AQUARIST & PONDKEEPER

NOVEMBER 1996

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Features

COVER PICTURE

Surely no excuse is necessary for the Discus (Symphysodon) to grace any front cover! There is one particularly good reason for it this month as we have coverage of the International Discus Show inside these pages, where you will find Show-stopping varieties of this exotic cichlid.

Photo: MP. & C. PIECNOIR

FREE SUPPLEMENT

AQUARIUMS & AQUARIUM EQUIPMENT

SEE PAGE 39

Regulars

***A&P GIVES DOUBLE SERVICE TO READERS AND ADVERTISERS! — Readers:** Our display advertisers always gives you the best aquatic merchandising sources but now you can shop for A&P itself here, too. Where you see the A&P logo within each box, you can be sure of obtaining A&P at the same place.*

Comment

Being an Editor puts one in a very peculiar position, especially when it comes to commissioning articles. Having mentally planned what subjects our readers will find interesting (often 'pencilled-in' for months in advance) then it's a case of getting the right person to do the actual writing.

Apart from contributors being on holiday (or ill) at the very time you need them, you would think that it's just a straightforward 'horses-for-courses' matter (or should that have been 'fishes for wishes?') but then occasionally I like to ask contributors to do something slightly out of their expected range of interests rather than simply switch on their journalistic 'auto-pilot' and get bashing the keyboard. Some contributors might feel offended at first at being asked to contribute something 'different' whilst others may relish the challenge. So far, so good, and then all there is left to do is sit back and (a) worry if the manuscript will arrive in time, and (b) what to do if it's not quite what you expected!

Fortunately, neither of these occasions have occurred as yet — the lateness problem can often be resolved quickly thanks to modern communications such as faxes or e-mail, should other more traditional methods let us down, as we had been dreading during recent postal service labour problems.

The 'content satisfaction' issue might well be likened to the old joke about the motorist asking for directions only to be told: 'Well, to get there I wouldn't start from here!' but then that is what makes each article particularly intriguing, seeing other people's interpretation of a theme.

In this issue our coldwater contributors were asked for their memories of 1996 and the results were certainly surprising: the biggest memory-effecting factor was not, as might have been expected, the fish and/or equipment but ... well, just turn to the article and find out for yourselves — it just goes to show how unpredictable things turn out to be.

EDITOR

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COLDWATER

North American Minnows

ROBERT J. GOLDSTEIN, Ph.D. BEGINS A TWO-PART OVERVIEW OF THESE 'NEW TO YOU?' FISHES

PHOTOGRAPHS BY THE AUTHOR

The Minnows (family *Cyprinidae*) make up a quarter of all freshwater fishes. With 49 genera and 264 species the US and Canada have 13 per cent of the world's 2,100 minnow species. Among them are some spectacularly gaudy species equal to any tropical Tetra, and as easy to breed.

ABOVE *Notropis lutipinnis*, YELLOWFIN SHINER, PICKENS CO., GA.

RIGHT *Notropis rubricroceus*, SAFFRON SHINER

PROTECTED SPECIES

A few Minnows are protected because of dwindling populations as deserts grow and isolated habitats dwindle. A few are threatened by exotics such as the Rudd and Bitterling from Europe, the Goldfish and the Grass, Bighead and Silver Carps from Asia, and the Common Carp from Asia via Europe. More are depleted because of sportfish and bait introductions. Equally egregious is the loss of rivers wrought by power generation and potable water supply, replacing free-running streams with artificial lakes in which riverine fishes cannot survive. Contact your State Game and Fish Agency for the laws governing collection and possession of wild native fishes in your State.

MINNOW FACTS AND FEATURES

Minnows can be seen everywhere in riffles, runs, and pools, underneath overhanging banks, in the largest rivers and

smallest creeks. Most male Minnows only colour up during spring breeding. Minnows may scatter eggs over gravel (like Danios) or vegetation (like Tetras), a few insert them into crevices (like Tanganyikan Killies) or beneath rocks, and still others construct a cichlid-type nest in the sand or gravel. Most minnows do well in single-species groups in 20-gallon tanks, with canister or trickling filtration, water changes, powerheads for current, a pebble substratum with rocks, and a diet of flakes, Bloodworms, Brine Shrimp, Whiteworms, Grindalworms, Blackworms, and/or *Daphnia*. Most cannot tolerate heat, and some require a chiller.

Gila Chub, ARROYO CHUB, CALIFORNIA

MINNOW GROUPS

BROADCASTERS/EGG SCATTERERS

Broadcasters may breed over clumps of dense vegetation (*Nitella*, *Ventenata*) or over gravel producing sticky or non-sticky eggs. Stickiness keeps eggs from falling into silt or washing away in current. Minnows with non-sticky eggs often spawn near bottom, their eggs falling into interstices between pebbles that protect them from currents and predators; some spawn in dense vegetation which serves the same function.

The largest genus is *Notropis*, mostly 2-4in, peaceful community tank fishes. Some are red or orange during the breeding season, especially those of the sub-genus Notropis (*Hydrophlox*), which fortunately live in the smallest streams where they are easily collected. Many of the prettiest only spawn on the nests of larger Minnows like *Luxilus*, *Nocomis*, *Campostoma* or *Semotilus* in nature. We are still learning which can be induced to breed in aquaria without their host nest-builders. Collect wild fish in late winter, separate the sexes, and feed live foods while keeping them cool and on an 8-10 hour light cycle for a month. Then, place them together in a larger tank with large gravel or pebbles, raise the temperature five degrees, and increase the light cycle to 12-16 hours. Spawning starts in a few days with flashing undulations by the males, fin erection, operculum flaring, and colour intensification. Non-adhesive eggs are scattered above the gravel or in thick bushy plants. After spawning, remove the adults. The eggs hatch within five days, and the fry need rotifers, ciliates, or other infusoria as a first food.

Pteronotropis was split out of *Notropis* for a few Gulf Coast Minnows with a broad, blue-black band on the flank and brilliant yellow or blue colours in the males. In the Bluehead Shiner, *P. hubbsi*, two types of males occur: the socially-dominant and large terminal males, which defend breeding territories, and the smaller, younger, secondary males, which dart into breeding territories to fertilise what eggs they can (sneaky males). They live in blackwater swamps and oxbow lakes, often in clumps of Hornwort, in deep pools with scattered Lilies, and sand and mud bottoms. From April through June, eggs are scattered in Warmouth nests or among plant roots. The more colourful smaller secondary males dart into the nest apparently to spawn when the terminal male is distracted. Seen in open water or Hornwort clumps, or collect eggs from Warmouth nests, scooping up litter or rubbing the bark of the tree roots facing into the cavity. Provide a 29-gallon high aquarium with moderate current and plants, leaving the middle unobstructed and the bottom covered with pebbles, and feed only live foods. Eggs are scattered, so turn off all filters. Remove the adults.

> Most minnows do well in single-species groups in 20-gallon tanks

The fry take rotifers, infusoria, and green water. After two weeks provide *Ceriodaphnia* and *Ostracods*; *Artemia* nauplii are not readily accepted. Other options include bottom spawning mops with mop removal to aerated gallon jars until hatching; or a pebble- or marble-filled spawning tray transferred to a 10- or 20-gallon aquarium for hatching. In all cases, there should be no turbulence in the fry aquarium, as it interferes with feeding.

Gila contains western, egg-scattering Chubs with fine scales and sometimes oddly shaped heads. Most are plain olive with a hazy line along the flank, but a few are colourful. The smaller Chubs may spawn in aquaria. Place males in a 30-gallon aquarium with, gravel, large rocks, and current from a powerhead, the females in a separate bare aquarium. Keep all fish at 55-58°F, and feed with insect larvae. In six weeks add the females and raise the temperature slowly to 65°F. Spawning begins within three weeks. Turn off the filters and remove the adults. Eggs hatch within 96 hours. The fry require rotifers and ciliates.

Clinostomus, with just two species, is an eastern genus related to *Gila*. Both the Redside and Rosyside Daces are greenish black with blue, violet, purple and green highlights above, and white below. The nuptial male develops specialised sensory scales on his body and an orange-red flush along the side. They live in pools of clear, high gradient, hard bottom streams, feeding on aquatic invertebrates. Both species broadcast eggs over nests of Chubs and other Minnows in nature, but will breed by themselves in their own tank using the methods described above for *Notropis*.

The fry require rotifers and ciliates.

Rhinichthys contains the Speckled Daces, long-nosed Minnows with a tiny barbel at the corner of the jaws, an inferior mouth below the elongate snout (the generic name means "nose fish"), and a bridge of tissue preventing the jaw from being protruded. Most are dark above, silvery below, with a prominent dark band in between; in addition, the (usually upper) body is often heavily marked with black dots. Most are egg-broadcasters, one may use the nest of another minnow as a spawning site, and at least one is an egg-clumper.

ABOVE *Phoxinus Oreas* MOUNTAIN REDBELLY DACE, VANCE CO., NC

BELOW *Phoxinus Erythrogaster* SOUTHERN REDBELLY DACE

Hemitremia contains only *Hemitremia flammea*, the Flame Chub. The nuptial male has orange red on the belly and fin bases. It is rare everywhere except Cypress Creek in Wayne County, Tennessee, and Lauderdale County, Alabama, in densely vegetated springs. Feeds on Bloodworms, Isopods, worms, snails, and algae. It breeds mostly in February and March, and is probably a plant spawner demanding high water quality.

Phoxinus phoxinus of Europe can cross with North American *Phoxinus* species. Nuptial males have brilliant red bellies. *Phoxinus eos*, the Northern Redbelly Dace ranges from Canada to New York and the upper Missouri River in lakes, ponds, bogs, and creeks where it eats algae, zooplankton, and aquatic insect larvae. It scatters non-adhesive eggs over vegetation. Also bred in bait ponds with flowing water over mats of algae. The eggs hatch in nine days at 75°F. It hybridises with *P. neogaeus* to form a self-perpetuating false species of diploids and triploids resembling the Amazon Molly phenomenon in southern Texas. Sometimes in feeder-fish shipments, the Northern Redbelly Dace, *P. oreas*, should be given open space and adjacent dense vegetation for spawning. The male becomes red from the upper jaw along the entire flank. He drives the female into plants, where they quiver, tetra-style, dropping eggs.

More easily bred and temperature tolerant is *Phoxinus erythrogaster*, the Southern Redbelly Dace which occurs throughout the eastern states in cool, clear, upland, streams with permanent strong flow, and gravel or rock bottoms. It spawns on riffles, or optionally on the nests of other Minnows. You can breed them in a 20-gallon aquarium with current from power heads. Feed vegetable flakes supplemented with blackworms, Brine Shrimp, and Bloodworms. Use a plastic shoe box with gravel or pebbles as a spawning site. Collect eggs for a week by leaving the box in the adult tank. Then move the box to a separate rearing aquarium before they hatch, providing only sponge filtration. The large fry take *Artemia nauplii* as a first food, but larger spawns will be raised if also provided with green water.

Hybopsis are Chub-like Minnows with a long rounded snout and underslung mouth, eight anal rays, and usually barbels at the corner of the jaws. They live in clear upland streams with sand, rock, or rubble bottoms, feeding on aquatic invertebrates among rocks and vegetation. They scatter eggs in vegetation.

COLDWATER North American Minnows

Most are dull, but two are pretty. *Hybopsis hyptinotus*, the Highback Chub and *Hybopsis rubrifrons*, the Rosyface Chub have a wide purple-black band along the flank and pink-tinged fins. The nuptial male is dark above, dusky with purple iridescence on the side, and a red belly. The upper jaw and nose are red, fins dark red, and there is a gold line above the dark side stripe. They sometimes spawn over Chub nests, but in captivity spawn freely over gravel. Provide a sand, gravel, and rocky bottom, some current, and a diet rich of Brine Shrimp, Bloodworms, and Blackworms. Separate the sexes in spring for two weeks before bringing them together for spawning.

Luxilus have elongated scales in the front of the body; origin of the dorsal fin directly over the origin of the pelvic fins; nine anal fin rays; and the nuptial male with prominent hooked tubercles on his snout. These mostly large Minnows require 20- to 50-gallon aquaria for a group of six. Most are broadcasters, some spawning over the pits of Chubs. Three groups are distinguishable: (a) Striped, Common, White, and Crescent Shiners are silver with pink overtones, and characteristic of moderate slope, medium sized sandy bottom rivers of Piedmont and foothill regions; (b) Warpaint and Bandfin Shiners have black bands behind the gill cover and black on the dorsal fin, and prefer upper Piedmont slopes with stronger flows; (c) Bleeding, Cardinal, and Duskystripe Shiners have black bands on the flank and red heads and tails, and occur in small, upland headwater streams with rocky or gravel bottoms.

