

The NEW

AQUARIST & PONDKEEPER

FEBRUARY 1996

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INSIDE

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AQUARIST PONDKEEPER

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COVER PICTURE

PHOTO: MAX GIBBS

The jaguar Cichlid, *Nandopsis managuensis*, is aptly named for not only does its distinctive spotted pattern emulate that of the genuine article *Panthera onca* but also it is an equally efficient predator, needing to be kept in a sturdily-furnished aquarium with well-anchored plants (use plastic replicas if necessary) and suitably 'able-to-look-after-themselves' companions! Incidentally, the native word 'jaguara' means capturing prey with one agile bound — you have been warned. See Cichlid Compara-File in this issue.



PLANTS FOR FREE:

Chris Rosam describes the sex life of plants — in the best possible taste

SPECIAL FREE SUPPLEMENT



Super Cichlids!

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As the BCA nears its Silver Jubilee, Karen Horrocks outlines its many services to cichlid keepers and looks ahead to the party!

Comment

First the apologies! Koin-eyed readers may have wondered where the promised contents of Tomonow's Aquarist got us. Due to pressure of space limitations it is regrettable that Gina's contribution fell victim at the very last moment. Owing to time constraints the Contents page had already gone to be printed before the axe fell and so we never realised what we'd already promised — and subsequently, what you'd be missing.

Second, it is to be expected that opinions made in articles may not always be accepted by everyone. We are happy to offer 'right to reply' space in which dissenting views can be expressed. No purpose is served by merely phoning in with a complaint as only a minimum number of people are reached — surely all our readers are entitled to share in the debate!

When preparing this month's Supplement, I naturally expected Angel Fish (*Phenylthium*) to be included — and that's when I discovered that Angels can, in fact, turn out to be devils! Coincidentally, a few months ago when I decided to return to keeping these fish a little more seriously, I had quite a bit of trouble locating any sort of Angel at all — not even the good old-fashioned Silver — there was a serious shortage, and I was warned off buying what ones I could find.

Years ago I had experienced strange antics with these fish — females spawning together, multiple males sharing one female, one male suddenly taking up with a new lady, fishes adopting other pair's eggs, my own home-bred (in-bred!) youngsters spawning at too early an age without any practical ideas of how to do it — laying eggs on twisted *Vallisneria* then, having recovered from their dizziness, deciding that *Wateria* might be a better bet, but not understanding where the eggs were going to when they laid them on the silt in the leaves! Parental care was obviously quite beyond them. Brian Middleton reported similar dysfunctional *Discus* in last month's A&P and it looks as if interbreeding on huge commercial scales may also have resulted in the Angel becoming not such a reliable favourite after all. But, as they say, 'there are other fish in the tank' so direct your gaze to these pages and try something new.

John Mills

EDITOR

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TOMORROW'S AQUARIST

BY GINA SANDFORD



A Day Out in Wrenthorpe

Next month sees an annual cichlid event that seems to attract cichlid idiots and cichlid ignorants alike — the BCA Convention. The first time I went along to one of these was more by accident than design, a friend (a true cichlid idiot) said, "You've got a large projection screen haven't you?" "Yes" said I, not dreaming of what was to follow. "Good, can you bring it to the Convention next month, it would get us out of the mire."

Side by Side

At that time what I knew about cichlids was limited to the ones I had kept, mainly South American odds and ends, such as Rams, Severum, Brown and Blue Acaras and, although these fishes had been fun to breed or try and breed, catfishes had taken over in my tanks and cichlids were the things that other people kept. I had fallen into the trap that so-called 'specialists' often find themselves in — all I saw was catfish. Trouble is, catfish don't live alone, they exist with many other species of fish and, to reveal them in their true light it is necessary to understand the interactions of the species in the wild.

A good example of this is *Synodontis multipunctatus*. This beautiful Lake Tanganyikan catfish was first bred by a cichlid fanatic not a catfish fanatic. Why? Because the eggs of the *Synodontis* are mouth-brooded by the cichlids who take them up with their own. Just how many catfish keepers had been trying to breed them in a set up without the necessary cichlids? The cichlid keeper had, by chance bought a pair of catfish to act as scavengers in his Rift Lake tank. Conditions were right for the cichlids and right for the catfish, so they did what comes naturally.



A typical Tanganyikan aquarium with a rocky background to provide hiding places is ideal for the catfish, *Synodontis multipunctatus*.

PHOTO: GINA SANDFORD

Experiences like this make me wonder just how much we are missing if we are too blinkered in our view of the fish world. There is, for example, the beautiful *Lamprologus tanganyicus*, a killifish which drops its eggs cracks and silts in rocks only to have them robbed by *Neolamprologus mondabu*. Shoals of the adult killifish are preyed upon by the likes of *Haplotaxodon microlepis*.

Just what else are we unaware of? Fortunately for us, some people go out into the field and study these fishes and Ad Konings is one of the best in his field. As you will see elsewhere in this issue of **A&P**, the British Cichlid Association have invited him to lecture at their Convention so, regardless of your personal specialisation why not go along and listen to something a little different? You may, like me, come away pleasantly surprised by what you've learned. Also at the Convention will be Frank Warzel whose chosen subject will be Pike

Cichlids — fishes he has studied in the wild and collected specimens for further study in his own aquaria. With the Auction and Bookstall there too, you'd better take some money!

What's That?

Having spent two days at the British Aquarists Festival chatting to everyone, it really came as no surprise that TA is read as much by new 77 year-old fishkeepers as by seven year-olds. It also transpired that experienced fishkeepers peruse the column and several commented that they had made many of the same mistakes I have made in the past, plus a few others besides.

Whatever we do in fishkeeping, we cannot fail, at some stage or another, to read books and magazines. Very often, as newcomers to the hobby, we meet terms and phrases that are a complete mystery to us — thinking back to my early days in the hobby I was totally clueless as to what Brine Shrimp was, never mind how you hatched it, and what the heck was a spawning mop? I never, ever, found one for sale in a shop and you feel a bit of a fool admitting your ignorance in a shop full of people. With all this in mind, I thought it might be helpful to newcomers to the hobby to include in TA a section to address such problems. I'll start off next month with spawning mops but I'd like you to drop me a line with your mystery terms. I cannot answer all of you personally but, through these pages, I hope to be able to unravel some of these mysteries, not only for you but also for many other novice aquarists.

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MARINE LIFE SUPPORT



Each alternate month I will be discussing one of the many popular filtration methods by which tropical marines may be successfully kept, with livestock suggestions suitable to that system in the month following. I'll start by encouraging the newcomer but, month by month, the set-ups and livestock recommendations will become more challenging. In this way it is hoped that all levels of the hobby will be accommodated, giving plenty of food for thought to the advanced mariner as well as providing a structured pathway for the beginner wishing to start modestly and hoping to progress as knowledge, practical experience and confidence build. Whichever way you look at it, it's a terrific excuse to carefully save every issue of **A&P** to form a comprehensive guide to the world of marine fishkeeping!

DOWN TO BASICS

Without doubt, by far the most widely-adopted system for keeping marines employs the use of undergravel filters in the downflow mode. It is easy to set up, well tried and tested, and ideal for anyone wanting to keep a basic marine aquarium.

The use of undergravel filtration is by no means a modern invention; it was first used in British water treatment works almost a century ago (in the few that there were) and is still used extensively today in the processing of sewage and the preparation of drinking water. However, an American diver and marine biologist, Robert Straughan, was thought to be the first person to popularise this method on a smaller scale for keeping marine fish in captivity. His initial plans were to use the gravel bed as a mechanical trap for detritus,

NICK DAKIN SETS OUT ON THE LONG ROAD TO SUCCESS WITH KEEPING MARINES.

• ILLUSTRATIONS BY THE AUTHOR •

but it soon became clear that the gravel made an ideal home for bacteria which fed on toxic fish waste. This made the existence of a self-contained recycling unit a possibility, rather than having to change all the water every few days with a totally fresh batch — as was the only previous alternative! Thus, marine fishkeeping became a realistic proposition for a growing number of people interested in studying the wonders of the undersea world in the comfort and convenience of the home or laboratory without the aid of diving equipment.

Graham Cox was largely responsible for popularising the keeping of marines in the UK during the mid- to late 1960s and I think I am right in saying that it was our very own editor who coined the phrase 'Downflow Filtration' sometime in the mid 1980s (it's only us fishkeepers who differentiate between down-flow and reverse-flow — I don't think the bacteria care which way the water's flowing — but thanks all the same! — Ed)

Even though we are still developing more and more sophisticated methods for keeping marine fishes and invertebrates, the downflow method remains an ideal place to start the hobby, and the most suitable system with which to kick off this series.

TANK SIZE

The smallest tank to use should be no

less than 20 gallons. Trying to 'miniaturise' marines leads to instability of water conditions and places severe restrictions on the amount of livestock that can be kept (see next month's stocking suggestions). The hobbyist should be looking for a tank of minimum dimensions 90x38x30cm (36x15x12in) (high); taking into account displacement by the filter, rockwork and freeboard the net volume of water will be in the region of 16 gallons: enough to house about eight inches of compatible fish. Having said that, a similar sized tank (but another six inches higher or 12in longer) would be far preferable in terms of water conditions stability and wider choice of livestock. Whilst hexagonal, octagonal, triangular and other weird and wonderfully-shaped tanks may seem visually appealing, they may not be adaptable to efficient undergravel filtration so newcomers are advised to choose a traditional rectangular, or trapezoid, shape.

SETTING UP

Once the aquarium has been positioned, fully cover the base with proprietary filter plates and fit an uplift at each end. Small plates of the 'lock-together' variety are readily available but larger, all-in-one plates are equally suitable. It has been suggested that plates are held in place with dabs of silicone sealant but experience has shown that it makes little difference to the filter's efficiency and is, therefore, not crucial. This is a good time to decide on uplift height and cut them accordingly to accommodate your chosen model of powerheads reasonably high in the water but still allow them to be easily removed for regular maintenance without the need to bend over the uplift tubes which might

dislodge them (refitting an uplift tube without taking out the substrate can be a nightmare and almost a physical impossibility!)

I have made no mention of air-operated uplifts. Whilst these were used extensively (and somewhat successfully) in the past, the advent of the more efficient powerhead has made them largely redundant.

With the whole of the aquarium base covered with the filter plate(s) and uplifts in position, the first layer of the filter 'medium' can be introduced. This may be coral gravel, dolomite chips or crushed shell — use 4kg (10lb) for each square foot (900 cms²); on top of this initial coarse layer, a fine

equal power (preferably exactly the same model) to prevent unevenness of flow. Pumps should be capable of turning over the complete volume of the tank at least 3-4 times an hour.

POWERING UP

Once the heating source and rockwork are in place the tank can be filled and the water and synthetic sea salt added. Adjust to a Specific Gravity (S.G.) of 1.021 and set the thermostat to 25°C (77°F). All electrical items should be wired through a Cable Tidy (for neatness and safety) and once checked for correctness of wiring, switched on. The tank should reach operating temperature within 24 hours.

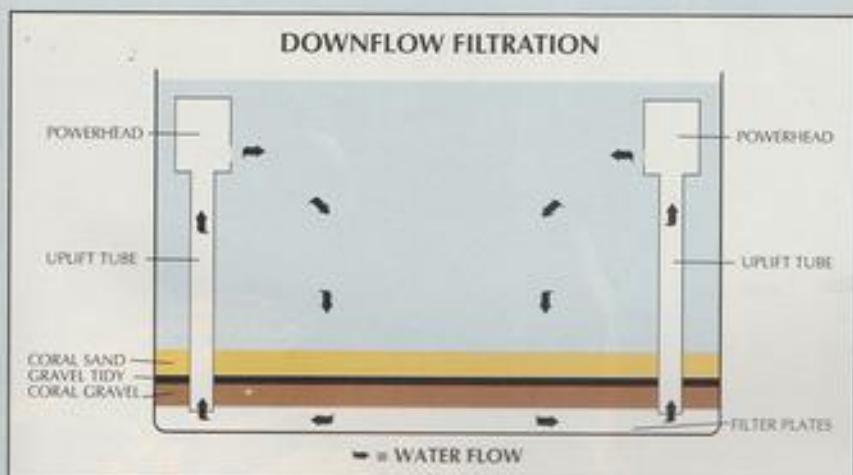
consumed by *Nitrosomonas* bacteria which convert it to nitrite. Nitrite is still harmful to fish and is removed by yet more bacteria (*Nitrobacter* this time) which convert it to relatively harmless nitrate. Both types of bacteria require high levels of dissolved oxygen within the water to help them perform their functions properly; for this reason they are known as aerobic bacteria. This particular conversion of one ammonia-based substance to another by bacteria is collectively known as the nitrogen cycle and it is essential that ALL fishkeepers understand this cycle and its influence on the well-being of the livestock.

By employing the services of a proprietary maturation fluid, both

Nitrosomonas and *Nitrobacter* bacteria can become established in the filter bed long before livestock is introduced; maturation will take between 21-28 days and its progress can be monitored by the use of ammonia and nitrite test kits (when tests show consistent minimum levels, ideally zero, the filter bed is mature). As nitrates build, these can be effectively lowered by regular nitrate-free water changes.

ESSENTIAL EXTRAS

It would be easy with such a basic system to try and save money by omitting a protein skimmer and activated carbon. However these are essential

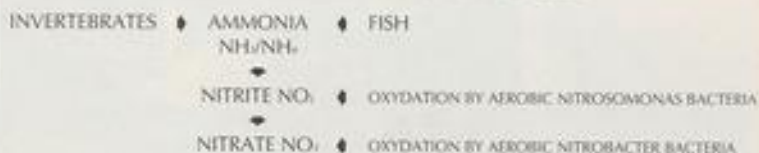


plastic grid (a Gravel Tidy) must be placed, trimming it carefully to fit snugly round the uplift and edges of the tank. This gravel tidy prevents the next layer of fine coral sand from mixing with the coarse gravel beneath (another 10lb for every square foot of base area).

All media must be thoroughly washed, under running water, to remove any impurities or particulate matter that would impede the progress of water through the filter bed. Pieces of metal are often found in coral gravel and sand as collection sites are often close to shipwrecks; running a strong magnet (use an algae scraper sealed in a plastic bag) over the media will remove them. Using the plastic bag means you won't have to pick the pieces off the magnet, bit by bit, afterwards!

One large powerhead would adequately service a tank of our modest sizes but two separate, smaller models would provide better water distribution and at least provide a back-up should one fail. Make sure that both are of

PART OF THE NITROGEN CYCLE



MATURATION

A newly set up tank is not capable of supporting life and must be pre-matured before any stock is introduced. This 'maturation' means the establishment of a colony of 'friendly' bacteria in the filter bed that will feed on the waste products of the livestock, converting them to relatively harmless substances. The first, and most deadly, substance is ammonia which fish produce in vast quantities. It can kill livestock at very low levels of concentration but, thankfully, is readily

devices by which other waste products (not capable of being removed by bacteria) can be extracted, thereby keeping the water fresh and quality high.

NEXT MONTH: SOME IDEAL STOCK FOR A DOWNFLOW SYSTEM PLUS FEEDING AND LIGHTING DETAILS



A pond during winter is a bleak place, but don't forget those essential maintenance tasks, and keep a careful eye on the temperature.

THE LONG, COLD WINTER

BARRY GOODWIN
ADVISES AGAINST GAZING AT
THE FIRE, DREAMING OF
SUMMER AND POND
IMPROVEMENTS, AND URGES
YOU NOT TO BELIEVE
THAT MYTHS WILL SAVE YOUR
KOI FROM THE COLD.

• PHOTOGRAPHS BY THE AUTHOR •

Tips for maintaining a winter Koi pond

Just sometimes, it is forgotten that there are still things of importance to be done, not only to guarantee the fishes' survival through the winter, but also to lessen the risk of problems arising when Spring does eventually come.

KOI-KEEPING FOLKLORE

Over the years, the myths perpetuated in connection with Koi keeping have increased with each telling and it is a very hard task to lay many of these to rest. Let's see how much credence we can attach to a random selection, in the light of present day knowledge.



* There is a stratified layer of warmer water at the bottom of the pond which Koi will seek out and inhabit during the coldest weather.

Whilst being a comforting thought this is hardly a workable assumption in a functioning Koi pond. Modern methods advocate filters feeds to be taken from bottom drains, therefore assuring an temperature distribution throughout the water at all times. Apart from this, Koi themselves do move about during winter, they're never in the same place twice. Because they move, water displacement occurs, with continual currents and eddies generated which, even in a pond that has mid-water feed to the filter during winter, mixes the top and bottom layers effectively destroying any temperature gradient that tries to establish itself. When you consider it carefully, Koi over 18-20in long displace a large amount of water when they swim and this is the reason why there are no 'dead-spots' in a functional Koi pond — just think back to the pandemonium and disturbance created during summer feedings!

This means that the Koi keeper must keep a watchful eye on pond temperatures throughout the coldest weather as, if it is allowed to drop too low, there is a danger that swim bladders may become irreparably damaged, and ice crystals

Splash returns such as those above, and venturi as shown below, should be bypassed during winter to prevent the induced air from cooling the water excessively.

could form in the gill membranes. You should never let your pond temperature drop below 2°C at any time.

MORE FOLKLORE

* You must slow your pump down to about half to produce less turbulent water conditions. Another myth, probably 'spawned'

from the previous one's preoccupation with stratified water layers.

Take common sense first: Koi do not shut down their metabolism in winter to such a level that waste is not being produced. Whilst food is not being eaten there is no solid matter being deposited in the pond, but Koi are living off the body weight they put on during summer. The metabolic waste from this is excreted via the gills as ammonia and therefore still needs to be oxidised to nitrate by bacteria in the filter. If the filter has been slowed down, nitrification still takes place but it takes longer — with the result that Koi are exposed to polluted water for longer.

Apart from that, the Koi's immune system is at a very low ebb and will not cope well in the face of an adverse environment. There are many organisms inhabiting the pond (and filter) at all times of the year and some, like nitrifying bacteria, perform vital functions. But not all organisms are desirable as some are pathogenic and will cause infection where the opportunity presents itself such as through parasitic attack damage or open wounds. If the pump speed is increased again after a winter period of sluggish operation, an excess of these organisms could be flushed back into the pond.



KOI

The Long, Cold Winter

from the filter bays where they have been previously deposited (and overwintered), just when you least desire it — in Spring-time.

Consider also a natural carp habitat (which we should be trying to mimic, after all). Water flows and replenishment are at their lowest in summer when there is little rain — and at their highest in winter — when the rains come! That should tell us something important I am sure. Whilst water flows should be kept the same in winter, aeration should be terminated, and waterfalls bypassed, to prevent excessive cooling of the water.

YET MORE FOLKLORE

* Do not feed Koi at temperatures below 10°C.

A very broad statement to make when speaking about Koi generally, and one which, if faithfully followed, will ensure that your Koi are without food for about six months during a normal British winter! This is too long, and is one of the very reasons that Koi ponds are designed as they are, to ensure a good

chance of winter survival. It is true that Koi will not digest food below about 6°C so don't feed at as low a temperature as this. Look at your pond and work out just how much temperature is lost on the coldest winter night — this should be the final arbiter of when to stop feeding.

An inadequate pond, too shallow and with a small amount of water, could lose 4°C overnight. In this case you would have to stop feeding at 10°C with all the penalties that this entails. In a larger pond, with a good volume of deep water and sheltered from the elements, then it may only lose 1°C on such a night — in this case you could safely feed down to 7°C. The feeding (or not) choice has to be an intelligent one based on the conditions being taken into account and not a rule of thumb to be followed blindly.

EXERCISING CONTROL

Many Koi owners regulate the length of 'winter' their fish are allowed; this is a good philosophy as, by doing this (and controlling feeding rates to a fairly high

level in peak season), Koi will be healthier, maintain better shape and colour and grow better.

If we consider the length of winter to be determined as the time during which the water temperature is below 10°C then, by the simple act of covering the pond, this period can be reduced from six months to four, or in some cases three, months. By the application of a small amount of heating for some of this period, sensibly applied, the non-feeding period can be reduced to one and a half, or two, months in all. Some Koi owners heat their ponds all the year round, that is fine, but I personally am not in favour. Koi that are allowed a winter period of inactivity (note, I do not say hibernation) certainly have a better growth rate, and a longer life span.

Next month —
WAKING UP TO SPRING

WORLD OF KOI

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Growing Tips

BY BARRY R JAMES

Last month I talked about gravels. Whilst in their natural habitats plants often grow in flowing water in beds of pure sand or gravel, in aquaria a more nutritious substrate must be used under the gravel layer if optimum growth is to be achieved.

In flowing waters, fresh supplies of fertiliser elements are constantly available to the plants from underground aquifers, which constitute the source of most perennial watercourses.

In aquaria, the water is not constantly replaced and therefore nutrients have to be supplied from the substrate and by daily additions.

To facilitate water movement in the gravel, a heating cable is essential. These heating cables instigate convection currents which not only warm the substrate and encourage root growth but also, by drawing oxygen down through the gravel eliminate 'black spots' set up by anaerobic conditions prevailing in stagnant gravel. In addition, fertiliser elements are also drawn down and circulated to all parts of the gravel. (A similar convection creating effect can be created by a buried water-carrying tube, rather than an electric-heating cable, under the gravel; warmed water, created by a loop of the tube coiled around the aquarium heater is pulled through the tube by the suction created by the return from a

power filter).

