotic Tropical Fish Loose Leaf Edition' could be used to determine that we have two males and two females. The catfishes have only just developed their distinctive



AQUARIUM FACTFILE



'red tails'.

The aquarium temperature is maintained around 76 degrees F. Bolton Museum have a deliberate policy to maintain lower temperatures and not to attempt to grow fish too rapidly.

The reason behind feeding beef heart/vitamin supplement and not fresh fish is purely on the grounds that at some time or other these fish are to be mixed with other fishes and the red tailed catfishes must not be encouraged to eat them!!

Tim Henshaw: The interview

Finally, Tim was asked to respond to the following questions by the Red Tail Catfish Club survey editor:

On keeping more than one red tailed catfish in the same aquarium:

David once wrote in a magazine article that other territorial pimelodids, such as *Pimelodus pictus*, could not be kept in pairs because of aggression but groups are fine because no one individual can dominate another.

On the subject of feeding beef heart:

'Our policy of feeding of beef heart with vitamin supplement is often criticised as being unbalanced. In view of the fact that our Piranhas are fed solely on beef heart and are now fourteen years old (a possible record for Piranhas!!), there doesn't

seem any reason for us to change our feeding regime.'

Should RTC's be kept in Aquaria:

'In our opinion there is no black and white answer to this. Certainly there are probably too many red tailed catfishes available in this country at the moment, and in the next few years, there will undoubtedly be a lot of very big fishes that need new homes. Maybe an organisation like the RTCC needs to look into the possibility of returning some of these

*As a rule
specimens kept together
will fight continually*

catfishes back to nature, although this idea is not necessarily the right choice if the fish are not perfectly healthy. Diseases could be introduced to an ecosystem where they normally do not exist and this at worst could lead to an ecological disaster.

The other side of the argument is that a healthy red tailed catfish is a very impressive and majestic fish which does generate a following amongst fishkeepers. This interest could be channelled in the direction of conserving the South American river systems. The data accrued could be used in the future to prevent the red tailed catfish from becoming extinct.

If juvenile red tail catfishes had not been available in quantity, as they are at present, Bolton museum would never have acquired four specimens and grown them on. Without captive records provided by ourselves and other people in the RTCC survey useful information would not be available.

What is probably required is that the few irresponsible 'fish keepers' - who attempt to confine this potentially large catfish in small systems - should be prevented from keeping the red tailed catfish and, for that matter, all fish! This statement can easily be disputed.'

● Information

For any AQUARIUM reader who may wish to view our red tailed catfishes they can be seen at Bolton during the times stated:

Bolton Museum and Art Gallery, Le Mans Crescent, Bolton, BL1 1SE
Tel: Bolton 22311 ext 2191

Museum Opening Times:

Monday, Tuesday, Thursday, Friday - 9.30am-5.30pm, Saturday - 10.00am-5.00pm

Closed Wednesday and Sunday
Admission is FREE

Details of the RTCC can be obtained from Amanda Jane, at Dee Bee Books 4c Bannister Hall Drive, Higher Walton PR5 4DE, Lancs. Please enclose a stamped addressed envelope. □

Photo CALL

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

freshwater tropical unlike most other species of puffer fishes which inhabit waters with a tidal influence.

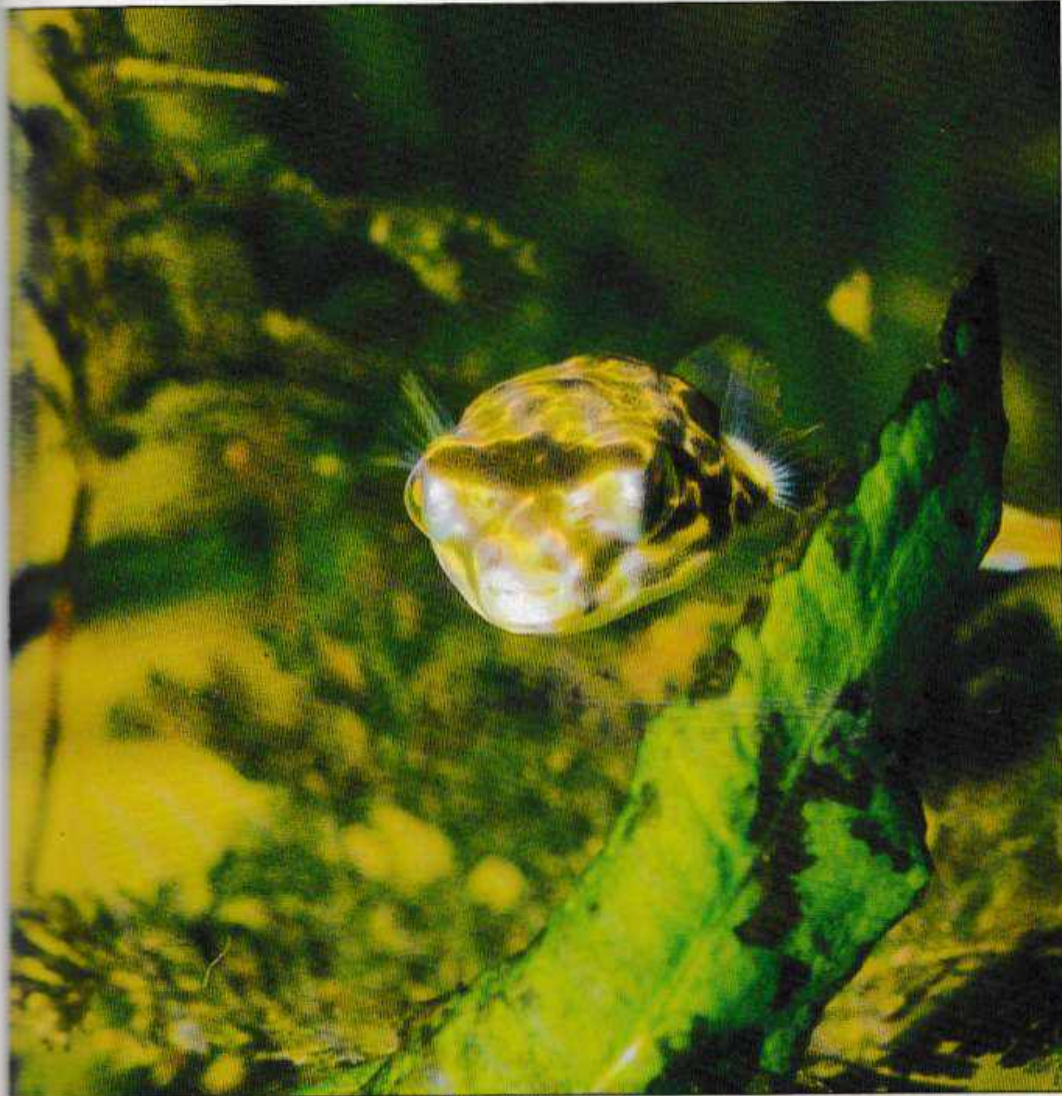
The Zaire puffer is not robust and would suit an aquarium life amongst peaceful similar sized fishes. They enjoy shrimp and bloodworm and a planted tank.

Few fishkeepers look for freshwater puffer fishes in retail shops even though they are very popular with members of the fairer sex, who, for reasons best known to them, seem to find them cute. Perhaps there's something in mothering an Extra terrestrial?

Tetradon schoutedeni, known as the Zaire puffer, is said to grow a little over four inches. This 'cutie' is thought to be truly

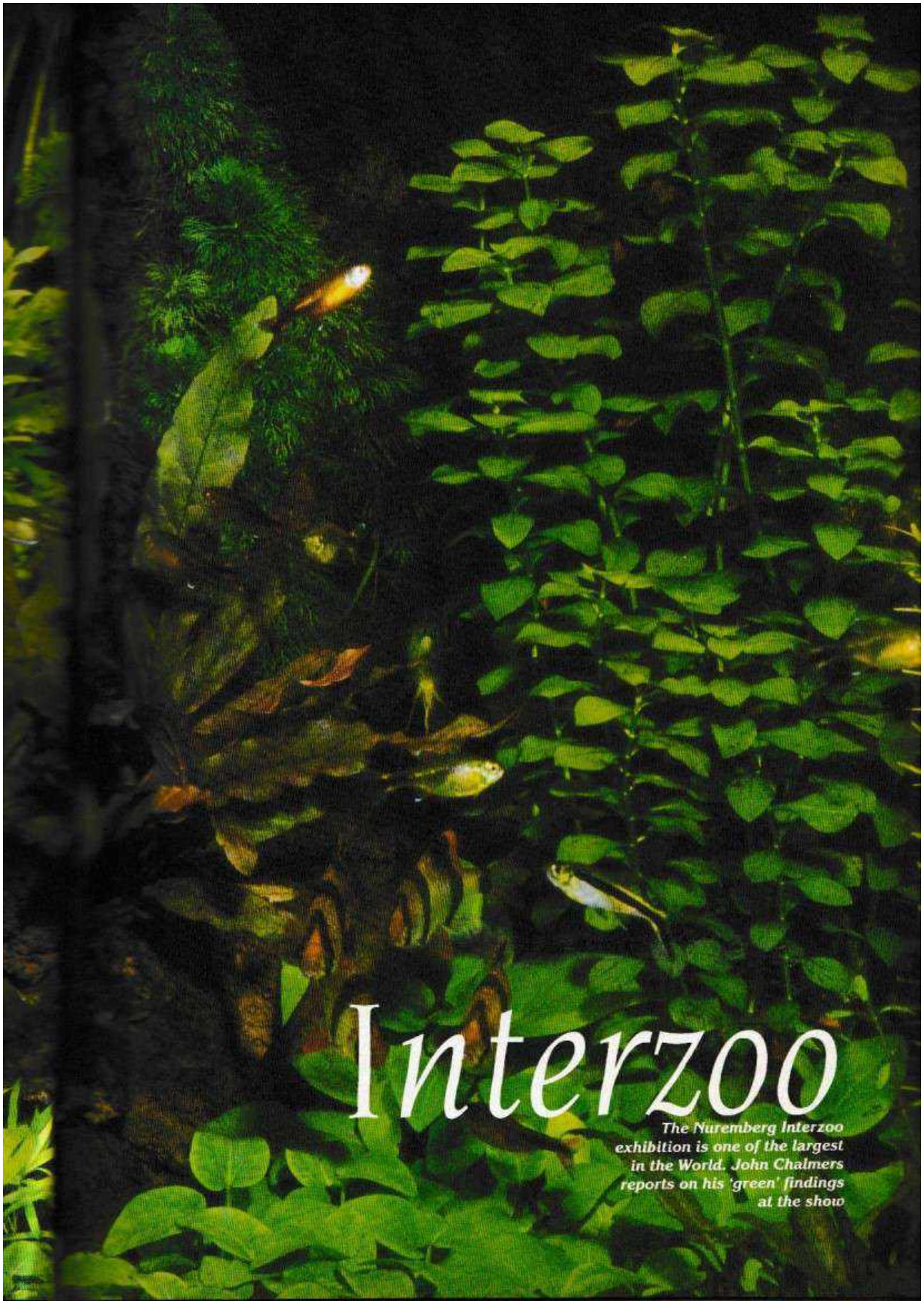
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E.T.'s got nothing on me!





Interzoo

The Nuremberg Interzoo exhibition is one of the largest in the World. John Chalmers reports on his 'green' findings at the show



The Interzoo exhibition at Nuremberg is held biannually and attracts the leading manufacturers, fish/plant producers and general visitors from all over the world. This year there were seven halls and, by ignoring pet product exhibitors, I only just managed to get around the aquatic exhibitors in two days!

I am pleased to report that the new products on show were of a high quality. Several manufacturers are now offering CO₂ systems. An Italian company, TFJ, had a very reasonable range of CO₂ cylinders, regulators and diffusers. The makers of cation- and anion- exchange systems, Aquatechnic, had a novel device 'Zeomax' for making CO₂ using acid and limestone chips. But the prize must go to the fantastic range of aquatic plant systems and apparatus shown by the Dennerle company along with twenty new varieties of aquarium plant, I hope to receive samples and will let you know what my experiences with them are.

Dupla had a magnificent stand, they were of course forerunners in plant systems utilising CO₂. I spoke to their sales manager and their new policy

means it will be easier for aquarist shops in the UK to stock their goods. Let's hope they can make a come back to give us more choice.

Tropica from Denmark also had some new plants but these had already been launched at Aquarama in Singapore last year. Another company, Gula, also had an impressive display of plants.

I was particularly pleased to see that a British company, Arcadia, has brought out a new lamp using 125W mercury vapour lamp which promises to sell at a reasonable price. Their previous lamp, the 80W Floraset, was never adequate for aquarium plants.

New doesn't always mean better

Now here's a funny thing: thirty years ago aquarists used tungsten filament lamp bulbs and had good results with their plants. Then along came the lavender- coloured lamps with a name promising luxuriant growth, but always failed to deliver. I am pleased to say that there is now a swing back to tungsten, using the little 24V/50W dichromic reflector lamps. These are compact and

will run on readily-available transformers sold for household ceiling lighting. Tests in Germany have shown that these lamps give excellent plant growth without stimulating algae. The Dennerle company displayed a large range of decorative lamp fittings. They also introduced a range of fluorescents with a light spectrum balanced for aquarium plants. The trap British aquarists have fallen into is that a fluorescent marketed for both freshwater and marine aquaria has a high blue content which is ideal for marine algae – but aquarium plants aren't algae! Surprise, surprise when your plants get covered in algae!

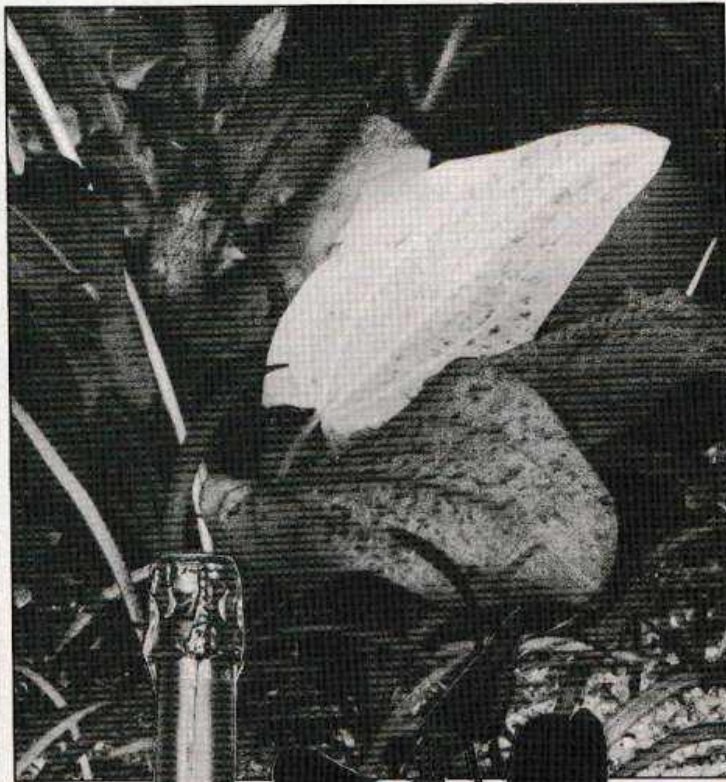
The new Dennerle Trocal 3085 tubes are available in 18", 24" and 36" sizes, but, regrettably, not in the useful 30" and 42" sizes.

Green Leopard

I promised to give some useful information on *Echinodorus schlueteri* variety Green Leopard in last month's column.

This plant was originally developed, in what was formerly East Germany by a

AQUARIUM PLANTS



...enthusiast, Hans Barth, in 1989. It was introduced to the hobby by Ludwig Zimmerle at the 1990 Interzoo exhibition. From one of the few plants available at the time, I was given one cut from this "mother" plant. I have been able to raise, from runners, sufficient plants to satisfy the existing demand. The *Echinodorus* cultivated is, of course, related to our common Amazon sword, *E. Bleheri*, known as *E. Paniculatus*. However the bright green leaves are certainly

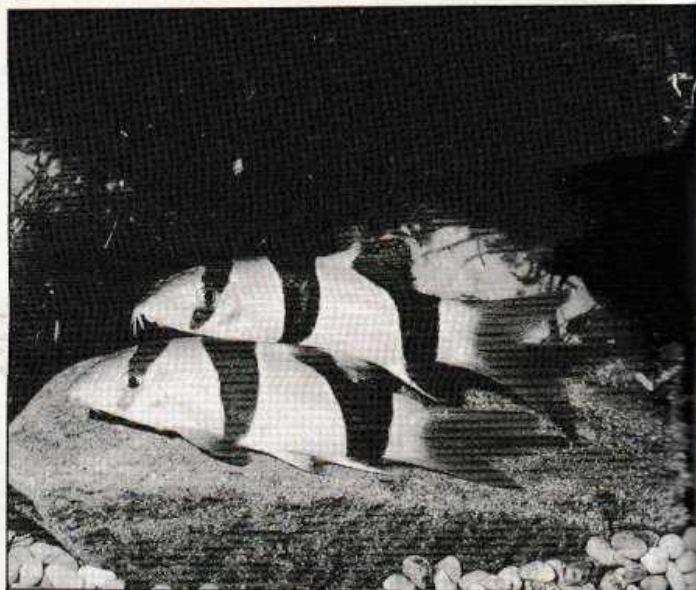
Such was the impact of the plant on the hobbyist in Germany that a variety of "Champagne" was named after it. Very nice, too!