Care and breeding are similar for all. Provide an inch deep pebble or large gravel bottom, no rocks or plants, vigorous aeration, and moderate current.

Care and breeding are similar for all. Provide an inch deep pebble or large gravel bottom, no rocks or plants, vigorous aeration, and moderate current. Cool water is important for conditioning. They spawn when the temperature is increased from 60°F to 70°F over a period of a month. In the wild, some species may spawn in depressions constructed by pit-building fishes. In captivity, any depression is used as a spawning site, or they may broadcast eggs over coar pea-gravel or pebbles wi no depressions apparent necessary. They spawn j above the bottom for se

hours over a few days. Adults should be remov after spawning or severa days of bright nuptial colouration and flashing observed. The eggs in t gravel and pebble space hatch in five-eight days Feed the thin newly-hatched fry rotifers, cili algae, or find dry food After a week, the fry ho just above the bottom.

Lythrurus can be distinguished from the *Luxilus* by smaller nape upper body scales, a dor fin origin well behind t pelvic fin origin, and us 10 or 11 anal fin rays ra than nine. They tend to lowland fishes of oxbow sluggish rivers, and blackwater streams, feed on insects, crustaceans, some vegetation. Some the nests of Minnows o Sunfishes, but in genera they broadcast over gra 55-80°F in different re of the country.

TO BE CONTINUE

MEXICAN ADVENTURE '96 — Part 2

Mexican Mollies

RIO PURIFICATION AT LA HUERTA, POLLUTED BY WASTE PRODUCTS FROM LEATHER TANNING. NOT EVEN THE LOCAL WOMEN USE IT FOR WASHING CLOTHES IN, MANY SICK FISHERS, SOME REMAINED VERY STRANGELY.

DEREK LAMBERT CONCLUDES HIS WILD LIVEBEARER ROUND-UP

PHOTOGRAPHS BY THE AUTHOR

At Puerto Vallarta we hired another Combi and drove down the coast to Barra de Navidad. We stopped on route to fish at a creek near the town of El Tuito and see if we could find some *Poeciliopsis baenschi*. This location proved to be teeming with this species but we were really thrown by the fact some fish were an iridescent gold and had fewer spots. These tended to be the larger fish but it was difficult to be sure. Although I had collected this species before it was way back in 1987 and at a different location. Even so, I did not remember them being this colour then. We tried to separate the two forms on site and then travelled on, arriving in Barra late in the afternoon.

That evening we drove out to the Rio Purification at La Huerta to try to catch some *Poeciliopsis turneri*. We had been warned not to go in the water at this location because of the pollution. This was not the usual sort of sewage-type pollution you see over much of Mexico but the waste products of leather, canning,

THE CATCH AT LA HUERTA INCLUDED *Poeciliopsis turneri*, *Poeciliopsis baenschi* AND *Poeciliopsis* Chica.

chromium and the like. The fish at this location had a high incidence of disease and there seemed to be some very aggressive behaviour going on as well. We decided it would be best if we tried to obtain our *Poeciliopsis turneri* from a less polluted location.

The next day we moved on down the coast to a little resort called Playa Azul. This was to be our base for a few days and had been used by English collectors several times in the past. Dennis Barrett collected the first *Poecilia butleri* in the British hobby from a stream running through a pig pen just near here and also found what was thought to be a new species of *Poeciliopsis* in the irrigation canals near here. These later turned out to be *Poeciliopsis turnibarensis* and this was one of the fish on our hit list. We tried in several of the canals in the area but could not find them.

Another location we had for them was the Rio Balsas as it ran through the town of Lazaro Gardenas. Here we found a wonderful location. The river was deep and wide with lots of boats on it. Women did their washing in the shallow water at the banks which is always a good sign that fish are present. Using hand and dip nets we caught just a few fish but when we ran through the river with a sieve we caught huge numbers of fish. Amongst these were Gobies and a predator which we could not identify; we also caught some huge *Poecilia butleri* Mollies and lots of lovely *Poeciliopsis turnibarensis*. This species is unique in in the genus because it has iridescent blue eye rings. In size it can grow as large as 7cm for a female but males only reach 3.5cm. The other species we had come for was *Poeciliopsis balsas* but despite a careful search below the hydroelectric dam we could not find any; this was a real shame since it was supposed to be a beautiful pink fish in the wild.

PETER MOORE BY THE SIDE OF THE BARREN-LOOKING RIO COMALA. WE CAUGHT *Ilyodon furcidens* IN THE FLOWING WATER AND *Allodontichthys zonistius* BURIED IN THE MUD.

We now turned back towards Puerto Vallarta but stopped off in the mountains at Colima. We arrived in a deluge. The storm we had at Patzcuaro was bad enough but that was at night, this one we had to drive through and was 10 times worse because of it. Eventually we arrived at a hotel with an underground car park and stayed the night.

The next morning we had one location to fish before travelling back to Barra de Navidad. This was the Rio Comala in the mountains above Colima City. It only took an hour to reach this location and very disappointing it looked too — nothing but stones and a fast flowing river. My immediate reaction was, no way are we going to find fish here, which was just the same as I had in 1987 when I drove on to find a more likely location. This time I knew better. Within a few minutes of fishing we had found *Ilyodon furcidens*. These live in the open areas in fast-flowing water but it was the other species which occurs with them that we were after. *Allodontichthys zonistius* lives under rocks and stones rather than in open water. After a lot of searching, Peter scooped up some mud and found a couple of baby *Allodontichthys zonistius* hidden in it. After that, it was just a case of searching through the mud until we found enough fish. Once we had packed up the fishing gear we headed back to Barra.

The next day we went in search of healthy *Poeciliopsis turneri*. Instead of La Huerta we went back to a location I visited in 1987. This was one of the upper tributaries of the Rio Purification and we hoped it would be above the leather works. I had brought with me the notes I had made in 1987 so we went straight to the location but not only were there no fish, there was no water!

The same was true of several other locations. In the end we asked some of the locals if they knew of any places where the water still flowed. One man said he would take us to the springs out on the ranch in the back of his pickup if we wanted. Our vehicle wouldn't make it and it was difficult to explain the way anyway. So we moved all the fishing gear into his pickup and drove off. Through fields and fences he took us and then we trekked through jungle until we finally reached the spring. Here we caught *Poeciliopsis baenschi*! When we explained these were not what we were looking for, he took us further on to a small river with a man-made dam. Here we found *Poeciliopsis turneri* and *Poeciliopsis baenschi* in profusion. Although there were a few parasites, the fish basically looked healthy and there was no sign of the strange behaviour we had seen in the other location. Our guide spent a few hours here helping collect the fish and then drove us back to the Combi. Out of the whole trip, this day was one of the highlights for me.

From here we had a long drive back to Puerto Vallarta and an even longer night packing the fish. I caught the plane back to Mexico City in the morning and then spent the rest of the day at the airport waiting for my connecting flight home.

After over 24 hours on the road I eventually arrived back home. Pat was delighted to see me, because it meant she was free of cleaning out 200 tanks of fish a week, and feeding them all several times a day (to say nothing of having send off Derek's earlier articles to an impatient Editor of A&P!) For myself, I was also very glad to be home — for a rest.

Arthur, Ivan and I would like to thank Aquarian and Frisby Aquatics of Hull for their generous sponsorship of this collecting trip.

Pond Diary

NOVEMBER 1996

Sun		3	10	17	24
Mon		4	11	18	25
Tue		5	12	19	26
Wed		6	13	20	27
Thu		7	14	21	28
Fri	1	8	15	22	29
Sat	2	9	16	23	30

Susan Stephenson says you can be sure the cold weather has arrived this month

Whatever the weather has been doing up until now, by November you can be pretty sure the cold weather has well and truly arrived. Jobs this month are aimed to ensure the pond stays in good condition over the winter and that its occupants have as high a chance of surviving the winter as possible.

Continue to protect the pond from long periods of ice covering the surface. Use either boards with sacks filled with straw laid on top. These covers should be removed after each freeze when a thaw sets in to prevent Water-lilies starting premature growth; or float a piece of wood or a ball on the pond. When a layer of ice over an inch thick has formed pour boiling water over the float to remove it and leave a small hole for gases to escape. Alternatively you could heat a small area with a heater or in an emergency use a tin can filled with hot water to melt a small hole. Small rock pools and tubs run the greatest risk of completely freezing so it may be a wise precaution to empty them and house the occupants elsewhere for the winter.

As leaves and flowers die they should be removed. Poolside Reeds and Sedges should be cut down to prevent them from becoming cosy overwintering places for pests, but leave foliage on marginal ones to protect them from the severest weather. Plants like Water Mint (*Mentha aquatica*) should be trimmed well away from the water's edge. Some species like Water-Plantains (*Alisma*) are vigorous seeders and old flowers should be removed to prevent over-population the following year. Bog plants such as the Marsh Marigold (*Caltha palustris*) should be tidied and weeded and old vegetation removed. Some plants like Thalia, Sarracenia and Elephant's-ear (*Colocasia esculenta*) should be lifted in their pots and put in a frost-free place before the first frosts arrive. Large leaved plants like Hostas should have old leaves removed where necessary.

Water-lilies such as *Nymphaea alba* should be alright over winter as long as they have 18in or more water as cover but more succulent ones such as *N. rubra* should be lifted, the corms dried and stored in sand over winter. Some bog plants such as *Gunnera manicata* may be protected by simply placing the old dry leaves over the plant's crown.

This is the latest time that waterside Primulas pricked out in June should be potted up or planted in their permanent sites after clearing space for them in the bog garden.

Fish should survive as long as they can get air. Many fish owners let their fish let them know when it is time to stop feeding as they become inactive.

Pumps need to be removed if they are submersible types and overhauled and cleaned. Now is a good time to overhaul all pumps if any are present.

Any repairs or maintenance needed to the concrete of the pool should be carried out now to create least disturbance to plants but before severe frosts as concrete repairs which freeze before completely setting will be useless.

November is the last month that there will be many chances to do preparation tasks such as pond maintenance before winter in all its severity and glory really sets in.

Useful November Tips

(1) Some plants such as Water Hyacinth (*Eichhornia crassipes*) are susceptible to frost so lift some plants and store potted tightly together in damp (not wet) soil in a bowl in a warm, frost-free place.

(2) Lift a few plants of any plants such as *Lobelia fulgens* where you have some doubts about their hardiness and store in a cold frame for winter as a precaution to safeguard stock.

Photo: Susan Stephenson

Big, Bold and Beautiful!

NICK DAKIN SAYS BIGGER MARINES CAN BE KEPT SUCCESSFULLY — ALL THEY NEED IS ROOM!

PHOTOGRAPHS BY THE AUTHOR

One type of marine aquarium never fails to create a stir, the fish-only tank containing BIG fish! The sight of large slices of brightly coloured piscine flesh cruising around an equally spacious aquarium is enough to make anyone's heart beat a little quicker. Such displays are normally the province of the public aquarium, but within the confines of a domestic setting the whole thing can be replicated on a somewhat smaller scale with equally stunning results.

THE TANK

There has to be a lower size limit to an aquarium housing big fish otherwise overstocking is quickly going to become a major problem. In addition, keeping large fish in a small aquarium is cruel and stressful, leading to disease, stunted growth and in all probability, a premature death. Of course, juvenile specimens can be housed in smaller accommodation, but the fishkeeper will soon have to make plans for a larger tank.

Most fish that I am about to discuss are going to require an aquarium with the minimum dimensions 6x2x2ft (180x 60x60cm), although a larger 8x2x2ft (240x 60x60cm) would be far preferable and ideal for big fish in a domestic situation. Whilst it is possible to run such a tank on undergravel filtration, this becomes very uneconomic and an under-tank trickle filter is not only going to prove cheaper, but also far more efficient at ridding the water of copious amounts of fish waste. A large, efficient protein-skimmer must also be regarded as essential and will help tremendously with such high stocking levels. The correct wattage ultra-violet steriliser will help protect valuable livestock against disease, and activated carbon will clear the water of yellowing dyes that might otherwise spoil viewing enjoyment.