In order to meet the demands of aquarists for substrate materials, various Companies have developed their own formulations. Dupla and Dennerle Aquaristik, both German Companies, are the market leaders. However, their philosophies differ somewhat in their respective approaches to this subject and both argue their case very convincingly.

Dupla use Laterite — a tropical clay powder — as the basis of their system whilst Dennerle developed an organic mixture whose exact derivation is not disclosed as their substrate. I believe better results are obtained by using a mixture of organic and non-organic substances. For this reason, I developed Everite No.1 — a powdered clay and humus supplement — a compost of tropical humus and peat. All these substrates have their respective devotees.

All proprietary substrates are not, in themselves, the complete answer to plant nutrition. All are complemented by fertilisers containing N.P.K (Nitrogen, Phosphorus and Potassium) and trace elements (Iron, Manganese, Boron etc) which are added according to the regime recommended by the manufacturer. All substrates are mixed with fine gravel or sand to 'open' the mixture.

The sequence of events in installing the substrate is as follows:

The heating cable (or water tube) is set out on the base of the aquarium (generally in zig-zag loops) and fixed in position by special suction cups. The substrate is

BioPlast Thermo-Float.

PHOTO: A&P LIBRARY



A to Z of plants

Blyxa

This genus contains about ten species, none of which are well known, but at least two species are freely available from suppliers in Malaysia. *Blyxa* is found throughout Africa and the warmer areas of Asia and, as an introduced species, in North America.

Blyxa japonica

Common name: Dwarf Blyxa
Distribution: Eastern and South-eastern Asia, including Thailand and Malaya

Description: A beautiful plant with a rosette of bright-green to golden narrow grass-like foliage. The plant is somewhat brittle. Although an annual, it seldom produces seed in the aquarium although imported plants are often in flower on arrival. However, offsets are produced from the base and specimens can be maintained for some time. This species only reaches a height of 10cm

Cultivation: It seems to prefer soft water, with a pH around 6.8-7.0. Temperature between 25-28°C (77-82°F). In the wild it is found in gently-flowing waters in well-illuminated areas. It is in the brightest areas that the plants with the golden sheen are seen



Blyxa japonica. PHOTO: BARRY JAMES

Blyxa echinosperma

Common name: Giant Blyxa
Distribution: Found over a wider area than the preceding species — further East into Northern China and Japan

Description: A larger and coarser plant than the preceding species reaching a height of 30cm with leaves up to 0.5cm wide. Larger specimens up to a metre high and with leaves up to 1.5cm wide are found in the wild. The plant is dark green in colour with a thick fibrous rootstock

Cultivation: Seems to be more difficult than the previous species but *B. echinosperma* is said to prefer cooler water within a range of 20-25°C (68-77°F). Soft, and slightly acid-water and a rich substrate are needed for optimum growth although it is reported that under less favourable conditions it will grow but in a decussate form. It produces no offshoots, is strictly an annual and definitely one for the specialist

Notes: Other species known, but not at present imported include *B. octandra* from India and S.E. Asia, *B. radicans*, a creeping species from S.W. Africa, *B. senegalensis*, a dwarf species just 3cm high, *B. novoguineensis*, New Guinea according to De Wit, a beautiful and caudiferous species from Lake Davinbu, *B. auberli* and *B. leiosperma* both from S.E. Asia

prepared according to instructions and mixed with the recommended amount of lime-free gravel. The mixture is then spread uniformly over the rear two-thirds of the base, the front third is left clear because the gravel depth in this area will not be enough to prevent leakage into the water. Rocks, terracing

and other decorative features are placed in position and the top layer of clean, washed, lime-free gravel placed on top. Filling the aquarium must be done carefully, using a deflector, such as a saucer, to prevent the disturbance of the substrate layer. The tank is now ready for planting.

THIS MONTH'S WEIRD WORDS

- Axil** Angle formed between the stem and leaf-shoot of a plant
- Decussate** A pair of opposite leaves arranged at right-angles to the pair below.
- Node** Where the leave-stem joins the main stem.
- Petiole** The 'stem' part of the leaf connecting it to the main plant stem.
- Seisile** Where a leaf has no petiole and connects directly to the main plant stem.

MISUNDERSTOOD MOLLIES

DEREK LAMBERT, RECENTLY THE FATHER OF OVER 100 NEW MOLLIES, BEGS TO DIFFER WITH SOME CLASSIC MOLLY MYTHS.

● PHOTOGRAPHS BY THE AUTHOR ●



Tributary of Rio Champoton on the Yucatan peninsula in Mexico is a river typical of many Molly habitats.

Of all the livebearers, Mollies seem to be the most misunderstood. Many books and articles tell you they need brackish water conditions, or at least some salt in their water, and must have lots of vegetable matter in their diet to thrive. The temperature should also be warmer when compared to other community fish (up to 28°C-82°F is often quoted). Yet when you talk to aquarists who actually keep and breed these lovely livebearers, few follow these 'Golden Rules'. This anomaly has baffled me for many years, particularly since visiting Dr Joanne Norton in America who is probably the world's foremost expert on Mollies and uses no salt in their water and feeds a good quality flake food, combined with live foods, for their diet. Her Mollies are not only of excellent size and robust build, but have a richness of colour I have rarely encountered in Mollies before.

MOLLIES AT HOME

To try to unravel exactly what Mollies require in captivity I thought it would be a good idea to examine some Molly habitats. The classic natural Molly habitat is epitomised by Laguna de Nichupte at the back of the Mexican

holiday resort of Cancun. The near-marine water contains Sailfin Mollies (*Poecilia latipinna*) in profusion — if you sit by the side of the lagoon you can watch them browsing on algae and other plants; the temperature often rises to above 27°C (80°F) during the afternoon. Looking at this habitat, it is easy to see how Mollies picked up the label 'brackish warm-water vegetarians.'

Mollies, however come from so many more habitats than brackish water lagoons. If you travel around the Yucatan peninsula to Champoton, turn inland along the Rio Champoton you come to a tributary of this river which is typical of many Molly habitats. The water is hard, alkaline but not salty. Plant life abounds in the quiet backwaters but most of the Mollies can be seen swimming in the open water feeding on any insects which fall on to the surface. Watch them closely and you will see them pecking away at algae growing on stones as well. Two Molly species live here, *P. latipinna* (a Sailfin) and *P. mexicana* (an ancestor of the Black Molly).

Looking at this much more typical Molly habitat, we can see that one of the 'classic' Molly requirements should be questioned. Whilst some wild Mollies do live in brackish water, most do not. Freshwater is fine, however, care does

need to be taken with the pH. Having collected Mollies all over Mexico I have rarely come across them in acidic water conditions and in captivity Mollies do not seem to do well in acidic water.

TOO HOT TO HANDLE?

Similar conditions to those just described can be found by the town of Tamazunchale in San Luis Potosi state where rivers run fast and cold in a mountainous region. The water temperature can often be as low as 16°C (20°F) yet *P. mexicana* can be found here as well, in open water feeding on surface-floating insects and algae-encrusted boulders. Another classic requirement — high temperatures — needs questioning. Again, whilst some Mollies live in habitats which are subjected to high temperatures, most do not. In my experience, all species and cultivars seem to do best in captivity when maintained at between 22°-24°C (72°-76°F). Higher temperatures tend to speed up the fish's metabolism and shorten its life. This means the fish sex out much younger and never grow to the full adult size they can achieve. This is born out by *P. latipinna* I found in Laguna de Nichupte which were only 2in long, yet fully-mature fish.

A GREEN MACHINE?

The final statement found in most aquarium literature about Mollies is that they must have large amounts of vegetable matter in their diets to thrive. This certainly does not tally with either Dr Joanne Norton's feeding regime nor, for that matter, with those of any successful Molly breeder that I know. Yet, at first glance, wild Mollies do seem to be feeding on algae which is of course, vegetable matter. Algae growing on a boulder in a Mexican river is very different from a blanched lettuce leaf or chopped spinach — the algae-encrusted rocks are home to huge numbers of crustacea and other small animals and it is these, rather than the algae, that the Mollies are looking for.

In captivity, providing you feed a good quality staple flake or granule food, all your Mollies' vegetable requirements will be met. What they may be lacking is some of the nutrient provided by the small crustacea and insects which make up such an important part of their natural diet. What Dr Joanne Norton feeds, to make up for this shortcoming, is Brine Shrimp in all its forms. Frozen, or live, adult shrimps to the mature shrimps and newly-hatched baby shrimp for the fry. To cut down the costs I supplement the Brine Shrimp in my



fishes' diet with *Daphnia*, which I collect myself.

24 HOUR EATERS

Another factor, which is of vital importance to promoting good growth in Mollies, can be appreciated when watching them feed in the wild — they are virtually eating something all the time. It may only be a scraping of algae but it all adds to the diet. In captivity we tend to feed our fish the same way we ourselves like to eat — three square meals a day! Mollies, however, do not feed like this in the wild and do not have their digestive systems adapted to make

the best use of food fed in large amounts. Ideally, they should be fed little and often; to obtain the best growth rate possible, you need to feed Mollies at least six times a day, but only as much as they can eat in five minutes.

SPACED OUT

One other vital factor to good Molly husbandry, which is all but ignored in much of the literature, is their need for good water conditions. All the larger Mollies I have caught in the wild have come from clean water conditions — either rivers with a good water flow or large lakes. I have found Mollies in polluted habitats but these have tended to be in poor condition and lacking in size.

Dr Joanne Norton does huge water changes and maintains good filtration in her tanks. Other Molly breeders do much the same. I try to change at least 80% of the water in my Molly tanks every week as an absolute minimum. Another very important factor — never crowd Mollies. I try to give my youngsters as much room as possible, and when they reach a couple of months in age I like to put them in a 180cm (6ft) long aquarium with a power filter to encourage them to grow. This way my fish achieve the best possible growth.



Labyrinth Molly...

Jackie's Juniors



Hi, my name is Jackie Bradbury and I love having fun with youngsters, especially young fishkeepers. I should like to share with you some of my favourite jokes, puzzles and funny stories in the hope of making you smile. Have you got any jokes or funny experiences to share with us? Please make me laugh and send material to Jackie's Juniors, c/o Aquarist and Pondkeeper, Caxton House, Wellesley Road, Ashford, Kent TN24 8ET. Send a drawing of your favourite fish, or illustrate your story with a cartoon. Please remember to include your name, age and which Society you belong to, if any. Those wonderful people at JOHN ALLAN AQUARIUMS have given us some fantastic prizes for the best contribution each month — so get cracking!

Why are little brothers so silly?

While we were away recently, my piece must have knocked over the internal power filter in our community tank. Worse than this, when it fell on the rocks, it came apart and all the debris came out and made a real mess of the water. Mum shouted at Dad to fix it and clean up the mess. "It looks awful," Mum roared, "like thick pea soup with live croutons!" Dad left the unpacking and set about cleaning the tank to please our late Mum.

The following week we all went to Grannies for the day. We always have fun at Grannies and she gives us lots of great food to eat. We washed our hands and sat up to dinner in expectation, then Grannie gave us all a steaming ladle of delicious smelling soup. My little brother asked Grannie what kind of soup it was. "I got a lovely ham bone," said Grannie. "This is my special pea soup," to which my silly little brother ran out of the room shouting at Grannie for being cruel and not loving fish as we do!

WORD SEARCH

T	H	E	R	M	O	M	E	T	E	R	S
A	I	P	A	O	S	S	A	H	Z	A	T
V	A	G	R	A	C	O	M	E	M	S	S
E	T	R	E	S	A	A	L	A	P	B	S
I	R	A	O	R	R	C	Z	T	L	O	O
L	Y	V	L	O	B	O	L	E	A	R	M
T	L	E	L	W	N	A	G	R	S	A	W
A	I	L	I	S	A	I	R	A	S	T	O
I	A	Z	W	A	T	E	R	B	V	R	L
L	C	O	M	E	T	O	G	L	S	I	L
G	R	A	V	E	L	S	T	I	L	A	I
D	U	L	I	A	N	S	R	E	T	A	W

FIND

AMAZON SWORD
COMET
GRAVEL
HEATER
OSCAR
RASBORA
THERMOMETER
TIGER BARBS
WATER
WATER SNAIL
WILLOW MOSS
VEILTAIL

S	H	R	O	A	C	K	E
A	L	N	A	M	M	C	R
P	M	O	C	H	A	E	E
R	A	C	N	H	B	R	L
G	U	E	O	E	G	H	C
H	D	G	E	R	N	U	B
S	T	A	C	R	I	N	M
I	F	T	W	O	N	N	I

FISHING TRIP



Starting top left, work your way around the grid, moving up and down or sideways (not diagonally), one square at a time, to spell the names of ten fish. When you've found all ten, several letters will remain unused. These can be rearranged to spell another fish.

The ten fish are — Salmon, Roach, Herring, Bream, Mackerel, Chub, Minnow, Catfish, Gudgeon, Carp. The letters remaining are H, C, E, T, N, which when rearranged spell TENCH.

- Q. Who captains the fishy football team?
A. David Platty.
- Q. What is the best way to catch a fish?
A. Have someone throw it for you.
- Q. How does an Octopus go into battle?
A. Well armed.
- Q. Which pop stars live at the bottom of the sea?
A. Cod Stewart and David Sole.
- Q. What goes croak! croak! when it's misty?
A. A frog horn.
- Q. What lies at the bottom of the sea and is dangerous?
A. Billy the Squid.
- Q. What do sea monsters eat?
A. Fish and ships.
- Q. How do you communicate with a fish?
A. Drop him a line.



PHOTO: AAP LIBRARY

KEEP COOL, AND HAVE SUCCESS WITH THE LADIES!

Say 'Killifish' to people and most think of the brilliant West-African, or South American jewels; others, if pressed, will admit to knowing the American Flagfish, *Jendania floridæ*, but there's another one from the Sunshine State.

Common in many waters (European visitors often wonder what the pretty, active little fish with flashing blue fin is), the Blue Fin, or Blue Fin Top Minnow, (*Lucania goodei*) grows to about 6cm and has a streamlined, slightly-compressed body. The green to yellow body has a brassy sheen and sports a dark, almost black, horizontal line that runs from the mouth to caudal peduncle; this line is echoed by a fainter line running from pectoral fins to anal fin. The pale-edged scales give the fish a reticulated, or netlike, effect particularly along the flanks. The fins, which always seem to held tautly-erect, have a yellowish cast, the dorsal and anal fins having an orange base, black crescent followed by a blue border. Sexual differences can be ascertained by the fact that the male has larger, red-flushed fins, and a typically slimmer body.

CARE

Although the fish resembles the British Minnow in shape, it is not a cyprinid but a cyprinodont — an egg-laying Toothcarp and, as such, is exhibited at Shows within the tropical fish Classes (well, it's always warmer in Florida isn't it?). However, this factor should not mean that the fish is treated like a tropical in its care for it definitely does not require the usual 'keep all' tropical temperature of around 25°C (77°F); it is much better suited to temperatures in the low to middle 60°F range (around 16°C) and becomes unhappy as temperatures rise. Unlike

ESSEX MAN PETER CAPON LOOKS AT THE FLORIDA BLUE-FIN.

the majority of Killifies, it prefers hard water for in its natural habitat the water often percolates through limestone formed from ancient coral reefs. The water should also be well-aerated.

BREEDING

A surface feeder, its favourite food is mosquito larvae but it will take most live foods, and quality dry foods quite readily.

The Blue Fin is a ready breeder, the male displaying to the female in the manner of a fluttering butterfly then driving her vigorously to lay her eggs in fine-leaved plants near to the water surface. If a pair seem reluctant to spawn, but are obviously well-conditioned, a partial water change with fresher, cooler water will often act as a spawning trigger. Only a few eggs are laid each day and a complete spawning (if ever decided on what this comprises) can be spread over as much as five weeks. At 18°C (65°F) the eggs hatch in about two weeks but at a higher temperature (which normally would hasten hatching times) there is a tendency for the eggs to be infertile. The parents are avid spawn-robbers. There is another factor to consider: with the eggs being laid (and hatched) over a period of weeks there is, of course, the difficulty in raising the fry together. Being of varying ages and sizes, cannibalism is inevitable.

Several aquarists in Essex have kept these pretty fish, after personally

importing them from their Florida holidays, under fish-house conditions. Whilst spawnings have been achieved, most of the fry have turned out to be males and subsequently the species has died out as an aquarium subject, for the want of a good woman. It is possible that higher temperatures favour the development of males to the exclusion of females. Any future 'importations' might fare better if kept at the lower end of the temperature range (and at physically lower levels of the fish-house!). It is known that the sex ratio of many fish, reptiles and amphibians is influenced by the temperature at which the eggs are incubated.

CONCLUSION

All in all, a pretty fish that will reward the fishkeeper willing to pander to its non-tropical requirements.

BLUE FIN FACT FILE

Scientific Name: *Lucania goodei*

Common Name: Blue Fin,

Blue Fin Top Minnow

Distribution: Florida

Size: 6cm

Temperature: middle 60 degrees F, (around 16-18°C)

Breeding: Egg-layer; spawning lasts several weeks

Note: Introduced European aquarists in 1928 as *Chriopeops goodei* and also sometimes referred to as *Fundulus goodei*. Its generic name is in honour of George Browne Goode, who also has the livebearing Family Goodeidae named after him



DAVID TWIGG'S

KOI CALENDAR

I recently made a visit to the north of England and called in at Clear Water Koi Direct. This was my first visit since they moved to purpose built premises in 1987. Some changes have been made to the layout due to the development of a tropical fish department but the main Koi ponds are unchanged and, when we visited, were full of the new season's stocks, recently imported from Japan.

Ken and Pauline Smith and their son Wayne are well-known on the Koi 'circuit' for their now four year association with 'Ogata' Koi and regularly attend Shows around the country. Ken and Wayne kindly caught and

bowled some of the latest shipment for us to see at close quarters.

Clear Water Koi Direct are on the Acaster Industrial Estate, Acaster Malbis, York and are really worth visiting if you are in the area. They can be contacted on 01904 705536.

Shirley Aquatics Koi Seminar

A late piece of news in is that this Seminar will take place either the last weekend of February or the first in March.

At the time of writing, three speakers, Dr Andrew Worthington, of Spirex Aquatech, Craig Baldwin, of Sparsholt College and Shirley's own Paul Stacey are confirmed with several others planned. Confirmation of date, and other details, can be obtained by contacting Shirley Aquatics on 0121 744 1300.

Society Report

This is a new idea for Koi Calendar so if you would like your Society or Section mentioned then please write to the Editor (Thanks, David! — Ed) or give me a ring on 019262 495213. Thank you.

The November meeting of **Leicestershire Koi Section BKKS** heard a talk on Koi varieties by Peter Haywood. Peter also covered fish health topics and I'm told that his overhead projector display was an excellent way of showing how a Koi is built up from its base colour.

Ken Smith "dipping the net" into the main pond at Clearwater Koi Direct.

PHOTO: DAVID TWIGG



1996 SHOW CALENDAR

MAY

4-5 International Koi Show. Bletchley Exhibition & Leisure Centre, Milton Keynes. Contact Djs Koi on 01922 493290 for further details.

26-27 Merseyside Section BKKS. Open Show at Camphill, Woolton. Phil Adamson 0151 2202970.

South Hants Section BKKS. Open Show at South Downs College, Crookhorn, Havant. George Rooney on 01420 473169.

JUNE

1-2 Yorkshire Section BKKS. Open Show at Lotherton Hall, Leeds.

15-16 Crouch Valley Open Show. Barleylands Farm, Billericay. Contact Vic Boreham on 01268 524232.

29-30 Middlesex & Surrey Border. Indoor Open Show. Kempton Park Racecourse, Sunbury.

30 Suffolk and North Essex Section BKKS. English Style Open Show. Langham Community Centre, near Colchester. Contact Mavis Carter on 01206 866011.

AUGUST

10-11 BKKS National Show. Billing Aquadrome, Northants.

SEPTEMBER

8 Leicester Koi Section BKKS. Annual Show. Contact Mick Roffin 0116 2712517.

MONTHLY MEETINGS

FEBRUARY

7 Leicester Koi Section BKKS. Monthly Meeting. Contact Mick Roffin 0116 2712517.

10 Heart of England Koi Society. Speaker Gary Pritchard, Chairman BKKS. Meet in Warwick. Contact David Twigg on 01926 495213.

12 Northampton Section BKKS. Speaker - Eric Duffield. Contact Albert Day 01604 407361.

14 South Hants Section BKKS. Speaker - Ken Haywood of Wessex Bonsai Society. Contact George Rooney 01420 473169.

Merseyside Section BKKS. Speaker Andrew Shepherd of QSS at Broadway Country Club. Contact Phil Adamson 0151 2202970.

18 Mid-Somerset Section BKKS. Speaker Paul Jarrett on Koi Pond Construction. Contact Alan Pamell 01458 272132.

Northern Koi Club. Speaker Robert Ketchell on 'Japanese Gardens and the Use of Water', at George Carnall Leisure Centre Urmston. Contact Tony McCann 0161 794 1958.

My thanks go to all Koi Club Secretaries, PROs and others who send me their latest calendar for inclusion in this column. I need to have information at least 10 weeks in advance to guarantee publication. You may, of course, ring me direct on 01926 495213. This request also applies to dealers with special events, auctions, etc. All Koi keepers are welcomed to the events mentioned in this calendar (an entry fee may be payable). Further details can be obtained from the contact telephone numbers quoted. Alternatively, write to me at your earliest convenience via the Editor at A&P, MJ Publications Ltd., Caxton House, Wellesley Road, Ashford, Kent TN24 8ET. Thank you.