If you have any comments or queries about the keeping of aquarium plants please drop me a line at: AQUARIUM, Green Issues, Argus House, Boundary Way, Hemel Hempstead, Herts. HP2

7ST. I am not able to deal with specific queries individually but will endeavour to cover as many items as possible in these pages. □

AQUA School

Most experienced aquarists quickly forget their own first slow steps into fishkeeping. Innocent questions such as "How does an air pump work," "Why does green algae form" and why shouldn't I just keep my fishes in pairs?" We've all asked simple questions at some stage in our aquarist life. Here, in Aqua-School, we can provide the nitty gritty answers for fishkeeping of all ages and all levels.



ARK SYNDROME

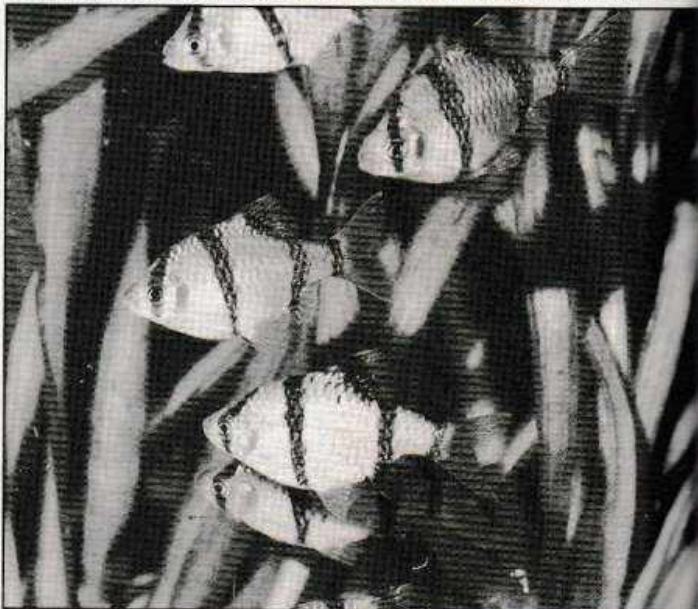
A term coined by the editor to describe the habit that some fishkeepers have of buying fishes two by two.

Shoaling fishes will always appear more impressive and the health of the group seems to be enhanced. Pecking orders and bullying is reduced because the 'one to one' situation is not allowed to occur.

Rather than filling a community fish tank with a multitude of different fishes it can be much more satisfying to watch a

large swimming shoal of one species as they weave in and out of the aquarium aquascape.

Most juvenile fishes prefer to live in groups with mature pairs forming at breeding times. Some territorial fishes such as *Labeo bicolor* the 'Red Tail Shark' will not tolerate another specimen in the same aquarium although it is possible to keep a group together in a large tank. see ● aquascapes ● community fishes



● Younger fishkeepers can write in to the editor with suggestions and we will not only provide prizes, but we will add suggested details to his series.

● Aqua-School wants to encourage pen pals, work experience in aquarium retail shops and give readers the opportunity to write their own columns. Send your letter now to AQUARIUM AQUA-SCHOOL, Argus House, Boundary Way, Hemel Hempstead, Herts. HP2 7ST.

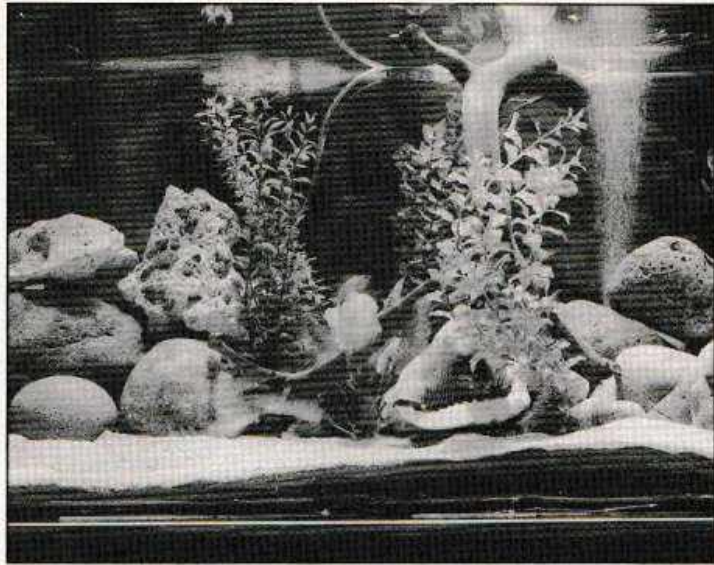
AQUATIC ADVICE

AQUASCAPING

Most aquarium layouts depend on natural nature in practical way. By using a combination of gravel, live and artificial plants, bogwood, branch wood surrounded boulders the interior design of an aquarium can appear natural.

It is possible to create an artificial natural lake scene in which different fish communities will behave naturally. Most aquarium books illustrate planting schemes and general aquascapes to help the reader decide the type of layout required to particular group of fishes. Specialised fish groups demand specialised aquascapes and it is essential that fishkeepers consult books related to the particular subject i.e., Lake Cichlids (boulder aquascapes) Discus (natural branch

- fish syndrome behaviour
- schooling fishes



AIR PUMPS

Air pumps deliver compressed air to the aquarium via plastic air tubing. They operate by a electro-vibrating arm design where the movement pumps a diaphragm side to side with the mains alternating voltage. The air is broken into smaller bubbles with the aid of airstones which can be small enough to fit inside an undergravel filter uplift tube or large enough to send a curtain of air across the back of a three foot long

aquarium.

There is a huge range small and large air pumps available to aquarists but it is always advisable to purchase a quiet and reliable product because of the importance of this piece of equipment to filter operation and fish health.

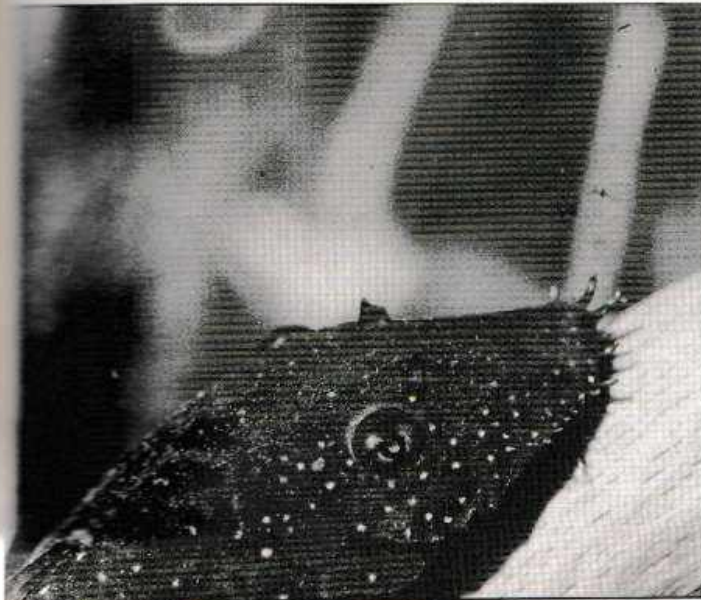
Some multi-tank fish houses and large aquatic establishments use a blower or air compressor to provide the necessary volume of air many aquaria require.
see ● fish house

ALGAE

Algae are single cell plants which can 'bloom' in the right conditions where there is plenty of light and an abundance of organic wastes including nitrogen in the substrate. Excessive green algae in aquaria suggests the lighting is too strong, on for too long or that natural daylight is reaching the aquarium via a window.

A certain amount of algae can be beneficial to aquaria in that it is an excellent surface for good bacteria to culture and these help to aid water purification through the nitrifying process.

Algae reducing chemicals are available although it is more natural to reduce the lighting and introduce algae-eating fishes into the aquarium. The best species are the South American catfishes of the genus *Ancistrus* (known as bristle nose catfishes) because they are peaceful, remain fairly small (4 inches average) and will not disturb other community fishes.
see ● lighting



In the silvery riverbank shadows a speckled rainbow trout holds position in the river flow. In a flash the trout slips round a granite boulder and travels into a deeper flow below the water drop. The angler watches as dawn lights the crest of pointed trees behind him. Some would argue that the fisherman, long in patience, short in conversation, has the best opportunity to understand the ways of fishes. How fishes travel in the river shadows and feed. Where they feel secure and why they should feel threatened out in open waters.

The hook

To the none 'angling aquarist' the fisherman is at odds with fishes although, even the most enthusiastic fishkeeper probably draws an imaginary line between ornamental fishes and our own native fishes.



Florida: 'oscar' caught in the Everglades (above).



One of the oldest cruelty debates is linked to hooking fishes. Do fish feel pain and if so, is this pain the same as that felt by higher animals including man?

As a fishkeeper of 25 years and an angler of none I can write that I am unsure of the exact position regarding both points. Many of my childhood friends enjoyed fishing. I simply enjoyed looking at captive fishes, in particular their spangling scales and feather soft fins. I even rescued bucket loads of fishes and newts from a local pit which had been pumped dry by house builders and released them into a pond which lay beside my home.

Fish fright

Fishes cannot speak, so only the flapping of captured fish as it leaves the

water - reeled in for sport - speaks of its struggle. From a fishkeeping point of view I have encountered a situation where catfish have remained against a heater element and in doing so they have received burns severe enough to penetrate the skin and make an impression in the body tissue. Would they do that if pain was involved?

Not withstanding such thoughts I do not believe any person should knowingly inflict stress on any animal.

Some excellent fishkeepers are anglers but can the two hobbies be truly shared by the same person or is one past time in conflict with the other?

Bruce Clarke, a keen Corydoras collector/breeder from Burnley, regularly takes part in match competitions in the UK and Eire. I have photographed many of his superb catfishes during

supplement production for *Catfishes of the World, Volume One*. His fishes receive the best care, food and maintenance.

Bruce would always be careful with fishes, uses a good quality keep net and less harmful hooks. Fishes would be gently returned to the water once they have been accounted for by officials.

Nigel Gerken, who joined me on the 'Aquarian' expedition to Peru in 1991, was a keen cichlid keeper and is a devout trout/salmon fisherman. Nigel bred many Malawi and Tanganyikan cichlids - some barely known to aquarists at the time and he searched out information wherever he could. His collection of fish-related literature would rival many retail establishments.

As a conservationist (a member of Greenpeace - as I am - and also a keen supporter of the Whale and Dolphin Conservation Society) Nigel wants to see animals protected for future generations. Can he equate fishkeeping with fishing?

Nigel can see a big difference between game fishing and keeping ornamental fishes. He believes that he learned a great deal about 'water' from angling, in that good fishkeepers learn to keep water rather than simply keep fishes, by observing nature.

'Fishing makes you aware of the environment, light, trees, water, animals, etc.' announced Nigel, carefully. 'I developed my fishkeeping skills alongside angling, and the two seemed to compliment one another.'

Fishing in Florida

When I stayed in Florida several years ago courtesy of Aquaculture - a fish farm specialising in the farming of Central American and African cichlids - had the opportunity to boat around the Everglades canal.

The local fisherman who escorted me was not as shocked as I was when the first catch I made was an adult oscar.

'Escaped from the fish farms during the floods!' announced the fisherman.

Four superb red oscars later I was wondering how many had actually escaped! Further catches revealed large sun Bass/Blue gills which do not interest most tropical fishkeepers. On a later expedition with my fish farm friends we could not catch a single specimen!

The fisherman was unimpressed with oscars. He thought these cichlids were slimy (a reference to the body mucus which is not quite as obvious on North American Native fishes) and all too easy to catch.

I was impressed with oscars as a game fish because they took the bait like a baby takes sweets!

DEBATE

I have not published the pictures because I believe most keepers would hate to see their prized cichlids on a hook. As a fishkeeper I did not feel any harm had been done to the oscar, probably because they should be endemic to South America and available in Singapore imports as farm bred fish. The reason for publishing my pictures could be to record these cichlids as they succeed into Florida waters. They really record *Hypostomus* and *Criclidichthys* species (buckermouth catfish) which have also escaped the Florida fish farm dirt ponds and *clarias*, the walking catfish.

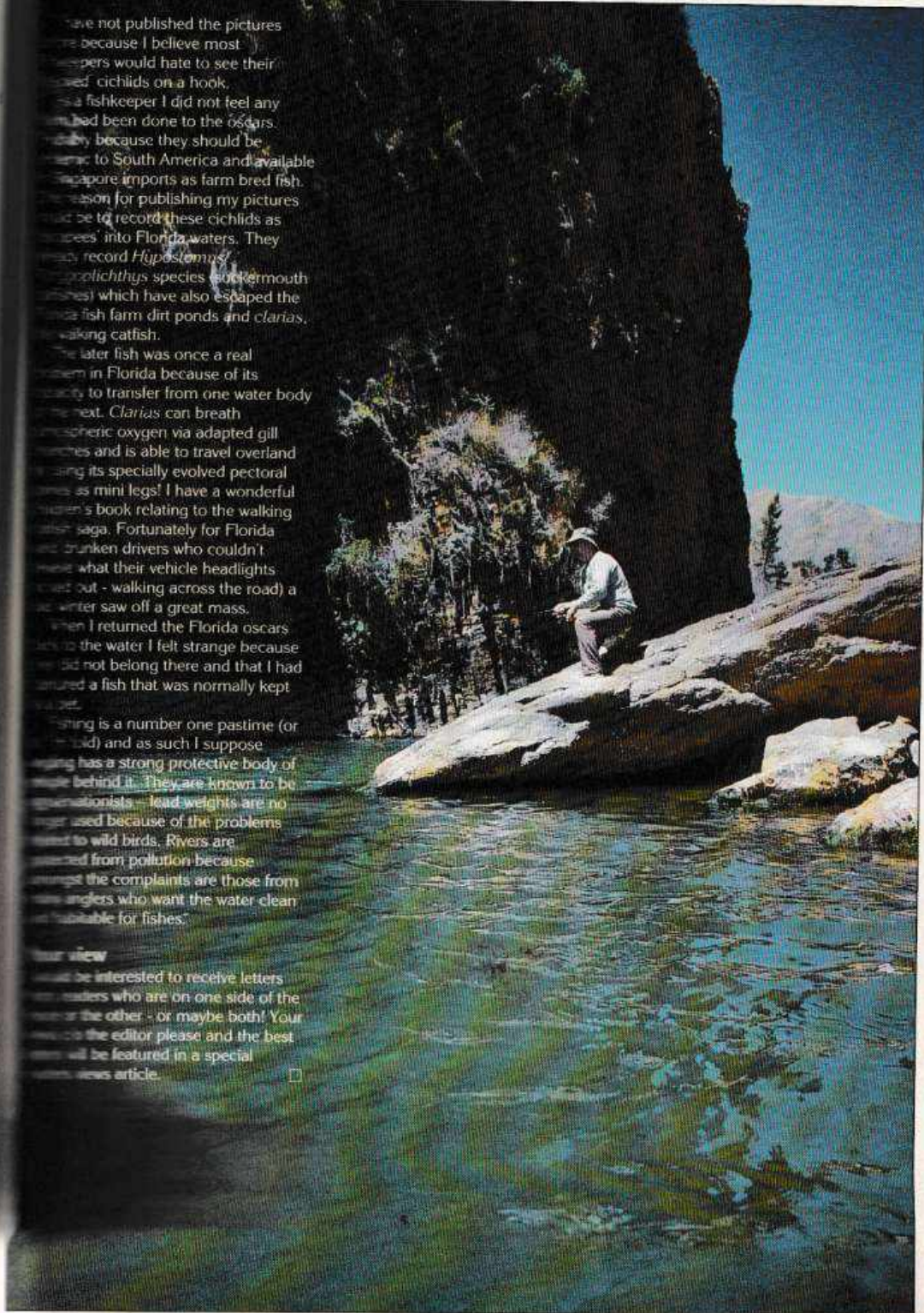
The later fish was once a real problem in Florida because of its capacity to transfer from one water body to the next. *Clarias* can breathe atmospheric oxygen via adapted gill branches and is able to travel overland using its specially evolved pectoral bones as mini legs! I have a wonderful children's book relating to the walking catfish saga. Fortunately for Florida and drunken drivers who couldn't see what their vehicle headlights shined out - walking across the road) a local writer saw off a great mass.

When I returned the Florida oscars to the water I felt strange because they did not belong there and that I had released a fish that was normally kept in a pet.

Fishing is a number one pastime (or hobby) and as such I suppose fishing has a strong protective body of people behind it. They are known to be conservationists - lead weights are no longer used because of the problems caused to wild birds. Rivers are protected from pollution because amongst the complaints are those from avid anglers who want the water clean and habitable for fishes.

Your view

I would be interested to receive letters from readers who are on one side of the issue or the other - or maybe both! Your views go to the editor please and the best ones will be featured in a special column news article. □





Photos courtesy of Tetra Information Centre.

Fish with fry will require more attention at an early stage

- ▶ aquarium is quickly polluted and even healthy fish will succumb to disease and it is just not worth taking that risk.