On the subject of viewing, large tanks will require substantial lighting to illuminate the fish properly so that the impact of colours and patterning may become apparent. A 6ft tank will require at least four full-length tubes spaced equally across its width. I would choose, for instance, 3xLife-Glo's and 1xMarine-Glo to accentuate blues, greens and black. Mercury-vapour lamps are a reasonable option, but will supply a predominantly yellow light that must be sharpened up with either actinic tubes or Marine-Glo's. Metal-halides are an

READY FOR BIG FISH! A 10FT 6IN x 3FT x 3FT TANK

expensive, but ideal choice, and 2x150 watt lamps will give an intense natural light. The beauty of both mercury-vapour and metal-halide lighting is that they create a wonderful rippling effect over the rockwork and base of the tank, very reminiscent of natural sunlight.

Big fish need room in which to manoeuvre and only the minimum amount of rockwork should be supplied. A reef wall may look impressive but it will take up important swimming space and displace valuable amounts of water. In all cases, the right balance must be struck for each particular species.

WHAT IS A BIG FISH?

There are no rules governing what constitutes a big fish; however, any specimen that has attained 6in (15cm) when measured from the tip of the nose to the caudal peduncle must regarded as a good contender. Six inches may not sound a great size (no smutty jokes, please!) but in reality this constitutes a respectable individual. Thereafter, specimens really do start to look big, especially as their girth starts to fill out as well. Some fish, of course, can measure 6in and still be small; our friends the Moray Eels are a good example (although these will also reach big fish status quite quickly). But these are the exceptions to the rule of thumb and most families, eg Triggerfish, large Angelfish, some Tangs, Porcupinefish, Batfish, Squirrelfish, large Wrasse, Boxfish, Lionfish, etc, will easily conform to our specifications.

There are a few fish in the trade that will eventually exceed the biggest domestic aquarium, most notable of these are the Sharks. The smallest Shark can be expected to reach 30in, while the largest may have a potential for 14ft — far too large for even the most enthusiastic fishkeeper! At the moment, most public aquaria are swamped with unwanted Sharks and the marinist must think long and hard before taking on such an enormous responsibility (even though it may initially arrive in a cute little egg pouch!). Needless to say, Sharks and other unsuitable fish will not feature in my forthcoming selection.

ADULT OR JUVENILE?

Ideally, a complete fish selection should be planned well in advance and all specimens introduced as juveniles. This procedure has several advantages: firstly, juveniles tend to be more forgiving than adults, especially of others in the same family and more importantly, feeding habits; secondly, a collection of juvenile fish all growing through to adulthood together is likely to be a much more peaceful, cohesive group, presenting far fewer compatibility problems for the owner; thirdly, biological filters can be allowed plenty of time to adapt to the increased loading placed upon them; and last, but not least, there is a great deal of pleasure to be had watching fish develop into a full-fledged adult from what might be a totally dissimilar juvenile. In all cases, patience is the key. For it might be several years before young fish start to look like big fish. The alternative is to plunge straight in and begin stocking with large specimens from the outset. If this route is followed, do not expect an easy ride! There are likely to be compatibility problems leading to fighting or general bullying, as well as dietary and water quality difficulties.

CONSIDER THESE BIG FISH

The Lionfish (*Pterois volitans*) is one of the most commonly available and impressive species. It is generally very peaceful and once acclimatised to dead food, easily fed. The aquarist needs to be aware of the venomous spines and keep hands well clear. Once full-grown, a

TOP OF PAGE LIONFISH

LEFT LIPSTICK TANG

large tank is essential to allow other fish space to manoeuvre around this slow swimming fish. Other species in the same family can be successfully housed in the same tank, making for a distinctive display. Potential ultimate size 14in (35cm)

The Picasso Triggerfish (*Rhinecanthus aculeatus*) is not quite as aggressive as some other Triggers but it is still potentially the most violent specimen in this selection. Having said that, it is an impressive fish when full-grown, with a colourful body and unusual markings. The Picasso Trigger is very forgiving of less-than-perfect water conditions and will eat almost anything on offer! Potential ultimate size 10in (25cm)

The Koran Angelfish (*Pomacanthus semicirculatus*) is best purchased as a blue and white juvenile. Given a good diet, it will grow quickly into a large specimen. Whilst the adult Koran Angel may not be as colourful as some of its more impressive cousins, it is generally much less problematic as far as upkeep is concerned. Potential ultimate size 16in (40cm)

The Lipstick Tang (*Naso lituratus*) is one of the largest Tangs in this family, and one of the most suited to share with other big fish. It has a peaceful disposition and enjoys most marine fare. As it gets older, its markings and coloration intensify, unlike some other Tangs which tend to do just the opposite! Potential ultimate size 10in (25cm)

TIPS

(1) Large Wrasse need to bury themselves at night. To avoid stress in a substrate-free tank, form a 'tray' in the corner of the tank using two pieces of glass siliconed to the base and sides. It should measure 9x9x4in deep and contain 3in of coral sand.

(2) Glue all rockwork structures together as big fish can be very destructive!

The Masked Pufferfish (*Arothron diadematus*) adapts to aquarium life very readily and quickly achieves real 'pet' status. They will consume just about any meaty marine fare although feeding by hand could encourage a nip from the four large and powerful incisor teeth. Puffers are capable of shedding a toxic mucus into the water that will kill it and any tankmates; however, this only occurs in the face of severe bullying but owners are warned to keep this peaceful fish with others of a placid nature. Potential ultimate size 12in (30cm).

The Snowflake Moray Eel (*Echnida nebulosa*) can be purchased as a very small specimen no bigger than a pencil, but with a wide and generous diet will soon grow into a respectably-sized fish. Caves or long lengths of pipe in which to shelter are essential to make this generally peaceful fish feel at home. Like the Pufferfish, they are inclined to feed from the hand with the risk of giving the owner an accidental nasty bite. Potential ultimate size 24in (60cm).

The Cowfish (*Lactoria cornuta*) is nearly always offered for sale as a juvenile of about 2in in length and most people regard it as a small fish. How wrong they are, for this species will achieve a very respectable size, albeit over a reasonable period of time. Once again, feeding is very easy with the Cowfish accepting a wide variety of frozen marine foods. This peaceful species should be housed away from bullies as they react very badly to constant aggression. Potential ultimate size 16in (40cm).

TOP OF PAGE
MASKED PUFFER

RIGHT
SNOWFLAKE MORAY EEL

FROGS & Friends

By BOB and VAL DAVIES

HERP FACT FILE

Mutations

The North American Corn Snake (*Elaphe guttata*), like many reptiles, exhibits considerable variation of colour and pattern in the wild. Selective breeding has produced a number of colour forms which are now widespread throughout the hobby; although not to everyone's taste, they are popular with some keepers and tend to command higher prices than normal forms — a further incentive to produce them! Most of these mutations have been produced in the U.S.A. where one of the latest advertised there is the 'Bubble-gum' Corn!

THREE POPULAR FORMS OF CORN SNAKES — NORMAL, ANERYTHRISTIC AND SNOW.
Photo: Bob & Val Davies

Amelanistic

Sometimes wrongly called albinos — the dark pigment is absent but, since other pigments are present, they are not true albinos. Eyes are red and the body has bright colouration varying from almost totally bright orange to light pink, or orange with deeper red/orange patches. Amelanistics are sometimes referred to as 'Red Albinos.'

Hypomelanistic

The black pigmentation is reduced but still present to some degree. Eyes are black, body colouration somewhere between amelanistic and normal forms.

Anerythristic

Often called 'Black Albinos' or 'Melanistics' both terms are incorrect. Pigmentation is the reverse of amelanistic — red/orange missing producing a body with black/greyish patches on a lighter background. Yellow markings may be present on the head and neck.

Snow Corns

Produced by crossing Anerythristic and Amelanistic forms — generally whitish overall, sometimes carrying visible stripes or patches in off-white, yellow or pink. Although they possess pink eyes they are not true albinos.

Ghost Corns

Another combination of mutations — Anerythristic and Hypomelanistic — which lack red but possess some melanin, the result being a 'faded' almost tan coloured Corn Snake. May also have pink/yellowish elements.

'Creamsicle' Corn Snakes

The result of crossing the Amelanistic form with Western sub-species *Elaphe guttata emoryi*. These tend to resemble light Amelanistics.

Blood Corn

Lacks the typical chequered belly pattern. Dorsal surface is a fairly uniform deep orange with little or no black present.

Geographic variables

Names like 'Okeetee' and 'Miami phase' are sometimes used for certain forms of normal Corn Snakes supposedly found in certain locations. The former carries a lot of orange, the latter tends to be greyish with red/orange patches. These names can be misleading as Corn Snakes from both locations can vary immensely and do not always conform to the colourations mentioned. Similarly coloured forms can be found in other locations too.

Pattern variations

The normal Corn Snake patterning has also been altered by mutation. Forms such as 'Striped,' 'Zig-Zag' and 'Motley' have been produced, although they are still rare in captivity.

'Jungle' and 'Gopher' Corns

These are actually fertile hybrids. The 'Jungle' is a cross between the Corn Snake and the Californian Kingsnake (*Lampropeltis getulus californiae*); the 'Gopher' hybrid results from a Corn Snake and a Gopher Snake (*Pituophis melanoleucus*). Both superficially resemble the Corn Snake.

Health and safety

No doubt many readers saw the report in the National Press in July about a baby which developed meningitis following a salmonella infection from the family's pet Monitor Lizard which roamed free in the house. The paediatrician involved was quoted as calling for compulsory health warnings on reptiles and suggesting that people with young children should not keep them.

There have been salmonella scares in the USA in the past mainly from pet Turtles and Iguanas. However, there are many other sources of the disease. Recent investigations have shown that dish-cloths and tea-towels harbour billions of bacteria, including salmonella, despite frequent washing. Undercooking chicken is another common source. As we pointed out in July all pet animals can carry germs but infections from reptiles are rare. Certainly in Britain, considering people's close relationship with pets, other infections are also rare. Ringworm is possibly the most common — toxoplasmosis, a fairly mild infection caught from cats, affects some 800 people per year but it can be extremely serious for pregnant women. Toxocaris (10 cases per year) is dangerous — dogs pass the eggs — if ingested they hatch and the worms migrate to the retina of the eye causing blindness.

We are by no means trivialising salmonella and meningitis, they are serious diseases. We wish to stress the warnings mentioned in July. Strict hygiene rules, especially the avoidance of mouth contact, should be observed with all animals. Reptiles allowed the freedom of the house are bound to leave behind faeces which can be difficult to eradicate completely — it is not a good idea! Children should be supervised when handling reptiles and made to wash their hands immediately — anti-bacterial handwash is widely available. Vetark Professional (advertised in this magazine) supply special disinfectants for reptile keepers. Having purchased a reptile it is possible, through a vet, to have a faecal sample analysed. Should worms, flagellates, etc, be found appropriate treatment is needed.

Native species

Britain's two rarest reptiles are the Sand Lizard (*Lacerta agilis*) and the Smooth Snake (*Coronella austriaca*) — both are protected species. Exact numbers are not known but an estimated 6,000 Sand Lizards and 2,000 Smooth Snakes are thought to be surviving. The main cause of their demise has been

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WARTY CHAMELEON (C. VERRUCOSUS) — BEAUTIFUL BUT LIKE MANY OTHERS IN THE GENUS CAN ACQUIRE FRUSTRATING HABITS. Photo: Bob & Val Davies

Chameleons — a danger to sanity?

A friend recently 'phoned us concerning one of our captive-bred Chameleons (*Chamoeleo verucosus*) which had been thriving in her care but had stopped feeding and was deteriorating. Since Chameleons often change their food preference we suggested trying other livefoods. However the whole range had been tried to no avail. We began to think the unthinkable — disease, kidney failure, liver failure and other nightmare scenarios. A letter then arrived — problem solved! It seems the Chameleon had learned to drink from a dish, a rare occurrence with Chameleons which normally lap from leaves, and because its water-dish had been changed for a larger one it had been refusing to drink and a thirsty Chameleon will not feed!

In our experience, Chameleons do not like change — they tend to become creatures of habit and variation from the normal can upset them. Placing them in different vivaria may cause them to stop feeding, although eventually they come round. An unfamiliar object placed in the vivarium can sometimes have the same effect. Most of our specimens feed from a bowl but some absolutely refuse to do this. A female Senegal Chameleon has to be fed (Locusts only) from forceps. One other Chameleon will eat only from a stainless steel bowl, another from a dog bowl with a blue base and so on. Young specimens normally accept a variety of foods but with maturity a preference for one or two types may develop. Of two adult male *C. verucosus* one will eat nothing but super-giant 'Mealworms' (*Zoophobos morio*), the other will accept these plus Crickets and Locusts, rather oddly Crickets are only taken if offered in forceps — they are ignored in a bowl or running around the vivarium. Another peculiarity is that if the cage is full of food insects they may be ignored after a few have been eaten. A Jackson's Chameleon would ignore bluebottles after eating several and would continue to do so although hungry — a new type of insect would be snapped up readily.