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A fascinating

FISH FACT!

by LINDA LEWIS

GOOD NEWS ABOUT A MORAY EEL'S BITE



PHOTO: LINDA LEWIS

There's good news and bad news if you've just been bitten by a Moray Eel. The bad news is that the teeth are very sharp, with long jagged canines, that will inflict a nasty wound which

will almost certainly need stitches (but you've probably found that out already). As the teeth are coated in bacteria and are often filthy, a nasty infection is likely to follow. The fish has a strong grip, thanks to the large muscles in its forehead that operate its heavy jaws, so efforts to escape will only make things worse.

The good news? Have you noticed that Moray Eels are constantly gaping? Water is drawn in as the mouth opens, and is then forced over the gills when the mouth closes. The fish must open its mouth in order to breathe. So, if you are grabbed by one, scream, wait, try not to panic — and it will eventually let go!

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COLDWATER JOTTINGS

BY
STEPHEN J. SMITH



Benefits of low-voltage

Pondkeepers are turning more and more to use of low-voltage equipment — such as pond pumps and lights — as they increasingly appreciate the advantages of economy and safety which low-voltage equipment provides, according to Britain's leading pond pump manufacturer **Hozelock Aquatics**.

Richard Bradley, marketing manager of Hozelock, explained that the use of low-voltage equipment not only helps to reduce risks presented by mains voltage equipment, but that such equipment is also more economical to install: "If pondkeepers do decide to use mains voltage (230v in the UK) equipment, they should always ensure that it is manufactured to approved UK and European safety standards. Under these standards, equipment without a transformer must have at least 10 metres of weatherproof cable if it is to be used outdoors. Consequently, the recommended retail price of mains-operated pumps is now no cheaper than their low-voltage equivalent. Furthermore, if you have a mains pump you must use a residual current device (RCD), and this immediately increases the initial cost of a mains voltage installation.

"It should also be considered that not only are low-voltage pumps extra-safe but they are also cheaper to run and cheaper to install. With mains products, installation by a qualified electrician is advisable."

So what are the differences in using each type of power supply? Richard explained the pros and cons of using mains electricity versus low-voltage in pond equipment: "In general, the customer perceives that he doesn't want a transformer, partly because he feels that it is an extra piece of equipment and an extra wiring installation. However, wiring to a transformer is easy. Hozelock transformers having been designed to ensure that any DIY installer can safely connect his pump or lighting to the

transformer supplied."

But doesn't 'low-voltage' mean 'low performance'? "On the contrary," replied Richard. "Performance of a Hozelock low-voltage pump is no less than a comparable pump in the Hozelock mains range. And there is no difference in price, so it is always advantageous to buy a low-voltage model. "Of course, for relatively major installations such as Koi pools and cascade features — where specific measures are taken to protect the supply as part of the overall project — it becomes necessary to use a mains pump; but, for most water features and garden ponds, a low-voltage model is ideal. No armoured cable is necessary and, if the pet dog does happen to chew through the cable for example, he will be perfectly safe."

Feedback

Frances Wyman has become a regular 'electronic' correspondent (her Goldfish "Flip and Flop" were featured in Coldwater Jottings last month) and she has come up with a splendid idea for those who have found themselves "padding about up to the elbows in cold water, trying to find the 'inside' half of a glass-cleaning magnet" and she added that the problem is magnified with a big tank, as the thicker glass reduces the magnetic attraction.

"Having discovered that to reach the bottom of my two-foot deep tank needed immersion to the armpits, a remedy was essential. I have siliconed a length of nylon fishing line to the 'inside' end of the cleaner, and then looped this around my finger so that, when contact is lost, it is an easy matter to remove the missing bit." Frances concluded: "The fishing line is sufficiently friction-free, especially when wet, that it does not hinder the cleaning process."

Thank you for your tip, Frances. I know this is a problem which the majority of fishkeepers have to face. Some 'algae magnets' do incorporate a loop on each half of the cleaner so that the two

halves can be attached with thread and thus if the inside half falls off, it does not sink to the bottom of the tank.

If any readers have any similar tips, do let us know, either by 'snail mail' or e-mail, at the address below.

Italian air

The origin and extraction of the word 'venturi' was the subject of some interesting late-night debate recently between myself and a Koi-keeping colleague. Our conclusion was that the plural of venturi is "ventura".

So, what has this got to do with fishkeeping? What self-respecting Koi-keeper does not have a UV unit, high-power water pump, high-power air-pump, sophisticated filter system, and a Venturi...? This last item, which injects air into the water on its return to the pond, "comes from the word vent which means 'air,'" I was reliably informed. Or does it?

So I dutifully turned to my trusty Collins Concise Dictionary to check. To my surprise — and delight — I learned that the correct terminology is indeed "Venturi tube". This is "a device for measuring or controlling fluid flow..." invented by none other than Sr. G.B. Venturi, an Italian physicist. I wonder, did he have relatives called Filter and Pumpies...?

Pinch me, I could be dreaming

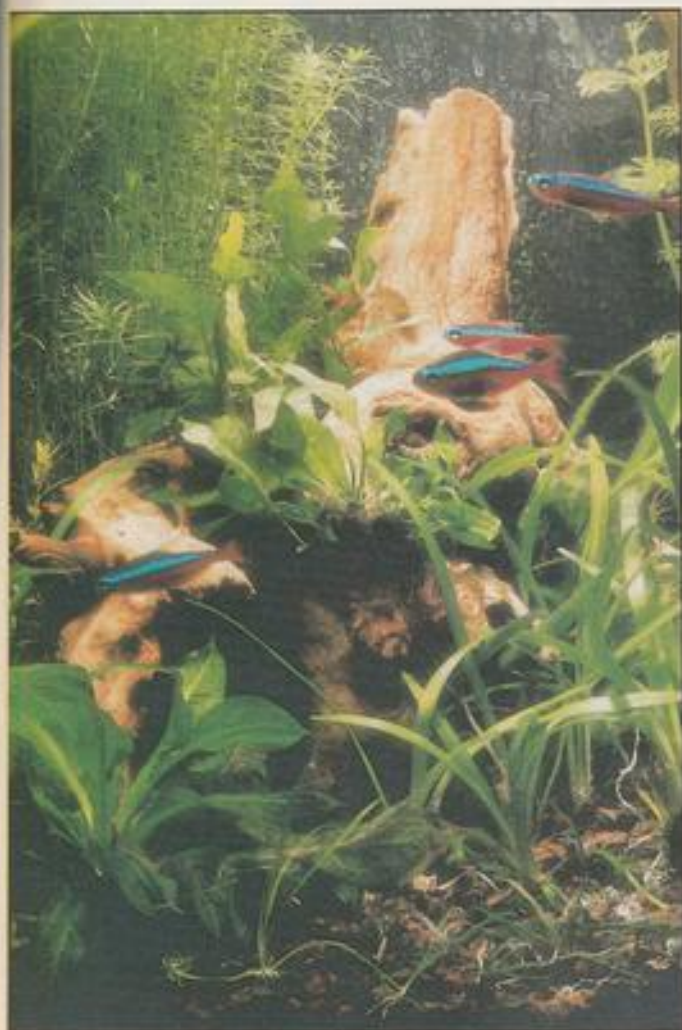
When I heard about a new filter which, apparently, needs virtually no maintenance, no cleaning or flushing out smelly medium, reduces partial water changes, is completely self-

contained and virtually eradicates ammonia and nitrite I thought I might be dreaming. O.K., we all know just how 'dirty' Goldfish and Koi can be (and I don't mean that they wear long matts and hang around in seedy bars, as one fishkeeping colleague suggested ...!). Any fishkeeper (not just coldwater types) knows of the toxicity problem with high levels of ammonia and that the 'solution' — regular partial water changes — was not only a temporary one, but also subjected the fish to undue stress through its yo-yo effect of constantly changing water conditions.

Through the good offices of Mike Clarke, of Elite SMP, I have been able to run one of these new filters through its paces. The QuikSand Filter, from BioCon, features a special silica for its medium; this is held in constant suspension (fluidized bed technology, it's called) in a cylindrical chamber through which the aquarium water is pumped. I installed the unit in the 'return leg' from the aquarium's external canister power filter, reasoning that the pre-cleaned water would not lead to clogging, or sliming up, of the silica and thus have a faster, less-impeded waterflow through the medium. Ammonia and nitrite are soon processed by the huge bacterial population that develops on every grain of silica constantly exposed to the flowing water.

A further thought comes to me: as a Goldfish breeder, I have found that ammonia is an inhibitor to growth. Now I've got a QuikSand does it mean my fry will grow faster? I suspect so — watch this space! For information about QuikSand Filters, please contact Mike Clarke at Elite SMP, P.O. Box 1229, Maidenhead, Berkshire SL6 3YB. (Tel/Fax: 01628 825691, Mobile: 0589 879481).

Whatever your coldwater preferences, don't forget to keep me informed: your comments, information, and opinions are always welcome, so write to me c/o Coldwater Jottings, ASP, Caxton House, Wellesley Road, Ashford, Kent TN24 8ET or you can e-mail me direct at jottings@sjpr.demon.co.uk where I will be delighted to hear from you.



Adventitious plantlets appear on the underside of mature *Microserum pteropus* leaves. They can easily be separated and attached to bogwood or rocks where they will happily grow.

PLANTS FOR FREE!

CHRIS ROSAM TAKES A LOOK AT THE SEX LIFE OF PLANTS – IN THE BEST POSSIBLE TASTE!

● PHOTOGRAPHS BY THE AUTHOR ●

If there is one thing we all like, it's something for nothing! What is more, you can be sure that you will be popular with friends if you are able to give them something for free.

Under favourable conditions aquarium plants will propagate freely, very often without any further assistance and you may well find yourself with more plants than you know what to do with. It is then that you and your friends can prosper as the excess plants are distributed. It will also mean that, once certain plants are purchased for the first time, they may never need to be bought again. For example, in 1986 (10 years ago!) I purchased a large Java Fern for £2.00. I may not have the original plant anymore but I certainly have many of the progeny from the original plant — and so do many others.

Plants can be considered genetically-programmed megalomaniacs: the desire to multiply and become the dominant species is irrepressible so, unless conditions become actually intolerable they will find a way to proliferate.

Like all plants, aquatic species employ a range of methods to multiply, both sexual and asexual.

NO SEX PLEASE, WE'RE PLANTS

To increase in number, many aquarium plants will produce vegetatively, or asexually. In other words, the plant reproduces itself without interaction with any other plant and produces a 'clone' of itself, or daughter plant. As the 'daughter' is genetically identical to the 'mother

plant, in terms of genetic diversity daughter plants are inferior to any new plants produced by sexual methods. The latter offspring contain the genes of two separate plants and therefore do not inherit the same weaknesses as their parents. Nonetheless, vegetative reproduction is very useful to the aquarist and occurs in a variety of ways depending on species. Some produce runners, others develop adventitious plantlets on their leaves or floral stalks.

CUTTINGS

Stem plants like *Hygrophila*, *Rotala*, *Ludwigia* and *Caesalpinia* are fast-growing and easy to propagate. Once the original stem has grown too long and is running along the water surface, simply cut off the top 15-20cms (6-8in), remove the lower leaves and re-plant in the



Not only is *Barclaya longifolia* one of the most beautiful of aquarium plants but it also produces one of the best flowers.

substrate. The old stem will, in time, produce new shoots and a dense stand of the plant will develop. They will also naturally break at the leaf axil and new shoots formed here can also be cut away to make new plants.

FAST RUNNERS

Runners may be formed from modified roots (or from the root rhizome) may be visible above the substrate or run below ground unnoticed to present a new 'surprise' plant. In either case, the parent plant will extend the runner out by a few inches and then develop a new daughter plant. Once the daughter plant is established the runner extends again, another plantlet developed, and so on.

The most common examples of root runners are found in *Valisneria*, *Sagittaria* and the smaller *Echinodorus* (*E. triellii* and *E. aquaticus*). All of these plants send out vigorous runners.

If one is trying to establish a 'lawn' of the low-growing Pygmy Chain Sword Plant, the new plants will be very welcome as runners and daughter plants will develop very quickly. *Valisneria* sends out many runners and can become invasive as the runners often probe out further than the space designated for the plant. Once seen to be invading, the runners can be quickly nipped in the bud by snipping them off with scissors.

It is a good idea to allow some daughter plants to develop to replace the original plant, in order to keep your plant stock young and vigorous.

Rhizome runners, as typically seen in *Cryptocoryne*, are generally not so fast-developing and it may take some time for a dense stand to develop.

Runners are not confined to rooted plants as can be witnessed by observation of floating plants such as Water Lettuce, which forms numerous new plants by sending out side shoots to quickly cover the water surface.

ADVENTITIOUS PLANTS

Rather than send out runners, some plants reproduce asexually by producing new plants attached to the mother plant in one way or another. Java Fern (*Microsorium pteropus*) and Indian Fern (*Ceratopteris thalictroides*) produce daughter plants on their leaves; in the case of the former on the underside, in the latter on the leaf margins. Once these plantlets reach an inch or so they can be removed and established. Attach Java Fern plantlets to a piece of bogwood onto which it will soon secure itself.

Hairgrass, or Umbrella Grass (*Elexakras vivipara*) also produces adventitious offspring at the tips of its hair-like leaves; these will develop roots in mid-water. The new plants can either be separated, or pegged down and allowed to root before separation.

Many species of the Amazon Sword Plant produce adventitious plants on their floral stalks. Whether growing submerge or emerge, *Echinodorus* develop floral stalks which contain the buds of flowers along its length; if this stalk reaches the surface (from submerge plants) flowers will open. They are usually small, white in colour and, as flowers go, fairly insignificant. Both stamen and pistils are present in the bisexual flowers. Flowers are short-lived (perhaps only for a day) but, as the stalk comprises several, a succession of

flowers is produced. Many species set seed readily which form inside a ball-shaped fruit comprising the seeds or achenes. In nature, when the fruits drop, the seeds are dispersed by with or water currents. Should the floral stalk fail to reach the surface the plant reverts to a vegetative form of reproduction under which viviparous daughter plants form from the area of the flower buds — although these also form on stalks that have flowered. Once developed to a reasonable size, these new plants can be pegged down

and allowed to root before severing from the floral stalk. Only in an open aquarium is the floral stalk likely to reach the surface: large specimens of *E. cardifolius* (the Radican Sword) complete with floral stalks and adventitious plants, are sometimes offered for sale a 'Mother Plants' — at an expensive price! Whilst such plants may give rise to tens of offspring in a season, a similar plant, that had been pollinated and set seed, would have produced several thousand — clearly a far more productive form of reproduction.

PRIZE-WINNING FLOWERS?

It would be fair to say that you would be unlikely to win any prizes for aquarium plant flowers. Nonetheless, aquarists are usually excited by the appearance of a flower as it gives rise to the feeling that conditions must be good for the plant.

Some flowers may go unnoticed, such is their insignificance. The *Valisneria* flower is small and unspectacular but the way in which the plant reproduces is quite fascinating and helps to explain why the straight-leaved *V. spiralis* is so named — the stem of the female blossom is spirally-shaped, not the leaf shape.

Apart from small Water-lilies that can be grown in the aquarium, the best flowers belong to the *Aponogeton* and *Barclaya* genera. *B. longifolia* is without doubt one of the most attractive of aquarium plants and a member of the Water Lily Family *Nymphaeaceae* (see A-Z of Plants, **A&P** January 1996). The flower is quite extraordinary as it will set seed whether or not it reaches the surface —

PLANTS FOR FREE!

Floating plants also send out runners or side shoots as can be seen in the water lettuce.

the seeds are self-fertile. The small hairy seeds are released below the waterline and germinate immediately.

Among *Apogonites* hybrids, *A. crispus* will willingly send up a flowering spike, or spicate inflorescence comprising a multitude of minute white flowers. The flowers are self-fertile, male (stamens) and female (pistils) organs both being present on the same inflorescence. They can be pollinated by gently running a soft brush over it or, if two flower spikes are present, gently rubbing them together. Following successful pollination, the set seeds should be sown in shallow warm water to germinate.

Apogonites such as the Madagascar Lace Plant produce forked inflorescences, with up to five spikes, coloured blue or pink.

Although not prize-winning blooms, the flowers of aquarium plants serve a very important purpose: given the apparent similarity of many species of *Cryptocoryne* and *Ecklonias*, correct identification is often only possible by studying the plants' inflorescences.

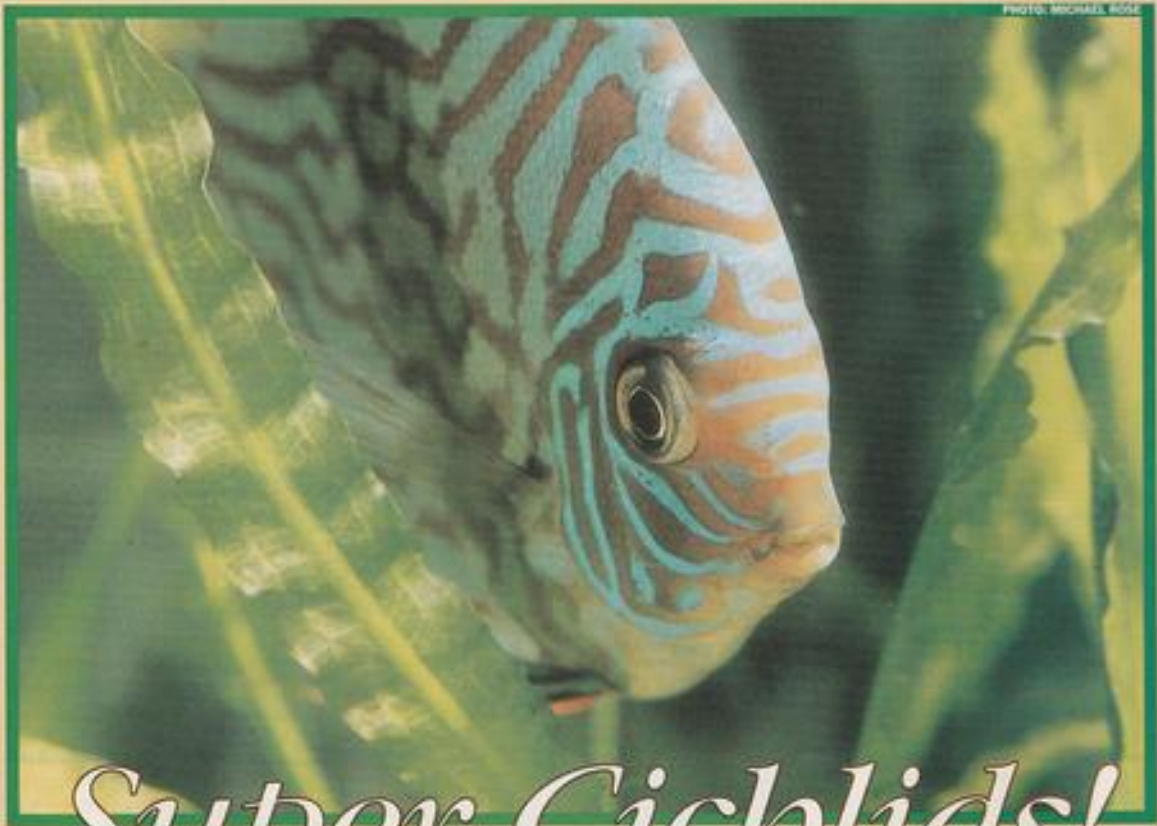
Close up of a typical *Ecklonias* flower comprising three petals, three green sepals, some six-50 stamens and many pistils. Following flowering adventitious plantlets may appear on the floral stalk which if pegged down will readily root.



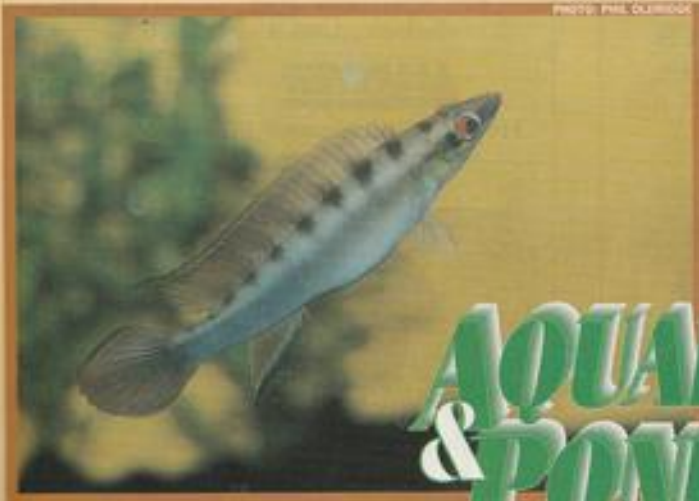
Whilst many of the methods of propagation described require little more effort than just providing good conditions, some skill (not to mention patience) is required to propagate

aquarium plants from seed. Although this course of action is only likely to appeal to the enthusiast, I bet if you know someone who does, you would be in the queue for some free plants!





Super Cichlids!



AN
AQUARIST
& PONDKEEPER

FREE SUPPLEMENT

SUPER CICHLIDS!

Maintaining a microcosm of the living world in any continuing degree is not only pleasurable but also offers a privileged insight into how other creatures live. Within fishkeeping, there are many such avenues to explore each with its own particular interests, challenges and disappointments.