Water changes

Routine maintenance is important at all times, of course, but never more so than in the weeks leading up to your holiday absence from home. Approximately three weeks in advance of your holiday date, a large partial water change and general clean-up of the aquarium is advised. Change around 50% of aquarium water and remove all debris that may have accumulated in the tank or gravel. The use of a 'Tetra Hydroclean' will enable you to remove debris from the gravel without clouding the water. If the system operates on an undergravel filter, it is worth putting a siphon tube down the uplift and drawing out water and debris from beneath the filter plates. In undertaking this method beware of disturbing the uplift from the filter plate!

If your aquarium is cleaned via a box filter then change half the media and rinse the balance in old aquarium water to remove the debris (but not the important bacteria). By careful cleaning of the filter media a bacterial population will remain to colonise the portion of the media you have replaced.

Water drawn fresh from the tap for replacement after a partial water change should be mixed with warm water to produce the same temperature as that already in the aquarium. Fresh water should be treated with 'Aquasafe' to remove any potentially dangerous chlorine.

These measures should ensure a clean and healthy setup.

For the next three weeks, follow normal routine maintenance procedures. For most fishkeepers this involves conducting a 25% water change and general spring clean after ten to fourteen days. If fishes such as large cichlids or Koi are kept then partial water changes will probably need to be completed weekly. In any event, the last water change should take place no later than two days before you leave.

Feeding

The greatest worry among fishkeepers is that their pets will starve while they are away. Accordingly, they are apt to panic and leave feeding to a friend or neighbour. Often, though not always, this results in overfeeding, which certainly can be a potential killer.

Fishes are able to tolerate long periods without food. This situation occurs naturally in the wild during the hot dry season or in Winter when

little food is available. Your aquarium and pond fishes will not be totally starved while you are away. Algae, plants, insect larvae, snails or pieces of uneaten food will provide emergency rations, should they be needed. In fact it is often surprising how healthy your fish appear and how free an aquarium or pond is of algae after you've been away. Do not forget that your fishes will also have internal reserves of food to tide them over.

Fry are the real exception to this fact. Juvenile fishes require regular, small feeds if they are to grow and develop normally. The only satisfactory way of overcoming this problem is to ask a fishkeeping friend to 'babysit'.

If your holiday is to last more than two weeks then there are other measures that can be taken. 'Fish vacation' blocks are available, which release small quantities of food over a period. Take care to read the instructions and not to add too many blocks, or the water will cloud and become too alkaline. Automatic fish feeders are available which can be programmed to feed your fish at regular intervals during your absence. Granular foods such as Tetra Prima are ideal for use in these feeders.

Alternatively you can fall back once more on a friend or neighbour. If that person does not keep fishes, it is imperative to stress how damaging overfeeding can be.

If you cannot be sure 'the message has got through' measure out daily rations, and leave each feed in a separate, small container. Daily feeds are not necessary except in the case of fry. Once every two to four days is more than adequate.

Lighting

If your aquarium contains living plants then some lighting is essential rather than merely decorative. Two or three weeks of subdued lighting will not harm healthy, established plants permanently, although they will look rather drawn and pale on your return.

To prevent a reduction in natural plant growth why not invest in a timing device to automatically switch the lights on and off?

If this is not possible or the aquarium contains only artificial plants then simply keep the lights off while you are away. Leaving some curtains open will ensure that the aquarium receives some light on a daily basis.

INFORMATION

Neighbours and friends

Despite the best-laid plans and precautions, disasters can and do happen. The thermostat might stick: a pump could die or the filter could break. Any of these problems would be only minor inconveniences while you were home to take swift action, but your absence all these could result in wipeout.

A regular check by a friend or neighbour could save the occupants of the aquarium and will help you to stop worrying leaving you to enjoy your well earned break. Leave them a list of items to inspect - it might include looking for dead fish, checking water temperature and ensuring airstones and filters are working. Simply to read instructions on what to do in an emergency will be invaluable to those you trust with the care of your fishes.

Pondkeepers

The skill for pondkeepers varies a little from that for the indoor tankkeeper, though the principles are the same.

Water changes, for example, are needed in a Koi pool but not in a well planted natural pond. It is unwise to add any remedies or water treatments to your pond for four



Care must be taken as disease could cause chaos in your aquarium.

weeks leading up to your holiday. This applies especially to algal treatments. Dead vegetable matter decomposes rapidly and will pollute the water if not removed.

Feeding is not required in any pond for periods of up to three weeks. Insects and algae will keep

the fishes going until your return.

Much of what has been written is only commonsense: the main thing to remember is to get your tank or pond into pristine condition well in advance, rather than rush at the last minute.

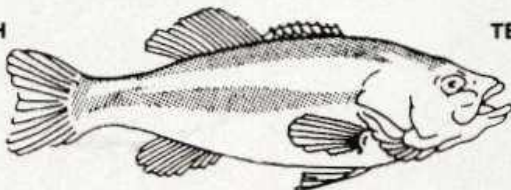
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AQUARIUM CABINETS IN STOCK OR TAILOR MADE

AQUA feature

Cornwall's leading lights on the aquarium scene, Derek and Pat Lambourne introduce AQUARIUM readers to five fascinating fishes ideal for the tropical freshwater and brackish water aquarium.

Archery

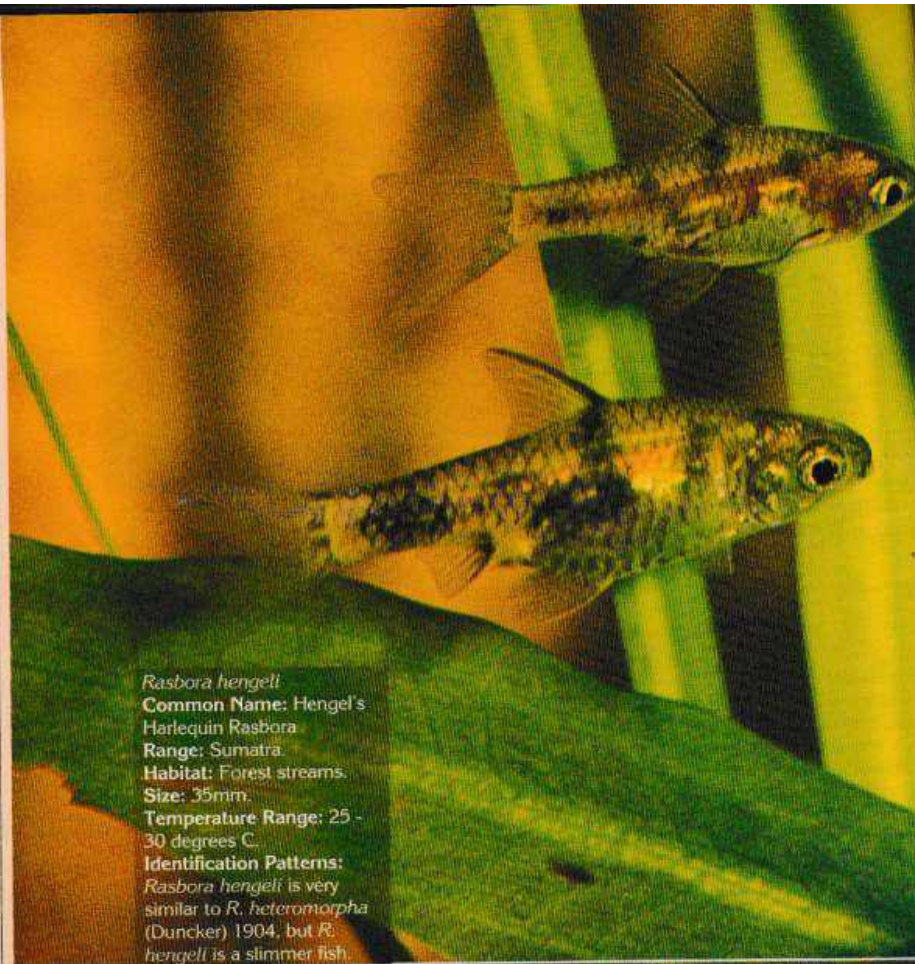
Common Name: The 'archer' because of their ability to spit out flies above the water surface.
Range: Distributed throughout southern and south eastern Asia (including the Philippines and Malay Archipelago) and Australia and many of the islands in the Pacific.
Habitat: Mainly found in shallow water at the

mouths of rivers but also found in fresh and salt water.
Size: 200mm in the wild.
Temperature Range: 24 - 28 degrees C.
Identification Patterns: Black vertical bands.
Additional Information: The 'archer' needs to be kept in a tank with a large surface area and with plenty of clear swimming space. Younger specimens are easier to acclimatise than

older ones as the adults can be very sensitive to extreme water conditions. They prefer a slightly brackish tank and warmer water conditions. Live foods, cockroaches, crickets, flies and grasshoppers, are best for their health but they will also eat small earthworms and fish so beware of introducing them into an aquarium containing community fishes! 'Archers' can be kept with

other fish of the same size but individuals of differing sizes can be very quarrelsome among themselves. They are capable of spitting a jet of water at insects on leaves and twigs above the water, shooting them down as prey.
Breeding Details: Breeding has not been achieved in captivity.





Rasbora hengeli
Common Name: Hengel's Harlequin Rasbora
Range: Sumatra
Habitat: Forest streams.
Size: 35mm.
Temperature Range: 25 - 30 degrees C.
Identification Patterns: *Rasbora hengeli* is very similar to *R. heteromorpha* (Duncker) 1904, but *R. hengeli* is a slimmer fish.

The dark, wedge shaped coloration in the body is smaller and does not stand out quite so much as it does in *R. heteromorpha*.
Additional Information: Hengel's rasbora are active, free swimming fish that should be kept in shoals within soft, slightly acid water. They are very peaceful fish and should be kept with like species. As well as eating dried foods they will also take small crustacea and midge larvae.

Breeding Details: Hengel's harlequin are not always the easiest fish to breed. They often chase each other and display during a few false spawnings. Their eggs are sticky and adhere to plants. Young hatch in 24 - 48 hours and hang from the plants. Fry are free swimming after 4 to 5 days. Parents are best removed after spawning. Young grow fairly rapidly.

Barbus gelius
Common Name: Golden dwarf barb.
Range: Bengal and Central India.
Habitat: Clear rivers and streams.
Size: Approximately 40mm.
Temperature Range: 18 - 22 degrees C.
Identification Patterns: The female grows somewhat larger than the male and, as with most tropical species, the male has more intense colour.
Additional Information: A pretty and peaceful little fish, ideal in a well planted aquarium where they will thrive in shoals. The 'gelius' barb will eat most types of prepared foods, such as flake, and enjoy frozen daphnia and live white worm, etc.
Breeding Details: 'Gelius' barbs are relatively easy to breed. The female places hundreds of small, adhesive yellowish eggs onto plant leaves. The young hatch after 24 hours and hang from the leaves, making them very difficult to see. The newly hatched fry will take infusoria 24 hours after hatching.



TROPICAL FRESHWATER

Betta splendens

Common Name: Jewel

Origin: Comes from the
Congo wide-
Africa south of the
Mountains of Morocco
of Good Hope.

Habitat: Found in most
brackish
waters.

Size: In the wild this fish
grows to 100mm and is
found at around
25°C. Tank reared
fish usually grow to
150mm.

Temperature Range: 25 -
30°C

Identification Patterns: A
dichlid which looks
like a guppy during breeding
seasons, the red
and the spangled
are even brighter.

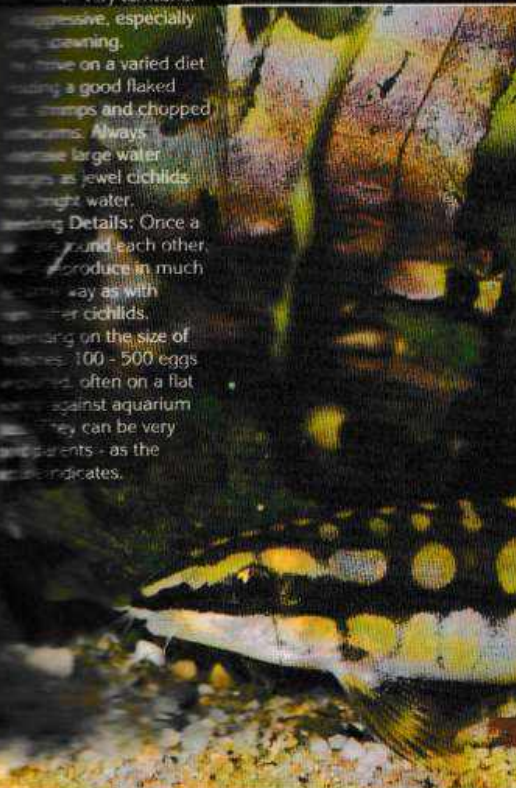
Additional Information:

These fish should be
kept in most fishes of
the same size or larger as
they are very territorial
and aggressive, especially
during spawning.

They have on a varied diet
including a good flaked
food, shrimps and chopped
vegetables. Always
use large water
tanks as jewel cichlids
love bright water.

Breeding Details: Once a
pair is found each other
they produce in much
the same way as with
other cichlids.

Depending on the size of
the males, 100 - 500 eggs
are laid, often on a flat
surface against aquarium
glass. They can be very
territorial - as the
male indicates.



Botia sidthimunki

Common Name: Chain
botia

Range: Indigenous to south
eastern parts of Asia and
Japan.

Habitat: Small running
streams.

Size: 55mm.

Temperature Range: 23 - 26
degrees C.

Identification Patterns:

The delightful series of
body circles gives this
Botia its common name.
Like other members of this

loach family the chain *Botia*
has spines below the eye
which can stick out from the
head.

Additional Information:

Whether the eye spines have
any purpose other than
simply being a defence organ
is unknown. They are a lively
and peaceful little fish that
seem happier kept in small
shoals. Chain loaches thrive
on flaked food, small shrimp
and bloodworm.

Breeding Details: Not
known in aquaria.



Ad Konings name has become linked with cichlids when it comes to new publications. Amanda Jane takes a look at his latest offering and an introductory book by AQUARIUM contributor Kevin Fox.

Calling Cichlidophiles

The Cichlids Yearbook

The Cichlids Yearbook, volume two, is packed with articles on Malawian and Tanganyikan cichlids backed up with Victorian, West African, Central and South American cichlids. What more could a cichlid crazy fishkeeper ask for?

There are over 100 brilliant colour pictures ranging cichlid fishes in habitat and breeding and some great nuggets of information thrown in for good measure. Gerard Tijsseling writes about breeding *Tropheus* the natural way, Roger Haggstrom on an artificial 'algae feeder' for cichlids, the UK's prominent cichlid writer,

Mary Bailey on the ins and outs of cichlid nomenclature and a special finish to the hardbacked edition with articles from Dr. Ethelwynn Trewavas and Ad Koning exploring 'spawning techniques in mouthbrooders'.

All in all the second year book is fantastic and a wonderful follow up to the first volume. No self respecting 'cichlid nut' would ever be seen without a copy on the bookshelf.

Distribution in the UK is by Animal House at Birstall, Batley, West Yorks at about £19.95. Copies are also available from the British Cichlid Association 7, Delamere Avenue, Sale, Cheshire. □

THE Tropical Fishkeeper's HANDBOOK



KEVIN M FOX

The Tropical Fishkeeper's Handbook

Kevin can write about any subject. I am convinced that if the history of the hobby needed writing up Kevin would be searching stuff out of the word processor faster than a bullet out of a gun. Writing a general book about keeping is certainly a challenge. It is a task of simply quoting other people's words and building on that

platform. The opposite action would be to start with a clean sheet and go back to basics.

The back cover of 'The Tropical Fishkeeper's Handbook' states that the contents assume that the reader knows absolutely nothing about tropical fishkeeping and therefore sets off in a step by step guide. The book 'doesn't stop there' announces the book blurb, but is written to 'compliment your growing skills as an aquarist'.

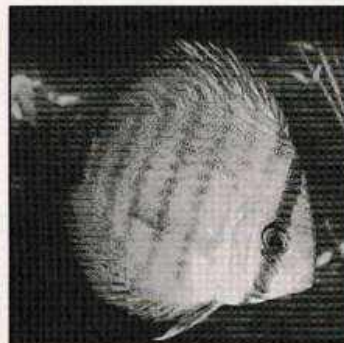
The contents follow the normal fish handbook pattern with early chapters on 'What is a fish?', 'Water', 'Hygiene' and then the book slips into an early taste of aquarium life with 'Aquatic plants' and then back into the basics with 'Aquarium hardware'.

'Creating a community aquarium', 'Aquarium management', 'Breeding' and 'The Aquarist' are all given their own sections.

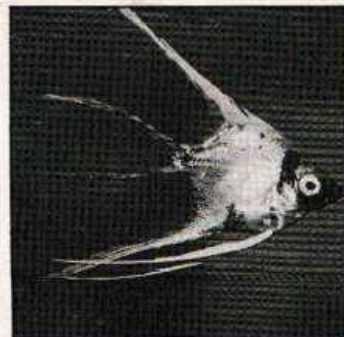
Three **database** chapters follow, involving community fishes, aquatic plants and fish diseases.

In his foreword Dr Neville Carrington congratulates Kevin on helping to clarify aquarium technology and water chemistry in an unusual and practical approach.

I looked for this clarification in the early text and found Kevin's style ▶



Discus



Angel

BOOKS AND VIDEOS



Sword tail

► bouncy and full of life. His writing leaves the reader in no doubts about Kevin's opinion on most subject and he rarely fudges an issue.