CLUBS

LIVE IN ESSEX and interested in reptiles/amphibians? E.R.A.S. meet in Witham on the second Thursday of each month. Contact 01621 819675 for further information.

Giant frogs

Anyone considering keeping large frogs such as the Horned Frog (*Ceratophrys*) or African Bullfrogs (*Pyxicephalus*) will need to bear in mind their gargantuan appetites. They are both available as baby specimens and will thrive on the usual insect fare but large specimens take some filling and need food such as mice and day-old chicks. They are literally 'walking stomachs' with a mouth to match. As they will readily snatch at anything that moves they will accept pieces of raw beef wiggled about in forceps. However, a diet of raw meat is not advisable as it acid certain vital elements so it becomes necessary to cut up thawed-out mice or chicks. Large specimens will take whole creatures, even quite large young rats. Neither should be kept with smaller companions which would be snapped up.

The African Bullfrog is well known for its appetite. In 1925 one got into a snake enclosure at Pretoria Zoo and polished off 17 baby Spitting Cobras each one larger than itself. Although the venom is fatal to amphibians no ill effects were observed.

◀ FROM PAGE 20

habitat loss due to building, farming, increased human contact (trampeling and otherwise destroying their territory) and fires. The very nature of their habitat (dunes and heaths) makes them vulnerable to fires. The Smooth Snake is more mobile and therefore has a slightly better chance of escaping. Also their density per acre is less.

To assist their recovery a programme was initiated in 1994 involving English Nature, the Herpetological Trust, the Worldwide Fund for Nature and the Countryside Council for Wales. Besides overseeing and protecting existing populations attempts at reintroduction at suitable sites are being carried out.

Grass Snakes are not the most threatened of our native species but they face problems from habitat loss as suitable sites for them are reduced due to human activity. Severn Trent Water and Gloucestershire Wildlife Trust, aided by volunteers, recently built a special site for Grass Snakes near Dowdeswell Reservoir near Cheltenham. Covering some 80 hectares the site includes suitable hibernation quarters, nesting sites and corrugated iron sheets which provide hiding places and enable the snakes to warm up in the morning. The project is evidently proving successful and is used by local schools for educational purposes. Grass Snakes are frequently killed due to the mistaken belief that they are harmful — education will hopefully dispel this misconception.

Toe-tapping

At least two species of frog have been shown to communicate by tapping the toes of the rear feet on the ground. As far as is known this 'seismic communication' is connected with courtship. Having kept Arrow-poison Frogs for many years we have noticed that as they move about the vivarium the toes are constantly twitching. The reason for this is not clear. Although it is not specifically connected with courtship, it is particularly noticeable when they are seeking food. One possible explanation is that it disturbs small insects which can be snapped up when they move.

DAVID TWIGG'S KOI CALENDAR

Champion and SEKC Chairman Geoffrey Addison took best 'Home Grown'.

My thanks to Tony Price for sending me details of this trip and to him and Bob Thomson for photographs.

Now to a Show that I did visit near Leicester. The Leicestershire Section BKKS held their Annual Show on 8 September in the grounds of Farmworld for the first time and it really was a lovely peaceful spot. Unfortunately the weather deteriorated as I headed up the M69 and by the time I reached the showground it was raining lightly and did so again a couple of times as the afternoon went on.

This did not, however, deter the Koi enthusiasts participating and the Show vats were the subject of constant admiration by both public and judges alike. The small group of dealers located in a covered area included Koi, Dry Goods and the BKKS Supplies stand manned by Phil Davies and his wife Pat. Judging of Koi was in the hands of BKKS Chairman Gary Pritchard, Nigel Williams, Sean Tolgyes and Andrew Richards and was well underway by the time I arrived.

During the afternoon, apart from taking photographs, I spent some time talking to people and adding a few more faces to both the names and voices that I already knew quite well. My thanks to Chairman Les Hadfield and his show team led by Dave Rowell for their hospitality and for sending me the following list of well deserved winners.

Dave Rowell, Supreme Champion & Best in Size 5 (Kohaku), Best Mature Koi (Size 5 Koromo) and Best in Size 1 (Kohaku), 1st Size 4 & 5 Sanke, Size 4 Hikari Utsuri, Size 3 Utsurimono, Kawarimono, Size 2 Bekko, Koromo, Size 1 Gin Rin.

Ernest and Alan Crampton, Best Adult Koi & Best in Size 4 (Kohaku), Best small Koi (Gin Rin Showa) and Best in Size 2 (Showa), 1st Size 5 Tancho and Size 4 Kawarimono.

Chris Chamberlain, Best in Size 3 and Best Koi owned by a Lady (Kohaku),1st Size 3 Sanke & Size 5 Kawarimono.

Other first prize winners were:

Wayne Eady, Size 1 Kohaku, Size 2 Sanke, Size 4 Showa, Tancho, Hikari Moyo, Size 5 Showa, Hikari Muji, Size 6 Kawarimono.

Charlie and Eileen Bacon Size 1 Showa, Size 2 Kohaku, Size 3 Bekko, Hikari Utsuri, Size 5 Asagi/Shusui.

Ray and Lorraine Evans, Size 1 Sanke, Bekko, Tancho, Kawarimono, Size 2 Kawarimono, Asagi/Shusui, Size 4 Asagi/Shusui.

Pip Ostell, Size 2 Showa, Size 3 Asagi/Shusui, Koromo.

Ray Fisher, Size 1 Koromo, Size 3 Showa, Hikarimuji.

Mark Farmer, Size 3 Tancho, Kohaku, Hikari Moyo, Size 4 & 5 Utsurimono.

Mick Sleight, Size 1 Asagi/Shusui.

Eric and Theresa Marlow, Size 1 Hikari Muji, Size 4 Koromo.

Graham Bailey, Size 4 Gin Rin, Hikari Muji.

Nigel Ostell, Size 1 Hikari Moyo, Size 4 Hikari Moyo.

Dave Sabin, Size 2 Hikari Moyo, Hikari Muji.

November, a neither here nor there month in the Koi keeping world; all the Shows are over, many of us have shut our ponds up (but not forgotten) for the winter and maybe spend time dreaming

▶ CONTINUED OVER/LEAF

FAR LEFT
UK KOI KEEPERS VISIT TO DUTCH KOI SHOW, ARCEN, HOLLAND.
Photo T. Price

LEFT
GRAND CHAMPION KOHAKU AT THE LEICESTER SECTION BKKS.
Photo David Twigg

old and new. This 'English style' Open Show had hobbyist and dealer Koi competing alongside and for the first time a hobbyist, Harold Van Engelen, won Grand Champion with his 64cm Shiro Utsuri.

Having thoroughly enjoyed the Show, and having taken part and done extremely well in a Japanese Judging Seminar, the party left for home but for good measure stopped off at the South East Section BKKS Show at Bromley where one of the ZNA members, Tony Whiting, took, amongst several other awards, Grand

up next year's project or improvement on the existing system. Others will be heading off to the dealers to eye up the latest imports of Koi from Japan. Maybe some lucky people will be actually going to Japan to pick their own perfect Koi! Either way that which is seen will be a talking point because that is the way the hobby improves, and surely the quality of fish coming into the UK from several sources as well as Japan is rising rapidly.

Coach trips arranged by Clubs throughout the country will usually take in two or three dealerships to give members a chance to compare stocks from different Japanese sources. Many dealers may stick to a particular group of breeders, others on the other hand may well take their pick [illegible]

the length of Japan.

A conversation with a fellow Koi keeper who had recently completed constructing his pond brought to light that he had not fitted a skimmer into the design. He was now trying to work out how he could add one without too much disruption of either Koi or construction. It is always difficult to 'upgrade' a pond after completion and therefore, as I have said many times before, those considering new pond construction really should read some good articles or books to aid design. After committing design to paper it is wise to show it to fellow Koi keepers before setting spade to ground because you can bet your bottom dollar that something in the design will draw constructive [illegible]

Koi Meetings in November

6 Leicestershire Section BKKS. Speaking on 'Rare Koi Varieties' is Kate McGill. Contact Mick Reffin, 0116 2712517.

7 Suffolk & North Essex Section BKKS. Monthly meeting. Contact Mavis Carter, 01206 866011.

7 North of England Koi Chapter of Zen Nippon Airinkai. Monthly meeting. Contact John Timmis on 01226 289507.

10 Heart of England Koi Society. Monthly meeting near Dunchurch. Contact me on 01926 495213.

11 Northants [illegible]

Speaker is Charles Harriss of 'Purity on Tap'. Contact Albert Day on 01604 407361.

12 Nottingham & District Section BKKS. AGM. Contact Shirley Hind on 0115 981 0923.

13 South Hants Section BKKS. Monthly meeting at Denmead Church Hall. Contact George Rooney on 01420 473169.

13 Merseyside Section BKKS. Monthly meeting. Contact Alan Findlay, 0151 284 5973.

16 Northern Koi Club. Annual Dinner Dance, Widnes. Contact Tony McCann on 0161 794 1958.

17 Northern Koi Club. Monthly meeting in Widnes. Contact Tony McCann on 0161 794 1958.

17 Scottish Section BKKS. [illegible]

in Bridge of Allan. Contact Archie Dick on 01786 832073.

20 Crouch Valley Section BKKS. Members ponds video show at Laindon, Essex. Contact Ron Parlour, 01277 840863.

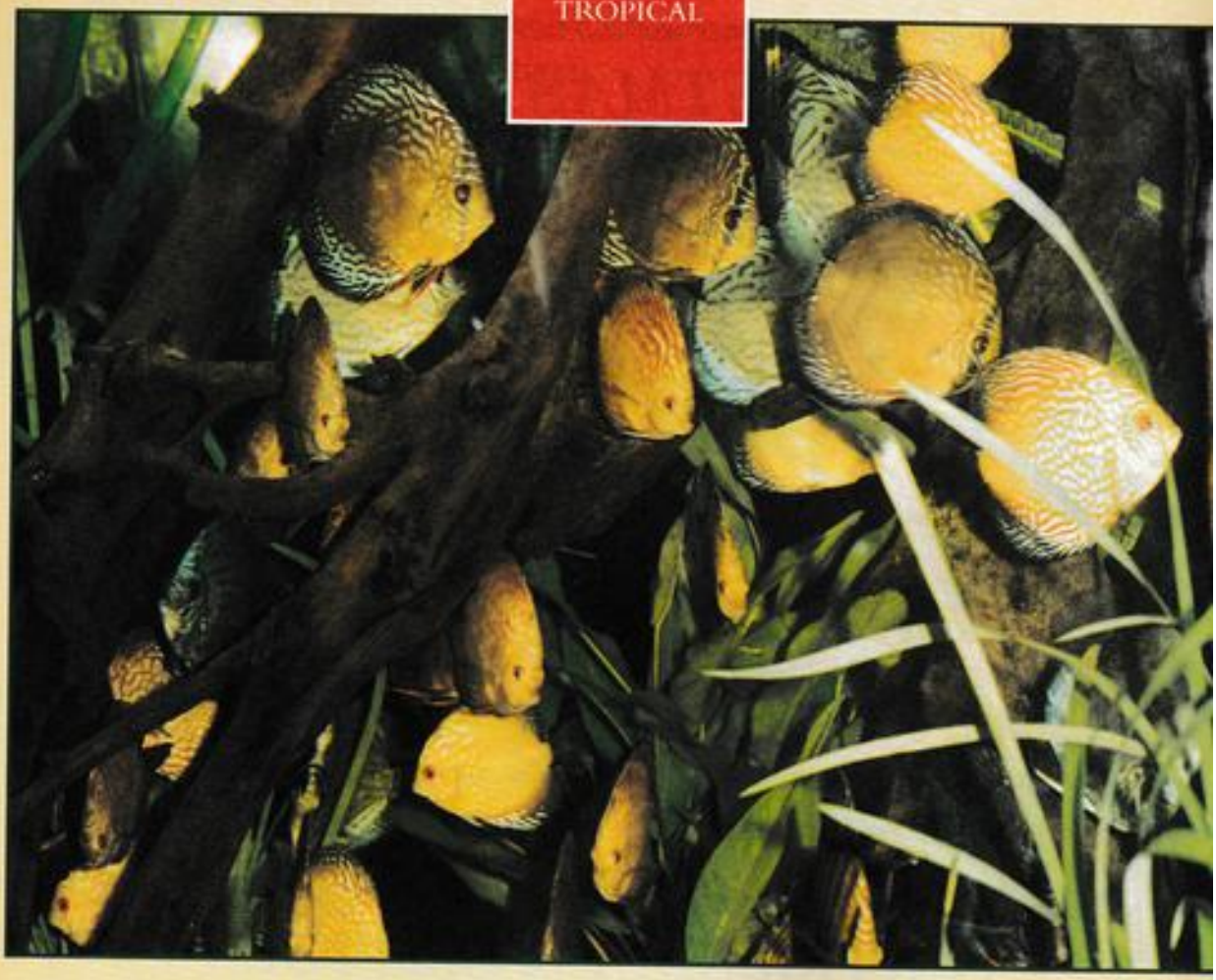
21 Oxfordshire Section BKKS. Monthly meeting at 'The New Club', Wheatley. Contact Kevin Newton on 01865 874008.