It is often said that the greatest compliment any fish can pay its owner is to reproduce whilst in captivity; this is quite true even in the case of both extremes of care — the urge to procreate and continue the species seems to be uppermost in many species whether they are kept in poor conditions or in five-star luxury. Compared to the rigours of the natural world, where predation, varying availability of food, often falling water levels, interference by Man and the like, most aquarium-kept fishes have never had it so good. But back to Cichlids.

All fish produce young from eggs, the actual fertilisation and delivery of which may vary from species to species — egglayers and livebearers are two main examples. Looking at breeding in very general terms, either 'conception' is a case of 'slam-bam, thank you ma'am' whilst after-care is nothing much short of cannibalism! However, with Cichlids it is different.

For start, some species are very particular about selecting partners; not for them the arranged marriages of the cyprinids and livebearers where parents are selected for their own contributory characteristics towards the youngsters' physical make-up. Cichlids are conservatives, usually choosing their own partners from which mutual attraction often leads to successful breeding. With methodical precision it's a case of building, and often defending, the nursery site and no time to lay back and have a cigarette

after the 'nuptials' are over; the subsequent days and weeks are then devoted to raising the fry and bringing to semi-adulthood. Of course, it's not all as easy as all that — there may be the slight inconvenience of tank decorations (especially plants) to be re-arranged; fights may break out between rival males; females fight like tigers to defend the territory surrounding their spawning caves. Plus, the problems for the fishkeeper of what to do when suddenly becoming the guardian of some 100 or so fry.



This panorama of a nuclear family life can be seen from the comfort of your own tank-side viewing point; many a thankful parent has used this scene to explain the 'facts of life' to their own children in the most natural way. But it doesn't stop there.

Not only do cichlids offer their life-style to the viewer at a reasonable pace — spawning and fry-raising sequences can be quite protracted — within this most important part of their lives they also differ in method. Bold, 'do-it-in-the-open' extroverts, shy 'upside-down-in-darkened-caves' non-exhibitionists, pit-digging excavators, self-starring, mouthbrooding females with throats full of growing families, parents providing self-produced body mucus for a vital first food, all these are wonderful scenes for you to witness. Again, often described as the most highly evolved fishes (by our own standards, other fishes may beg to differ!) Cichlids should not be ignored. By all means do give them a try but be warned — you could become obsessed without too much effort.

Within this Supplement you will find plenty to help you decide about Cichlids. There's comparisons made and challenges overcome — and some pretty fine pictures too. Enjoy!

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Industry lends Mother Nature a hand

SUPER CICHLIDS!

Starting with Discus

Discus breeding unit.

PHOTO: BRIAN MEELETON

Hardness is acceptable (and actually quite desirable) as the Calcium, and other Trace Elements, which make the water hard are essential to proper growth.

NITROGEN CYCLE (OR HOW A BIOLOGICAL FILTER WORKS)

A 'working' aquarium basically functions in the following way:

1. The chemical compounds derived from fish excreta and uneaten food are TOXIC.
2. These compounds are broken down by bacteria present in the water to form Ammonia and Ammonium compounds.
3. The Ammonia is then converted to the still-harmful Nitrite (NO₂), but this is rapidly converted to relatively less-harmful Nitrate (NO₃) by more bacteria in oxygenated conditions.
4. The next stage occurs if there is no aeration, or if the filter system is insufficient. It involves the production of VERY TOXIC Nitrite and, eventually, Nitrogen from the Nitrate.

To summarize, a good biological filter and regular, thorough cleaning are prerequisites for the successful maintenance of this carefully-balanced

biological environment within the Discus tank.

ESSENTIAL TEST KITS

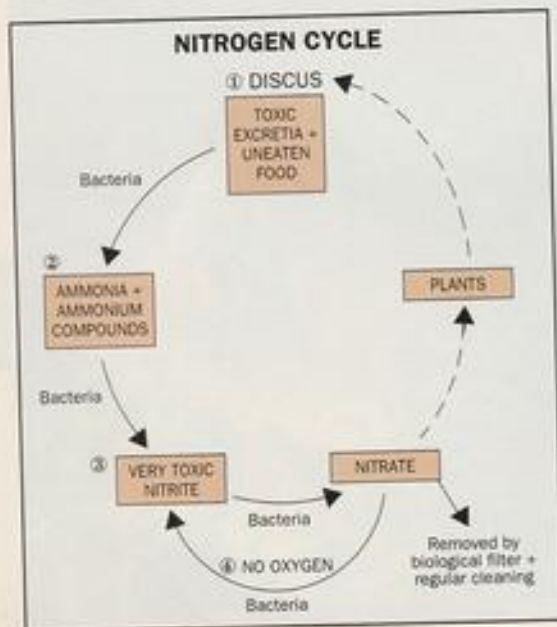
When deciding to keep Discus, it is absolutely vital to monitor water quality. The test kits required for this purpose are easily available from any reputable dealer. These kits are for determining pH, Nitrite and Nitrate levels; a Hardness Test Kit is useful but not mandatory. Discus keeping without the use of these kits cannot be achieved. I can liken it to driving at night without headlights without seeing where you're going ... you're bound to crash! You can't 'see' what the condition of your aquarium water is

simply by looking at it. These test kits are absolutely essential, they are easy to use, results are equally easy to interpret and the kits themselves are relatively inexpensive. From a personal point of view, this aspect of Discus keeping is one which I find extremely interesting and, without doubt, has been the key to my success.

In this opening article, I have assumed that the potential Discus keeper has a basic knowledge of tropical fishkeeping and I have therefore only given a basic view of those essential criteria required.

I have not expanded on the finer points, but I feel it should be appreciated that when a tank is initially set up, water should be aged, filters should be matured and the whole system be operational for a period of at least two weeks before the addition of any Discus.

Next month I will discuss the aspects of stocking your aquarium, feeding regimes and basic Discus health.



SHY FIREMOUTH CICHLIDS



Although I have been preoccupied by the newer, exotic species of Cichlids appearing in recent years, I decided it was time to return to re-appraise the well-loved cichlids which formed the backbone of the hobby for such a long time. At Morden Waterworld (Maidenhead Aquatics), Surrey, some Green Terrors (*Aequidens rivalatus*), Blue Acaras (*Aequidens palcher*) and Convicts (*Cichlasoma nigrofasciatum*) were on offer. A tankful of almost full-grown Firemouths (*Cichlasoma-Therichthys-merri*) caught my eye and out of the ten or so fish, I could (after studying them for some time) only spot one female. Firemouths can be difficult to sex because large females also develop long trails to their dorsal fins, however, mature females tend to be plumper and fin shape differences can be discerned on close inspection. I purchased the female together with a splendid male.

FISH DESCRIPTION

The Firemouth has a bluish-grey body enlightened by iridescent blue marking with a red throat and belly. These are more intensely coloured during breeding at which time the large blue eye turns to amber. There is a large black spot in the

DR IGGY TAVARES GOES BACK IN TIME, AND FORWARD, TO UNCERTAINTIES WITH AN OLD FAVOURITE.

• PHOTOGRAPHS BY THE AUTHOR / PENTAX UK LTD •

centre of the flank from which extends a broken black, horizontal bar to the gill plates. A black spot also appears at the lower part of the gill plate and at the base of the caudal peduncle. All unpaired fins are suffused with emerald-green/blue while the dorsal fin has a marginal red band. Both sexes are equally beautifully coloured. Males tend to have slightly longer dorsal and anal fins whilst, as previously mentioned, females are more rotund in the belly.

AQUARIUM SET-UP

In their bare shop display tank the fish appeared well-adjusted. However, the minute I introduced them into my three

foot tank they vanished! The aquarium offered plenty of cover in the form of boulders and green plastic shrubbery: it also housed a pair of 3in Convicts introduced the previous day. The Convicts were bold, almost always out in the open, not so the Firemouths. Introduction of some dither fish was called for so having many half-grown (tame and always hungry) *Astatotilapia aluani* (Lake Victoria Cichlid) I added half a dozen of these to the tank. No joy — the Firemouths remained in hiding but did venture out when the room was empty and quiet but any movement sent them dashing for cover.

FEEDING

I fed the Firemouths a basic diet of DoroMin pellets, large TetraMin Flake and, once a week, live earthworms which they really relished. Whilst taking food in mid-water they also had an earth-eating habit taking up gravel in their mouth, chewing it over, then spitting it out. This habit was confined to the Firemouths (I never saw the Convicts do it), not surprising for they have been described as a shallow water, substrate-filterer in their native habitat where invertebrates and vegetable matter is recovered by foraging in the soft substrate.



ABOVE
Young Firemouths in shop usually do not show too much colour.

AQUARIUM CARE

Aquarium size: 90x30x45cm (36x12x18in) minimum. Bigger is better

Decoration: Plenty of rockwork. Flowerpots

Temperature: 26°-28°C

Water: Hard and alkaline (pH 7.8, 20°DH approximately)

Diet: Tetra DoroMin, TetraMin, some live earthworms

CONVICT SPAWNING

Soon after getting the Firemouths the Convicts spawned, restricting the movement of the Firemouths even more — after four days the free-swimming family group foraging for food all over the tank put the Firemouths under renewed attack. Removing the Firemouths (along with the dither

BELOW
Male Firemouth. Note the fine papilla.



SUPER CICHLIDS! *Shy Firemouths*



LEFT
Large male displaying.
Note the aggressive
coloured bars on the
back.

BELOW
Female Firemouth
displaying. Note broad
ovipositor.

fish) to a temporary home did not improve their attitude so four weeks later they went back in with the Convicts, now minus the fry. When the male Convict began to beat up the female Convict he was replaced with a female Convict; a few days later the female Convict spawned alone, guarded and cared for the eggs until they fungussed. The shy Firemouths, still hiding, remained unquisitive and unimpressed.

FIREMOUTH SPAWNING!

Some weeks later, I noticed that gravel was being moved from an area behind the rocks that the Firemouths were occupying. Sitting quietly (some ten feet away), I was able to watch the Firemouths displaying, flaring their gills and red nape — a spectacular sight. However they quickly vanished if there was any movement in the room, leaving the other cichlids to patrol the front of

the tank.

A week later, when they still hadn't spawned, I was getting impatient and introduced a large flowerpot near to their favourite haunt. This did the trick, since the next day I found the inside of the pot covered with eggs — all looking good with no white ones — but the parents seemed lackadaisical in their care, abandoning their eggs when I was around, sometimes even letting other cichlids take up residence in the pot! However, the eggs were not eaten and the Firemouths fanned the eggs when

undisturbed. Gradually, over the next few days, the eggs fungussed and under microscope examination no sign of fry development within the egg (certainly expected after four days) could be seen. In the aquarium, when a male is absent two females may spawned together in which the unfertilised eggs do fungus over a few days. Observations of my fish indicated that only one appeared to be 'gravid', carrying eggs, prior to spawning; moreover, from their behaviour, and from fin shape, I was sure that they were a true pair.

FURTHER READING

Cichlids of Central America by Ad Konings (TFH Publications 1989)

Fish and Their Behaviour by G. K. H. Zupank (Tetra Press 1985)

NORMAL BEHAVIOUR

A week later the Firemouths were getting a lot bolder and displaying to each other out in the open. As before there was the gill and nape flaring, thrashing the tail with the male occasionally chasing the female round the tank — their even started acting aggressively towards the Convicts! The male tried to lead the female into the flowerpot, he would go into the pot, peck furiously at the sides in some sort of ritualistic cleaning, and wag his tail violently, then he chased the female round the tank. My hopes were high, now that they were behaving like proper cichlids, although they were still shy when I was about. Months went by and they didn't spawn again.

ANOTHER FIREMOUTH

I came across another female Firemouth, slightly larger than the two I already had. This new individual was much more sociable and did not hide from me. I really took to this new arrival but within two months the other two were dead. The culprit, I surmised, had to be the new introduction especially as I did see some bullying going on. Introducing new, mature cichlids to any established setup is always fraught with danger; with hindsight, I should have paid more attention to the bullying and separated the fish.

CONCLUSIONS

Firemouths are not generally noted for their inherent shyness. Like other Central American cichlids they are usually a robust fish which should have spawned easily. The water conditions were obviously suitable as the Convicts spawned and raised fry. The main problem, as I see it, was that I started with a pair of adult fish which were unable to settle down in a new environment. Perhaps I should have started with four adults rather than two?

FIREMOUTH FACT FILE

Scientific name: *Cichlasoma (Thorichthys) meeki*

Common name: Firemouth

Distribution: Central America, Yucatan, Belize

Size: Male & female 13cms (4.5in)
TL

The usual recommendation with cichlids is to start off with half a dozen young fish, grow them on together and let them choose their own partners. Young cichlids soon get very tame and when mature are less likely to hide when someone is in the room. I usually manage to avoid following this rule, primarily because of lack of tank space — but obviously this was one of those times that I should have done

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UVAQ calculate the effect of the UV light on bacteria and algae, using unique computer software to optimise the UV chamber design. They then maximise the effect of ultraviolet light, to provide economical products that out-perform larger, but poorly designed, alternatives. The eight-watt CLEARMASTER will frequently clear a pond of algae faster than other 15-watt units.





Manufacturers should give guidance as to the maximum pond size that can be treated by their products under differing conditions of sun/shade and fish stock levels. Algae problems increase with prolonged fine weather, high fish stocks and little shade. In last year's hot summer many other owners found their UV purifiers could not cope with algae problems in ponds of the 'recommended' size. "CLEARMASTERS", rated conservatively and professionally designed, gave no such problems.

UVAQ never compromises on safety or quality. Positive seals are used for weatherproofing rather than push-on splash covers. All designs have sleeved UV lamps internal to the water chamber for peak efficiency (lamps fitted outside the water waste most of their UV energy). And UV chambers are always made large enough to provide good contact times, even where smaller units would be cheaper.

To sum up, an ultraviolet purifier should not be chosen by the power of its lamp alone. The design features, quality of construction and experience of the manufacturer are more important in determining the maximum pond size it will effectively protect. Buyers should consider all these points to avoid future problems.

CICHLID COMPA

By Mary Bailey

	Size	Origin/ Availability	Tank Size (Pair)	Water	Lighting
<p>Big & Nasty</p>  <p>PHOTO: JAMES COLTON</p> <p>Jaguar Cichlid or 'Marine' <i>Nandopsis (formerly Cichlasoma) managuensis</i></p>	Up to 50cm (20in) TL. Females smaller than males. Aquarium specimens rarely larger than 30cm (12in)	Central America, in particular the great Lakes of Nicaragua. Aquarium stocks now generally home-bred by hobbyists	Minimum 120x38x38cm (48x15x15 in)	Moderately hard and alkaline (pH 7.5-8.0). Ammonia and nitrite zero, nitrate <50ppm. Reasonable oxygen content. 24-26°C (75-80°F)	No special requirements
<p>Easy</p>  <p>PHOTO: DAVID SANDERS</p> <p>Blue Acara <i>Aequidens pulcher</i></p>	Up to 20cm (8in) TL, usually smaller. Females smaller than males	Trinidad and coastal drainages of Venezuela. Long established in the hobby and stocks normally home-bred by hobbyists	Minimum 75x30x30cm (30x12x12in), 90x38x38cm (36x15x15in) better	Moderately hard and alkaline (pH 7.2-8.0). Hardy as regards water quality but aim for zero ammonia/nitrite, nitrate <50ppm. Reasonable oxygen content. 25-28°C (75-82°F)	No special requirements
<p>Difficult</p>  <p>PHOTO: JAMES COLTON</p> <p>Calvus <i>Aitolamplogus calvus</i></p>	Males to 10cm (4in) TL, females only half this size	Lake Tanganyika. Available as wild adults and sometimes as tank-breds, usually of European, occasionally UK, origin.	60x30x30cm (24x12x12in)	Hard and alkaline (pH 7.8-8.5). pH must NEVER drop below neutral (pH 7). Water quality A1. Zero ammonia/nitrite, nitrate <25ppm ideally much lower. High oxygen content essential. 26-27°C (78-81°F)	Should not be excessively bright for these shy fishes
<p>Small & Beautifully Marked</p>  <p>PHOTO: DAVID SANDERS</p> <p>Thomasi <i>Anomalochromis thomasi</i></p>	10cm (4in) TL males, 7cm (2.75in) females	Coastal rivers in Sierra Leone, Liberia and Guinea, West Africa. Aquarium stocks are generally hobbyist/breeder produced in the UK.	60x30x30cm (24x12x12in)	Will live in hard alkaline water, but ideal conditions are soft and slightly acid (pH 6.5-6.8) to promote good colour and breeding. Zero ammonia/nitrite, nitrate <25ppm for optimum health. Oxygen levels not critical. 26-27°C (78-81°F)	Not too bright for this species from shady waters

ARA-FILE

With the fascination of cichlids being so diverse within the family, A&P are pleased to introduce a new way of looking at species — after all, one person's fish is still another's 'poisson' — and some species require different conditions and care than others. Simply select the species from its photograph on the left and follow through horizontally to check out its needs, attractions and, yes, complications! Moving vertically, the information about the other species is also instantly available.

Decor	Foods/Feeding	Special Requirements	Compatibility/Territoriality	Sexing	Special Requirements for Breeding
Substrate in which to dig nursery pits. Caves for shelter, rocks on which to spawn. Rockwork well bedded to prevent undermining. Will not eat plants, but may dig them up.	Predator with piscivorous tendencies. Raw fish (ideal disposal unit for culled fry), earthworms, crickets, woodlice, other insects. Some (carnivore) pellets. 1-2 times daily	None	Will eat smaller tankmates, and eliminate those its own size — and larger. Mated pairs are highly compatible	Adult males and females highly dichromatic	Best to obtain compatible pair by growing on juveniles. Easy to breed if other requirements satisfied
Substrate in which to dig nursery pits. Well bedded (to prevent undermining) caves (flowerpots will do) plus flat stones in open as spawning sites. Likely to uproot plants. Will not eat plants but may dig them up	Natural diet is small fishes, insects, larvae and aquatic invertebrates. In captivity thrives on anything, loves earthworms. Feed twice daily	None	Rather peaceful, though will defend brood vigorously. Likely to eat mouth-sized tankmates (Neons!) Can be housed with other peaceful fishes of similar size in a large (at least 120cm-48in) tank.	Impossible! Except for ultimate size	Very easy to breed once a pair is obtained — growing on 5-6 juveniles for self-selection is the best way round the sexing problem. Much available stock is very poor quality as a result of poor breeding practices — shop around for good stock (from more than one source) to prevent further degeneration
Fine substrate to allow minimal digging this species performs. Large amounts of well-founded rockwork with small nooks and crannies to simulate natural habitat. Will not harm plants, though these do not occur in native rocky biotopes	Natural diet is aquatic invertebrates — will learn to take some flake but should be given pond foods (fresh/frozen), whiteworm, frozen (never live) Tubifex. Feed small amounts 3-4 times daily, or large amount of live pond food, to permit continuous feeding	Minimal disturbance, initially slow to settle, and may not emerge from rockwork for weeks (or months!) Do not move rocks to check if alive — this will set you back to square one. For breeding female must have a cave too small for male to enter — a shell among the rocks can provide this	Peaceful, even when breeding. Can be kept with other small rock-dwelling Tanganyikans — Julidochromis, small Neotemprlogus and with Tanganyikan shell-dwellers — if sufficient space for all provided. May eat fry	Easy, by virtue of size dimorphism which becomes apparent 2.5cm (1in)	'Female-only' cave as mentioned above. Male is likely to eat fry when they leave the cave so should be removed, ideally behind tank-divider, so as to avoid too much upset to pair. Often reluctant to spawn even under optimum conditions. Fry slowgrowing and difficult to rear
A well-planted aquarium with small caves (flowerpots adequate), fine substrate and flat stones/pebbles in the open for spawning sites. Bogwood optional	Natural diet is aquatic invertebrates. Will take flake but does better on pond foods (fresh/frozen), frozen Tubifex, whiteworm, finely-chopped earthworm. Feed 2-3 times daily	None not already mentioned	Peaceful, though will defend brood valiantly. Can be kept with other soft water dwarfs or in a general community	Not easy. Females tend to be smaller, stockier and less colourful but none of these points are likely to show up in dealer's tanks. Buy a group and allow natural pairing	Breeding should occur given proper diet and maintenance. Egg-cannibalism can be a problem but usually cures itself given time

Footnote: BCA information pamphlets available on *N. managuensis*, *A. pulcher* and *A. thomasi*. Price 50p each (plus SAE) from **BCA Sales (AP)**, 46 St. Margarets Road, Androssan, Ayrshire KA22 7EW.

THE COLOURFUL AFRICANS

Up until the mid 1960s, the Americas had the cichlid source market pretty well sewn up; there were the occasional imports from Asia but bearing, in mind the paucity of indigenous species, these were limited to *Etoplus*, Chromides of the Orange (*E. maculatus*) and Green (*E. suranensis*) colours. African was not much better represented with the small to medium-sized 'Krib' — *Pelvicachromis* (then *Pelmatochromis*) with their confusing sub-species, the aggressive Jewel Cichlid (*Hemichromis fowalatus*), the occasionally-seen *Nadiceps dimidiatus* with one or two *Tilapia* species filling the much larger fishes category. Whilst the mid-American species were reasonably happy with hard water, the species from south of the equator were much more at home with soft, more acid conditions — especially if breeding was to be contemplated.