The opening chapter 'What is a fish?' is detailed enough to help anyone interested in knowing more about the physiology and general biology of fishes. Clear diagrams are used throughout and these work very well with the bright and breezy text. The following 'Water' and



Ambulia

hygiene chapters are informative and when added to the preceding chapter would point any fishkeeper in the right direction when introduced.

Kevin's honesty in some subjects is refreshing and a good example occurs in the chapter on Aquatic plants. He rightly airs the view that undergravel filters are thought to be the cause of



Sailfin Molly - *Poecilia velifera*

poor plant growth. Then he cites cases where some plants have grown in undergravel filtered aquaria and others have not and also how some plants have grown in aquaria without undergravel filtration whilst others have not.

There are many contributing factors to poor plant growth in ordinary community aquaria not the least, the fact that many plants offered for sale are marginals or have been grown hydroponically. To his credit Kevin tackles the 'conflict of interest' problem between what is good for plants in terms of CO₂ and nutrients and what is good for fishes.

The 'Aquarium Hardware' chapter deals with the fundamentals of fishkeeping and as such it must be difficult to strike an interesting balance between text and pictures. In one section titled 'Viva dirty water' Kevin is confused when comparing an open water, natural system and an aquarium but this type of slip is easy when discussing general terms.

The illustrations in this section as in others before it are 'clean', clear and easy to understand and for that alone the book should be commended to any newcomer to fishkeeping. All aspects of aquarium hardware are generally discussed in this large chapter and each side of the coin is more often than not given. This may not help the reader make a final decision but will certainly provide the information prior to a choice.

'Creating a community aquarium' allows Kevin to explore the basic of setting up aquaria and he actually provides examples of tank and equipment prices which is a rare thing in today's books. Few editors want to date the book so easily. This chapter is handled well, although I would have appreciated a price comparison for an aquarium based on a cabinet. Many people prefer the finished object to be a piece of furniture rather than a wonderful aquatic display placed on a crude metal stand.

'Aquarium management' covers real problems and discusses situations which will occur when buying fishes for the first time. To be honest, the newcomer has to step through a 'mine field' at this stage and I believe any book which 'tells it like it is' should be applauded.

Introducing new fishes into the aquarium is handled carefully although most experienced fishkeepers prefer an immediate water mix rather than a simple five minute floating of a closed bag. I agree with Kevin that any radical differences between the water chemistry in the fish bag and the aquarium water

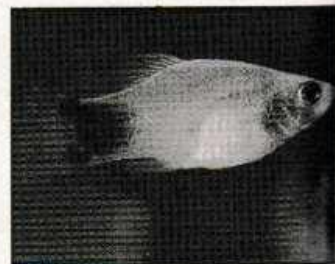


Sagittaria - *Sagittaria*

will require the fish days, rather than minutes, to adjust.

The 'Breeding' chapter is entertaining and will encourage new fishkeepers to 'have a go'. 'The Aquarist' could also be described as such in that it deals with the organised hobby, clubs, showing, etc. and is extremely informative.

The three 'data base' sections are simple and easy to read with the disease section enhanced by the use of AQUARIAN'S disease guide.



Platy - *Xiphophorus maculatus*

Finally, the appendices, including a formulae page, add to the overall information provided in this novel handbook.

I would recommend this book for the complete beginner and for those who want to expand their general fishkeeping knowledge.

The 'Tropical Fishkeepers Handbook' is published by Argus Books, Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST. Price £12.95. ISBN 1 85486 069 0.



Pygmy Chbain Sword - *Echinodorus tenellus*



Winchester based vet, **PETER SCOTT** is one of the few in the profession to specialise in consultation and treatments of commercial fisheries and ornamental fishes. He has written several books and scientific papers. This month he expresses concern about the lowering of European barriers and asks, "Is your fish stressed?"



SCOTTfree

This month has been spent in deep contemplation of a computer screen, arguing tortuous points with myself, for a chapter I have been writing on fish therapeutics. My work is to be included into a new textbook for veterinarians which is being edited by a colleague. My odd forays into the outside world have been for therapy, to drink coffee on fish farms (my wife measures how hard I work in a day by the number of cups of coffee I drink) and with aviculturists. The 'bird people' took little time to discuss a recent TV Cook Report which attacked sections of the bird trade. For people who did not see the program you should know it was not exactly kind to the people involved in the buying and selling of birds. I think it is fair to say that this type of reporting can make any hobby which is a 'consumer' of animals appear very bad to those outside.

Giving fish the needle

The ulcer and general bacterial problems that I mentioned last month which were being seen by koi owners, have not been mirrored to a degree by the carp fisheries. I have recently visited a couple which are experiencing problems with mortalities in their big 'specimen' carp. These fishes take an awful long time to reach 20lb plus and it is tragic to see them dying. The fish problems encountered by me at the moment are essentially due to upsurges in bacterial levels brought about by the fluctuating temperatures - high enough to encourage bacterial growth yet not consistently warm enough to raise the fish's metabolism and trigger its

immune system.

One carp fishery has opted for vaccination, rather than dip the fishes in the new vaccine. Dipping is too costly when dealing with 20lb plus carp so I used an injectable vaccine licensed for use in salmon. The NRA agreed to help net lakes and all fishes with bacterial damage were injected with antibiotics and those which looked healthy were given vaccines. Vaccinating fish, affected with disease, may conceivably make matters worse because this can soak up any protective antibodies which they may have. On the other hand the potential value of the fish makes vaccination a serious option. The future plan is to vaccinate all incoming fish prior to going out into the lakes.

Carp farmers and carp fisheries are concerned, like the rest of the UK fish farmers, about impending EEC legislation.

If the UK manages to encourage Europe to accept our current believed 'disease free' status then the UK will be able to keep out fish from all areas except those with a similar status. The rub comes that without border controls, fishes could be sent to the UK from anywhere after passing through a supposed 'disease free' zone. Much will depend on the way that veterinary checks are carried out. Reduced controls at all stages and a difficulty to police the scheme may place too much emphasis on trust. After all, fishes have been smuggled into the UK already and from 1993 it will be so easy to transfer goods and certain livestock that sneaking fishes through borders may not be worthy of being termed smuggling!

What will actually happen in 1993 - when 'the barriers come down' - should certainly be interesting. If fishes can be moved from one disease free area - for instance, Belgium - to a fishery in the South of England, where does the UK stand with the current 'Section 30 consents' currently being required by the NRA. At the moment, at

Some 70% of fishes, as they are unpacked, have bacteria circulating in their blood

the discretion of local area offices of the National Rivers Authority, before a coarse fish farmer can transfer fish from one lake to another, up to 30 must be killed and checked for parasites and a disease free certificate written. I have undertaken this for a number of clients over several years but the NRA is at the moment refusing to advise those doing the tests what should we certify fishes free of, or what methods we should use to look at them. The NRA have caused considerable confusion this year for a piece of legislation which is apparently about to disappear as the EEC regulations take priority over those in the UK.

Over the rainbow trout

Trout farmers are now moving young fishes from

the hatcheries onto the main growing farms. They may well be stocked in earth ponds, concrete tanks or metal sided circular tanks. The hydraulics of these systems have been worked out long ago in the 50's by the US fish farmers and their research groups but most farmers still keep going through the various systems, trying the one which looks right for the budget and the site with a view to changing it later! Tanks certainly give the best return for space, in that they allow fishes to distribute evenly in a supposedly homogeneous body of water. Tanks are still popular with farmers but are falling out of favour for small 5g fry (described in the trade as 100 to the pound).

It can be very difficult to dose fishes with external treatments when they are in 30m x 3m x 3m deep ponds

Carp farmers and fisheries are concerned, like the rest of the UK fish farmers, about impending EEC legislation

with a half a million gallons of water a day rushing through. This is attempted but the volumes of chemicals have pollution and cost implications which all farmers bear in mind. The chemicals break down in the environment but other river users are rightly concerned to see green stains coming down the river on a regular basis. Over the 14 years that I have been involved with fish farming changing attitudes and reduced chemical and drug usage is a credit to the industry. Where once large amounts of malachite green, copper sulphate and formalin

were used, despite the growth in the trout farming industry from probably less than 4000 tonnes to over 14,000 tonnes, the amounts are significantly reduced. Part of the improvement stems from a move away from the 'swimming frankfurter' with no fins, confined at high stocking densities to the better product, held at lower stocking densities under less stress.

Chill out

Stress needs to be taken into account by any person dealing with fishes. When I speak to students, whether veterinary of fish management, an important aspect which is always laboured is stress. Many factors affect fishes: these may be low level disease, pH changes, temperature changes, starvation, high ammonia, low oxygen, bullying, handling etc. All of these factors produce the same physiological effects in the fish, and the summate, with a bit of this and a bit of that -like building blocks adding up - produce a 'stressed fish'.

This 'stressed fish' sequence for ornamental fish begins in the transport bag, some 70% of fishes, as they are unpacked, have bacteria circulating in their blood. If they are treated kindly and



Fishes are stressed to their limits during transport

allowed to settle, to acclimatise, then all is well. If the stress continues - by poor handling for example -then the bacteraemia becomes a septicaemia and fishes die. Appropriate treatment enters

the equation at this point, whether or not to reach for antibiotics etc. In many cases ornamental dealers are learning the lesson of the fish farmers. More volume and better water quality is the best treatment.



Manchester Airport. Fishes packed in polystyrene cartons with plastic bags are shipped around the world

The British Koi- Keepers' Society

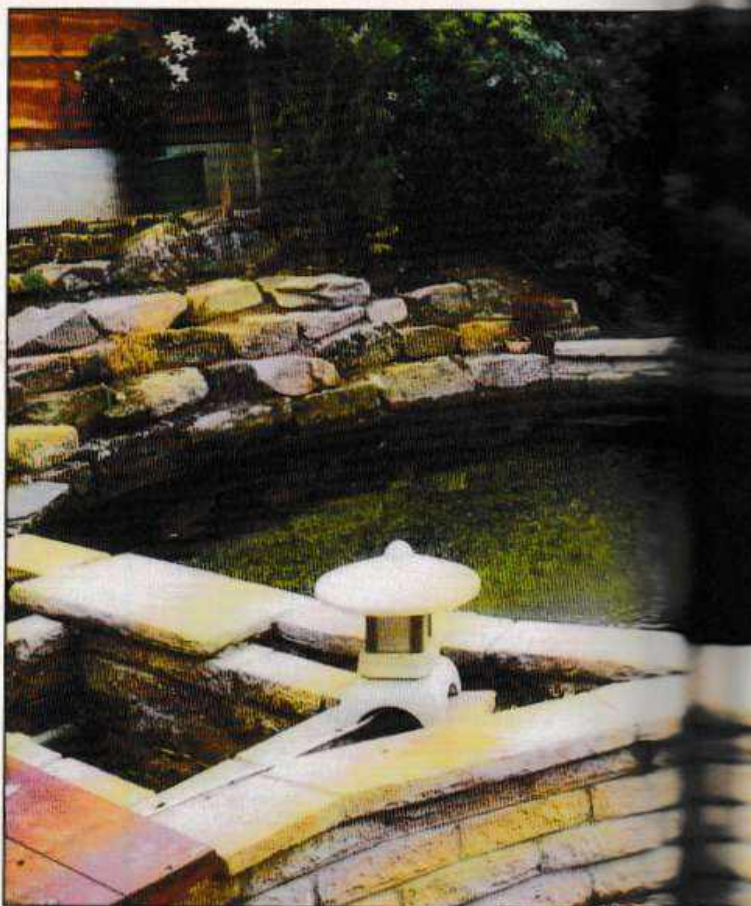
We are pleased to welcome Liz Donlan, General Secretary of the British Koi-Keepers' Society, to the pages of AQUARIUM. Here Liz explains how she got hooked on Koi

I was introduced to the hobby of koi-keeping by my Father in 1973 and joined The British Koi-Keepers' Society and Northern Section in that same year. In 1977 I was elected onto the Committee of the Northern Section and later took on the roles of Secretary, Assistant Secretary and Librarian. I am currently Programme Officer and Editor of the Northern Section's monthly magazine Ripples.

I have been involved at National level in The B.K.K.S.; having held the positions of Minutes Secretary, Membership Secretary, Supplies Officer and Distribution Manager. In March 1992 I was elected back onto the Council as General Secretary and Minutes Secretary.

I was awarded Honorary Life Membership of The B.K.K.S. in 1983 and am a member of the Yorkshire Section. In April 1992 I became a Trainee Judge - an achievement of which I am proud.

The above probably makes me look as though I am "Committee mad" - I'm not! I'm just obsessed with koi; I think The B.K.K.S. and its Sections are the best thing since sliced bread and will do anything to



further the hobby of koi-keeping.

Our pond

When I left home I moved into a flat and was fortunate enough to have my own private garden. Within a couple of months I had started digging a pond!

Several Northern Section members took pity on me digging by myself and very kindly came along one weekend to dig out the hole, following which 2-3 of them completed the pond.

Most koi-keepers tend to build a small pond and then progress onto larger versions. For once I had done something right and went as large as I could first time. The pond contained 3,750 gallons and took up most of the garden. I was extremely happy with it and was convinced that this would last me forever!

I was married in October 1985 and moved into a house. At that time my husband, Mike, was not the least bit interested in koi but

agreed that we would have to have a pond as I had no intentions of parting with my koi!

We managed to borrow a collapsible pond which we erected in the garage whilst building the outdoor pond. We also purchased a ready-made 165 gallon fibreglass tank to go in the greenhouse which housed some of my smaller koi.

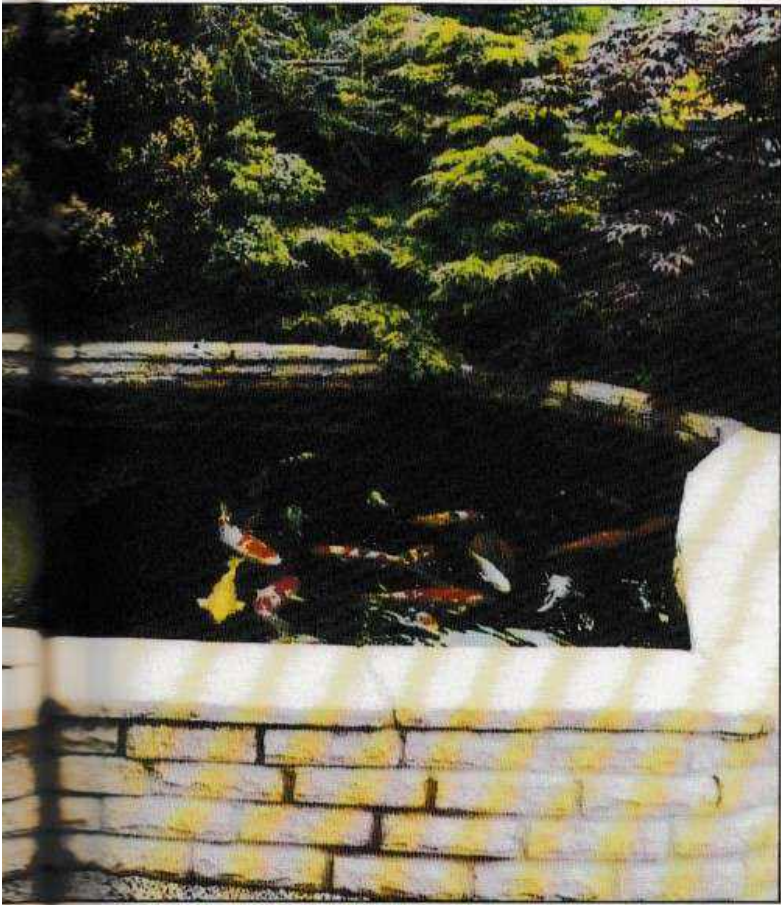
Pond Mark 1 was built over the Winter of 1985 and contained approximately 2,000 gallons. I kept insisting that it wasn't big enough but was told that if I didn't keep quiet I wouldn't have a pond at all!

Gradually, Mike became more and more interested in koi and in Spring 1990 accepted that Mark 1 wasn't big enough and by Autumn that year Mark 2 was finished!