27 Ireland Section BKKS. Meet 8pm at the Cregagh Cricket Club, Cregagh Road, Belfast. Contact Secretary on 01247 467171.

All Koi keepers are welcomed to the events mentioned in this Calendar (an entry fee may be payable) and further details can be obtained from the contact [illegible]

quoted alongside the diary entry. My thanks go to all Koi Club Secretaries or PROs' and others who send me their latest calendar for inclusion in this column. If your Club is not mentioned and you would like it to be, please write to me via the Editor at MJ Publications Ltd, Caxton House, Wellesley Road, Ashford, Kent, TN24 8ET.

Although I do my best to ensure all events are mentioned it may be that some information, which arrives a little late, misses my deadline. To minimise the chance of this occurring you may find it more convenient to fax me direct on 01926 403500. This request also applies to dealers with special events, auctions, etc. I look forward to [illegible]



Int Ch

BRIAN MIDDLETON IS STILL BREATHLESS FROM COVERING THIS FANTASTIC EVENT

PHOTOGRAPHS BY THE AUTHOR

October 3 saw the start of the very first International Discus Championships staged by Norbert Zajac, of Zoo Zajac, Duisburg, Germany.

What a world-class event it turned out to be: to any serious Discus keeper it was more than anyone could ever have expected. The organisation was superb, the venue was large (and it needed to be) and it was crammed full of some of the world's most beautiful Discus.

The biggest surprise was the amount of support the championship attracted from the Far East, both in the competition and in the dealers present. Although the Far East was so well represented there was hardly a Pigeon Blood (as we know them) to be seen. There was a considerable amount of 'unclassifiable' Discus but they were all of Tangerine or Red colouration with virtually solid bodies. There were no 'Red Dragons', no 'White Dragons', no 'Sunset Tigers', but there were a considerable amount of absolutely stunning fish, which breeders throughout the world had obviously put an amazing amount of effort into getting ready for the Show.

There were no entries

Review of ernational Discus ampionship 1996

from the United Kingdom, but that was due to the relatively unusual concept of Discus Keeping we seem to have got into in this country. It seems to be that potential Discus keepers in the UK are under the impression that they can obtain perfect fish for very little outlay. I think that one thing this Championship did prove was that perfect Discus are not as common as we would like to believe, and the price of top quality fish was anything up to £500 for a good adult. These were snapped up by eager buyers from around the world within the first few hours of the Show opening its doors. The Show coincided with the beginning of the Wild Discus season and some of the Wild Discus were quite special. I think if I had to make a prediction, it would be that this is the way Discus keeping in Europe is going. The wild fish were absolutely stunning, and many were just like the photographs that can be seen in the books. The price of the most beautiful specimens were reading like telephone numbers, and were bought by the world's leading breeders as soon as they were on sale.

All of the world's leading breeders were there, and they were extremely forthcoming with answers to any questions that were asked of them. I hope this dispels the myth that Discus breeders are a secretive lot as this was simply was not the case. They do, of course, each have their own unique way of doing things, but their advice on the keeping of Discus was unsurpassed. If you missed this chance to become more knowledgeable it was your loss, because the information was there for everyone. Some of the lectures were a golden opportunity to learn the very latest breakthroughs and pitfalls in this fascinating area of fishkeeping.

The remainder of the huge venue was taken up with hundreds of tanks full of the finest fish. Every book available on Discus from around the world was there. There was also a stunning Dutch-style

FAR LEFT
DISCUS SHOW AQUARIUM — SET UP THE DAY BEFORE!

LEFT
BRIAN MIDDLETON WITH BEST IN SHOW WINNER ZUE-KANG WON

TROPICAL International Discus Championship

ABOVE RED TURQUOISE — DIRK SCHLINGMAN

BELOW SNAKESKIN — DAT DE LIM YU HO

ABOVE MARLBORO RED — NURA DISCUS, MALAYSIA

BELOW UNPLACED RED COAR

TROPICAL
International Discus
Championship

planted tank, complete with 30 or 40 Discus, complete with tree-roots, all contained in crystal clear water; how this tank was set up to look so impressive is surely a credit to the organisers, with only three days in which to prepare.

There was a 'crash team' ready for any emergency, staffed by members of I.G. Discus. In addition to this, Prof Dr. H. Mehlhorn, P.D., Dr. G. Schmahl and Mr Dieter Untergasser were there in case of problems; if I was a Discus with a health problem, then this was surely the Harley Street of the Discus world!

To sum up in one sentence: the Show was sensational and inspirational, and a real credit to the organisers. One improbable thing occurred in the course of the Competition — the Best in Show, a Brown Discus entered by Zue-Kang Won from Taiwan, didn't even win its Class!

DIARY DATE: NEXT SHOW — OCTOBER 1998 — NOT TO BE MISSED!

LECTURERS

DIETER UNTERGASSER

This again was an absolutely unique experience to be able to listen to, and question, one of the world's greatest brains on Fish Diseases. He is the gentleman responsible for writing the 'Bible' on diseases of Discus and his knowledge of the subject was there to be gathered if you wanted it. One of the most interesting subjects he talked on was the effect that stress has on Discus, and that in actual fact it can be responsible for many of the ailments that Discus are susceptible to.

DR CLIFFORD CHAN

Dr Chan was fascinating in the respect of telling his audience about the way in which Discus are kept in the Far East, and Singapore in particular. He was totally honest and some of what he said was in fact quite alarming in the respect of feeding of Discus. He explained that Discus keepers in that part of the world feed their Discus a diet which consists mainly of live Tubifex worms! I can almost hear the gasps of horror from some of you seasoned Discus keepers! In my opinion this completely explains the source of many of the problems associated with Discus from the Far East (be warned!).

JACK WATTLEY

This was a rare chance to listen to one of the great Masters of Discus Breeding the world has known. The information that he divulged was absolutely invaluable. He went into great detail of the so-called Discus Plague and fully explained how he cures it without the aid of any drugs whatsoever. He was also very much an advocate of 'Old Style'Discus keeping using sponge filters, etc. He was explicit about the feeding and raising of fry, and also explained an ingenious way of using R/O waste water instead of letting it go down the drain, in fact he classed it as Gold Dust. I will explain this further in a future article.

MANFRED GOBEL

Again this was a unique experience to hear one of the modern Masters impart some of his knowledge and what he had to say was extremely important. He explained that whilst he was fishing for Discus in the Amazon, from a stationary boat, he caught every so-called 'species' of Discus within a radius of metres of the vessel. This opened up the theory that Discus may interbreed prolifically. He went on to explain that genetic fingerprinting of all varieties of Discus has been carried out in both Singapore and Germany and the results are going to alter the theories everyone has taken for granted for so long. The results of the genetic scientists are that they now prove beyond any doubt whatsoever that there is only one species of Discus and possibly only one sub-species. This will probably explain why some fish are so difficult to recognise and identify accurately.

DATO DR LIM YU HO

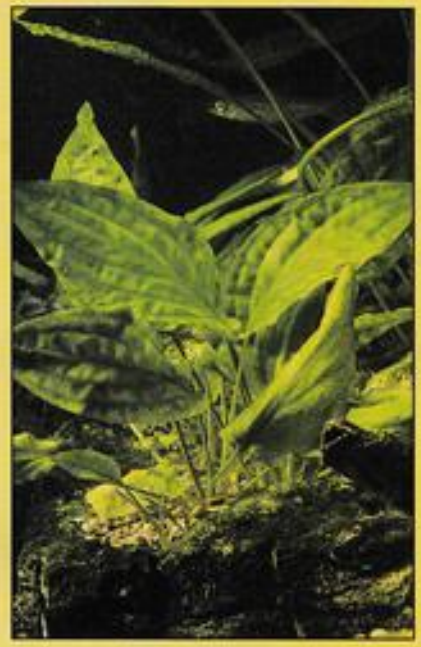
Dr Lim brought a hush to the lecture room with an explanation of his breeding technique which is basically inbreeding (brother and sister) fish for many generations until the chances of obtaining a mutant fish are extremely high. In his case he has now obtained a completely pure white Discus (not an Albino) and, in the same fashion as Koi breeding, is now planning to breed a desirable colour gene into the fish. He called it the 'Modern Method'. He also stunned the audience when he called the German method of selective breeding the 'Old Method'! The interpreter by now was hyperventilating and was stuttering in both English and German! But this is what it was all about, having different people give their opinions and leaving the audience to make up their own minds.

A to Z of plants

By **BARRY JAMES**

CRYPTOCORYNES

The *Cryptocoryne purpurea* group of Cryptocorynes are on the whole the most difficult group to cultivate in the aquarium. Hailing from the dense forests of Malaysia and the major islands of Indonesia they mostly demand soft, acid water as a prerequisite to healthy growth. In general, they dislike bright light under which conditions they are prone to develop velvet-like growths of filamentous algae on the surface of the leaves. The substrate should be the usual laterite mixed with a humus supplement, which is the soil they are used to in the wild. Nutrients should in general be restricted to trace elements, in particular iron and manganese, with only occasional feedings of basic fertilizers.



CRYPTOCORYNE PONTEDERIFOLIA
Photo: Barry James

CRYPTOCORYNE PURPUREA (Ridley) 1902

Description: The type plant for the group. Many similar species, such as *C. griffithi* and *C. cordata*, are now thought to be but variants of *C. purpurea*. This herbaceous plant grows mainly submerged in dense patches. The lamina are born on long brown petioles and are very variable in colour and markings depending on the area and time of year that they are collected. They are elliptical, heart-shaped or oval and flat to slightly wavy. Upperside mid- to dark-green with a variable pattern of chocolate-brown dots, streaks or lines. The underside is pale-green to violet. Often the upperside is covered in a layer of red mud when collected.
Distribution: Malay peninsular.
Cultivation and Propagation: The plant colonise large areas by rhizomes and runners in ideal conditions. The plants resent disturbance and takes a while to re-establish itself. Temperature around 25°C.

CRYPTOCORYNE PONTEDERIFOLIA (Schott) 1863

Description: The plant grows well both submerged and emerse when it emerges as a bog plant. The most luxuriant foliage however is produced in aquaria. The submerged foliage is born on long petioles. The light to olive-green lamina are up to 15cm long by 5-6cm wide. The undersides are pale-green often with a pale-reddish overlay. The leaves are cordate or elliptical often with a slightly bullate surface. The whole plant reaches 30cm or so in height.
Cultivation and Propagation: The plant spreads naturally by root runners and imported plants survive the transplanting shock well. This is the easiest of the *C. purpurea* group to grow. It is seemingly indifferent to water chemistry and succeeds even in hard and alkaline water. Temperature 23-26°C.

CRYPTOCORYNE BLASSII (De Wit) 1960

Description: This plant on account of its large size is constantly in demand. Often known as *C. siamensis* this Cryptocoryne reaches a height of 60cm with the lamina accounting for about a quarter of the total. The leaves are cordate and up to 50mm in width. The upper side is a dark olive-green with a violet underside. The surface is often slightly bullate.
Cultivation: There appear to be different races of this plant some of which come from areas with a limestone substrate. These specimens succeed well in hard, alkaline water. Plants from other areas seem to prefer soft and slightly acid conditions. *C. blassii* grows well in well-lit situations. Temperature about 25°C. The plant does not produce abundant runners and is best propagated by division of the parent plant.