Then, it happened... fishes from the great African Rift Valley Lakes were not only discovered but actually exported to the fishkeepers of the world. Superlative descriptions abounded — freshwater fishes able to outcompete

marines for colours' — was a favourite at the time; but the real bonus was that these 'jewels' actually enjoyed hard water! If you couldn't grow plants, these fish would not hold it against you for their rocky shores habitat were devoid of such luxuries. Their spawning behaviour differed too in some ways: whilst some spawned in caves — like some shy *Apistogramma* — others dug nests in the substrate and exhibited mouthbrooding. Even sexing was not quite the mystery it had been with other cichlid nationalities as males from the mouthbrooding species often wore eggspots on their anal fins as an advertisement of their sexuality for the convenience of the fishkeeper.

The only drawback, apart from

being their high price and sometimes difficulty in obtaining just the species you wanted, was their innate aggressiveness to each other. It soon became apparent that a large aquarium with plenty of rocky retreats was to be the norm for keeping most of these fishes, if any community collection was to be maintained for any length of time.

At the forefront of the imports were fishes from Lake Malawi (formerly Lake Nyassa) known as 'mbuna' — rock dwellers — but soon species from other Lakes such as Victoria and Tanganyika were filling up the dealer's tanks to the delight of aquarists worldwide. Nowadays, aquarists are well-acquainted with African cichlids and their differing behavioural lifestyles: the small, delightful *Lutichromis* and

Nelampotilus will form a long-term nuclear family within an aquarium of even modest dimensions, as will many of the shell-dwelling species. As for those colours, well, there can never have been so many species of fish with so many colour variations (dimorphism) within them: never mind a taxonomic identification guide, what you really need is a colour chart!



RIFT VALLEY CICHLID
PHOTO: AAP LIBRARY

CICHLID

Secrets . . .

by MARY BAILEY



Pseudotropheus crabro in cleanerfish colouration. The stripe colours varies from cream to yellow depending on geographical locality. PHOTO: MARY BAILEY

THE HORNET'S STING

Pseudotropheus crabro (the specific name means 'hornet', referring to the black and yellow barring) is one of the most unusual of the Lake Malawi mbuna as far as behaviour goes: it is a cleanerfish, which removes skin parasites from the 'Kampango' the large, cave-dwelling Catfish, *Bagrus meridionalis*. But, somewhere in the course of evolutionary history, the *crabro* apparently decided that its host had another type of protein to offer — it also feeds on catfish eggs!

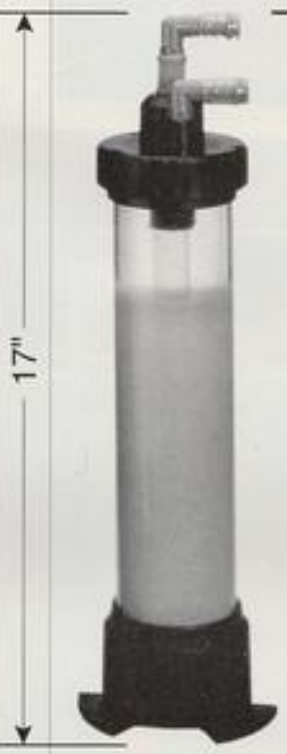
Now it doesn't take a genius to realise that a fish which has just pinched a catfish's eggs isn't going to get an enthusiastic welcome the next time it offers its 'cleaning' services. But *crabro* has found a way round this. Quick as a flash, it changes colour from wasp-like bars to dark and inconspicuous before dining on 'caviar à la Kampango.' Then it reverses the process just as quickly before once again approaching its 'client' on 'legal' business. Hence its alternative hobby name of *Pseudotropheus 'chameleon'*. Until we crack inter-species (animal/fish) communications, we will never know what the Kampango calls it!

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DR DAVID FORD,
AQUARIAN ADVISORY SERVICE,
CONSIDERS WHAT CICHLIDS
LOOK UPON AS FOOD, GLORIOUS
FOOD!

• PHOTOGRAPHS BY THE AUTHOR •

Automatic feeders operating in the Aquacentre at Waltham. The fish can take food on demand by mouthing a sensor and computer controls monitor amount and frequency.

piscivores such as *Urotaenia* Blue (*Protomelas* sp) that just eats Utakas!

The algae-grazing Mbuna are well known to cichlidophiles and many of the *Pseudotropheus* species feed by grazing off rocks, ingesting algae and plankton too. This can be seen in the aquarium where the fish stand at right angles to any rock, pecking continuously. Others are insectivores or dine exclusively on particular small invertebrates (e.g. *Labiaticromis maculicauda*). Species such as *Mannichromis anaphyretus* have large

pharyngeal bones to crush snails scooped from the silty areas and *Taniasia laticeps* (better known as *Latesia laticeps*) has a long snout to probe even deeper in the silt for insect larvae.

Despite the range of feeding types, one thing is common to all Cichlids; the

The range of Cichlid species in both the New and Old World means that a definitive nutritional type does not exist. Every Cichlid has its own particular diet according to its position in the food web. For example in just one biotope in Lake Malawi the population

has existed for some 25,000 years (because the lake was lower in earlier times) and a stable food chain has developed. This ranges from the vegetarian Cichlids, such as Utaka (*Ngassacromis brevicaeps*) which eat exclusively phytoplankton and has a gut four times longer than the fish itself, to

Cichlids can have big mouths and big appetites like this Oscar — but that means big excretions, too!

basic metabolic chemistry for their nutrition is the same as for warm-blooded animals. Adenosine diphosphate and triphosphate are found in their tissues indicate the same metabolic energy processes as ourselves. However, being poikilothermic (i.e. cannot regulate their body temperatures) the fish do have a different fat storage system to warm-blooded animals. They store unsaturated oils (the same applies to all fishes — think of Cod Liver Oil!) rather than the saturated fats of mammals (which would solidify at their body temperatures).

The consequence is that it is easier to list unsuitable foods for Cichlids rather than list ideal diets.

WHAT NOT TO FEED

Traditional human foods are unsuitable for Cichlids (and most fishes) especially the fat-containing hams, burgers, sausages and formed meat chunks of many canned foods and pies. The fat they contain can block the gut of the fish and even if successfully digested, it will give solid fat in the liver where the fish stores the food. The enlarged or pale liver seen in post-mortem examinations of fish is actually called a 'fatty liver' and is indicative of feeding unsuitable foods. The practice of feeding meat chunks (especially if processed) is wrong, even the so-called non-fat meats (they aren't!) of Chicken or Turkey, and offals such as liver, kidney and heart (yes, even the popular beef heart).

From a palatability point of view the best foods must be the same diet the species eats in the wild. The problem with reproducing this feeding regime in the aquarium is that the foods are living and so carry parasites, bacteria and viruses. Over millions of years parasites have used the food chain to infest fish in a balanced way that ensures survival of the parasite and its host. In the confines of the aquarium the balance is tipped towards the parasite and infestations such as *Kryptopeltis*, *Lernae*, *Ciliates*, *Camallanus* and so on will multiply until the host fish is overwhelmed and dies.

Daphnia is a popular live food but is a



carrier of many gut parasites such as the tapeworms.

Tubifex is also very popular but carries massive levels of *Aeromonas* and *Pseudomonas* bacteria, both implicated in problems such as fin or body rot and Cichlid Bloat.

WHAT YOU CAN FEED

Live foods that have been cultivated so they are free of parasites are safer, such as Brine Shrimps, White Worm, Grindal Worm, Vinegar Eels and so on. Non-aquatic live foods are the safest because they do not carry water-borne bacteria or viruses, e.g. garden earthworms, aphids (unsprayed source of course), land snails, slugs and flies. The earthworm is particularly useful because it can be shredded down to a particular size in a kitchen blender (best have your own!) for first feeding to fry.

Scrap feeds should be fish rather than meat-based; any white or oily fish and shellfish such as prawns, shrimps, crab, scampi, whelk, oyster and so on. Another advantage with seafoods is that any parasites in the raw flesh will not infest freshwater species.

The vegetable eaters (since most are omnivores) can cope with these foods too, but some vegetable protein is essential in their diet. Feed algae where possible, otherwise use lettuce, peas, spinach etc. However, note that these are land-based vegetable and so have a higher cellulose content than aquatic plants. Break down the cellulose first by

scalding with a short splash (careful!) of boiling water. Pre-cooked vegetables (such as frozen peas) are acceptable without scalding.

THE IDEAL FOODS

The most convenient food for Cichlids is the commercial fish food, flake for small fish, sticks or pellets for the larger fish. One of the problems with scrap foods is that the trace element content (vitamins, minerals and phytochemicals) may be deficient. Other essentials such as certain amino-acids (the proteins) will be unbalanced. Cichlid flesh is high in methionine and lysine for example and these must be supplied in the diet for healthy growth. Manufacturers do study the needs of fishes and adjust their recipes to ensure a balanced and complete diet that can be claimed and proved to the advertising authorities. As usual you pay more for the best but part of the cost is for research into the needs of captive fishes.

The most active research unit into the needs and care of pets, including fish, is Waltham. You can see the Waltham symbol on all pots of Aquarian Fish Foods and many other pet foods such as Chum, Whiskas, Sheba and so on. This shows that the latest findings of the scientists at Waltham are included in the food recipes. Their work has revealed

SUPER CICHLIDS!

Dwarf Pikes

their dorsal fin. Females that are in good condition should be alert and have slightly rounded, pink stomachs. *C. compressiceps* differ in that males are always larger and more robust looking and have zig zag vertical lines through their tail fins, female *C. compressiceps* do not exhibit dorsal markings.

Dwarf Pikes do not need to be maintained on their own, in fact they are better kept with other small cichlids or Tetras. Ideal cichlid tankmates come from the genera *Biotodoma*, *Microgobius* and *Chilinaea*. Tetras such as Black Widows or Bleeding Hearts are also fine — but only a few; it's the Pikes that we want to feed and breed, the Tetras can wait for another day.

FEEDING

So, we are off, tanks set up, fish are settled in nicely, how do we feed them? Contrary to belief Pikes do not need to be fed live foods, by doing so you increase the risk of introducing infection. As you will have noticed, Dwarf Pikes have very small mouths (unlike the larger ones which could be employed as excavators at gravel quarries!) So we only need to feed small foods, a single whole bloodworm may prove too large for some species. Ideal frozen foods are Mysis, Bloodworm, Cyclops and ground up Prawns. These foods used alternatively will provide a good varied diet. Some Dwarf Pikes have been known to eat flake and granular food, please don't feed these, these fish are predators and don't need turning into Veggies.

Once settled, you will soon find the Pikes out and about the tank, in particular *C. compressiceps* are very gregarious and are very good at begging for food from the front glass. These are very small fish with very small stomachs, don't be enticed into over feeding — little and often is the rule.

BREEDING

Evidence of imminent spawning will start by the female completely taking over a cave area, increased colouration of her abdomen and wanton expressions of body shaking and "S" curving displays to her chosen partner. A small water change plus an extra feed may well entice spawning. A successful spawning will be noticeable by the obvious decreased size of the female's stomach and by her darkened colouration. At this

stage other tank mates should be carefully removed, especially if the tank is a minimum size.

Pike cichlids lay oval shaped eggs, hung from very fine filament by one end from the roof of the cave. Colouration of eggs may vary but most fall between tan and red. Egg numbers are dictated by a number of factors, such as parental size and age, species and often water quality. I have yet to see my *C. compressiceps* have a spawn that numbers more than 25, whilst successful spawnings of *C. regani* have exceeded 100.

Two days after spawning and the eggs will be just about hatching, a further eight-10 days will see the female lead her now free swimming fry out and into the big wide world. Pike cichlids are EXTREMELY protective of their young, hence the need to remove all other fish. Initially females will lead the fry in a tight shoal whilst the male patrols the outer areas, too small a tank and the male will have little to do and may well kill him as he will be seen as surplus to requirements. Well informed hobbyists monitor this part of the breeding carefully and remove the male if necessary — yes, love can come to an abrupt end for some cichlids. One method I have tried (and been successful with) is to house the breeding tank next to, and almost side up to, a second tank containing the same species, unfortunately this is usually only possible in a fish house.

The female can be safely left to raise the fry on her own; in the wild, breeding pairs of Pikes have been found still protecting fry that were over six months old.

Feed the fry with small and often feeds of Brine Shrimp Nauplii and then, as soon as they can be managed, Cyclops. If you are unable to raise Nauplii or none is available I have used Waterlife's Invert Food, also frozen.

Crenicichla regani
(female).

foods can be finely shaved off blocks by using a Stanley Knife blade.

A FINAL BONUS

All Dwarf Pikes are very saleable and both adults and fry command good prices. Dwarf Pike cichlids are very enthralling, give them a try.

HISTORICAL FACT FILE

1840 Heckel erects the genus *Crenicichla* — the slim, torpedo-shaped fishes that we call Pike Cichlids. *Crenicichla* translates to clearly identify the type of fish, *Creni* meaning toothed and *cichla* referring to the genus likeness to another South American genus, *Cichla* — the large predators. Heckel erects a second genus *Batrachops* to cover the more fuller-bodied, frog-eyed Pikes which didn't seem to conform to the original *Crenicichla* description.

(Currently both groups have been brought together under the single genus name of *Crenicichla* — something on which not all ichthyologists and hobbyists agree!)

1988 Kullander erects a third genus *Tetraodon* — a rheophilic group of bottom-dwelling Pike Cichlids having limited swim bladders.

Currently around 60 species of Pike Cichlid are scientifically described. It is thought that the same number again remain as yet undescribed and unknown to science. When all the species are finally counted up this could turn out to be the largest genus of cichlid found in the world.



CICHLID CONSERVATION INVOLVES INDUSTRY

DR DAVID FORD OF THE AQUARIAN ADVISORY SERVICE LIFTS THE LID ON INDUSTRY'S LIFE-LINE TO ENDANGERED SPECIES.

● PHOTOGRAPHS BY JOHN MILLS PHOTOGRAPHY LTD ●

The inauguration ceremony, May 1995, at Chester Zoo (left to right): Chester Zoo Curator Justin Bell, Aquarian Manager Andy Porter, Aquarian Consultant Dr David Ford, Chester Zoo Director Dr Gordon McGregor-Reid, Aquarian Consultant Dr David Sands, Chester Zoo Curator Mike Crumpler and Chester Zoo Marketing Manager Chris Vere.



It is accepted that the pressures of human population expansion are destroying other animals on Planet Earth. Not just land animals but also fishes (and mammals) in rivers, lakes and seas. Zoos have a unique role to play in conserving all these animals and, since most Zoos have an Aquarium (many are exclusively Aquatic Zoos in themselves), there is now an international effort to collect, house and breed endangered fishes.

Co-operation with Universities is part of this work since Zoo Aquaria staff can supply practical knowledge, and academics can supply scientific data and assistance. For example, the University of Plymouth sent their scientists to Trinidad to collect rare Livebearers and specimens were delivered to Chester Zoo for a captive breeding programme, with future re-colonisation plans.

ENTER INDUSTRY

Aquatic Zoos contact each other via newsletters, mail, e-mail and even Internet these days. Chester Zoo have sent Tilapia for captive breeding to the

National Aquarium at Baltimore, USA and also exchanged fish and data with Columbus Zoo who carry out research in co-operation with the University of Ohio. Hence, a network of conservation work has been woven world-wide and this is the story of how that network has involved the Mars group of Companies.

Over 1,000 species of Cichlids used to inhabit the Rift Valley Lakes of Africa. Of these, the Haplochromine Cichlids of Lake Victoria are accepted by ichthyologists as 'one of the most extraordinary evolutionary assemblages known to mankind.' It is well known that introduction of the Nile Perch caused major disruption to the complex Cichlid population, and many species are now lost or endangered. What is less well known is that developments around the Lake have caused environmental changes that have had an even worse effect on the fish population than the Nile Perch predation problem. Hence, just removing the Perch — and efforts are under way to do this — will not solve the problem.

European and North American Zoos have taken collective action to save

some of the Cichlid species for a future — perhaps far future — restocking programme. Fish eggs and milt of endangered species are being preserved in liquid nitrogen (cryopreservation) for long-term storage. Captive breeding programmes are needed to supply these biological specimens.

The first species investigated by Columbus Zoo's Johnson Aquatic Complex were *Pygocentrus nethastama* and *Prognathochromis perrieri* because these are now probably extinct in the wild. After a year's work with these fish, the captive colony was getting smaller as fish died for unknown reasons. Among methods tried to save the colony was a batch fed on AQUARIAN Vitamin Flake Food (this is available only in the USA where a special market for vitaminised foods is recognised; in the UK, the vitamin flake is incorporated in the basic diets of Tropical, Goldfish and Marine Foods). To the surprise of the Zoo scientists the AQUARIAN-fed fish prospered and bred, bringing to the Aquarium recognition and rewards for saving the endangered species. One such award was the Significant Achievement Award from the

American Association of Zoological Parks and Aquariums. It was at an international conference hosted by the University of Ohio on the Lake Victoria Cichlids that aquarist Sandy Andromeda, of Columbus Zoo, revealed the reason for the Award and the secret of their success with the breeding programme — AQUARIAN food bought from local shops!

In the audience was the Head of the Waltham Aquacentre at that time, Marinus Pannevis — a Dutch nutritionist working at the Mars-sponsored Waltham centre here in the U.K. He offered to supply Aquarian products direct from the factory (Thomas's Europe, based in Batley, West Yorkshire. Every time the breeding pairs of Haplochromines were shipped to other Zoos and Universities so the offer of Aquarian foods followed and a number of specially-chosen Public Aquariums now use a bulk supply of the flake.

CHESTER ZOO AQUARIUM

Active in the field of Lake Victoria Cichlid preservation, the Zoo has just obtained a cryopreservation unit and are collaborating with the experts of preserving genetic material, the Institute of Aquaculture at the University of Stirling. The Columbus success with Aquarian Flake food was noted and

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The Aquarian Tropical Fish Community Aquarium.

samples given to Curators Justin Bell and Mike Crumpler, aquarists working in the public aquarium but carrying out research behind the scenes too. They are particularly interested in *H. pyrrhocéphalus* and have been breeding stocks of *H. zebra*, *H. argus* and *H. riponensis* — all Rift Valley cichlids but plans are under way to extend the work to endangered Goodeids and other Livebearers. The British Cichlid Association are involved with the Zoo, offering specimens to about 40 private aquarists for home-breeding. Just like the Zoo Aquaria, these aquarists are supplied with Aquarian flake foods.

A liaison soon built up between AQUARIAN and the Zoo staff with Drs Ford and Sands visiting and lecturing at the Zoo. So when Zoo Director, Dr Gordon McGregor-Reid, needed to build a new community tank in the Aquarium he approached his new contacts. He

proposed that Mars — in particular the AQUARIAN brand — should sponsor the new aquarium: this was agreed and work was completed in time for the 1995 season with a 120x75x74cm (48x30x30in) tank, housing tropical community fish in a fully-planted aquascape, sited at the end of the first corridor of the public aquarium. It carries a notice board with Aquarian literature and Advisory Service details.

Many international Zoo Aquaria use AQUARIAN fish foods routinely — London Zoo for the past 10 years and all the SeaLife Centres. Whilst this helps maintain the necessary health and quality of fishes in the public eye, it is the conservation success that Aquarian staff are particularly proud of and examples of the endangered Cichlids were seen on the Aquarian displays at national fishkeeping shows throughout 1995.

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frogs & friends

By BOB and VAL DAVIES



Winter reflections on the summer

The heatwave in July reduced heating bills in vivaria but caused some other problems — some of our reptiles which are housed in the loft had to be evacuated when temperatures soared. At one point, 41°C (106°F) was recorded. Downstairs it was practically impossible to switch on any lights without temperatures rising above the desired maximum. This disturbed the breeding patterns of the Dendrobatid Frogs as some of their vivaria are rather dim without lights.

We started Spring with masses of frog spawn in the garden pond but very few metamorphosed frogs were observed later in the year, and the few we did see were under stones at the pond's edge, possibly unable (or unwilling) to disperse as normal because of the hot, dry conditions.

Incubating reptile eggs in one room rose to over 32°C (90°F) but seem to have suffered no harm, although the incubation temperature is known to determine the sex of some hatchlings. These eggs (from Chameleons) have an incubation period from 8-12 months so the outcome remains to be seen.

However, it wasn't all bad news. Green Lizards (*Lacerta viridis*) kept outside enjoyed the sunshine and produced eggs; the Tortoises benefited from natural sunlight as did baby Chameleons and some of the adults.

As we approach mid-Winter, many herps are being cooled to ensure successful breeding in the coming season. Mild winters can be a problem — a sunny day, even if cold, can raise the temperature of outbuildings, lofts etc. During the winter of 1993-94 Blue-tongued Skinks (*Tiliqua scincoides*) in our loft did not cool down adequately and,

although they mated, failed to produce young. The following year breeding was successful (22 young) after hibernation in part of the garage which is insulated. A tubular heater, with thermostatic control, prevented too low a temperature but even so there was cause for concern on mild days. A further worry is power cuts which always seem to happen when one is asleep, or out for the day.

However, all of these factors all make the keeping and successful breeding of reptiles more interesting and challenging.



Blue-tongued skink two days old. The result of successful hibernation last winter.

PHOTO: BOB & VAL DAVIES

Melanism

The opposite of albinism (lack of the black pigment, melanin) is melanism i.e. a predominance of melanin which gives the animal a dark appearance.

This condition is frequently mentioned in the Adder (*Vipera berus*) and the Common Lizard (*Lacerta vivipara*) as enabling them to survive in northerly latitudes, the dark pigment assisting in the absorption of

relatively weak sunlight which raises the body temperature to allow normal activity.