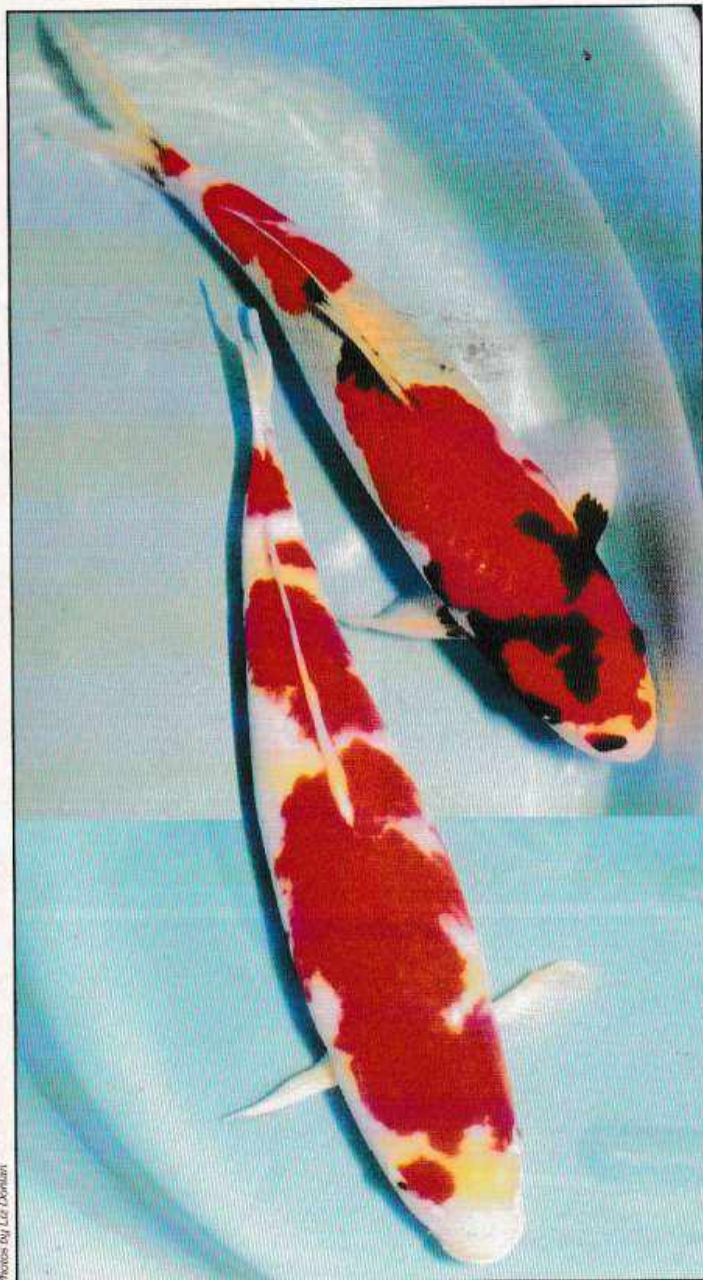
The pond now contains 2,800 gallons - unfortunately we couldn't get much bigger as we have a relatively small garden.

Bottom water is drawn through a 24" sand filter, an ultra violet steriliser, an 18" sand filter contains

CLUB CALL



Photos by Lix Doylans



Photos by L.E. Dondan

► floor and returns to the pond via a reverse-flow under-gravel filter and a venturi. An ITT Marlow pump is used and last Winter we installed a 50,000BTU Laars gas boiler, from which we maintained a temperature of around 56F.

A small waterfall has been incorporated but is currently undergoing repairs due to a slight leak!

The surround of the pond contains a gravel garden with a couple of acers and various Japanese style lanterns are situated around the garden. The rockery at the back of the pond was installed in May 1991 and is gradually becoming more established.

The pond itself is currently overstocked and we hope to put some of our koi through two local

auctions during the next few months.

My favourite koi at the present time is a female 22" Shusui which I won in a raffle and cost me £5 in raffle tickets! I was extremely pleased when she won Best Mature Doitsu Koi at the Northern Section's Open Show in 1991.

The British Koi-Keepers' Society.

The B.K.K.S. was formed in 1970 by a group of koi hobbyists from various parts of the country and boasts the largest number of members of any koi society outside Japan from where our beautiful koi originate (I will not go into any details on the origin of koi as this was explained in the June issue of AQUARIUM by Peter Waddington). At the end of the last membership year (April 1992) the Society had attained over 6,000 members and 1992-93 looks set to be a bumper year.

The Society produces a monthly magazine which features articles on all aspects of koi-keeping, together with dates of many koi shows held in this country. Many koi dealers advertise in the magazine and this can be extremely handy when on holiday in other parts of the UK, as it often gives members the opportunity to visit different establishments.

In January 1993 we are hoping to hold an all-day Seminar which will include topics such as water quality; diseases and treatments; varieties of koi; pond construction, etc. and further details will be published in due course.

National show

The Society holds its own annual show which, this year, is to be held at Billing Aquadrome on 15th/16th August, 1992. This is the largest Koi show in the UK, and in 1991 had a record number of entries together with trade stands. Refreshments are available on site and various talks will be held throughout the two days on different aspects of koi-keeping.

A weekend package is available at £48.50 per head for B.K.K.S. members or £55 for non-members and details can be obtained from Marilyn Fleming on 091 268 0936. Further details regarding the show can be obtained from Graham Oldroyd, Show Chairman on 0924 277192.

Local Sections

The B.K.K.S. has various Sections in many parts of the country and currently has 36 ranging from the

CLUB CALL

Scottish Section in the North to the South Devon and Plymouth Sections in the South West. Local Sections have many meetings and events and I hope to be able to report on some of these activities over the coming months.

For this article I would like to concentrate on the Northern Section which, this year, is celebrating its 20th Anniversary.

Northern Section

The Northern Section has been

the exception of 1983 the annual show has been held at Tatton Park ever since and this year, under the Show Chairmanship of Mike Donlan, looks set to see the best ever show to be held on 11th & 12th July.

The Northern Section has gone from strength to strength under the leadership of Tony McCann who is now the National Chairman. Monthly meetings/events are held which include meetings at St. James Hall, Salford with top speakers; beginners seminars; coach trips to other Sections of The

year, a quarterly raffle is being held for a high quality koi. The first raffle was drawn in April for a 20" Kohaku purchased from P.W.L. Fish Industries.

Two anniversary events which have already been held was an all day Seminar and a koi weekend in Essex.

The last four years has seen a rapid progression from a single A4 sheet newsletter to a monthly edition of Ripples which boasts 32 pages and has a colour cover.

Membership to the Northern Section is £10 per family and further details can be obtained from Doreen Cook, Membership Secretary on 061 789 5629

Northern Section Open Show and Craft Fair 11th & 12th July, 1992

The show itself will be English style i.e. each exhibitor will have his/her own vat. There will be two trade marquees with some of the top koi dealers in the country, together with koi related items including a small bonsai display.

There will also be a membership stand where you will be able to join both The B.K.K.S. and the Northern Section

For the last few years the show has incorporated a small craft fair and in 1992 we will be holding the largest craft fair the Northern Section has ever seen - at the time of writing there are 40 stands booked and enquiries are still being received. Further details regarding the craft fair can be obtained from Sue McCann on 061 794 1958.

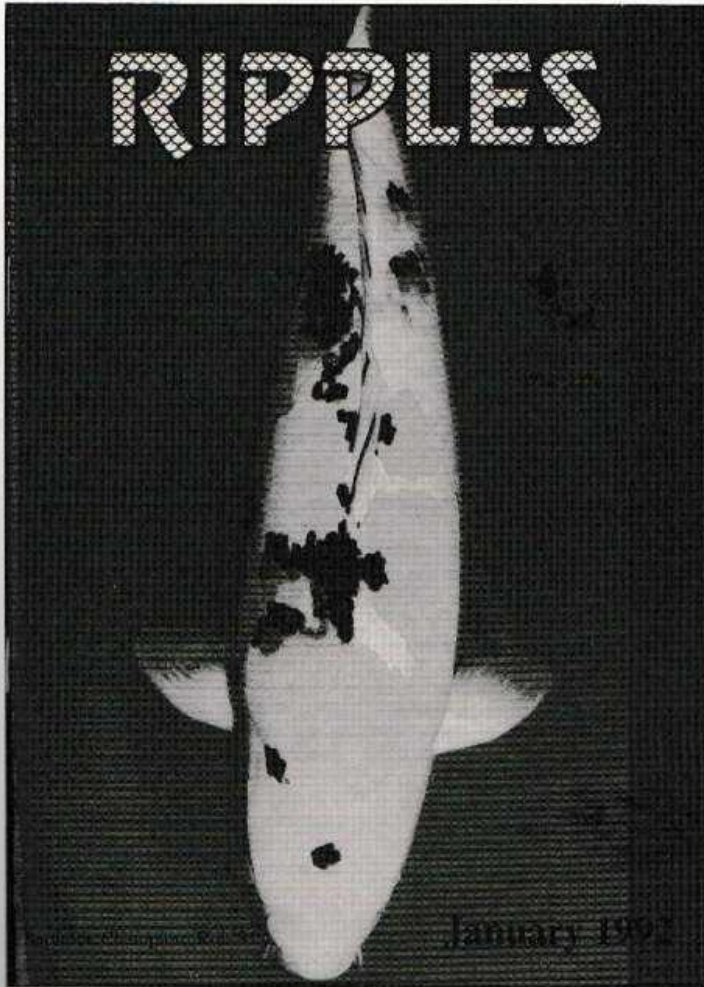
The show area itself is self-contained with the craft fair, kiddies amusements, bar, refreshments and toilets and entrance to the show is £1 per person (half price for children and O.A.P.s).

If you require any further information on the show or wish to enter koi (free of charge) please contact Mike Donlan, Show Chairman on 061 643 9107 or Tony McCann, Northern Section Chairman on 061 794 1958

B.K.K.S.

Being a member of The B.K.K.S. and one of its Sections can be fun; you can learn a great deal about Koi and koi-keeping as well as making lots of new friends. Don't delay join now

Membership is currently £15 single £16 joint and £20 overseas (Europe) and £34.50 elsewhere. Details can be obtained from: Mr B Barton, Membership Secretary, 316 Bournemouth Park Road, Southend on Sea, Essex, SS2 5LY. □



instrumental in many events with The B.K.K.S. and indeed they held the first ever show in 1975 in Peter Waddington's the garden. Following on from this, in 1976 they actually held two shows (again both in members back gardens) and in 1978 moved on to better things by staging their show in the beautiful gardens of Tatton Park, Knutsford, Cheshire. With

B.K.K.S. and to koi dealers; annual show; open days when members can visit other members ponds; auctions; social events.

The Northern Section is notorious for holding raffles and has adopted the policy that if there are more than 6 members present, then a raffle should be held! As one of the many attractions for its 20th Anniversary

Aqua MAIL

We asked for readers views and judging from our mail bags you took us at our word! Please feel free to express your opinions on AQUARIUM matters or any subject which touches our hobby

Dear Aquarium

Having just read the article by Kevin Fox in the new magazine, AQUARIUM, I find that I have to put pen to paper immediately. Firstly to congratulate Kevin on his article which is not only informative but also very funny. Secondly, as the tea-boy at Aquarium Design Centre, I can relate to your position as cleaner!!
Aquarium Design Centre

Dear David,

I must say I am impressed with the new magazine, AQUARIUM. I haven't seen some of the other magazines for some years. It is, however, time some of the other fishkeeping magazines had serious competition and that they have! I am particularly pleased with the extensive use of colour and the photographic quality is superb. I found the text easy to read, not too technical but not unduly patronising. Personally I like the odd free gift (especially as an incentive to buy an issue one) and felt quite put out when there was no sticky tape to pull half the cover off of my edition. I appreciate that the message was meant to be 'With such excellence, who needs freebies,' but I just thought, 'Don't they want to sell this then?' That is only my personal opinion however, I still bought AQUARIUM and am pleased I did and will certainly buy it again. I hope AQUARIUM proves to be as successful as first impressions suggest it deserves to be.
Terry Flood Harrogate, Yorks

Thanks Terry. We might organise a freebie at some stage - just watch carefully for future specials.

Dear David,

So you've got your own magazine now, congratulations, and a brilliant one at that. Just one query - where is the young aquarist column? Apart from the absence of that column, AQUARIUM is probably one of the best aquarist magazines on sale at present - Well Done!!

It is good to see that nothing in your new magazine is covered too seriously like it is in several other well known magazines and there is plenty of variety (and colour pics!) I stumbled across it in WH Smiths. There were plenty of articles on catfish too (surprise, surprise.) which is another plus, but no loaches unfortunately. Anyway, I had better in turn now, I'm still suffering from cleaning my koi filter. Think about the young aquarist column!

Matt Bond Hampton Magna, Warwick

Nice to read your reaction - don't worry about the young aquarist column - AQUA SCHOOL is to be found in this issue and already requires input from any of our younger readers. Write in for pen pals, subjects to discuss, etc.

Dear Mr Sands

I just thought I would like to thank you for your new magazine AQUARIUM. It was such a pleasure to read a magazine on your favourite hobby without all the rubbish that other monthly magazines add in to fill the space. I was particularly gripped by the article by Amanda Jane on 'Friendly Fishes' under the heading of 'Compatible Communities.' I have been a keen fishkeeper for some years now but my worst nightmare was when I first started. I wish your magazine had been around then as it would have made life a lot easier. What impressed me most about this article was the way in which references were made to the proper pronunciation to those rather dull and stuffy scientific names which are given to all breeds of fish. We all know the popular names to the fishes and we can all find out what their scientific names are but alas in any of the books I have read no-one has thought of the poor beginner at all. So it really was a breath of fresh air to read this article.

I also enjoyed the article on 'Aqua Feature - Tropical Marine' as I am seriously thinking of making the big move from tropical freshwater to

marines. It would be nice to think that there may be a similar article on 'Newcomers' for marine fish like the one produced by Kevin Fox, which was extremely interesting.

Keep up the good work, and well done. AQUARIUM - a new concept in fishkeeping magazines.

J Hepburn Gourrock, Scotland

Amanda Jane says she will continue to use the phonetic spellings of the scientific names in future articles but wanted to see how readers felt. We have received several letters congratulating Amanda for using this method to overcome some of the heavyweight names - so look out for more.

Dear AQUARIUM

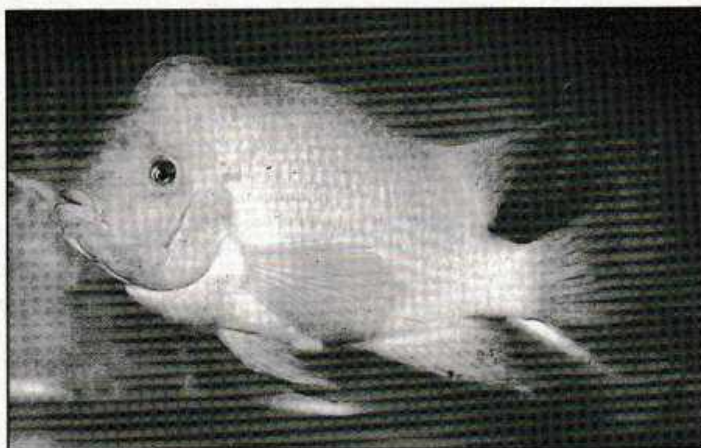
We write concerning the article written by Kevin Fox in the June Issue of AQUARIUM. It is interesting to note his comments, reference: cushioning for all glass tanks, but wish to point out that we do not recommend any material placed under our products. As he mentions one by name, 'Gem', and illustrates tanks designed by ourselves and manufactured in Germany, by Juwel Aquariums, using jointly owned tooling, we both definitely do not recommend Polystyrene or any other material under our products including, the British manufactured Panarama, Delta, and Panavision ranges.

He is obviously unaware that we use a much thicker glass base than our competitors, precisely because we do not want to see unsightly foam or felt protruding underneath our tanks. Use of these materials invalidates our guarantee.

As manufacturers of 30 years standing and being the very first manufacturer to use both silicone sealant and plastic framing for our aquariums, a phone call from Mr Fox to ourselves would have enabled him not to mislead the first time hobbyist in this way. We clearly state on our products 'A layer of Polystyrene foam is not needed beneath this tank.'

**Andrew Werendel
John Allan Aquariums Limited**

Please accept our apologies for any confusion that Kevin's article may have caused. Whilst it is common practice to place a layer of cushioning material under many tanks there are exceptions check with your dealer if you are unsure.



The Association of Aquarists

Malcolm Goss, chairman and irrepressible worker, explains why the 'A of A' has gone on from strength to strength over the last few years

The Association of Aquarists is unique, being an association that not only caters for aquarists societies but also for aquarists as individual members. Their judges and speakers travel all over Britain, judging at open shows, giving lectures on all aspects of our hobby to societies. As an individual member if you're not quite prepared for a speaker setting up a screen and projector in your front room, you can always book a video. With the sponsorship



of AQUARIAN, 'Superbowl', an annual competition for knowledgeable aquarists, has no fewer than 1440 place prizes to be won.

Sandown Show

There can be no better venue for meeting the Association of Aquarists with its members and friends than at Aquarists Fishkeeping Exhibition held yearly at Sandown Park Exhibition Centre in Esher, Surrey. In collaboration with Argus Specialist Exhibitions Limited the A of A held this greatly enjoyed annual exhibition on the 6th and 7th of June this year.

The Association of Aquarists staged 'Information' stands throughout the hall in order to provide advice favourite fishes. Individuals, from specialist groups,

gave lectures throughout the two day event with enthusiast talking to enthusiast.

Behind the scenes committee members are pooling their knowledge to produce several new publications this year.

The new titles are: Coldwater 2, Catfish - Part 1 and Plants/Furnished Aquaria.

New faces have now been added to their Judges and Speakers list along with several special home video programs.

New Species

The A of A's biggest undertaking at this time is the complete review of a 'New Species and Size Guide.' Members report that with so many new species coming into the hobby, some being seen for the very first time at an open show, to update with all the correct information would take at least a year!