SHORE WATCH

An **ABC** of Rockpooling

BY **ANDY HORTON**

For most of the length of the British Isles the shore fauna during November is likely to be very poor. It is time to write up your 'Shore Log' from the previous autumn.

Discoveries of interest by readers will warrant a mention in this column during 1997. For more immediate news the British Marine Life Study Society run an electronic news service 'Torpedo' through the Internet for up to date reports on marine wildlife around Britain.

An Atlantic Bonito, *Sarda sarda*, was caught by an angler off South Wales this summer whilst feathering for Mackerel. This fish is normally an inhabitant of more southerly seas.

Large congregations of the Common Moon Jellyfish, *Aurita aurita*, were also reported in the clear water of Angle Bay, one of the areas polluted by oil from the 'Sea Empress' disaster in February of this year.

V

A **VAGRANT** is a term given to an animal that has wandered off from its normal habitats and turned up in an area outside its normal distribution. Every year several species of vagrant fish end up on our south-western shores. Under the 'Shorewatch' scheme reports of unusual marine wildlife occurrences are sent to the British Marine Life Study Society at the address and telephone number at the foot of this article. Latest discoveries are available to enquirers on the Internet BMLSS (Scotland) World Wide Web site at: URL= http://www.ed.co.uk/~evah01/bmlss.htm.

A **VECTOR** is an agent for a pathogen. Winkles are known to be a vector for the Cryptocotyle fluke-worm parasite, and it is possible for marine fish introduced in the aquarium to be vectors of disease organisms like Amyloodinium which are then passed on to the other fish.

VELELLA to anybody other than a specialist is a purple-coloured Jellyfish that is also known as By-the-wind Sailor. In some years hundreds will be washed up on the south-western coast of Britain (see *PLEUSTONIC* in the August issue).

VELIGER LARVAE are the free-swimming planktonic larval stages of molluscs, eg. Mussels, that contain a rudimentary shell.

The **VELUM** is a shelf underneath the umbrella, or medusa, of a hydroid. This organ enables the mobile stage of the hydroid to have more control over its movements and is present in Velella but absent in true Jellyfishes.

The **VELVET SWIMMING CRAB,** *Necora puber*, with its bright red eyes, is one of the most spectacular crabs that can be found on the rocky shores around Britain.

VENTRAL means under, eg. the ventral surface is the underneath surface.

VERNAL is an alternative name for the season of Spring.

VERTEBRATES are animals with backbones classified as the subphylum Vertebrata in the phylum Chordata.

VERTICAL MIGRATION is the movement of organisms up and down in the water column. This is most noticeable in small planktonic organisms that rise to the surface at night, followed by predatory fish.

VIRUSES are particles that can only replicate within living cells, although they can exist outside their host. Treatment of fish viruses is by isolating the fish and improving its living

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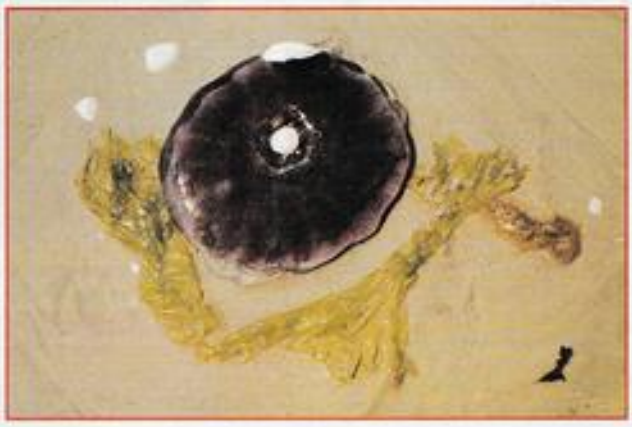

BY-THE-WIND SAILOR WASHED UP ON THE SHORE. IT IS A COLONIAL HYDROZOAN AND NOT A TRUE JELLYFISH. Photo: Andy Horton

THE VELVET SWIMMING CRAB CAN INFLICT A MORDACIOUS NIP WITH ITS SHARP CLAWS.
Photo: Andy Horton

Please send reports to: Shore Watch Reports, British Marine Life Study Society, Glaucus House, 14 Corbyn Crescent, Shoreham-by-Sea, Sussex. BN43 6PQ.

If you are in doubt about the identification of any species please say so and give as full as description as possible. If you know the scientific name please use it as well as the common name. All letters will be replied to. If you want a complimentary copy of the journal Glaucus with your reply, please enclose stamps for a letter up to 200g (43 pence or 57 pence).

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conditions. For further information read 'The Manual of Fish Health' published by Salamander Books, 1988.

VIVIPAROUS means giving birth to live young in an advanced stage of development. Most fish are oviparous, discharging eggs and and sperm into the sea. However, the Blue Shark, *Prionace glauca*, is viviparous, the embryo developing in the female. Other Sharks like the Tope, *Galeorhinus galeus*, are ovoviviparous with eggs that are laid and hatch out internally with the release of live offspring. The Eelpout, *Zoarces viviparous*, is a shore fish found on the eastern and northern coasts of Britain and is very unusual amongst bony fish as the eggs develop in the female for three to four weeks before hatching.

W

WATER is the single most important factor as far as the aquarist is concerned. If the water conditions are perfect, most of the problems in keeping fish and aquatic invertebrates can be solved (the other important parameter is nutrition).

The principle concerns are:

(1) Salinity, which is the amount of dissolved salts in the water. A salinity of 3.4 per cent is the mean around the British isles which equals a specific gravity of 1.025 at 15°C.

(2) Temperature: fish and other aquatic animals can only survive in water temperatures in which they are naturally found. The English Channel varies between 7°C in February rising to 17°C in August, although temperatures as high as 21°C are reached in the shallows.

(3) Nitrogen wastes are of interest to aquarists. The principal soluble waste is ammonia which is toxic in minute amounts. Biological filtration utilises naturally occuring bacteria to covert the ammonia to the safer compounds of nitrites and nitrates.

(4) The acid-alkaline balance known as the pH scale. The sea is stable at 8.3 but in marine aquaria the level falls quickly and after a period of time to 7.5. Fish and especially invertebrates thrive better if the pH exceeds 8.0.

(5) Biochemical changes occur in marine aquaria, including the accumulation of dissolved carbon, nitrates, and changes in the proportion of mineral salts. This is remedied by water changes at 25 per cent every month.

(6) Dissolved gases. Dissolved oxygen is essential for all the animals in the tank. If the oxygen is used up by the tank inhabitants, including bacteria, more quickly than it can be replaced at the water surface, the fish and other creatures will suffocate.

(7) Real sea water contains billions of microorganisms invisible to the human eye.

WAVES are churned up by winds and are of more interest to surfers than rockpoolers. Waves breaking over a rocky shore can make the coastal pools uninhabitable for all but the hardiest of marine life. However, most of the small fish and crabs are designed to hide in crevices and survive the worse onslaughts.

WEEVERS are the Trachinidae family of marine fish with two species found in British seas of which the Lesser Weever, *Echiichthys vipera*, is a fish to be warned about because it possesses a black spiny dorsal fin that is capable of inflicting a severe sting. The fish buries in the sandy shallows and bathers may step on the exposed spines.

The **WENTWORTH SCALE** is a scale of the particle size of rocks and sediments. This is very important to animals that will only burrow in silt or sand of a certain size.

A **WHALE** is a common term in use for huge marine mammals that can be divided into two groups: the Baleen Whales that sieve plankton and small fishes from the sea, and the Toothed Whales that are active predators of fish and squids. Dolphins belong to the group of 'Toothed Whales'.

The **WHELK** is the largest marine snail (gastropod mollusc) found in the seas around Britain. It feeds on carrion and is an active predator on oysters.

WHITEBAIT is a colloquial term for shoals of small fish seen in harbours and estuaries during the summer.

WINKLES are marine snails with four species that are readily identified from British shores. The Edible Periwinkle, *Littorina littorea*, is very common and would be abundant if it was not picked as food.

WORMS are very common inhabitants of sandy and muddy shores, but have been over-collected for bait in many popular areas. Segmented worms are classified in the phylum Annelida and include the Lugworms and Ragworms common on sandy shores as well as Earthworms.

WRACK is a common name for the large brown seaweeds of the genus Fucus that are dominate on rocky shores.

WRASSES are a family of colourful bony fish called Labridae. Five species breed in British seas.

YOUNG BALLAN WRASSE COMPRISE ABOUT 1 PER CENT OF WRASSE CAUGHT ON SOUTHERN AND WESTERN COASTS FROM AUGUST TO OCTOBER. THE OTHER 99 PER CENT ARE CORKWING WRASSE.
Photo: Andy Horton

.. News Desk ... News Desk ..

Mission Impossible

It's always pleasing to see an aquarium featured in the set design in television programmes and films, and occasionally they play quite a dramatic part in the 'action' too. Many years ago, there was a spectacular circular aquarium in one of the James Bond films (to say nothing of often-seen Shark enclosures!). In the recently released Paramount picture 'Mission Impossible' another purpose-built aquarium forms part of the dramatic action sequence as it bursts, showering its contents everywhere!

Now — and sorry to disappoint you film-goers with the dreadful truth — the aquarium, incorporated in a bar, was not actually destroyed totally (only built-in segments of the installation were planned to explode — isn't it marvellous what they can do these days to fool us? — and to allow themselves the luxury of 'retakes' should it be necessary!) and it will be on display at the imminent Supreme Festival of Fishkeeping (2-3 November) at Weston-super-Mare.

Obviously someone, somewhere, has to build these aquariums, and it comes as no surprise to learn the latest example of 'aquatic-action' was the work of Sam Bray's company, Seabray — probably more well-known for the thousands of tanks that happily do not 'self-destruct' in the countless homes around the country.

At this other, more peaceful, end of the scale, Seabray has always supported the hobby's major Shows, and Sam has generously supplied not only the actual cocktail-bar tank as used in the film to be an added attraction at the Festival but also two superb Cabinet Aquariums for the daily Grand Draws. Obviously, there are no limits to the imaginative use of aquariums these days and Seabray can design and build them to whatever specifications are required.

Full details of Seabray's Aquariums (for whatever purpose!) can be obtained from: Seabray Aquariums, Swinburne Road, Burnt Mills Industrial Estate, Basildon, Essex. Tel: 01268 590457.

... KOI NEWS ... KOI NEWS ... KOI NEWS ... KOI NEWS ... KOI NEWS ... KOI NEWS ...

The winning team deliver international success

For more than ten years Japanese Water Gardens of Nottingham and Tani Fish Farm in Narita, Japan, have enjoyed a very special business alliance which has delivered Koi enthusiasts all over the world great Koi at affordable prices.

Japanese Water Gardens' managing director Bernard Channing is one of the international Koi industries most respected and colourful characters and, through his company, Japanese Water Gardens, has developed a highly-successful worldwide Koi business based on quite simply delivering great Koi and high quality Koi products at realistic prices.

The key to success in the dry goods field has been the development of the world-beating Hydra range of Koi products, which includes filters, bowls, nets and videos — in fact everything needed for successful Koi keeping. For 15 years JWG have imported some of the UK's top Koi and for most of that time all the Koi Bernard imports have been specially sourced for JWG by Tani Fish Farms, one of the world's leading Koi Companies.

This unique business alliance, combined with the irrepressible entrepreneurial talents of Mr Channing, or 'Bema Chan' as everyone in Japan affectionately calls him, has ensured JWG consistently deliver. The JWG international business developed rapidly in recent years, especially in USA, and JWG's prominence in this tough but rapidly-expanding market was recently unequivocally confirmed by a stunning victory by a JWG/Tani supplied Koi at the very first all American Koi Show held in Philadelphia. The prestigious US national Koi Show — Koi America '96, PA, was won by a superb 6cm Sanke produced and supplied to prominent New Jersey Koi enthusiast Jim Reilly by JWG.

During the 1996 UK Show season JWG supplied Koi have taken top awards, including Supreme Champions, Adult, Mature, Baby Champions and countless Best in Size and Variety awards, at Shows all over the country just as they consistently have for many years.

The international Koi industry owes a debt of gratitude to pioneers like Bernard Channing whose vision has resulted in not just the importation of some of the best Koi in the world but also rendering good Koi and Koi products affordable and available to all serious Koi enthusiasts worldwide.

For more information on JWG contact: Dave Ford, Japanese Water Gardens, 251 Toton Lane, Stapleford, Nottingham, UK. Tel: 0115 9397926. Fax: 0115 9490451.