Since both species are ovoviviparous (livebearers) the absorptive powers of the melanin also aids in the development of the young inside the female. In effect, she becomes a 'mobile incubator', able to seek out favourable basking spots.

Ovoviviparity must be useful in northern latitudes but is not confined to them, so it may

have other advantages. Oddly enough, a friend who had been studying reptiles in the mountains of Northern Spain reported seeing many melanistic specimens of *L. vivipara* (just at the snowline in May) but the Iberian Rock Lizard (*Lacerta monticola*), which lived in the same area showed no signs of melanism. Both species actually went onto the snow to obtain moisture from snow which was melting in quite strong sunlight.

Albino Frogs?

Soon after we had written the piece on albino frogs (**A&P** October) a friend telephoned to say he had some odd-looking tadpoles in his pond.

By the time we went over, a few had metamorphosed. They were certainly a much lighter colour than any previously seen, apparently lacking normal pigmentation. He is hoping to raise some in a vivarium to see how they develop.

One of the unusually coloured frogs soon after metamorphosis.



PHOTO: BOB & VAL DAVIES

A small, hardy terrapin

In past articles readers were asked to think carefully before buying Terrapins because of their eventual size and the appropriate housing required. However, we are not advocating



Reeve's terrapin, a more manageable species. PHOTO: BOB & VIL DAVES



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that no-one should keep Terrapins — they are a fascinating group — and a number of people keep and even breed them successfully. For anyone prepared to provide proper accommodation and care they are engaging subjects.

One moderately-small species is Reeves' Terrapin (*Chinemys reevesii*) which reaches a maximum of 20cm (8in). Although not as colourful as some species the carapace and head are dark, the head usually having a network of lighter

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markings — they are hardy species which can be cooled over winter and do well in an outside, escape-proof enclosure with a small pond (provided we have a reasonable summer). If kept indoors, an adequate-sized aquarium is necessary (90x30x30cm (36x12x12in). Regular water changes, or an efficient filtration system, are essential to prevent disease. A basking spot must also be provided. As with other Chelonians, a calcium-rich diet is necessary otherwise shell-deformity will occur.

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TECHNICALITIES for beginners

REVERSE OSMOSIS...

... or, THROUGH THE MEMBRANE

This month Peter Moon takes a look at tap water filtration with the emphasis on assisting the would-be buyer on selecting the right unit for the situation.

To kick off, let's begin with some basics:

Water is often referred to as the 'UNIVERSAL SOLVENT' which, in effect, means all sorts of minerals are present in various forms. Also, chemicals will be added from time to time by the local water authority in their purifying processes. The water that comes out of your tap, may be suitable for human consumption, but generally causes problems for the inhabitants of our aquariums. So, what are the alternatives?

Distilled water is a possibility, but some distillers may use copper or lead piping, both of which are toxic to fish and invertebrates.

You could use **spring water** purchased from supermarkets and shops, but this would work out too expensive and time-consuming in the long run.

The real solution is water made at home by way of **Reverse Osmosis**. The R/O unit utilises a membrane, under pressure, to force water to leave its pollutants on one side of the membrane and produce water, free of dissolved solids, on the other.

Okay, so you have seen advertisements in aquatic magazines and your local retailer stocks some units, but which to choose? Don't worry, help is at hand! To address your requirements, you are going to need a little education. When you have completed your homework (which is not difficult), you will then be able to face the problem confidently.

The make-up of an R/O unit

THE MEMBRANE: Two types of membrane exist!

(1) CTA (Cellulose Triacetate) Least expensive, and will remove about 90% of most pollutants and, together with an activated carbon (post-filter),

will provide all the filtration required by most people for their aquariums. Water must be chlorinated to use this membrane. Generally poorer nitrate removal.

(2) TFC (Thin Film Composite) More expensive (better for marines and more sensitive fish). Removes a higher proportion of most pollutants. Must have carbon filtration ahead of the membrane. All water (both product and waste needs to flow through carbon filter).

FILTERS: These are necessary and will be used either as pre- or post-filters (or both) depending upon type of membrane used. Activated carbon, solid block. Granular activated carbon. Micron sediment-filters (string wound) or a combination of the above on larger units. Carbon should be replaced at least every six months.

CANISTERS: Clear or coloured, made from non-toxic plastics.

ACCESSORIES: Monitors (to determine quantity/quality of output), float-valves for more adventurous set-ups etc.

Installation

You will need a suitable site to stand or mount the R/O unit.

Undereath the sink is an obvious choice. A valve will be needed to pierce the cold water pipe, to feed water into the unit; also, a drain for waste water will be required. Product water will need to be stored in a suitable non-toxic container (water-butt, or brewers bucket).

You can also mount your R/O in the garage or shed and obtain a fitting to run

water from an outside tap into the unit.

Membrane use and care

Very much in line with 'maturing' biological filters, membranes don't work at peak efficiency straight off the shelf. It takes about a week for them to hydrate fully (under proper working conditions too) — don't just lay them in water for a week.

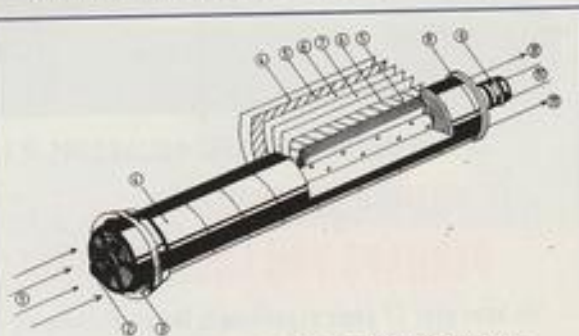
When not in use, membranes can be left in the unit (but still filled with water) for up to 30 days. For longer periods, store membranes in a zippered

bag, containing a little water, in the refrigerator (not the freezer).

Homework time!

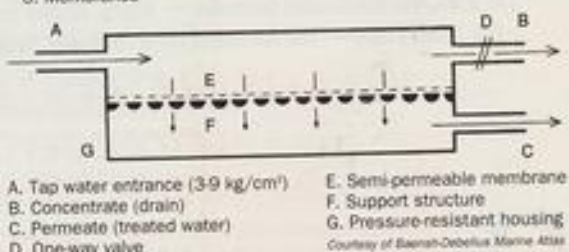
Having covered the make-up of an R/O unit and how it is operated and installed, we now need to find the right unit.

Different areas of the country have different water qualities, fairly obvious, but not quite — we also need to determine, water pressure, hardness and temperature; these factors will assist in deciding your own requirements. For instance, if you require 10 gpd (gallons per



CROSS-SECTION THROUGH A REVERSE OSMOSIS MODULE

1. Water source (tap water)
2. Seal
3. Polyethylene seal
4. Membranes
5. Channel for tap water
6. Membranes
7. Channel for treated water
8. Centering ring
9. O-ring
10. Permeate (treated water)
11. Concentrate (waste water)



- A. Tap water entrance (3.9 kg/cm²)
 - B. Concentrate (drain)
 - C. Permeate (treated water)
 - D. One-way valve
 - E. Semi-permeable membrane
 - F. Support structure
 - G. Pressure-resistant housing
- Courtesy of Baeroh-Debelius Marine Atlas

day), your TDS (total dissolved solids) is high, your water pressure and temperature are low, DON'T buy a 10gpd unit, go to the next larger size.

At this stage it is a good idea to phone your local Water Authority and ask for a WATER QUALITY REPORT for your area. I did and found the Water Authority to be most helpful - all for the price of a phone call! A word of caution, don't take the report as Gospel: use it as a guide, especially regarding pressure, this depends if the reservoir is situated LOW or HIGH and if there are any restrictors (to reduce pressure) on the pipes.

So, you are now armed with the information required to select your unit, but just to re-cap:

Decide on how many gallons you need to produce.

Select the appropriate membrane (see technical data).

Decide on your place of installation and any accessories you may need.

Choose a reputable dealer for your unit and make sure that replacement parts can be obtained.

Suffice to say, ask questions and adhere to the manufacturer's instructions.

Most units available today are upgradeable, should your circumstances change in the future (bigger tank = more water required = larger membrane).

Deionisation units

More of these are appearing combined with an R/O unit, which does the bulk of the work, with the deionisation resins (cation/anion) employed to POLISH the R/O water; these are especially good if your water suffers from high phosphates!

Regeneration of the resins

requires qualified people (strong chemicals are used). The best option is to purchase replacement resins when the originals become exhausted (as shown by a colour indicator).

Water testing (nitrite, nitrate, phosphate, GH etc) is still required when using your R/O, so use your test kits in tandem with your unit and your aquarium will benefit accordingly.

More information

A fact sheet is available by sending an sae to: Advanced Aquarium products,

10 Crundale Way, Cliftonville, Margate, Kent CT9 3YH. Tel/Fax: 01843 299785.

Until next month — Happy Fishkeeping!

Feedback:

With reference to last month's TFB — Creating Water Currents, it has been pointed out that the Eheim range of Breathing Filters (Models 2227, 2229, 2327, 2329) will, because of their particular design action, also create intermittent 'wave action' in the aquarium, and possibly with a lot less noise than individually-programmed powerheads.

Comparison between types

Type	For	Against
Reverse Osmosis — CTA	Low initial cost Minimum maintenance	Poor nitrate removal Must have chlorinated supply Wastes water
Reverse Osmosis — TFC	Excellent TDS removal Medium maintenance	More expensive Membrane damaged by Chlorine Wastes water
Deioniser	No waste water Regenerable High water purity	Higher cost per gallon High initial cost Purity varies as resin exhausts Frequent maintenance required Regeneration needs qualified persons

Illustrations and technical data courtesy of Kent Marine Inc.

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PRICES CORRECT AT TIME OF GOING TO PRESS

Sea View

BY GORDON KAY



In the perception of the average marine aquarist, the big issue is that of disease. Most of the questions I am asked, through these columns or whilst lecturing, are about spots on fins or diminishing anemones. Ask most seawater fishkeepers what they would choose, if they could have anything, and they would very probably say 'an end to fish disease.' Well, I prefer to speak of health rather than illness, prevention rather than cure. The truth is that most aquarium maladies can be avoided and, with a little effort in doing the job properly, we can all achieve a world without fish disease.

Pathogens, the organisms that cause disease, are ever-present on the coral reef yet bacterial and parasitic infections are hardly encountered in the wild. This is because, under normal conditions, the animals' immune systems either stop the pathogen entering completely or, at the very least, prevent them from reproducing large enough quantities to cause trouble. Disease only breaks out when the environment in which they live becomes bad enough to cause serious stress to its inhabitants. This stress disables the animal's immune system to an extent which allows the multiplication of pathogens which cause disease. Even though our fishes at home live in a glass box — in conditions which could never claim to be natural — their glass box is an ecosystem just the same and the same situation exists. **THE BIGGEST CAUSE OF DISEASE IN THE AQUARIUM IS STRESS.** In fact, one could argue that it is the **ONLY** cause. However, whereas people think of stress as being bullied, for instance, this is only part of the story. Poor conditions, poor diet and lack of compatibility are all stress-inducing factors. These issues can, and **MUST** be addressed if we are to succeed in our endeavours.

It should be remembered that fishes are already stressed

before you buy them but may not develop symptoms until they have been in your care for some considerable time. Given the unavoidable stresses involved in their capture and transportation, every animal you buy should be considered as a biological time-bomb waiting to go off in YOUR aquarium. When that happens, it usually has catastrophic effects because infestations can spread like wildfire in the confines of the aquarium. You will read of many ways to prevent disease from entering into the aquarium — including administering prophylactics as a matter of course to new acquisitions or using ozone or ultra-violet sterilisers — but the best way to keep disease away where it belongs (in the past) is



The nutrition of aquarium animals is as important as the environment in which they live. PHOTO: ASP LIBRARY

to eliminate stress completely. This means buying correctly, doing your homework and making sure that all of your fishes and invertebrates are compatible, introducing your purchases properly, correct feeding and, most important, proper care. This proper care means everything — from correct filtration, changing water at the right frequency, **NO OVERFEEDING** to providing the correct lighting. I shall be reminding you of these aspects during the months to come, but please take some time to

consider stress; look at your aquarium — the way in which it was set up and the way in which you run it now. Are you doing all you can to eliminate stress?

One of the most important factors in the wellbeing of any living creature is its food. We are all what we eat, and yet, there are so many of us who spend hundreds (even thousands) of pounds and hours of time when establishing our aquariums — only to dismiss food altogether. As I said, we are what we eat, and it doesn't take a Dr Kildare to work out that if we eat nothing but chips we wouldn't stay healthy for very long. In much the same way,

fish are only 'human' and if they ate (or fed in this case) nothing but brine shrimp, then they too wouldn't live for very long. As far as I'm aware, no-one has carried out any research specifically into the nutrition of aquarium animals and so there is only one way to

ensure our charges get all of the nutrients they need — that is to feed a diet which is as varied as possible. In the wild many fishes browse and pick at food items all day long; furthermore, there are also many of them which possess only rudimentary stomachs which cannot handle vast amounts of food. In addition, fishes' physiology is such that they simply have to excrete large amounts of salts, in order to stay alive. This action requires an enormous amount of energy so the animals display a correspondingly large appetites. For these reasons, most fishes fare much better when fed little and often.

In an ideal world we would be able to feed our fishes every couple of hours; however, most of us have to earn a living so they have to make do with twice or three times a day. This is fine so long as they are getting some variety. In the mayhem that is early morning in most households, we don't have a lot of time for our aquariums so it is best to feed them flake food in the morning and a feed of frozen food when you get back home. The flake should give them most of the vitamins and minerals they need but the frozen stuff should still be varied as much as possible. Whatever you do, always match the food to the size and species of the animal. For instance, it would be ridiculous to feed Lionfishes with brine shrimp and half a cod to a Butterflyfish! Also, make sure that the food types match the animal's natural diet, at least, in the main. Furthermore, if you keep Tangs and your aquarium lacks a lush growth of algae, then remember to supplement their diet with lettuce or similar. Oh, one more thing — **NEVER EVER OVERFEED.**

Finally, I've just read a sickening story in the newspaper about a year-old Atlantic Grey Seal which was found near a weir at Haverfordwest, littered with algae pellets. It had been washed up by the tide. So far, police have failed to apprehend the culprits. What is this world coming to? For once, words fail me. Meanwhile, I'll be with you next month.

You Write

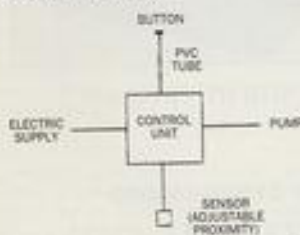
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BIOPLAST LETTER OF THE MONTH

Dear Sir,

I started my pond just short of a year ago, with little or no interest in aquatics. The pond was not purpose-built as such, it was just the answer to a soil and stone problem — after walling an area, the soil and stone filled in the void and gave me an idea for a raised pond and rockery.

Problem after problem meant I had to read up on various things which created both an interest and a craving for more information. The realisation and clarification of many aspects led me to believe I'd done it all wrong, and to spend any money would be stupid; rather than trying to save a sinking ship — I let it sink and now I'm starting again (on paper at the moment).



The unit is in a splash-proof box and can be mounted almost anywhere, as it switches on and off using air-pressure in PVC tubing (just like airline tubing); this means there is no chance of electric shock when carrying out maintenance. The

In my hunt for information, I found A&P and on reading through it found the article on a pond-owner's nightmare and feel I might have an answer. Now this time I want to get my pond right, so I've started to get certain items together, one being a control but it which will not allow the pump to operate when the water level is below a certain, adjustable, level.

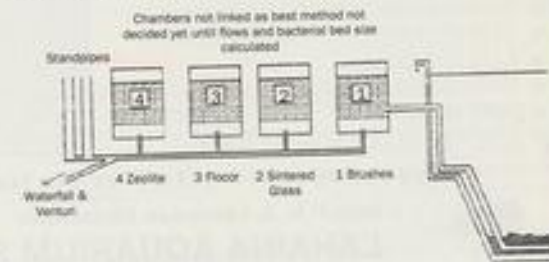
The unit is in a splash-proof box and can be mounted almost anywhere, as it switches on and off using air-pressure in PVC tubing (just like airline tubing); this means there is no chance of electric shock when carrying out maintenance. The

unit is made specifically for spa-baths (mass-produced) so I'm sure if you contact the appropriate manufacturers they may help (I came aware of this device because I am involved in bath production).

I hope this information will be of great use to many pond enthusiasts. As you can see, its simplistic design allows quick and easy installation.

As regards my own pond design, I've opted for a liner-style pond one with a 25 year guarantee. At its deepest point it will be 1.8 metres with a capacity of 63 metres approximately, excluding gravity fed filters.

The filters will be four separate units each containing a different medium. I am still toying with ideas (parallel or series?) as I need quite a high output for a small waterfall and a home-made venturi. One of my ideas, through research, has led me to believe that drawing water from



the bottom is best, so I began to wonder would it be viable to draw water through tubes beneath the gravel to the gravity fed filters? If readers have any thoughts (or criticisms) of this idea I would like to hear from them.

D. Martin, Halifax.

Mr Martin's letter gives plenty of things to think on but his idea of a simple level-switch wins him this month's parcel of BioPlast products (worth £30.00) which will soon be reaching him from our sponsors BioPlast (tel: 01535 630230).

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Dear Sir,

In responding to Brian Middleton's article — 'Taking the Strain out of Discus Keeping' (January A&P) — I would say that the situation he addresses is worse, if anything, here in the USA and not just confined to live fish either.

One can do something ... demonstrates the truth, without addressing the lie. It is stressful and accomplishes, in my opinion, the same end. Using Brian's example (and I have considered doing this exact same thing), take the real Blue Diamond Discus, describing its beginnings and characteristics. Cite advertisements in current Japanese magazines where adults sell for 10,000 US dollars each, then refer to my pricing of 750 dollars for a youngster.

By the time one is done, anyone equating the 20 dollar counterfeit with the real one is a fool ... and those that bought them will know it themselves. They deserve what they will get. Would the same person believe a new Rolls Royce could be had for such a fraction of the going price? I have a belief that the people I care that know the truth would know it from my advertising; perhaps I am wrong — if so, then these counterfeit

fish will become obvious when delivered — and certainly when grown out! Will they not?

That this all damages the hobby and trade, I heartily agree. As long as pettiness and jealousy are part of human nature I don't know what can be done beyond supplying good products to customers, and conducting ourselves in a professional manner. We can only educate those that care to listen, whereas those that are jealous will go to the ends of the earth to disprove us!

I occasionally get A&P and have seen Brian's good work which should help to achieve the ideal goal. I am happy to help — I might even do an article when I have time (we're relocating at the moment) — all good ammunition but I can no longer lead the regiment!

Marc Weiss,
World Wide Fish Farm, USA.

Dear Sir,

I am writing on behalf of Bishop Auckland and Wear Valley Aquarist Society to thank you for advertising our Second Charity Auction in your magazine. I am happy to tell you that we raised £2,521 for the BBC Children in Need Appeal.

John D. Hitch,
B.A. & W.V.A.S

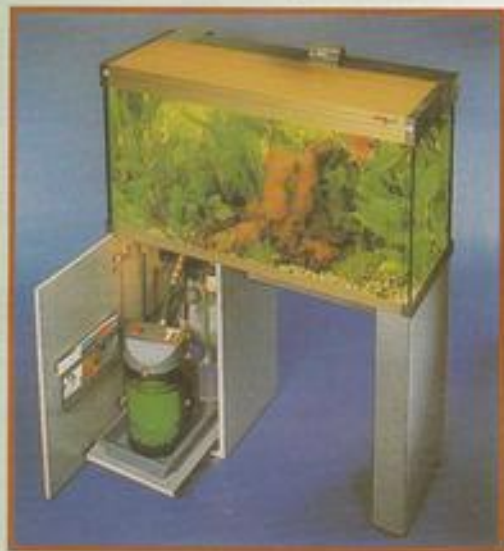
It Seems To Me ...

As I travel around the country (some 45,000 miles each year) I am appalled at some of the aquaria I see for sale in retailers.

The problems are manifold and obvious to practising fishkeepers but, regrettably, for those new to our hobby pitfalls abound in plenty. Having chatted to Dick Mills, **A&P's** new editor, it was suggested to me that a few pointers on what to look for, when purchasing, might be useful.

Aquariums

Look for a well-finished aquarium with polished



edges to the glass. Carefully rub your hands along all exposed edges, bottom corners and the strengthening bars inside (often forgotten). If sharp, or rough to the feel, I would discard. Check whether the aquarium is all-glass or framed (fully, or top and bottom). Framed aquaria offer some distinct advantages in that they do not require ugly polystyrene foam on the bottom and the joints only seal, not hold the whole thing together.

Andrew Werendel, of John Allan Aquariums, gives a monthly view on product selection criteria

Sealant manufacturers recommend that a gap, half the thickness of the glass, should be left between glass panels. Most aquaria simply butt together, with no evidence of this gap. The advantage of the joint gap is that there is flexibility, or movement, allowed in the aquarium and so there is

combination of the two. These materials are long-lasting and are very easy to clean. Avoid steel — even when plastic-coated steel rusts — and wooden hoods are prone to warping, expanding and veneers will lift.