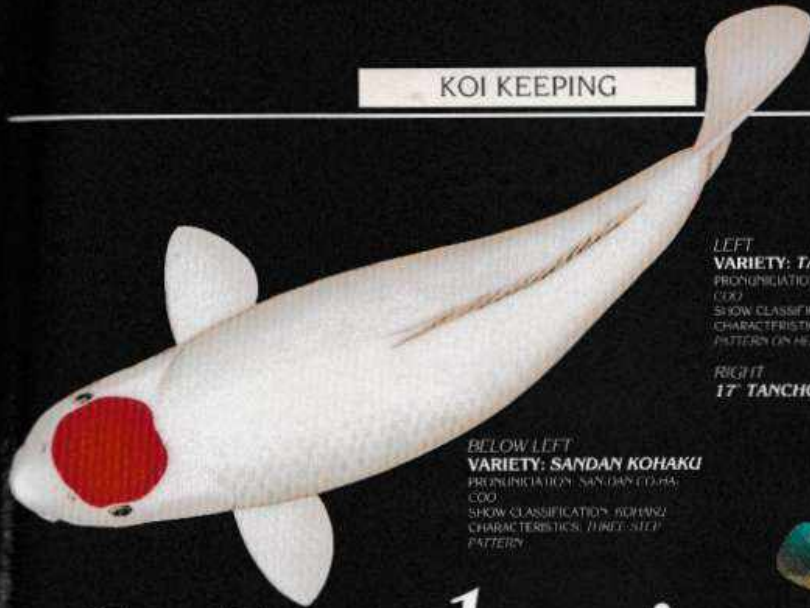
The Association's magazine keeps all its members in touch with each other and contains special articles to whet the appetite of a complete range of fishkeepers.

Many letters are received by the membership secretary during the year, not only regarding membership but containing questions on all sorts of fishkeeping problems. The membership secretary often receives mail from young members of our hobby, some are simply brimming with enthusiasm, others relating to school projects and some are just lovely like this one:-

'I am a young girl seeking advice on breeding fish for the first time. My name is Charmaine Ryland. I am eleven and a half years old. I have two fish called "Glug and Prince", 'Glug' is a rather cute black moor and 'Prince' is a red and white goldfish. I have recently introduced the two and they get on quite well. I have an aunty who has lots of goldfish and fantails in her pond. I am going to start breeding fish. I know it is not going to be easy, but I am willing to give it a go. I know that I will need more fish. I have Christmas money to pay for more fish. I have two tanks and my aunty can lend me hers.'

The Association of Aquarists is made up of enthusiasts and with young hobbyist like Charmaine it has plenty of support!

For details please write to the secretary Dilys Hinton at 45 Wollaton Avenue, Gedling, Notts NG4 4HY or to Malcolm Goss, 25 The Gowers, Chestnut Lane, Amersham, Bucks. ☐



LEFT
VARIETY: TANCHO KOHAKU
 PRONUNCIATION: TAN SHOH CO-HA
 (1X)
 SHOW CLASSIFICATION: FANCHO
 CHARACTERISTICS: SINGLE RED
 PATTERN ON HEAD



RIGHT
17' TANCHO SANKE

BELOW LEFT
VARIETY: SANDAN KOHAKU
 PRONUNCIATION: SAN-DAN CO-HA
 COO
 SHOW CLASSIFICATION: KOFANZ
 CHARACTERISTICS: THREE-SIDE
 PATTERN

Made in Japan



BOTTOM RIGHT
VARIETY: YONDAN KOHAKU
 PRONUNCIATION: YOH-DAN
 CO-HA (1X)
 SHOW CLASSIFICATION: KOFANZ
 CHARACTERISTICS: FOUR-SIDE
 PATTERN

What makes one Koi carp worth a fiver and another worth \$5000? Amanda Jane takes over Peter Waddington's column whilst our koi expert goes himself in Japan. A wryly smiling Mandy looks at the fish and partly explains why the Japanese have set all the trends which must be followed by those dedicated 'fashionable fishkeepers'

Some. A raised pond containing a mass of six inch koi fish, each marked by a circle of red. 'That's a 'gin-rin kohaku' and that 'kohaku' is the 'shiro-bekko'?

'No, the 'gin-rin kohaku' is best! I'm having that red and white one there...'

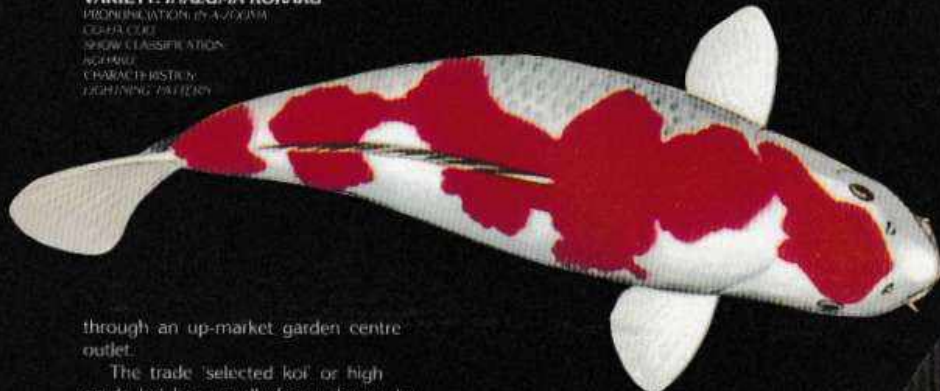
A blue one, please

Choosing koi can be like choosing a car. All cars will carry the driver from A to B. It is true some vehicles go faster but does a red model go any faster than a white? A pure white koi is no less a fine fish than an all red koi. There is a status to be maintained amongst those interested in price tags - although beauty is certainly in the eye of the beholder. A beautiful 'doitsu' (large scaled koi) might appear ugly to one fishkeeper and superb to another. A similar sized specimen 'selected' for clean patterning may be retailed at ten times the price of its sibling sold ▶

KOI KEEPING

VARIETY: INAZUMA KOKAKU

PRONUNCIATION: IN-AZU-MAMA
 COLOUR: GOLD
 SHOW CLASSIFICATION:
 NISHIKI
 CHARACTERISTICS:
 LIGHTNING PATTERN



through an up-market garden centre outlet.

The trade 'selected koi' or high grade koi has usually been chosen by an experienced eye from a quality breeder in Japan and therefore some cost in terms of expenses, time and effort has been used. It is possible to carefully select a good koi out of a mass of 'medium grade' imported fishes but the eye for 'cracker' has to be educated.

A local Lancashire koi keeper has been known to buy 'A1 class' young koi (imported from Japan by AQUARIUM editor David Sands) and grow them on to win a section at a major Yorkshire koi show.

Can the 'man in the street' pick up a show winner for the price of mongrel koi?

The Rising Sun

It is said that the Japanese koi collectors see the white bodied, large, red-head spot koi as representing the rising sun. This image fires the nationalistic pride that the people from this tiny island have diligently passed on to each generation for over a thousand years.

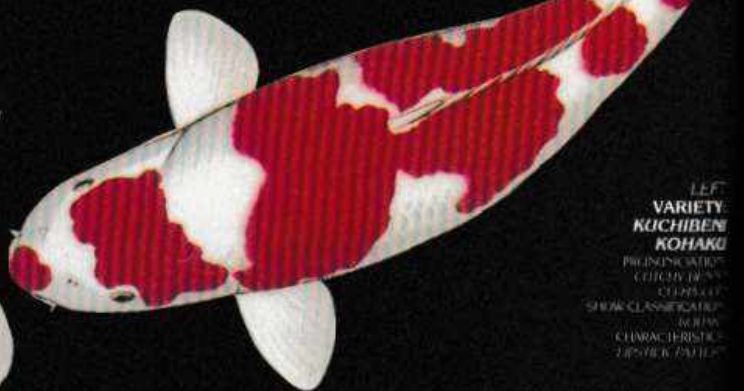
The 'koi trend' from Japan has been to put the 'sanke' (red, white and black) and, more so because of

the national flag, the 'kohaku' (red and white) colour forms at the top of list of show winners. This has changed over recent years, so I am told by those 'in know', but a good 'kohaku' still 'swims high' in the Japanese koi charts.

The kudos of winning a class or section in major Japanese show is difficult to comprehend here in the UK. For a breeder or a financial backer winning is everything. It is

VARIETY: NEZU OGON

PRONUNCIATION: NE-ZU-OGON
 COLOUR: GOLD
 SHOW CLASSIFICATION:
 NISHIKI
 CHARACTERISTICS: VERY OLD
 VARIETY



LEFT VARIETY: KUCHIBENI KOHAKU

PRONUNCIATION:
 KUCHI-BENI
 COLOUR:
 SHOW CLASSIFICATION:
 NISHIKI
 CHARACTERISTICS:
 LIGHTNING PATTERN

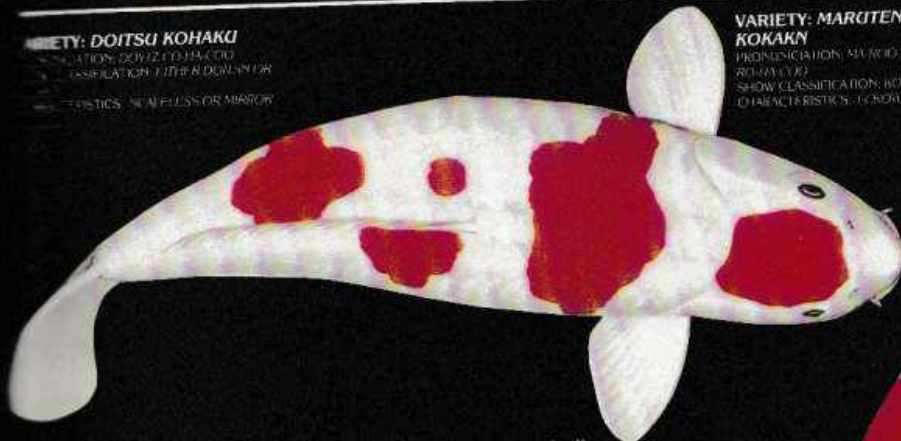


LEFT VARIETY: MENKABIR KOHAKU

PRONUNCIATION: MEN-KABIR
 COLOUR:
 SHOW CLASSIFICATION: NISHIKI
 CHARACTERISTICS: LIGHTNING PATTERN

KOI KEEPING

VARIETY: DOITSU KOHAKU
 PRONUNCIATION: DOITSU KOHAKU
 SHOW CLASSIFICATION: NIPPON KUI
 CHARACTERISTICS: NEAR FLUSSOR MARUO



VARIETY: MARUTEN KOKAKU
 PRONUNCIATION: MARU TEN
 SHOW CLASSIFICATION: NIPPON
 CHARACTERISTICS: CHERRY



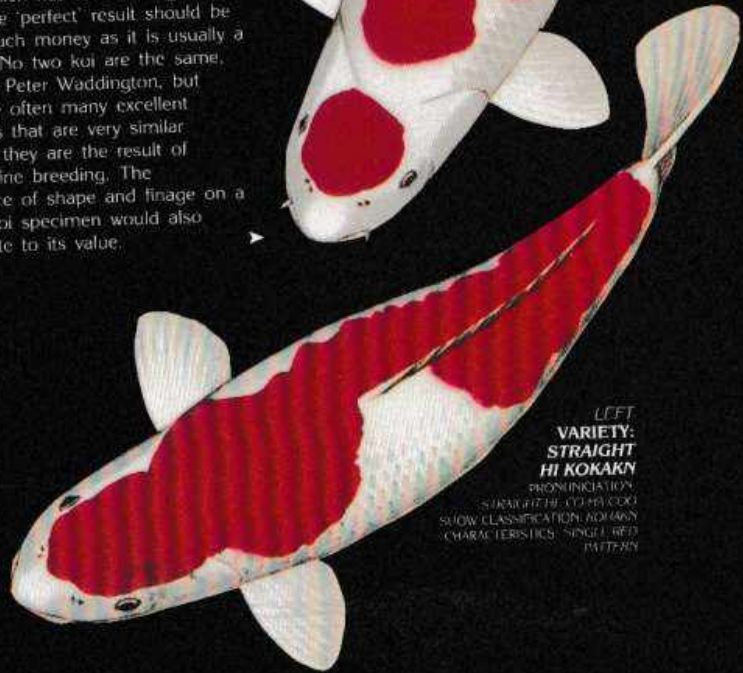
Probably like a dog breeder winning a craft in that a champion can sire produce a line with potential. A koi keeper will usually receive what he or she pays for, in that a valuable koi at a specialist outlet will be visibly better than others in its colour class. A

It is possible to carefully select a good koi out of a mass of 'medium grade' imported fishes

for all the time and effort involved - will ever be accomplished. A good koi is the result of line breeding and the husbandry required for success is undoubtedly a skill which has to be recognised as such. The 'perfect' result should be worth much money as it is usually a one off. No two koi are the same, to quote Peter Waddington, but there are often many excellent examples that are very similar because they are the result of parallel line breeding. The excellence of shape and finage on a 'great' koi specimen would also contribute to its value.

A cheap koi is almost always inferior when it comes to definition of colour and shape.

Winning tends to attract money whatever the sport or hobby. If judges of a koi show express a preference for a particular colour form, body shape or scale expression then breeders will work towards producing better examples of that particular form. A breeding program could take many years and it is doubtful a full return



LEFT VARIETY: STRAIGHT HI KOKAKU
 PRONUNCIATION: SUKAIHI KOKAKU
 SHOW CLASSIFICATION: NIPPON
 CHARACTERISTICS: SINGLE RED PATCH



LEFT VARIETY: NIDAN KOKAKU
 PRONUNCIATION: ANE DAN KO
 SHOW CLASSIFICATION: NIPPON
 CHARACTERISTICS: TWO SPLIT PATCHES

Aqua Clinic

Water heaters, breeding and problems with itchy fish are this month's queries answered by top fishkeepers.

I am planning to construct an external fish house pool to house my red tailed catfish. The pool will measure 8 feet by 3 feet by 3 feet and should hold about 400 gallons of water.

Although my fish house and the pool will be insulated with thick polystyrene sheets I am unsure of the best way to heat the water. Working on a formula of 5 watts per gallon I would need 2000 watts of heaters. Is there any other way of heating the pool besides seven heaters?

Also, what filtration would you recommend (I had in mind a pond

pump and pond filter) and what problems, if any, do you consider I will encounter with the pool?
CR Wilson, Stafford

The main problem related to heating an open water surface pool is the heat loss and water evaporation. Providing your fish house insulation is good enough then excessive water loss should not occur.

It is difficult to suggest an alternative heating arrangement to several heater/thermostats which would not cost a lot of money (heat pump), although you could attempt to heat the pool with a 1000 watt and use a storage heater to heat the fish house. If any readers have any ideas on heating large volumes of water then let us know. It may be that swimming pool plumbers have the technology?

I would suggest you use a container type pond filter with water circulated from the pool to the filter via a pond pump. The filter should contain long term filter material such as pond Siporax topped with a sheet of good quality filter wool.



Red tail by the pool

Your pool should be reasonable for a growing red tailed catfish although it is important to allow a foot between the water surface and the sides on the pool or your red tail could try going for 'walkies'.

Both photos by David Sands

I have a tropical fish aquarium which has been established about two months and I think there is something wrong with my fishes. A couple of them have started hiding and when then come out

they dart about and scratch themselves on the gravel. I have treated the tank with a white spot cure. A black molly seemed to have fungus so I treated the tank with a fungus cure. The fishes

look healthier but they continue to scratch themselves on the gravel.

Can you please tell me how to treat this problem and let me know what other products that I might need in order to

keep my new hobby on the right track.

Mrs. AM Frostick,
Dunmow, Essex

When an aquarium in first set up the system is like a new garden and it requires time to become established. A new garden would not come into flower over night. The new tank



New aquarium

needs time to mature, up to six weeks, even when 'seeding' preparations have been added. Should any conditions be incorrect (temperature/pH/bacterial balance) then is likely that stress will induce infection in fishes.

Live bearing fishes, such as platies, guppies and

READERS LETTERS

Breeding difficulties

I am writing to you for any information on breeding *Corydoras schurtzi*. I have recently purchased five fairly large individuals from my local retailer.

I have set up a 24x15x12 tank with a couple of Amazon sword plants, a flower pot and a couple of pebbles. The substrate is bare, the pH is 7, temperature 78 degrees and the nitrite and ammonia is nil. The tank is kept clean with a sponge filter.

I have heard that this species is difficult to breed, therefore any help you can give would be appreciated.

AD Measures, Derby

Corydoras schurtzi, from Brazil, is quite difficult to spawn but your chances are increased by having larger

specimens.

The first trick is to get the fishes into condition. This entails feeding a wide variety of food two or three times a day. Their diet should be finely shredded shrimp, bloodworm, finely chopped earthworm, live brine shrimp and a good quality flaked food.

Wild catfishes, in keeping with many other fishes, have a natural clock which encourages them to spawn during certain periods in the year. Once the fish are in excellent condition the females will visibly roe-up and become swollen with eggs. A good 50% water change with cool water combined with subdued lighting or even semi darkness will sometimes encourage a difficult spawner, like *Corydoras schurtzi*, to breed.

When the time is right they will spawn but patience is certainly required.

I have three beautiful Japanese koi carp which I keep in a 24x12x18 aquarium. The koi carp are a little over 4 inches long and they keep thrusting themselves onto the rocks as if they are trying to itch

Feeling koi

themselves. Sometimes they swim in a vertical position keeping their fins close to their bodies and they do not look happy. Can you please help as I have treated them with Sterazin to no avail.