MEDIA INFORMATION FROM: NISHIKIGOI INTERNATIONAL KOI BUSINESS INFORMATION SERVICES. CONTACT NIGEL CADDOCK. TEL: 01942 726864. FAX: 01942 723914.

CYPRIO COMPETITION WINNERS

WINNERS OF THE CYPRIO COMPETITION FEATURED IN THE AUGUST ISSUE OF A&P WERE:

1st Prize: Terracotta-effect PLANTER FILTER 1200, with MATCHING PLINTH incorporating a UVC and a PRIMA 525 PUMP — Jim Rigby, Wickford, Essex; 2nd Prize: A BIOFLOC 2000 FILTER and a UVC 1000 — Mrs J. Shortland, Spalding, Lincs; 3rd Prize: Stone-effect FILTERFALL 1000 FILTER and a UVC 1000 — Mark Achurch, Jericho, Oxford; 4th Prize: A PRIMA 1000 PUMP — Mrs Joyce Davies, Conwy, N. Wales; 5th Prize: A FUTURA 270 FOUNTAIN PUMP and a BIO-COMPACT 500 DELUXE FILTER — Paul Rogerson, Morecame, Lancs.

Our congratulations to the winners who will receive their prizes direct from Cyprio as soon as possible.

AQUARIUMS & AQUARIUM EQUIPMENT

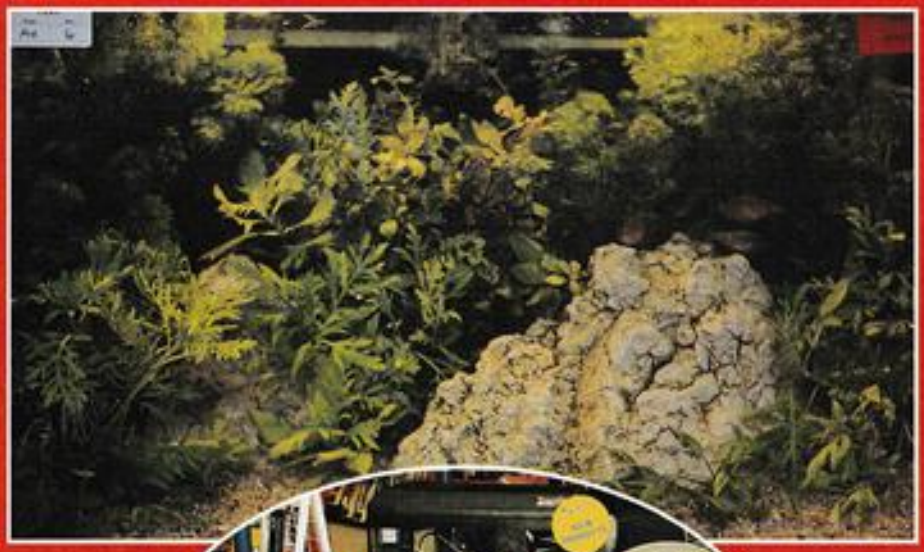

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Photo: A&P Library

Whatever your interests in fishkeeping you've got to keep the fish in something — they have to have an environment all of their own. As responsible fishkeepers, it is vital that we understand their needs in order to provide them with the ideal living conditions if they are to thrive; everything the fish receives (for good or bad) has to come through the actions of the aquarist and the 'living quarters' comes right at the top of the list.

Selecting the right 'container' for fish can be quite straightforward as long as you know what you intend to keep; advance research on the fishes' needs (and also their final physical size) always pays dividends in the long run — it's not just a case of measuring up the tank to see if it will fit into that vacant space in the lounge! The general rule is to get the biggest tank you can afford — apart from being able to keep more fish in it, water conditions will be more stable over a longer period of time. However, you can obviously modify this rule in the interests of economy — who would have a 6ft tank to keep Killifish in?

Whereas the secret to successful gardening lies in the soil, with fish it's the quality of water that matters; choosing the right filtration system is important and again this should be tailored to the fishes' requirements — not your desire to impress visitors.

An important part of the comfort of your own home is the furniture — where would you be without that armchair and tasteful decorations? Would you feel comfortable, secure and confident about bringing up a family in a bare room? Fish need to feel 'at home', too, and furnishing the aquarium goes a lot further than just making it look nice (to our selfish point of view). Yet again, different species appreciate different furnishings — with some fish plants are a waste of time (and money) but rocky caves? Now you're talking!

Fulfilling the basic needs is all very well, but there is still room for pushing forward with new ideas and, to take one example, the use of Carbon Dioxide fertilisation for improved plant growth has been increasing in recent years. If you want to learn more, then read on.

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AQUARIUMS & AQUARIUM EQUIPMENT

Containing The Interest

ROY OSMINT LOOKS INTO THE REAL CONTENTS OF AN AQUARIUM

A brightly-illuminated magical underwater world of colourful fishes, living jewels gliding silently amidst contrasting plants and natural rock of diverse form and texture. A perpetual myriad column of glistening bubbles dancing rhythmically as they gently rise through crystal waters.

This rather graphic description of an imaginatively-designed, tastefully-furnished and well-maintained aquarium should almost certainly invoke in the minds of most a relaxing, aesthetically pleasing vision of peace and tranquillity. A beautiful constantly changing aquascene which is quite literally a living picture.

Undoubtedly this is the kind of effect that the up and coming aquarist will want to aspire to when contemplating setting up a display aquarium, and it is certainly an objective well worth aiming for. All too often, however, the completed project will fall short of this ideal due mainly to inadequate thought and planning at the outset resulting in a lack of proper appreciation as to what is actually involved.

Establishing an aquarium of this type is by no means a difficult undertaking but there are many things to consider, some obvious, others less so; a bit of time and trouble taken at this early stage to reflect upon them will be richly rewarded and help to avoid later disappointments, and even possible disasters.

Unless you live alone, or intend to site the aquarium in some little-used portion of the house, it is clearly necessary to first of all gain the consent of other members or the household as the finished aquarium is likely to be a prominent feature in everyone's living space and their enthusiasm may well at this stage not rival your own! Fortunately, modern aquaria present a far cry from the stark angle-iron tanks and equipment of yesteryear which, although functional, totally lacked the elegance of today's units which are designed to blend with, and complement, all styles of decor and introduce an exciting new dimension of beauty and charm to almost any area of the home. It is from this perspective that an otherwise reluctant domestic authority will frequently acquiesce to the idea of an aquarium in the first place.

Among the principal factors to consider when selecting an aquarium therefore, are its size, where it is to be sited, the design and style of the tank best suited to the circumstances, other equipment and, of course, cost — each of these elements being closely related.

TANK SIZE

As a general rule it is always a good idea to choose the largest tank possible and certainly one a little bigger than you initially think you need. This gives plenty of swimming space for the intended occupants and allows a higher stocking level which is likely to be necessary as a natural consequence of a growing interest. There are also other more fundamental reasons for thinking moderately big. A large aquarium is generally easier to maintain than a small one as conditions tend to remain more stable and are therefore more controllable. In addition, a good sized aquarium offers greater scope for creating an interesting aquascape and will provide overall a more impressive and aesthetically-pleasing effect.

It is wise also to have at this planning stage an idea of the types of fishes that are to be kept for this will have considerable bearing on the required tank dimensions. Large fish, for example, or those that possess highly-developed territorial instincts must obviously be given more space than their smaller, less-demanding cousins. In practice, however, most newcomers to the hobby commence by keeping a wide variety of shapes, sizes and colours in a harmonious community and only perhaps later start to specialise when their knowledge, interests and preferences have

Photo: Rolf C. Hagen (UK)

THE LATEST TROPICQUARIUM COMPLETE WITH LIGHT, FILTRATION AND HEATING ACCESSORIES. ALL YOU NEED TO DO IS ADD GRAVEL, WATER AND FISH!

had an opportunity to develop.

An important point which must always be borne in mind, however, is that tank size in the context of fish-holding capacity refers to surface area and not necessarily water volume. A tall slim tank may well contain more water than a shallow wide one but it is the latter that can house the greater number of fishes as it presents a larger water surface area to the atmosphere, and consequently absorbs a much higher level of oxygen.

SITING THE AQUARIUM

There are a number of important considerations when deciding upon the location of the aquarium in addition to the obvious one of where it will look the most impressive and blend in with the general decor. A window site, for instance, is likely to be unsuitable especially one that catches the full sun as the excessive light will encourage the growth of unsightly algae and also cause the water temperature to become too high.

Far better to select a darker area of the room in a corner, or perhaps an alcove, where the amount of light reaching the tank can be carefully controlled by artificial means. Do not overlook the need for electric power for lighting, heaters and pumps, etc, so a conveniently-placed electric socket is essential to avoid ugly and potentially hazardous trailing wires.

A vital factor frequently underestimated by the newcomer but which can have dire consequences if not properly considered is that even a fairly small aquarium when furnished and full of water is HEAVY. One litre of water weighs a kilo so an aquarium containing say 100 litres will carry a weight of 100 kilos PLUS of course the weight of the tank itself together with gravel substrate, ornamental rockwork and all other necessary equipment. For this reason, great care must be exercised when deciding where (and upon what) the aquarium will

THE TRIO INTERNAL POWER FILTER HAS BEEN DEVELOPED TO GIVE IMPROVED PERFORMANCE OVER STANDARD INTERNALS BY ADOPTING A THREE CHAMBER DESIGN THAT IS EXTREMELY USER FRIENDLY.

Photo: Rolf C. Hagen (UK)

stand; a nice well-placed sideboard or occasional table may on the face of it appear ideal, but beware! Few pieces of modern furniture can withstand this sort of weight and a disaster will be waiting to happen.

Commercially-manufactured stands and cabinets designed for the purpose are readily available from stockists in either standard sizes or made to order in dimensions precisely tailored to your requirements. But even these need care when carrying a large tank and on floorboards it is wise to try and position over the joists so that the weight load is supported and more evenly spread. Whatever location is eventually chosen for the aquarium do make sure that it is easily accessible for regular routine maintenance and, of course, feeding.

TANK STYLE AND DESIGN

Since the introduction of silicon rubber sealants which effectively revolutionised aquarium construction, allowing attractive all-glass tanks to be built without angle-iron frames, the popularity of the hobby has steadily increased. This, together with the rapid technological advances which have taken place in recent years with associated aquatic equipment, have combined to make the whole business much more 'Domestic Friendly'.

Consequently, today the range of aquaria widely available is greater than ever before from relatively inexpensive basic tanks in extruded acrylic to sophisticated integral pieces of furniture built in all manner of shapes, sizes, styles and designs and finished in a variety of wood veneers to complement almost any interior decorative setting. The final choice will be determined by personal preference and individual circumstances together with, of course, the ever-present budget considerations.

MARINE AQUARIUMS, ESPECIALLY THOSE CONTAINING INVERTEBRATES NEED PLENTY OF LIGHT.
Photo: A&P Library

TRONIC HEATERS OPERATE WITH A PATENTED SENSOR THAT MONITORS WATER TEMPERATURE OUTSIDE THE HEATER TUBE.

Photo: Rolf C. Hagen (UK)

HEATING, LIGHTING AND OTHER EQUIPMENT

As has already been suggested, natural light is by no means a necessity for the aquarium and in fact has quite considerable disadvantages. The fishes themselves, with a few notable exceptions, do not require bright light at all as a prerequisite for health and are generally perfectly happy in quite subdued conditions. Light in the aquarium therefore serves two principal purposes, for plants which do require it in order to photosynthesise and thus thrive, and for illumination so that your fishes and aquascape can be seen in all their beauty.

These days many aquarists choose to use the various ranges of excellent highly-realistic artificial plants that are readily available, especially when incorporating a filtration system that does not lend itself to successful plant growth or when keeping fishes that like a vegetarian diet. In this event the requirement for lighting is down to purely aesthetic reasons.

It is perfectly possible to use either tungsten or fluorescent lighting in the aquarium but the opinion of most experienced fishkeepers is that the latter is the better option. Although initially more costly to install it is less expensive to run, has considerably longer lamp life, does not run hot and provides much more even illumination. Whichever system is used the intensity

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and duration of light required will be determined by the presence, or absence, of plant-life and your viewing habits.

The installation and control of light should be carefully considered. Modern control units are slim-line and can be fitted either inside the hood (some hoods have provision allowed for the starter gear necessary for fluorescent tubes) or even nearby (hopefully, eventually, there will be extendable connectors to allow really remote siting of this gear). Of course, the actual connections to the tubes should utilise water-tight cap-covers (most up to date units use these). The correct amount of light is usually arrived at by trial and error — enough light for the plants to thrive but not so much so that algae grows rampantly! If the aquarium is sited in a separate room or fish-house you might even consider time switches to operate the lights at the correct times and for the right period.