A lot of aquaria have built-in wooden hoods and, to try to stop the problems associated as mentioned, massive areas of glass (with moving cover-glasses) are incorporated. I have seen aquaria 6ft in length with only about 18in of accessible (i.e. usable) space in the middle; this becomes a nightmare not only for regular cleaning and servicing but also just simply installing filter pipework at the outset. Think about it and you will see what I mean.

There is another big disadvantage — about 25% of light is lost through these condensation covers. Look for

a hood which is white underneath — that way you do not need fiddly light-enhancers. Look for lights which are built-in, water-proof and slide so that you can maintain the aquarium with light on to allow you to see what you are doing. I only know of three manufacturers which have this facility, one British — John Allan; and two German — Muller and Pflieger, and Juwel.

Cabinet and Stand

Make sure the manufacturer has allowed a large enough space for all pipework associated with external filters, and enough height to accommodate the equipment. I am sure you are now thinking that this is always the case but, believe me, it isn't so please check to avoid disappointment and frustration.

To conclude, anyone can set themselves up as manufacturers but I wonder how many have ever kept fish, or have a love for this hobby of ours? From the evidence out there, I regret to say, precious few.



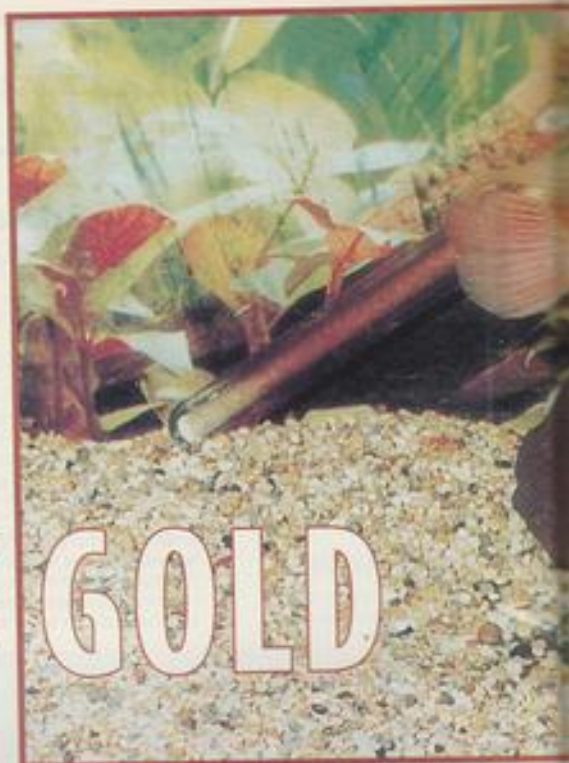
less likelihood of leaks or stress-induced cracking.

Finally, look for an open top — more of this later.

Hoods

Look for a hood that is designed to allow condensation to run back into the aquarium — an obvious point, but I bet that at least half of the hoods out on the market place are not designed this way. Make sure the hoods are aluminium, plastic-based or a

DEVILS WITH A TOUCH OF GOLD



Pair of *C. labiatum* close to their rock caves.

PHOTO: MARTIN CHANDLER

PART TWO

Maintenance

The Red Devil, *Cichlasoma labiatum*, and the Lemon Devil (or Midas Cichlid), *C. citrinellum*, both live up to their common names when it comes to colour.

Both can be found in the following colour morphs — grey, red, orange, yellow, pink and blotched varieties. In captivity larger specimens may lose a lot of colour, possibly because the need for bright colours in an aquarium is not as important as it is for the fish in the wild who uses colour to advertise its presence.

Reds and oranges are used by a wide variety of animals as a warning; in the case of the Devils, these colours also serve as a warning — as ounce for ounce there is possibly no more an aggressive, or powerful cichlid. In the great lakes of Nicaragua they often swim out on their own in open water such is their confidence. *C. citrinellum* are also found in large shoals in open water and it is very unlikely that any solitary fish would stand in the way of an advancing shoal of these fish!

MARTIN CHANDLER CONTINUES TO KEEP COMPANY WITH THE DEVILS AND LOOKS AT THEIR MAINTENANCE NEEDS.

Both species breed amongst rocks in the depths, another good reason for having bright colour forms: in the shallower waters the grey forms are more abundant, outnumbering their colourful counterparts, but the grey forms are only imported infrequently — hardly a commercial attraction against the coloured forms in the hobby.

KEEPING DEVILS

Bearing in mind the natural aggressive tendencies of both species, Devils are only recommended for the most dedicated cichlid keeper. Once over 7in

in length, it's a case of only one male in its own tank! Most cichlid keepers have had more success keeping *C. labiatum* in communities than *C. citrinellum*, but the aquariums used have been large — 150x50x50cm (60x20x20in) or even larger. Companions MUST be of equal size, similar temperament and not a species that morphs such as *C. fenestratum* or *Petenia splendida*.

The following species have all been kept with *C. labiatum* up to 8in in length: *C. signatum*, *C. intermedium*, *C. managuensis*, *C. festae*, *C. carpius* and wild Oscars. In the case of the Oscars the wild ones were extremely resilient, very unlike the more common tank-breds, who should not be kept with either species under any circumstances, as they will suffer, possibly fatally. Quite often you will come across a real rogue who, from an early age, will just not mix with any other fish at all, although such rogues make excellent pets when kept on their own, however, they do not become tame (like Oscars) and would soon bite your hand if you tried to stroke them!



Caution must be exercised at all times when putting your hand in a Devil's tank. A large net should be used to trap the fish whilst any in-tank maintenance is carried out. In the case of a single fish aquarium a 90x38x30cm tank (36x15x12in) is perfectly adequate and I have grown *C. quinellum* to over 12in in such a tank.

FILTRATION

Most of the widely-available forms of filtration may be used with both species, but some have their drawbacks.

The least suitable filter would be an air-driven box- or sponge-filter; these could not possibly cope biologically with the large quantities of waste produced

and the fish would probably demolish them anyway!

Standard air-, or powerhead-, driven undergravel filters are both useable but their effectiveness may be reduced by the fishes' non-stop digging — on top of this, bare undergravel plates do not look very attractive if the aquarium is for decorative purposes. However, for the more functional fish-house this is an ideal filtration system and one that I use (powerhead driven with venturi and/or airstones) to good effect. I do not restrict digging (by using Gravel Tidy) and have found that, despite vast areas of exposed plates, the fish flourish and rear young with no problem thus dispelling the myth that exposed filter plates render the filter useless. I have used Gravel Tidies with both species but I generally find that their use causes more problems than providing actual benefits, firstly, within hours the Tidy will be exposed, the fish getting very frustrated as they try to pull it up. If a corner does get exposed then large fish are very likely to pull out the Tidy altogether. With large 'dirty' fish, the gravel under a Tidy soon becomes clogged with the copious waste, demanding regular strip downs — a tedious task.

With large, 'dirty' fish the gravel under a Tidy soon becomes clogged with the copious waste, demanding regular strip downs — a tedious task.

Large internal power filters can be used but these filters usually contain sponge media which will quickly clog, need cleaning twice a week and, as they age, smell! Another drawback comes when the sponge disintegrates as it is



An attractive male *C. latiatum*
PHOTO: PHILIP ROBINSON

BUY LINES

Barry James'

round-up of latest innovations for your pond and aquarium

Red Sea Fish pHarm filter

CORAL REEF TECHNOLOGY has announced that RED SEA FISH PHARM have now launched their long-awaited MERLIN fluidized bed, biological canister filter. Compared with a conventional trickle filter it is claimed that this filter has over 20 times the filtering capacity for the same volume and works 35% faster which gives an incredible five times the volume of filter media, and so more efficient conversion of ammonia to nitrate. The canister is 1.7m in height and is very compact with a small



adjustment of the regulator; water flows down the inlet tube and passes to the fluidization chamber through the opening

'footprint'. Water is supplied by a 150gph 5ft head pump (not supplied with the unit) placed in the aquarium or sump. The inlet connector above the regulator is free to rotate 360 degrees so as not to interfere with the

PRO Series complete

ROLF C. HAGEN (UK) LTD has announced the introduction of the MINI-PRO POWERHEAD which, added to the PRO 2, 3 and 4 models, completes the range. Light, compact and powerful, the Mini-Pro has been designed especially for the 10 gallon (US) aquarium. All the range have an integrated flow control which controls both the venturi air inlet as well as the water flow. The floating impeller, with ceramic shaft, provides perfect alignment resulting in quiet operation and extended life. The pumps are fitted to the airlift with a unique rotating bracket; once installed, and attached to the wall of the aquarium, PROs can be removed for maintenance without disturbing the riser stem.

The range comprises:

Model	Recommended Aquarium Size (US gallons)
Mini-Pro	10
PRO 2	20
PRO 3	30
PRO 4	50 upwards

Details from: ROLF C. HAGEN (UK) LTD., California Drive, Whitwood Industrial Estate, Castleford, West Yorkshire WF10 5QH. (Tel: 01977 556622. Fax: 01977 513465).



New carbon packs

Using Activated Carbon in filters is standard practice in the aquarium world. When various sources of carbon are blended together they remove dyes, metals, tannins, chlorine and odours. They will also clear discoloured water. Activated carbon has a massive surface area of over 1,000m² per gram, providing very high activity levels. Bulk users of INTERPET AQUACARBON will no doubt be pleased to see the introduction of two new pack sizes, containing 400 and 800 grams, to supplement the existing 100gram pack. The Company has also re-packed their fluorescent tubes, BLUE MOON, TRITON and BEAUTY LIGHT in new, eye-catching, colourful sleeves.

Details from: INTERPET LTD., Vincent Lane, Dorking, Surrey, RH4 3YX. (Tel: 01306 881033. Fax: 01306 885009).



between the flow nozzle and deflection plate. The media is in constant motion and, since every bacteria-coated particle presents the maximum area combined with abundant oxygen, digestion of detritus occurs at a much more efficient level. Water flows up through the fluidization chamber and is returned to the aquarium, or sump, via the outlet in the lid assembly.

Details from: CORAL REEF TECHNOLOGY LTD., 62 High Road, Byfleet, Surrey KT14 7QL. (Tel: 01932 355121. Fax: 01932 349718).

Freshwater nitrate denitrifying culture

ADVANCED AQUARIUM PRODUCTS has announced the availability of an ANAEROBIC BACTERIAL CULTURE for the natural removal of nitrate from freshwater aquariums (a similar marine bacterial strain was released last year). It is being marketed as a liquid culture with an unknown shelf life. Until this shelf life has been ascertained, the product will be distributed directly from the Company's microbiological laboratory. Because this technique is in its infancy the Company plans to enclose a questionnaire to aid

evaluation of the product.

The Company has also released details of the new FLUIDIZED BED BIOFILTER known as the QUIKSAND which they are importing direct from the manufacturers, Bio-Con Labs in the USA and supplying to retailers. Housed in a tube 18x12in diameter, the unit hangs outside the tank. Model QSA1 has media giving over 65 sq. feet of surface area, enough for a theoretical 20lbs of fish in a 135 gallon aquarium! Various aquarium sizes of unit are available and there are also three models (5,000 gallon usage upwards) aimed at Koi pond applications.

Should you have difficulty in obtaining any of the above products please contact: ADVANCED AQUARIUM PRODUCTS, 10 Crundale Way, Cliftonville, Margate, Kent CT9 3YH. (Tel/Fax: 01843 299785).

More submersible pool pumps

STUART-TURNER has added a new model to its high head range of submersible pumps. The four-stage, centrifugal pump (called the DIVER 4) joins the Diver 2 and Diver 3 models of the two- and three-stage centrifugal construction respectively.

The Diver 4 produces heads up to 46 metres and flows up to 95 litres per hour. This makes it ideal for situations requiring high pressure, such as pumping water from a well. The submersible pumps are supplied with a built-in strainer and optional float switch. The pumps are also available with a Boostermatic option to supply water at an increased pressure.

BUY LINES

where mains pressure is inadequate or unavailable.

Details from: STUART TURNER LTD., 47 Market Place, Henley-on-Thames, Oxon. (Tel: 01491 572655).

Micro-processor-based portable calorimeter

I suspect that many of our readers reading the above will not have a clue what the thing is, let alone how it can help them with running their aquaria or pools. It is incredible how advanced technology is beginning to impinge on what was once the simple hobby of tropical and coldwater fishkeeping.

Having said that, there are many aquarists who have diverse interests ranging throughout the natural and technological worlds with the inclination (and the money!) to combine the two. In addition, there are those in the worlds of fish-farming and water resources management who would find the above device quite invaluable. So what is it?

Basically, it is an analytical device for testing water (say for pH, DH etc) but it will carry out over 90 different tests. Supplied with the machine (ORBECO-HELLIGES 975MP PORTABLE CALORIMETER — THE ANALYST) is a comprehensive 120-page Manual, four batteries, four of each glass, and plastic, Sample Tubes, and a Carrying Case to hold up to 14 Tablet-reagent Test Kit Boxes. The machine is pre-calibrated and, according to the manufacturer's instructions, there are easy-to-follow, step-by-step procedures prompted by a large LCD display. (I seem to remember reading something similar when

I bought my first computer some years ago — and I'm still trying to understand the darn thing!)

However, for the technically minded, the following description may be useful:

General purpose photometer modes serves for other calorimetric analytical applications.

Seven internally-mounted wavelength filters (420640) serve all tests — extra modules not required.

Pre-measured, non-hazardous reagent tablets are used for most tests.

Uniform 28mm Sample tubes supplied provide high-sensitivity and reproducibility.

Zero and standardization are automatically set by the micro-processor.

Test results can be read directly in mg/litre, %T and absorbance.

RS-232 output is supplied for downloading test data to an optional portable printer.

Optional model stores data for downloading at a later date to printer or computer, and has memory capacity to store 10 user-generated test calibrations. So there!!!

Further information from: Henry Reed Jr., Director of Marketing, ORBECO ANALYTICAL SYSTEMS INC., Orbeco-Hellige, 185 Marine Street, Farmingdale New York 11735 U.S.A. (Tel: (516) 293-4110. Fax: (516) 293-8258).

Air today — and the next, and the next...

The whole success of pond life depends on air and the supply of oxygen it brings, not just for the fish to 'breathe', but for the rapid decomposition of wastes too. Beneficial bacteria in biological filtration systems can't do without

Lotus Diamond Filterpumps

The biggest problem with biological filters is the vast amount of space needed for conventional plastic filter media. SIPORAX POND, is a sintered glass medium, manufactured in 25mm (1in) rings. One litre of Siporax has 200 times the habitable area of a material such as Floror and 10 times the surface area of activated carbon. Bacteria can colonise both outer and inner surfaces of the rings in vast numbers.

LOTUS have taken advantage of the space-saving, but highly efficient, properties of Siporax Pond in the design of their new DIAMOND FILTERPUMPS. A filter module is mounted on the inlet of the pump; here, mechanical filtering occurs in the pre-filter sponge before the water passes through layers of Siporax Pond before being returned to the pond.

Although pump-mounted filters are commonplace, the ease with which the pre-filter can be cleaned must be a major advantage. It will obviously appeal to pondkeepers who dislike unsightly pipework and large tanks needed for external filters.

There are three Diamond Filterpumps: Diamond 140 and 400 give maximum pump performances of 475 and 660 gph respectively and are suitable for a 500 gallon pond, whilst the Diamond 750 (maximum flow 975 gph) will cleanse a 1,000 gallon pond.

Further details from: LOTUS WATER GARDEN PRODUCTS LTD., P.O. Box 36, Junction Street, Burnley, Lancashire BB12 0NA. (Tel: 01282 420771. Fax: 01282 412719).



oxygen either, and nor can plants (day or night).

The AIRMASTER is a unique aerator which puts millions of microscopic bubbles into any waterflow — before, or after, the filter, or fitted simply to the output of your submersible pump. Designed to be positioned near the surface of the pond (for easy access and adjustment), the Airmaster's outlet can be extended down into the pond to a maximum depth of three feet, depending upon the pump's flow rate.

Incidentally, pump flow rates of between 700 and 3,000 gph suit the device ideally. It also places less strain on your pump than a standard venturi system, as its restriction force is less than half; this means your pump will not have to work so hard and an increased waterflow rate through your filter and your pond is achieved using the same pump — and for the same running costs.

In addition to being easily adjustable (very convenient for adding aeration on thundery days), the unit is also very easily dismantled for cleaning and won't disturb your neighbours with its operational noise.

Full details from: AIRMASTER, 141 Hampton Road, Chingford, London E4 8NS. Tel: 0181 559 3989.

Extra pet protection

The subject of insurance for pets is a particularly tricky one and one can well appreciate it is a path down which many underwriters fear to tread. However, EXOTIC DIRECT is a new venture daring to do just that.

Effectuated through STIRLING COOKE, the insurance policy can be tailored to your specific requirements and even includes public liability coverage should one of your more exotic and dangerous charges turn nasty ('Octopus grabs passer-by', 'Catfish mauls dog on pondside', 'Shark bites hand that feeds it'). Losses from theft, fire and allied perils, services of vets can all be included and, together with expert 'hands on' knowledge of the animal welfare concerned, your policy will be 'well written' and exactly what you are looking for.

Details from: STIRLING COOKE INTERNATIONAL INSURANCE BROKERS, 65 Leadenhall Street, London EC3A 2AD. Tel: 0171 702 2062. Fax: 0171 454 0327.

THE BRITISH CICHLID ASSOCIATION

Formed in the late 1960s or early 1970s, by a group of like-minded cichlid enthusiasts, the British Cichlid Association (BCA) is still going strong today. Due to the uncertainty of the actual formation date, we celebrate our anniversaries on the date of our first Newsletter in 1971. The 'Cichlid Clarion' was a modest typewritten, photocopied affair but now our publications have evolved and improved beyond recognition: a general bi-monthly Newsletter, along with two black and white Information Pamphlets,

on specific species or cichlid-related topics (disease prevention, feeding, maintaining water quality etc); there is also a quarterly technical journal, 'Cichlidae' covering more scientific aspects of the hobby. From January 1996, to help celebrate our Silver Jubilee, we will be producing our Information pamphlets in colour; this major improvement will help keep the BCA in the forefront of the British hobby.

Membership is once again on the increase after remaining fairly constant in recent years. Currently over 600 cichlid keepers, from general hobbyists through to confirmed cichlidiots, recognise the value of belonging to an Association such as ours. The BCA offers various services to members including favourable rates on cichlid books

KAREN HORROCKS,
BCA PUBLICITY OFFICER

Club Profile

(available via mail order) some of which are not readily available in the U.K.; we also offer videos for hire or purchase. Through our Species Controller, there is a 'search' facility by which members can contact others in the group keeping similar species; this service is regularly used by members to obtain unusual stock for breeding purposes. Our 'Trading Post' regularly carries advertisements of species for sale, or wanted, many of which cannot be found in normal retail outlets.

Our Technical Editor offers advice on all manner of problems from setting up that first cichlid tank, right through identification, behaviour, feeding, maintenance and breeding.

As with any hobby group, the BCA relies on its members for support and input for its publications. Our members tend to fall into two groups — those who would find life without cichlids almost unbearable and general fishkeepers with perhaps only a couple of species within a community collection. We endeavour to cater for both these 'extremes' via our publications which cover aspects of the hobby from the regular 'Beginners Guide to ...' species which may be frequently available but are slightly more challenging to more sophisticated information contained in 'Cichlidae'.

In March 1996, we will be celebrating our Silver Jubilee with a major event (see panel below). Even if you are not a member do come along and enjoy the day, we are sure you will feel it well worth the effort. If you would like more information about the BCA please send a

stamped, self-addressed envelope to: **BCA, Dept APA, 70 Morton Street, Middleton, Manchester M24 8AY.**

If you would like a Sample Pack of publications please also include a cheque/postal order for £3 (payable to British Cichlid Association).

BCA JUBILEE CONVENTION

Sunday 10th March 1996

Silkcoates School, Silkcoates Lane, Wrenthorpe, Wakefield, West Yorkshire

Renowned Cichlid Author **AD KONINGS**

'Cichlids of Lake Tanganyika'

FRANK WARZELL

'Pike Cichlids'

Grand Auction of 300 pre-booked Lots.

To pre-book Auction Lots and for further details of the event (generously sponsored by *Animal House*), please contact: **Alan Hill, tel: 0161 797 2311**

Pond Diary

FEBRUARY 1996

Sun	4	11	18	25
Mon	5	12	19	26
Tue	6	13	20	27
Wed	7	14	21	28
Thu	1	8	15	22
Fri	2	9	16	23
Sat	3	10	17	24

Pond-watching is a favourite pastime but, to make sure nothing is left to chance, we've put **Susan Stephenson** on monthly reconnaissance duties. Here, she braves the winter elements to check things out

February is often the quietest month for the pondkeeper — outside at least! Severe drops in temperature and ice can be major problems to life in the pond so continue protecting the surface from total freezing (see Pond Diary, **A&P** January for methods).

When there is a light drying frost it may be possible to remove weeds from the bog garden bit if the ground remains frozen hard then this task is best left until later.

Primulas which germinate better after frost should be sown now. Fill seed boxes to within an inch from the top with seed compost; firm down, taking care to push the corners

down and level off with a piece of board. Sow a thin layer of seeds and cover with lightly-sifted compost. Using a can, with a fine rose fitted, water carefully and then stand the boxes on a level site in light shade and allow them to freeze. You can, alternatively, put sown boxes inside polythene bags with the ends sealed until germination has taken place.

Any early growth of marginals, such as Water Mint (*Mentha aquatica*), should be trimmed back to avoid further frost damage; watch for early shooting of *Gunnera manicata*, and other plants under leaf covers during warmer spells,



The sowing of primulas can be carried out at this time of the year.