Sallie Pears, Sheffield

Koi carp are not ideal fishes to keep in smaller tanks. They are much better suited to giant aquaria or large garden pools.



Photo by Miss Cobble, Oxford

As they grow they produce plenty of waste and in coldwater systems the filters are less efficient because of the lower bacterial activity.

I suspect your fishes have reacted to stress and suffered a form of white spot. It is necessary to undertake regular water changes (40% per week) stirring up the gravel to draw

out the soil and feed plenty of roughage foods such as lettuce, peas and shrimp.

● AQUARIUM readers are welcome to write to our editorial experts on any fish related subject. Marine queries will be dealt with via our *In Depth* series and should be directed to the editor marked 'Marine Query'.

mollies, can be vulnerable to white spot and treatment can sometimes take up to two weeks to fully treat. A 'one off dose' of a tea spoon of salt per gallon, added to the tank in a pint of warm water is known to help fishes fight off infections.

Check your tank temperature range is between 79-84 degrees Fahrenheit and re-dose the white spot remedy. If you can add some water from another 'mature', established, tank then this might also help the situation.

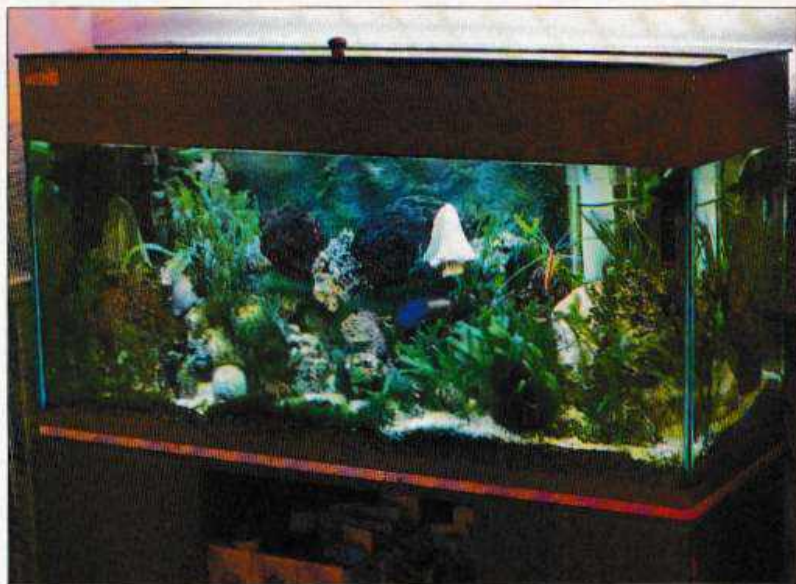
Providing you feed a wide diet and undertake weekly partial water changes once the aquarium is over six weeks old then your fishes should go from strength to strength.

AQUARIUM JULY 1992



Photo A. Van Der Meulenhuizen

The space available for siting an aquarium in our modern homes is often limited. Written for the individual with some experience of fishkeeping, this series by Nick P. Dakin explains how to set up a relatively small tropical marine fish-only aquarium in just three feet.



The 3ft tank

PART 1

More and more these days our lives seem to be governed by space restrictions, most noticeably in the home. The rise of the affluent society has witnessed an unprecedented amassing of domestic 'space fillers': TV's, videos, wall units, shelves, cupboards... the list is almost endless. Not that there is anything wrong in that, but when it comes to the humble fish tank it is often the space remaining that restricts our choices, rather than what is altogether correct for the livestock, let alone what satisfies our creative capabilities. All too often the excuse goes up, 'but I've only got three feet available, can't I really have a few Lionfish and a Moray Eel?!' In this case, not really, but to adopt a more commonsense approach it certainly is feasible to site a modest marine aquarium in all but the smallest of spaces. This can be an especially successful arrangement if the aquarium is limited to fish-only and the hobbyist has some previous experience of fishkeeping, perhaps with freshwater. It is to these people this article is particularly aimed.

Most people can find three feet of all space even if it means rearranging a few pieces of furniture. A room divider arrangement can be practical and attractive. Of course, it will always be the case that a two foot tank would be more convenient but this restrictive size of marine aquarium must be discouraged at all costs as a

short-cut to disaster. This is because its holding capacity of less than 10 gallons is inherently unstable in the mid to long term. pH and salinities can vary wildly, leading to stress of livestock, disease and fatalities. Larger tanks have a greater buffering effect against such things and the three foot tank is about the smallest that can be relied upon to give continued success.

The Aquarium

Having found that elusive three feet of wall space, the aquarium and stand can be carefully chosen.

More people are resisting the temptation to go for the all glass tank with welded metal stand and plastic hood. It just looks so incongruous when surrounded by polished teak or black ash furnishings. The cabinet style aquarium has become progressively the more popular choice. It can be purchased in a wide range of finishes to complement almost any furnishing scheme and has the added advantage of being able to conceal unsightly wires,

pipes, pumps and canisters.

Having found an attractive style, the overall size can then be decided upon. The three foot length cannot be altered but there is generally little restriction on height and width. Taking into account what has already been said regarding the fact that larger tanks are most stable, why settle for a 36"x12"x12" (nett gallonage 15 gallons approx.) when a 36"x15"x12" (nett 19 gallons), or even a 36"x18"x15" (nett 30 gallons) would generally fit equally as well. The latter example is actually greater in volume than a 48"x15"x12" tank!

Site the tank in a prominent position. All too often an aquarium is recommended to brighten up a dark alcove. The theory behind this suggestion seems so bound but in practice the unfortunate reality is that this can lead to the 'out of sight, out of mind' method of fishkeeping, whereby the tank is given a cursory glance once in a while and the all important maintenance becomes neglected. Siting the aquarium where everyone can view easily and in

comfort for relatively long periods promotes a pride and enjoyment in fishkeeping (especially when high praise is heaped on the owners by impressed visitors), and encourages vital regular maintenance.

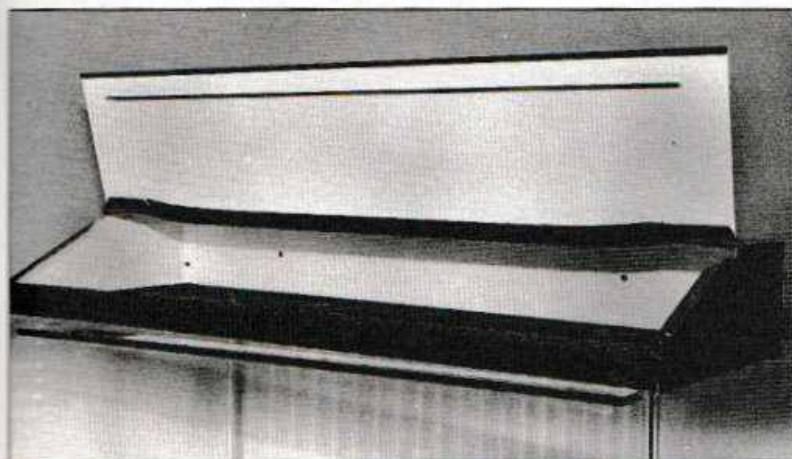
Filtration

Much has been written about various filtration techniques, and it is possible to incorporate nearly any within the three foot tank but traditional methods are still effective and proportionate in cost.

Undergravel filtration, run in either the downflow mode with one or two matched powerheads, or in the reverse-flow mode utilising a canister filter and a circulation pump, is still quite acceptable. The traditional arrangement being to cover a filter plate with a layer of coral gravel at a rate of 10lb per square foot of base area. This is then covered with a plastic gravel tidy mesh, followed by a layer of coral sand at a similar rate of 10lb per square foot of base area. Undergravel set ►

Community beginnings

Kevin Fox offers advice on the first steps of fishkeeping and enlightens AQUARIUM readers who are beginning to be aquarists in their own right



This type of aquarium hood houses the light and covers the condensation lid

Tradition dictates that newcomers to fishkeeping set up a 'Community Aquarium' as their first step into the hobby. Although newcomers have been pushed towards this system for years, I make no apology for sticking with it. The community aquarium scores heavily in favour of newcomers because it allows a range of fishes from various countries around the world to be kept. Each of the fishes has its own unique behaviour yet still retains certain qualities which allow them to live peacefully amongst other fishes. This favourable disposition of community fishes allows newcomers to our wonderful hobby to make a choice when ready and then to move on and create something different such as a one species aquarium. In such a system all conditions, such as the water, gravel, plants, etc. - known as the biosphere - are just right for one type of fish only.

A community aquarium

is actually a compromise solution to the problem of keeping fishes with differing requirements for example the exquisitely coloured Dwarf Gourami from India, the playful 'livebearing' Guppy from America or the stately Angelfish from the Far East, but originally from the South American Amazon. Some species of fish, such as those mentioned, have similarities which allow them to be kept together. On the other hand, there are some fishes which most definitely cannot be kept with others; Piranhas and Guppies being a prime example - Well, it is possible but only for an hour or so!

Which fishes are 'communal', i.e. will live peacefully with each other, will be revealed as this series progresses. Once you've purchased your tank, I discussed the two basic types of tank available in my previous article, you are still a long way off from rushing around the aquatic dealers looking for good quality stock for the tank. It

is essential to establish the aquarium and allow time for important chemical and bacteriological processes to function fully before looking at fish stocks.

System 1 - Community aquarium

There are many routes towards the goal of creating a community aquarium, as well as many side issues. Over the next few months I plan to explain in detail two fairly common systems, leaving the eventual choice of system and approach to you. System 1 is the traditional 'newcomers' aquarium which uses air driven undergravel filter plates, whilst System 2 is a more technical approach based around an external power filter. Each has its own advantages and disadvantages, once you know what they are you will be better equipped to make an informed purchase and not waste any money. After discussion on Systems 1 and 2 I will look at special aquaria which come fully equipped. I refer to them

as 'dehydrated aquaria' because all you have to do is to add the water!

To create System 1 it is necessary to discuss what it does, how all the parts fit together, how it works and, more importantly, what's it all going to cost?

The tank starts the ball rolling and, as explained last installment, unless you know exactly what size you require, such as to fit into a specific location, then always buy the biggest tank you can afford. A huge aquarium with a few fishes in it will not come to any harm. A small one 'stuffed' full of aquatic life will result in many deaths very quickly. Prices vary according to size, and type of construction, but to make things fairly simple I will assume that the community aquarium is based on a 90x30x30cm. (36x12x12") tank. This tank size holds enough water so that the inevitable mistakes will be cushioned more than they would be in a smaller aquarium. Changes, such as sudden drops of temperature or a rise in ammonium (don't worry about these terms yet, they will all be fully explained in the relevant sections) happen much more slowly in bigger tanks because of their larger water volume. Expect to pay somewhere around £15 to £25 depending on construction.

Tanks, cover glasses & condensation trays

Tanks do not usually come fitted with either cover glasses/condensation trays or with hoods, so apart from forking out for the tank you have to add the additional cost of a condensation tray and a hood. Cover glasses, or plastic condensation trays, sit on two small glass shelves running horizontally at the top of the tank. These are fitted to the front and back glasses just above the water line, and have two purposes, they keep the fishes inside and fumes, ►

dust, etc. outside. The best quality tanks will come complete with cover glasses, but in truth these are really an unnecessary luxury; the plastic condensation tray does exactly the same job but will only cost a couple of pounds. They can also be purchased in sizes which fit your tank exactly and may be cut quite easily to accommodate wires from heater/stats, plastic airlines, etc. Of course they still perform the prime purpose of keeping fishes in and dirt out as well as slowing down the amount of water lost through evaporation.

The hood

As is generally true, you tend to 'get what you pay for', so a new hood which costs around a 'tenner' is not likely to survive for as long, or be as easy to operate as a hood costing around twice as much. Before outlining the various types of aquarium hoods available it is important to ask is it really necessary to have one at all? I know that it sounds 'daft' to discuss if a hood is needed or not but, if a plastic condensation tray is used, fishes are kept in and 'nasties' out. Even so there are many aquarists who

don't use a hood of any description.

Another reason for using a hood is that it gives aquarists somewhere to put the lighting equipment, such as the choke/starter unit and tubes of a fluorescent lighting setup. If you are not going to use a hood then you'll have to work out another way to position the lighting gear; such as suspending either quartz halogen or mercury vapour lamps, even fluorescent tubes, directly above the 'open' tank. A hood protects your tank by stopping things falling into the water, and also adds to the beauty of the finished aquarium.

Cheap hoods usually consist of a single sheet of very light weight aluminium which slots into two plastic end pieces. The underside of this cheapest hood is usually a piece of clear plastic. Although it's possible to fit at least one, and with a little work two fluorescent lighting tubes inside the hood there's no room for the choke/starter. Such a hood will cost about £15. It is worth remembering when contemplating purchase of this type of aquarium hood that to gain access to the inside of the tank, whether

for feeding or for routine maintenance, the whole hood has to be either raised or entirely removed. On the plus side, this type of hood is easily cut to accommodate wires, airline pipework and power filter input/output hoses.

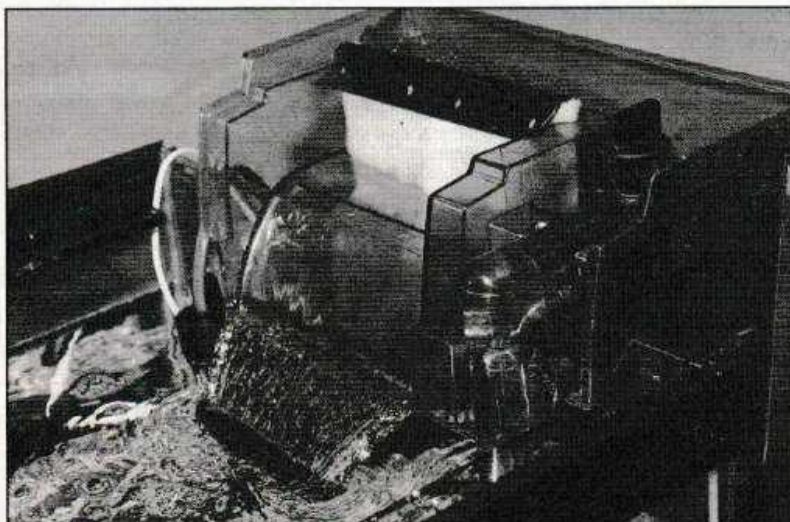
In the next price bracket there are the taller, wedge-shaped hoods which allow accessories such as lighting starter/chokes, and a Over Head Trickle Filter device, an above water box to add a final 'polish' to the aquarium water, inside the back of the hood, whilst at the front there is a hinged door which runs the full length of the hood, and is around 4-6" wide. This gives direct access to the inside of the tank for feeding and simple maintenance. Such hoods are made from either heavy gauge aluminium or tin covered steel and are very strong. Such hoods are not easily cut for pipework and hose entry points, requiring some heavy work with a hacksaw or heavy duty tin shears.

Cabinet aquaria come with their own hood system, which usually has either the site for lighting/filtering hardware marked out inside the hood or is already fitted. Making your

own hood is a relatively simple job, and I have seen some really beautiful home made ones in my time. The favourite material for making your own hoods seems to be chipboard. In my opinion this is a mistake unless you take special precautions to ensure that the internal surfaces of a chipboard hood are fully waterproofed else the board will quickly become waterlogged and start to crumble. Also don't forget to add reflectors behind the fluorescent tubes - simple aluminium cooking foil will suffice - although you can buy custom designed reflectors quite cheaply. Adding a reflector can and actually does in many cases double the light output from a lighting tube as it directs all of the light to where it's most needed; ie. straight down into the water exactly like real sunshine.

For those who can afford the better types of canopy, buy a hood which is made from very strong plastic, has all the lighting equipment already installed, and which also has a whole array of knockout templates along the back. You pick the knockout section closest to where you want it - such as the input/output hoses - and then simply give it a sharp tap to remove it permanently. Such hoods are usually aimed at a specific tank manufacturers range and the average cost is around £40.

Finally, the choice of filtration system chosen often dictates which sort of aquarium hood you have to acquire. For example, one of my tanks uses the superb Interpet external power box filter. This hangs onto one of the outside walls of the tank but the cascade return of the cleaned water from the filter requires virtually the entire removal of one of the end walls of the hood [PLATE 3]. In these circumstances there's little



In action, a working Whisper 2 external power box filter



Community beginnings

point in buying an expensive hood only to hack it to pieces. And don't forget to ensure that any hood you anticipate buying will actually fit your aquarium! A 12" wide hood is not much use on a 15" wide tank.

I have delved deeply into the subject of tanks, stands and hoods deliberately because these items represent the greatest financial outlay, and with care will last you for many years, it is therefore vitally important that you know

enough about these basic but vital elements of your proposed aquarium so that you may purchase confidently. Now it is time to investigate the remaining items needed to complete a Community Aquarium, and then later on move onto an explanation of how they all work and fit together.

Filtration

The first community aquarium discussed will employ an Undergravel (U/G) filter system. Although (according to many aquatic authors) it would seem mandatory for the newcomer to start with this type of filter, in actual fact it is one of the most complicated of all the

various filter options available. So why have I chosen it for your first tank? The undergravel filter system uses all three of the prime filtration methods - mechanical, chemical and biological; so a firm understanding of what the U/G system does and how it achieves it becomes the fundamental stepping stone towards more technologically based filter methods. Once you grasp how undergravel filters work then it's no great problem to change to, say an external power filter. But the keyword is understanding, and a few aquarists - even those who have been using the system for years - fail to grasp the essentials of the system.



A range of heater thermostats, 'Aquarium' version in the foreground

Undergravel filter systems require U/G filter plates, gravel and air.

Air pumps

To operate the undergravel filter system requires power, which in this system is supplied by air created and delivered into the system by an air pump and various odd bits of 'plumbing' such as an airline - to carry the air from the pump into the aquarium - and (if needed) various valves to share the pump's output or to control the amount of air entering the system. Air for the aquarium is mostly created by two main methods: the vibrating rubber diaphragm, or the piston driven air pump. Each system has its own unique advantages and disadvantages, and these will be discussed next month when I explain how to connect everything together, and how it works, together with any tips I have acquired in some thirty years of keeping tropical fishes.

Lighting

Although it's perfectly possible (and sometimes even desirable, such as for a breeding tank for various gouramis) to use incandescent light bulbs as the main lighting system they are not very efficient and do lack spectral output (colour of the light) at important wavelengths which aquatic plants require. Many aquarists around the world have never used anything but light bulbs and have very healthy fishes and luxuriant plant growth. Besides for those people with very little cash incandescent lighting offers the cheapest start but much higher running costs.

Most aquarists prefer to use the much cooler running fluorescent lighting system, which although its initial purchase price is much greater than light bulbs actually costs much

►less to run. A single 15 watt choke/starter kit will cost around £12 but then add the price of a fluorescent tube which, because of the now bewildering array of 'so called' specially designed 'spectral output tubes' for aquarium use can cost between £5 to around £12 depending on which type is chosen. If more than 15 watts of lighting is required then it is far cheaper to buy a double 15 watt choke/starter kit rather than two single ones. Formulae to calculate various important items such as heating and lighting requirements, tank size, surface area, volume and amount of gravel required will be given later.

Heating & temperature control

They are not called Tropical Fishes for nothing! Although a small number of fishes can tolerate very low temperatures most tropical fishes require a constant temperature of around 24-25 degrees C. Therefore (even in a centrally heated room) it is necessary to provide some form of heating for the aquarium water. The simplest and cheapest way to do this is to buy a combined heater/thermostat. This is like a large glass test tube; at the bottom sits the actual wire heating element whilst above this is the thermostat control mechanisms which switches off the heater element once the pre-set temperature has been achieved. There are numerous other ways to heat the aquarium water, such as an under-tank heating mat (of the correct wattage, naturally) separate heater and thermostat, and nowadays there are some truly amazing electronic thermostatic devices which will maintain the temperature to .5 of a degree C. For a good

heater/stat expect to pay between £12 to £20 depending on tank volume. Under-tank heating mats costs slightly less than heater/stats. There is a good reason for this, an under-tank heating mat is only a heater; it has no means of switching off the power when the correct temperature is reached. Therefore they have to be used with a separate thermostat. For example a 60x30 cms. (2'x12") heating mat will cost around £9; by the time the cost of a thermostat is added (which vary greatly, internal, bi-metallic ones costing much less than electronic devices around the cheapest 400 watt switch-load are the Uno range, which start at around £11) comes to £20, which is firmly into the top range of the combined heater/stats.

My own major rule when dealing with electricity and water is don't! Deal with one or the other, never both at the same time. Now I appreciate that this rule has to be broken, especially when setting-up a tank and getting the heater/stat temperature right. So, where it's

<h2>Summary</h2>	
<i>Basic equipment is as follows</i>	
90 x 30 x 30 cms tank	£15
Hood to fit	£15
Fluorescent lighting kit (single)	£12
Flourescent lighting tube	£6
Plasting condensation tray	£3
Undergravel filter plate(s) + air pump	£20
Combined heater/stat	£15
<hr/>	
Total	£86

absolutely necessary to have your hands in the water with the power switched on, then another 'rule' takes over. One hand in the tank; the other in your pocket. For those (like me) who hate putting their hands (and lives!) at risk in a powered-up aquarium, then Aquarian make a range of heater/stats where the control box for adjusting temperature lays outside of the tank, and can therefore be changed without any fear of electric shock or getting your hands wet.

Totals so far are average, 'new' prices. And, the spending is not

finished yet! We still have to buy the gravel substrate, plants, a few chemicals and, of course, the fishes. I will cover the actual setting up in next month's column. □

Your community aquarium – in a nutshell

Aquarium Volume – Length x depth x width (in centimetres) Divided by 1000 gives the tank volume in *Litres*. Take away ten percent for tank contents (rocks, gravel etc.) when working out the volume for medication.

Litres to Gallons – Multiply litres by 0.22. Answer in UK gallons.

Gallons to Litres – Multiply gallons by 4.56. Answer in litres.

Aquarium Surface (floor) area – Length x Width. (Answer in centimetres or inches depending on units used). There are 144 square inches in a square foot.

Lighting requirements – Unplanted aquaria, allow ten watts per square foot. Planted aquaria require 15-30 watts (depending on plant numbers – to be discussed later).

Heating requirements – Calculate tank volume in UK gallons then multiply by 7.5 for tanks kept in un-heated rooms, or

multiply by 10 for aquaria in heated rooms. Your answer will nearly always be an odd number, so where the calculation says 90 watts then go for the nearest heater in the standard range, which in this case would be 100 watts.

Substrate ((gravel) requirements – Allow 10 litres of gravel for every square foot of floor (900 square centimetres) area. (1 litre of gravel weighs approx 3.5lbs Avoirdupois.

Tropical fish stocking level – Allow 1inch of fish length (excluding tail fin) for every 12 inches of tank water surface.

The above formulae is for those aquarists who cannot wait until next month, where I will be providing information on setting up the 90x12x12cms., 'Community Aquarium'.

Until next time, happy fishkeeping.

£25 for your suggestion
£60 for your pictures.

We welcome your suggestions of fish for inclusion in AQUA feature and we will give a £25 prize or books to the value of £30 for any that are selected for publication. Photographers are also invited to enter a selection of fish pictures and a cash prize of £60 will be awarded for those five or six chosen to appear.

The selections may link similar species or display a wide range of fishes - the choice is yours.

Send to Aquarium, Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST.

AQUA feature

David Sands presents a vivid selection of tropical marine fishes suitable for the modest to large marine aquarium.

Pseudoballistes fuscus
Common Name: Blue lined trigger.
Range: Topical Indo-Pacific and the Red Sea.
Habitat: Shallow reef waters and rocky outcrops.
Size: 200mm.

Temperature Range: 25 - 27 degrees C.
Identification Patterns: Outstandingly blue lined patterns.
Additional Information: A robust species suitable for the larger marine system

containing strong fishes. As with all trigger fishes, the blue lined trigger can produce sounds by grinding its teeth and amplifying the noise from the swim bladder. Thrives on strips of fish, earthworms and

shrimps in the shell.
Breeding Details: Spawn in pairs on the substrate beyond the reef. Breeding has not been achieved in aquaria.





Platax pinnatus

Common Name: Long finned batfish.

Range: Philippines, Indonesia and New Guinea.

Habitat: Mangrove outcrops, tall seaweed gardens and alongside reefs and shorelines where its cryptic pattern acts as a perfect disguise.

Size: 400mm.

Temperature Range: 23 - 28 degrees C.

Identification Patterns:

Juveniles possess the superb red edges to the body, adults are less vividly marked.

Additional Information:

Only suitable for deep and large aquaria. The Long finned batfish is a finicky feeder when first imported and great care should be taken to make sure a good range of foods are offered. Tempt a young fish with live bloodworm, shrimp, earthworm and spinach.

Breeding Details: Breeding details are unknown although it is likely a pair develops and show parental care to fry.

This is a species best kept by the experienced aquarist.



Centropyge bispinosus

Common Name: Dusky angel or coral beauty.

Range: Widespread throughout tropical Indo-Pacific to South Africa.

Habitat: Coral reefs amongst the outcrops.

Size: up to 100mm.

Temperature Range: 25 - 27 degrees C.

Identification Patterns:

Commonly purple edged with rusty red central body.

Additional Information: A variably coloured coral fish ranging yellow-orange to

purple and red body, occasionally with vivid cross bars. Individuals are territorial although pairs will form from aquarium groups. Enjoys a broad diet including fine shrimp,

flaked food and spinach.

Breeding Details: Pairing takes place and then an area of rock close to an anemone is chosen and cleaned. Eggs are guarded although the newly hatched fry require very small food even in rotifer terms.





Pterois sphex
Common name: Hawaiian lionfish.
Range: Hawaiian Islands.
Habitat: reef outcrops.
Size: 200mm - 250mm.
Temperature range: 23 - 28 degrees C.
Identification patterns: Red and white banded in much the same way as other *Pterois* species such as *P. volitans* and *P. antennata*.
Additional Information: A venomous, nocturnal predator suitable for larger fish communities. Only the locality can visually distinguish this species from others with which it is confused. Feed large shrimp, earthworms and small strips of fish. The upper spines can inflict pain if accidentally encountered.
Breeding details: Habitat details suggest cave spawning occurs once a year although this has not been achieved in aquaria. Juveniles are supposed to grow rapidly in the first year.

Amphiprion ocellaris
Common Name: Clown/ anemone fish.
Range: Widespread throughout the tropical Indo Pacific.
Habitat: Coral reefs amongst anemone gardens.
Size: Males are smaller than females 75mm - 100mm.

Temperature Range: 25 - 28 degrees C.
Identification Patterns: Orange to red body with white bands.
Additional Information: Juveniles can be kept in groups although adults, particularly spawning pairs, are extremely aggressive towards their own kind and

other clowns and damsel fishes. Clowns enjoy a wide diet ranging flaked food, shrimp and small fish strips.
Breeding Details: The common clown is regularly spawned by experienced marine fish keepers. They breed in similar manner to substrate spawning cichlids.

The female deposits up to 150-250 eggs on a pre-cleaned stone, beneath or alongside the tentacles of the anemone. The male guards the eggs vigorously until hatching. Rotifers are essential for raising young clowns but the rewards are well worth the effort. □



Leon the Pig Farmer

Dr. David Ford of the Aquarian Advisory Service received an unusual request from a film director who, for the story line, had to have several aquaria on set without delay

It is widely known that the British film industry is in financial trouble. Rather than just accept the current underfunding a group of film buffs started filming a new British comedy on a shoe string budget.

Their technique is to pay 'expenses only' to technicians and actors with the agreement that if the film is a success the profits will go first to the backers and technical people, then the actors, then a share out of whatever else the film may generate.

The first film in this arrangement is to be called 'Leon the Pig Farmer' is the story of a Jewish boy who discovers he was a test-tube baby.

Acting and the aquaria

The lead part in the film is taken by Mark Frankel who is an English actor better known in the USA. Glamour is provided by Madeline, played by Maryam D'Abo, one of the James Bond girls.

The film which was made on location to save the high studio costs. These were in London and Settle, North Yorkshire. At London the rare studio photography took place in Tufnell Park where a giant cross was used with three aquariums in the background. One tank housed common goldfish, one had brightly coloured coralfishes and the third a live North sea lobster. If you want to know why these three animals were integral to the plot you will have to see the film!

The film company approached **Aquarian** to set-up the tanks and the execution of establishing these was given to the Aquarian Advisory Service.

As usual, with filming, the request was for the immediate installation of three complete tanks crowded with active fish. This request was then delayed a week – thank heaven – which



David Ford busy installing the aquaria

allowed me some time to set-up the tanks and settle-in the fishes.

My assistant (wife) and I moved to lodgings in North London and visited the flat to see what and where three tanks could be installed. That moment was when we discovered the scene would be in a room on the third floor, up three flights of stairs with the nearest water point a flight below in the bathroom.

The tanks chosen were 36" by 12" by 15" (the largest I can lift alone!) donated by Bryan Dainton of **Aquatop** in Oldham.

Day one was spent dragging buckets of water up the flights of stairs to fill the two main tanks. A hosepipe could not be used because of the old fashioned taps in the incredible Victorian bathroom (it will be featured in the film too). The giant size gold taps were never designed for hose pipes and adapters!

Salts were added to the water for both the coralfish and the lobster tanks and **Aquarian** power filters, airpumps and a heaterstat installed. The lobster tank was left as cool seawater. Triton lights, from **Interpet**, were included with decorative, but artificial, corals and rocks, with coral sand supplied by

Underworld. All the equipment was then plugged into the mains and the systems left overnight to stabilise.

The next day found that the temperatures and the specific gravities at 1.022 had reached correct levels, with clear water provided by the powerfilters. The next step was to drive to see Stan Kemp of **Kingfisheries Ltd** in Beckenham who was donating the coralfishes for the film.

Angels with magnificent faces

The choice of fishes ranged magnificent angels, tangs and damsels to provide a colourful scene for the camera. These fishes were transported back through London no thanks to a traffic nightmare, but at least the fish saw nothing of the long vehicle jams in their darkened, oxygen filled polybags.

We advised not to feed the fishesthe last thing we wanted was an 'ammonia crisis'. We retired to our digs exhausted leaving the fishes overnight to settle down.

Next day the film set was in chaos. Construction men were erecting scaffolding to allow cameras to view the flat from a third floor window. Others were installing lifting gear for the giant cross. Stained glass windows were ➤

BIG SCREEN FISHES

► also being erected and I feared the coralfish would be in total shock with all the noise and dust. Unbelievably the fishes seemed oblivious to all the happenings around them.

Whilst we stood and watched huge vans arrived, blocking the street completely, as more men poured into the house snaking fat power cables up the three flights of stairs. Then came directors, producers, sound and cameramen with 'Star Wars type equipment'. Finally, in followed actors with an entourage of hairstylists, make-up people, writers, dressers and some people who did not seem to do anything but simply 'be there'.

The stream of people going up the three flights and an equal number coming down held us up as we tried to get to our fishes. Dorothy, my hard pressed wife, gave up fighting the flow of human ants and went to sit in the car, which, thanks to the articulated trucks,

Edgware Road, it can be impossible. We drove first to Hendon Aquatics, a petfish shop I remembered from years ago but all that remained was an empty shell with 'Gone Away' on the door. Next to Harringay Aquatics....closed Mondays. Then to the North Circular Garden Centre "Yes, we had a fish section but it closed down last week...the recession you know".

By this time we had run out of options and we returned (parking two streets away because the huge vans) and fought our way up the packed stairways. The director announced that the scene was running late so could we please, please find some goldfishes. A researcher announced that she knew a pet shop in Golders Green. 'Too far, in London's traffic!' I said, but the researcher, who knew the area, offered to come along to show time-saving shortcuts. We had just 30 minutes before filming the top of the stairs scene

wanted to know why the rush to buy goldfish. After a rapid explanation I clutched the bag as we ran back to the car and set off, back through London's back streets, until we arrived within walking (running) distance of the flat. After a mad dash up the stairs (passing people coming down) we then found the way blocked by a huge camera about to film the top of the stairs scene. There was no way past.

The goldfish bag was passed under the camera to a hand that reached over the bannister and the fishes were released into the background aquarium, just as the director said "Quiet please...and...action!"

With my 'mission accomplished' I retired to the digs and returned next day to collect the fishes and equipment. The house set was now deserted and silent.

I gave the Billingsgate lobster to the house-minder on the understanding that he took it from the tank. He managed to



Dorothy Ford by the film unit's van



The tank in situ

was now parked a long way away from the film set!

Eventually I battled my way into the flat just in time to hear the director announce that the fish tanks were in the wrong place. I pointed out there was no way that a 36" tank, filled with water, could be moved. Not, at least, without emptying and refilling 20 gallons of seawater and transferring the lot up and down two flights of stairs choc-o-block with people.

My next task was to collect the lobster, a huge 'green monster' donated by Billingsgate market. On my return I found the aquariums rearranged into a right angled position. How this was achieved I will never know, but the fishes seemed none the worse for the move.

It was then that I was asked to collect a few goldfishes ready for the next scene in about an hour's time. Whilst this request might seem an easy task in London, where it takes two hours to motor a short distance like the

would commence...

Going for Gold

From the back seat the lady started giving directions. When we reached the junction where the A1 meets the North Circular (at the same time as a hundred other vehicles) the road was about to divide.

"Which way?" I asked, but there was no reply. A glance in the mirror showed my guide was fast asleep, as I hurtled to the junction...and, of course, made the wrong choice.

Once awake, the researcher guided me to a little pet shop in Golders Green High Street where we parked on double yellow lines and ran to the shop. "Any Goldfish?" I asked breathlessly and the owner pointed to just one small tank with half a dozen baby common goldfish.

"I'll take the lot" I gasped, "if you can bag them up quickly."

My haste intrigued the lady who

do that without losing any fingers. I bagged the baby goldfish and coralfish and started dismantling the aquaria. The immediate problem was what to do with 40 gallons of seawater, so I chucked it out the window. It can not be often that it rains sea water in London.

I then endured another battle with central London traffic and the coralfish were returned intact to **Kingfisheries Ltd** before I tackled the dreaded M25 and the long haul back to my home county Yorkshire.

The tank and goldfishes were then installed in an Halifax based old folks home, again none the worse for their short film career.

So, do look out for the film in Springtime '93 an when you see the coralfishes in the background you will be able to say you know how they got there. If you should see the goldfishes at the top of the stairs you will recall how they nearly did not arrive in time for the filming!