PHOTO: A&P LIBRARY

and re-cover any exposed shoots to avoid frost damage.

With little to actually do outside this month, now is the time to sit indoors in comfort and create planting schemes for the pond and surrounds, and to order seeds or plants from catalogues. When planning, thought should be given to colours, size, time of flowering and moisture requirements of the plants. Year-round interest can be maintained by careful planning now. Advice can usually be found in the garden catalogues and most garden centres have staff trained in aquatics who will be happy to advise.

If a pump is left in the pond in winter, run it for a few minutes each week or so to reduce silt build-up and keep the machine parts freely moving. Keep pumps off the bottom to avoid disturbing overwintering animals and plant buds, but still deep enough to ensure they do not become frozen in ice. Pond lights should have been removed for the winter and the glasses cleaned of algae; check wiring for any problems which need to be corrected and ensure they are stored in a dry place.

Continue to keep an eye on the state of the pond and note any repairs to be done as soon as the weather improves. Give fish a little food if they show signs of activity in warmer spells. Continue to top up water levels if required and remove any debris that falls into the water.

The weather is still

unpredictable during February and often severe frosts are still to come so do not be tempted to remove covers or plant out seedlings during seemingly warm periods. This can be fatal for the plants and lead to expensive regrets.

Useful February Tips

- From time to time, check the condition of any cuttings, or buds, taken indoors over winter. It is easy to forget them, only to find they have deteriorated over the winter.
- Never break ice with heavy blows as this will cause shock waves, which may well kill the fish.
- Leave pond cover nets in place. Even though coentamination by debris is reduced, birds such as herons are more likely to attack at a time when fish are sluggish and have little plant cover.
- Sweep some snow off the ice to allow light to penetrate and keep oxygenating plants alive, but leave some snow on to act as an insulating layer.
- When severe frosts are forecast, drain and rinse biological filters unless you keep valuable fish which benefit from the running water. Store the filters dry during severe weather.

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An A B C of

SHORE WATCH

BY ANDY HORTON

Rockpooling

PHOTOGRAPHS BY
THE AUTHOR

February is the first month that it is worthwhile to go down to a rocky shore and explore the rather sparse and barren habitat at this time of the year, and search for the first rock pool fish and invertebrate animals that have ventured in from the deeper warmer sea.

Aquarists may reckon that some of the scientific terms are not relevant to their hobby.

The simple answer to this is if you know what goes on in the sea, it helps to understand what the changes that occur in the marine aquarium. In this series I will introduce some of the commoner animals found by rockpoolers and divers, and briefly explain some of the terms in common use by rockpoolers and marine biologists.

C

CALCAREOUS pertains to calcium. It describes parts of a marine animal that is rich in calcium or limestone, e.g. the exoskeleton of crabs.

The **CARAPACE** is the hard covering protecting most of a crustacean's body. This is commonly called the shell in crabs.

The **CARBON CYCLE** involves the conversion of carbon dioxide to organisms through photosynthesis and return to

the atmosphere through respiration and decay.

CARTILAGE is a gristle-like substance used in lieu of bone. Cartilaginous fish include the jawless fish and sharks. They evolved at earlier date in history than the bony fishes.

The **CEPHALOPODA** are a class of mobile marine molluscs that include the squids, cuttlefish and octopuses. Cephalopods prey on other animals.

The **CETACEA** are the order of marine mammals that includes the whales, dolphins and porpoises.

They are divided into two suborders called the Mysticeti, or baleen whales, which sieve zooplankton and fish from the sea through baleen plates, and the Odontoceti, or toothed whales, which actively chase after fish and other prey. The second group includes the dolphins.

CHART DATUM is now regarded as the point of the lowest astronomical tide. This

is important to rockpoolers as the farthest point that the tide will recede and as the reference point for the depth of the sea measurements, and the height of the tide as shown on the Tide Tables.

A **CHITON** is a mollusc that resembles a woodlice without legs found on the underside of rocks on the shore. It comprises the class called Polyplacophora. They are sometimes called **Coat-of-Mail** shells.

CHLOROPHYLL is the green pigment in plants and algae. It is important in photosynthesis.

The **CHONDRICHTHYES** are vertebrates with true jaws and a cartilaginous skeleton. This class of 'fish' includes the sharks, skates and rays.

CHROMATOPHORES are cells in the skin of marine animals including cephalopods and fish that are responsible for varying colours.

CILIA are very fine 'hairs' projecting from an animal's body. Compound cilia are called cilli.

The **CIRRIPEDIA** are a class of Crustacea commonly known as acorn barnacles. The final

stage of the barnacle larva before it settles on its sessile existence is called the cypris.

The **CNIDARIA** are a phylum of invertebrates with stinging cells called cnida, of which the nematocysts are the most familiar type. Cnidarians include the sea anemones found on the shore and in the sea, as well as jellyfish, hydroids, and corals.

COCKLES are common bivalve molluscs found in sand in estuaries and shallow seas.

COELENTERATES (pronounced see-lenter-ates) is a name given to the two phyla of Cnidaria and Ctenophora. It is used in the older books.

COMB-JELLIES (Ctenophora) are predatory marine animals that look superficially like small transparent jellyfish but lack the sting. A species called the Sea Gooseberry inhabits the sea around Britain.

COMMENSAL means living together.

CONCHOLOGY is the study of mollusc shells.

CONSERVATION is the management of natural resources.

CONVERGENT EVOLUTION is the independent evolution of two similar forms or functions in unrelated species, e.g. flatfish (bony fish) and rays (sharks or Chondrichthyes) that both have evolved a flattened



Chitons need to be searched for on the underside of rocks. Do not forget to follow the Coastal Code and return all rocks in the same position and the same way up in which they are found.



The Hairy Porcelain Crab, *Porcellana platycheles*, has cilia all over its body including a fringe along its claws. It is not a true crab but an anomuran and only has eight visible legs.

body to live on the sea floor.

COPEPODS are a class (the Copepoda) of minute planktonic crustaceans, an important part of the food chain in the sea, providing food for young and adult fish.

CORALS are closely related to sea anemones. The coral reefs of shallow tropical seas are made up of calcareous secretions by coral polyps. True corals are classified in the order Madreporaria. Many unrelated invertebrates have acquired the title 'coral' which can be misleading.

The **COTTIDAE** are a group of predatory rock pool and shallow water fish called the bullheads, sculpins or cottids.

CRABS are the layman's name for the crusty invertebrates that are classified in an infraorder of Crustacea known as the Brachyura, or true crabs. Everyone knows what a crab looks like: a squat skulking creature with an armoured body and two formidable claws, that moves sideways. Actually, true crabs come in a variety of different shapes and sizes on the basic design, including the spider crabs with long legs and a small carapace. The name crab has also been given to some of the closely related crustaceans in the infraorder called the Anomura. These include the hermit crabs and porcelain crabs. If you want to be pedantic, you can say these are not true crabs, but the term 'crab' is not scientific terminology.

The **CRINOIDEA**, or crinoids, are known as Sea-lilies, a class of the phylum Echinodermata which includes the starfish. They are feather-like, branching from a cup that rests on the sea floor. The Rosy Feather-star cannot survive on the shore, but is sometimes washed up between the tides.

The **CRUSTACEA** are a

subphylum of arthropod invertebrates that differ from the insects because they have two pairs of antennae. Most species and numbers are found in the sea, and they vary in size from minute plankton to shrimp-like animals, prawns, crabs and lobsters. They all have an external calcareous skeleton that restricts their growth. Crustaceans can grow larger than insects because of the buoyancy of seawater.

d

DECAPODA CEPHALOPODA are the order of cuttlefishes and squids with ten tentacles.

DECAPODA CRUSTACEA are the order of large stalked-eyed crustaceans that have ten legs including the claws. The ten legs are clearly seen in the crabs, but not so clear in the prawns, lobsters, hermit crabs etc.

DEMERSAL pertains to the sea bottom, describing fish and other animals that live on the bottom but have a capacity for free swimming.

DEPOSIT FEEDERS are organisms feeding on particles of organic matter, suspended in water and brought by tides or currents, or contained in the substrate.

DESICCATION is the removal of water. This is an important 'rockpooling' term because the ability to



The Devonshire Cup Coral is found in the seas off the south-west of Britain, it is a true coral that secretes a calcareous cup, but does not form the reefs like tropical species.

resist desiccation is an important factor in the ability of the animals and plants of a rocky shore to remain alive in the quiescent period when the tide goes out.

DETRITUS is inorganic remains in various states of bacterial decay, as well as fragments of inorganic material eroded from rocks. The detritus, or dirt, in the aquarium will already have undergone bacterial action and will have no food value.

DIATOMS are the most abundant of the microscopic plant life of the plankton in British seas. They are characterised by their cases of silica. The next important group in the phytoplankton are the Dinoflagellates.

DOC stands for Dissolved

Organic Carbon, which is a waste product that is not removed from the aquarium by filtration. It is mostly responsible for yellow colouring of aquarium water over a period of time.

The **DOGWHELK** is a marine snail that preys on barnacles and mussels. It is very common on unpolluted rocky shores around Britain where its prey occurs.

DOLPHINS are streamlined aquatic mammals feeding mostly on fish at which they superbly adapted to catch. They use 'sonar' echo-location to find the shoals and then locate the individual fish by sight.

The marine species are classified in the family called the **DELPHINIDAE**.



The Dogfish, *Scyliorhinus canicula*, is a small shark, with a cartilaginous skeleton.

COASTAL CODE FOR ROCKY SHORES

Like any natural habitat, the presence of man disturbs the coastal environment. Wildlife needs undisturbed conditions in order to survive. Over-exploitation can destroy the fauna permanently. Therefore:

1. Cause as little disturbance as possible. Always return rocks to the exact position and the same way up as they were found.
2. Collection of live animals, fish etc., should be kept to a minimum.

WARNING

The coast can be a dangerous place. Seaweeds are slippery. It is easy to have an accident when crossing difficult terrain.

BEWARE OF THE INCOMING TIDE!

SOCIETY WORLD

SOCIETY MEMBERS!

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K.A.A.S. Convention

The 1996 K.A.A.S.

Convention will be held on Saturday 16th March at the Beulah Court Hotel, Athelstan Road, Margate, Kent. The Speaker will be Wilhelm Heinz. There will be an Auction and the Final Round of the Inter-Society Quiz. Tickets, price £10.00, are available by contacting Dave Goodwin. (Tel: 01304 381721). Overnight accommodation can be arranged, at extra cost, if required.

Grocklemania '96

The annual gathering of fishkeepers on the Isle of Wight at the fun weekend that's known as Grocklemania will be held this year at the Harcourt Sands Holiday Village, Ryde, Isle of Wight over the weekend of Friday 17th-Sunday 19th May 1996.

The cost is £69.00 per adult, Children (2-15) £39.00 per head. The price includes full board (Friday evening meal, Saturday breakfast, lunch and dinner, Sunday breakfast and lunch) and FREE car ferry (based on 4 persons sharing the car crossing), and all entertainments.

The theme for the weekend is

'Swinging Sixties' with entertainment by 'The Fortunes', 'Lieutenant Pigeon', 'Fred the Ted' and 'Over the Hill Mob.'

Open Show on Sunday 19th. Lectures, Competitions etc. All Holiday Village facilities available at the largest Holiday Park on the Island.

Grocklemania '96 will be sponsored by **Rolf C. Hagen (UK)**.

Bookings to: Les Pearce, I.O.W.A.S., 44 Weeks Road, Ryde, Isle of Wight PO33 2TL. (Tel: 01983 613575).

Reformed Sheffield group

Sheffield A.S. has reformed, following an increase in the fishkeeping hobby throughout South Yorkshire. Meetings are held on the second and fourth Mondays of the month at The Riverside Inn, Mowbray Street, Sheffield (8pm). For details contact Chris or Robbie after 6.30pm on 0114 239 0272.

Bumper Fish Fayre '96

This year's Fish Fayre '96, the **Yorkshire Aquarist**



Seascale Junior Fishkeeping Society hit a winning streak

Les Holliday finds out more about the
Supreme Festival Sensations ...

If you were one of the visitors or weekend residents at last November's **Supreme Festival of Fishkeeping**, organised by the Federation of British Aquarist Societies at Portina, Sand Bay, near Weston-super-Mare, I'm sure you couldn't fail to be impressed by the engaging children from **Seascale Junior Fishkeeping Society** who had travelled all the way down from Cumbria for the event. The 12 children, their teacher, **Helen Steele**, and her husband, Chris, really entered into the full spirit of the weekend and were more than amply rewarded for their sterling efforts by winning a number of the contests and competitions, they decided to enter, with flying colours.

Any young, aspiring aquarists still at school might be wise to follow the example of the children of Seascale School who decided to form their own junior fishkeeping Society and, with the aid of their teacher, contacted **Rolf C. Hagen** to let him know how they were getting on. The people at Hagen were so impressed with the children that they invited the whole Junior Society and their teacher to be their guests over the weekend at the Festival and, as main sponsors of the event, made sure these avid junior aquarists had a great time.

The children, in return, rewarded their sponsors for their generosity by turning out smartly-dressed in their Society's monogrammed sweaters and Hagen baseball caps and really became fully involved in the Weekend's activities injecting lots of youthful energy and enthusiasm.

Early in the Weekend, Society members **Mark Munro** and **Andrew McDonald**, both aged nine, became winners of the first heat of the **Junior Furnished Aquarium Race** and went on to win the Junior Final. Perhaps the greatest victory for the youngsters over the whole weekend was when they all competed, and became the overall winners, of the **Tug o' War Competition**. Organised by **Geoff Capes**, former world's strongest man, this event was the highlight of the weekend and, with a little 'help' and coaching from Geoff the Seascale kids breezed through the qualifying heats. Everyone was cheering them on by the semi-finals but after having to pull three times to win through to the final the youngsters were all completely pooped out. There was no way that their victory was going to be snatched away, however, and a great crowd of brawny Scots from **Peterhead A.S.** volunteered to pull on their behalf in the final, beating **Bracknell A.S.** hands down.

The prize for winning the Tug o' War, a complete Hagen **TropiQuarium**, was just what the youngsters hoped for, as their Society has only one aquarium set up at the school at present. The TropiQuarium bristles with features. The tank itself is all-glass, has a capacity of 120 litres (27 gallons) and was provided complete with stand, water-sealed light-hood and fluorescent light fittings; filtration is provided by the excellent Hagen BioLife Wet/Dry Filter with integrated heater. Particularly useful, now the tank is installed at the school, is the built-in programmable light timer/clock which allows pre-set lighting intervals and will avoid any necessary personal attention to the lighting over weekends when the school is closed.

Helen Steele is so pleased with the interest and work the children have put into their Society that she is recommending fishkeeping as an optional subject which can be added to the National Curriculum. The nice guys at Hagen have again decided to help and are looking for ways in which they can assist Helen to achieve this ambition.

Festival, is expected to be a bumper event, with more attractions than ever. The event takes place over the weekend of Saturday and Sunday, April 13th-14th, and admission is only £2.80 for adults and £1.40 concessions (children under five are admitted free). Family and group discounts are also available, and information about showing, exhibiting, or visiting the event can be obtained from **Marie Harrop**. Tel: 01484 666591.

FBAS officers changes

Portsmouth A.S. member **Jack Stillwell** has been elected Vice-Chairman of **FBAS** at the Federation's AGM, held in December, while **Paul Corbett** has been elected Trophy and Brooch Officer. Paul can be contacted at The Orchard, Gatcombe, Isle of Wight PO30

3EF. Tel: 01983 721246. Newly-elected PRO is **Alan Benson**, who can be contacted at 25 Biewitts Cottage, Rainham, Essex RM13 8SL.

New officers on board

A new President and a new Secretary have been elected at **Plymouth and District A.S.** **Albert Taylor** has been elected President, while the new Secretary is **Julie West**.

The Society meets on the first and second Tuesday of the month at Plymouth Electricity Sports and Social Club, Armada Street, Plymouth (7.45pm). Recent meetings included a talk by Bill Rundle on Aquatic Plants, and a Table Show.

Details are available by contacting Julie West at 9 Linden Terrace, St. Jude's, Plymouth.

The new owners of **A&P** are pleased to confirm that support for the **CHAMPION OF CHAMPIONS** Competition at the **British Aquarists Festival**, organised by the Federation of Northern Aquarium Societies, is to continue.

Societies are invited to write to John Young (see address below) to obtain copies of the necessary **Champion of Champions Registration Form**. Following Societies' Open Shows, completed forms (showing details of winners, etc.) should be returned as soon as possible; owners of qualifying entries for the **Champion of Champions Competition** at **BAF** will be notified of final arrangements in due course.

Champion of Champion Registration Forms available from: **JOHN YOUNG, 13 EAST COURT, NORTH WEMBLEY, MIDDLESEX HA9 3QJ.**

Society World is provided to help all Societies to promote themselves and their activities. One of the most difficult tasks within any Society is that of Programme Secretary, who is expected to fill every meeting with something of interest. These columns are a source for all manner of ideas for Societies' entertainment, and could lead to many a Speaker finding fame (if not fortune!).

So do your bit to let readers know of your good fortune, whether you have found an excellent Speaker or have come up with good ideas which have helped to entertain your Club's membership.

We can help you only if you provide the information. Depending upon availability of space, we are also pleased to incorporate highlights of Show results (major prizewinners only, please, and DO please include first names) together with photographs if they are suitable.

And, of course, ensure that as many people as possible have advanced warning of your Meetings, Shows, and other events, by sending us details for our comprehensive 'Diary Dates' column in good time.

Send your information to: **'Society World' Aquarist & Pondkeeper, Caxton House, Wellesley Road, Ashford, Kent TN24 8ET**; or you can e-mail direct to: **societyw@sjpr.demon.co.uk** (please let us have your information at least six weeks prior to publication).

DIARY DATES

4 February — North-West Cichlid Group. Grand Auction of pre-booked lots of Cichlids (and Catfish)! No 1 Labour Club, Skelmersdale, Lancashire. Contact Zan Leech on 01565 652879.

6 February — Gloucestershire A.S. Meeting with talk and viewing of a video on livebearers. For information contact Andy Ramsbotham on 01452 372948 or Clive Norris 01453 755450

18 February — Northern Area Catfish Group. Catfish Convention, Wigan Pier Exhibition Centre. 10.30am. Display of rare catfish, information stand. Speakers: Dr David Sands, 'Doctorate Lecture on Corydoras'; 'Loricariidae' by Brian Walsh. Includes previously unseen videos. Dr Darrell Siebert (American ichthyologist currently working at the Natural History Museum).

Details from J. T. Morris, 102 Cale Lane, New Springs, Wigan, Lancashire WG2 1HB. (Tel: 01942 242386) or Brian Walsh (01254 776567).

3 March — Burley-in-Wharfedale A.S. Open Show at Collingham Village Memorial Hall, Collingham, nr Wetherby, Yorks. Information: Mrs J. Thurlby on 01943 862643.

5 March — Gloucestershire A.S. Bell & Gavel P.H., Cattle Market, St Oswalds Road, Gloucester, 8pm. Talk/Video on livebearers. Information: Andy on 01452 372948 or Clive 01453 755450

2 April — Gloucestershire A.S. Bell & Gavel P.H., Cattle Market, St Oswalds Road, Gloucester, 8pm. Talk: Marine Conservation. Table Show: Cichlids and A.O.V. Information: Andy on 01452 372948 or Clive 01453 755450

1996 OPEN SHOW DATES

(Rule Codes: A = A of A; FB = FBAS; FN = FNAS; FS = FSAS; I = International Goldfish Standards; N = NEFAS; U = USA)

25 February OASIS A.S.

3 March Burley in Wharfedale A.S. (Y)

31 March Eastleigh A.S. (FB)

31 March Northampton A.S. (FB)

5/7 April Strathclyde Fishkeepers Festival (FS)

7 April Malvern A.S. (FB)

13/14 April Yorkshire

Aquarists Festival (Doncaster) (Y)

21 April Kirkcaldy A.S.

Strood A.S. (FB)

28 April Robin Hood A.S.

4 May Southend, Leigh & D.A.S. (FB)

5 May Bracknell A.S. (FB)

5 May Gateshead A.S. (FS)

5 May Musselburgh A.S. (FS)

12 May Bournemouth A.S. (FB)

12 May CAST 88 (FN)

12 May Corby A.S. (FB)

12 May Four Lane Ends A.S. (FB)

19 May Cardiff & D.A.S. (FB)

19 May Isle of Wight A.S. (Grocklemania) (FB)

9 June Merseyside A.S. (FN)

9 June Redcar A.S., NEFAS

23 June Workington A.S. (FS)

28 June Caer Ufa A.S. (FB)

2 July Sandgrounders A.S. (FN)

6 July Port Talbot A.S. (FB)

3 August — HOT NEWS! G.A.S. OPEN SHOW

4 August Gloucestershire A.S. (FB)

11 August Salisbury A.S. (FB)

1 September Cramlington A.S. (FB)

1 September Dunstable A.S. (A)

7 September Bristol A.S. (I)

14 September Hounslow A.S. (FB)

28 September Bristol Trop. F.C. (FB)

28 September Northern Goldfish & P.S. (I)

6 October Halifax A.S. (FN)

6 October Washington A.S. & P. (FB)

20 October West Cornwall F.K. (FB)

1/3 November Supreme Festival of Fishkeeping (FB)