The aquarium hood has two main purposes: to house the lighting equipment and to prevent fishes leaping out of the tank — many are very accomplished jumpers. A condensation tray should also always be used, this helps reduce water evaporation and more importantly protects electrical contacts from dampness as well as keeping dust from settling on the water surface.

Keeping tropical fishes in a temperate climate obviously involves the need for a heater. The most popular method is the submersible combined heater/thermostat, modern versions of which are reliable, easily adjustable to a specific temperature and available in a range of models and wattages to suit most tank sizes. The cost of running such a heater will be determined by the volume of water, the desired water temperature and the ambient room temperature. To ensure that the correct water temperature is always maintained a reliable aquatic thermometer is essential. These are inexpensive and are available in various designs; the traditional type positioned inside the tank with the more modern liquid-crystal fixing to the outside of the glass.

An air diffuser — airstone — powered by a small pump adds significantly to both the appearance of the finished aquarium by creating a column or wall of bubbles rising to the surface, as well as to the operation of the tank system itself by keeping the water circulating thus helping to avoid hot/cold spots. It is also beneficial by introducing a certain amount of oxygen into the water as well as assisting to disperse carbon dioxide waste.

Finally, a word on safety which, although frequently mentioned, cannot be over-stressed: water and electricity are a potentially-lethal combination and great care should be taken at all times especially when carrying out routine maintenance on your tank. Always ensure that all electrical equipment is switched off at the mains before immersing your hands in the water, not of course forgetting to switch it back on again when the job is completed! That way both you and your fishes will hopefully enjoy long and healthy lives.

What Filter - and Why?

MARTIN CHANDLER FILTERS OUT THE MYSTERIES OF AQUARIUM FILTRATION

One of the most important requirements of the modern aquarium is the inclusion of a system of filtration. This filtration can operate in three different ways:

Firstly there is biological filtration. This type of filtration can come in a variety of guises. Principally it is used to remove the metabolic waste product ammonia, that is produced by fishes in the aquarium. Biological filtration occurs due to the action of de-nitrifying bacteria which naturally break down waste products as part of the nitrogen cycle. However, a bi-product of this process is Nitrate which, when present in high levels adversely affects certain sensitive fish, needs to be watered down by a process of regular partial water changes. Nitrate levels will also be controlled by the presence of plants which can utilise it as a food.

Secondly, there is mechanical filtration. This is what most people new to the hobby envisage filtration to be all about. That is the removal of suspended matter in the water leaving the water crystal clear. Although very important to us, the hobbyist, this method of filtration is probably not as important as the former as far as our fish are concerned. There are a wide variety of filters for this purpose many of which double up as biological filters.

Finally, there is chemical filtration. This occurs when the aquarist uses filtration to control the chemical composition of the water in the aquarium. This can be done before the water is added, or as part of a filtration system either within, or outside, the tank. Such filtration might be used to alter pH, hardness, remove metals and minerals, and control nitrate.

BIOLOGICAL FILTRATION

The most commonly used form of filtration of all is the under-gravel filter which to a certain extent doubles up as a mechanical filter. It works like this:

The media, gravel, is placed on top of a filter plate. This filter plate can be a single large plate that fits the inside dimensions of the tank, or it can be made up of several plates that interlock. The plates keep the gravel off the base of the tank and are pierced with numerous small holes which allow the passage of water. At the back may be one or several so-called up-lift tubes. These are powered by air or mechanical action. In the air system a air stone is placed at the bottom of the up-lift. As air bubbles rise to the surface they push water ahead of them creating a temporary vacuum behind. This causes an upward water flow, drawing water from below the filter plate, which in turn draws more water down through the gravel. The gravel houses a culture of aerobic bacteria which break down the ammonia to less harmful products. In order to maintain these bacteria the water flow must be continuous and it is therefore important that any air pump or power-head used to create the water flow is not shut down, especially overnight as some people have done in the past due to the noise! Noise is a drawback of this system with the air driven method; although power-heads are almost silent they may pull the water through the gravel media too quickly for it to have maximum effect.

Other media than gravel is used in other forms of filtration for biological action and they will be discussed later. Undergravel filtration works no matter which way the water flows, recent systems pump water

BELOW LEFT: A REDUCTION IN WATER FLOW CAN BE DUE TO A SLIMED-UP IMPELLER; CLEAN REGULARLY.

BELOW RIGHT: SEPARATE FILTER MEDIUM CONTAINERS ALLOW FOR MECHANICAL (FLOSS), CHEMICAL (CARBON) AND BIOLOGICAL (CERAMIC PIECES) ACTIONS TO OCCUR WITHIN ONE UNIT.

Photos: A&P Library

(previously cleaned in an external canister filer) back up through the gravel which, theoretically keep the gravel detritus free.

The most recent development on biological filtration is the fluidised bed system where the whole filter medium is kept literally in suspension in the water, thus never becoming clogged as does its more stationary relatives. There are other forms of biological filtration available. Air-driven sponge and corner box filters both work by biological action and all these filters including the under-gravel have some mechanical effect in trapping suspended particles, however, they need cleaning on a regular basis to remove this matter. The sponge can be rinsed out in some of the tank water NOT tap water or the bacteria culture will be harmed. When it comes to cleaning a under-gravel system this should be done by siphon when doing a water change. Gravel-washers gently disturb the gravel and remove the detritus without making a mess of your tank, use one of these. DO NOT empty the tank and rinse the gravel in tap water periodically, this has often been done by those wishing to remove the accumulation of detritus. This will destroy the bacteria culture, use the siphon method. For a under-gravel filter to reach optimum effectiveness it may take several years and quite a build up of detritus which helps feed the bacteria. Provided the tank does not house messy digging fish like cichlids this build up is not a problem and will also help nourish any plants.

MECHANICAL FILTRATION

Mechanical filtration removes the suspended matter from the water. Some of the most effective mechanical filters are the electric-powered type designed to be housed either inside or outside the aquarium. There are two types of internal power filter currently popular in the hobby.

One type is of a simple small container design with a power-head at the top. This filter usually houses only a sponge although some of the larger models can take small amounts of additional media. The sponge is used to trap any suspended particles before the clear water is returned to the tank. The sponge also doubles as an effective biological filter as it has a network of tiny holes providing a large surface area for the aerobic bacteria to gather. These types of filters are often used alongside a standard under-gravel system as a water cleaning filter. They are very effective at this job but need regular maintenance. The sponge will soon become clogged with detritus and once clogged it slows down the flow rate and reduces the efficiency of the filter.

Therefore, it is advisable to clean the sponge about every second water change. Again clean it by rinsing in tank water removed at the water change, to prevent harm to the bacteria culture. Finally, some of these filters are very powerful pushing out over 1,000 litres of water per hour. This type of flow rate will create strong currents even in the largest of aquaria, therefore it would be advisable if you use a filter of this size to return the water via a spray bar to break up the current.

A second type of internal filter which is becoming more and more popular is the multi-chamber filter. These are either wet only or can be wet-dry in design. With the wet dry-type, one compartment which contains media, fills with air, this is then pushed out by water, thus creating a high level of oxygen for the aerobic bacteria. The compartments in this type of filter usually contain media for the three main types of filtration. In the main, the first compartment houses a sponge for mechanical filtration. This sifts out any suspended particles before the water enters the other chambers. Again this sponge is liable to clogging and should be cleaned as suggested on a regular basis.

Other media commonly used are Siporax, biotic rock, per-lag, clay pipes, and plastic. There may well be additional chemical media for removal of other substances.

ABOVE A TYPICAL OUTSIDE POWER FILTER WITH ISOLATING TAPS, FLOW CONTROL AND A HIGHLY-VISIBLE FILTER MEDIUM. Photo: Interpet

BELOW THE SPECIAL SILICA SAND FILTER MEDIUM IS MOVING IN THE WATER ALL THE TIME. Photo: ARP Library

CHEMICAL FILTRATION

Altering the chemical composition of aquarium can be done in two ways. Firstly one can remove items from the water to affect pH, hardness, and mineral content. Alternatively items can be added to the water to raise the levels of pH, etc. Probably the most simplistic form of chemical alteration is achieved by the use of activated carbon. This substance acts like a sponge adsorbing many dissolved minerals, especially metals, and helps keep the water crystal clean. However, there are two major drawbacks with carbon! Remember it acts like a sponge and, just like a sponge when over-loaded, it leaches back all its contents into the tank, often all in one go. The second draw back is that carbon will also adsorb chemical remedies used to cure health problems within the tank. So it should not be used when such treatments are required. Most activated carbon has a maximum life span of two to three months depending upon the cleanliness of your set up, etc. It would be wise to replace it every two months and certainly check the manufacturer's instructions in relation to this. All this having been said it is still a very useful substance and is of great use when preparing water for use from a tap or rain water butt.

For most of the UK tap water tends to be slightly alkaline and often very hard indeed. This is fine for those wishing to keep African Rift Lake cichlids, anabantoids and many Central American livebearers. However, a great many tropical aquarium fish originate from the Amazon or Congo River basins. These fish are mostly soft water fish that desire a pH of less than neutral being slightly acidic. One method of achieving this is to use rain water, but of course this method may not be practical to many aquarists who perhaps live in tower blocks or flats. In which case the hobby has responded to the needs of such people with a variety of ion-exchange resins and other water altering media available. Ion exchange resins are used principally to lower hardness by removing the dissolved minerals that cause water to be hard. These minerals can often be seen as limescale in your kettle or around your taps. These resins are available in loose form for addition to external or internal filter systems, and in canister form for attaching to your taps to pre-filter the water prior to use. Once the hardness is lowered right down, lowering of pH is quite easy. This can be done by adding natural acids from substances such as peat fibre/granules or Humquate. There are also a number of powdered pH buffers available for adding to the water. Some are quite stable and will not allow the water to drop below a certain level, however, other can cause rapid large drops in pH which can cause extreme distress to your fish and even death. Therefore when attempting to alter pH in such a fashion you must be careful and follow manufacturer's instructions to the letter, also be patient it may take some time for the effects to occur fully in your aquarium.

Alternatively raising of the pH may be required if keeping fish that thrive in very hard water with relatively high alkalinity, such as Lake Tanganyika cichlids. Substances such as coral sand/gravel, tufa rock and calcium-plus will all assist in this and there are a number of additives available for use much in the same way as already described for taking the opposite action.

Another scourge for those restricted to using tap water for the aquarium is Nitrate. This substance in high concentrations is not appreciated by fish and can affect growth, breeding and health. This is a separate issue to nitrates that occur within the tank which regular water changes are principally used to reduce. Obviously such water changes are not going to have much effect if the 'fresh water' already contains nitrate! Again there are resin-filled canisters that can be used to remove this from the tap water prior to use and they can, in most cases, also be re-charged making them quite economical in the long term. However, some nitrate-removing resins, as with carbon, have been known to 'dump' back the removed nitrate into the water causing instant high levels.

EQUIPMENT

In this article I have discussed the need for filtration and how it is used to control the water quality within an aquarium. Systems of filtration have been discussed that can be bought to cope with the waste products of the fish and control water. There are a great many types of filtration available from the relatively cheaply-priced, but very effective, air-driven under-gravel filter to the costly but very useful external canister-type filters which can be used to good effect in all three types of filtration I have suggested.

CONCLUSION

There is, however, other factors that need to be appreciated whatever filter you decide is right for your aquarium, no matter how little or how much you pay for it. You need to understand how the filter works, what it can (or cannot) do, if it will affect the fishes' lifestyle in the aquarium (not all fish appreciate 'tidal waves' all the time) and how much maintenance you need to do in order that the filter can continue to do its job. A smaller, often overlooked detail, is the primary one of fitting the filter to your set-up; will the filter pipes pass easily through the cabinet to the filter canister? Most moulded-on plugs won't pass through small angle left between the glass hood-supporting shelves. Can you remove the body of the internal filter easily for cleaning — some new models now leave the motor and supporting bracket behind in the tank. All these niggles can have a deterring effect on maintenance tasks.

The amount of systems and different brands available to aquarists makes choosing filtration very difficult. However, it is a vital part of your tank and you should buy the best system that you possibly can to enable you to control the water to the best effect for whatever fishes you decide to buy.

Whatever you do, do not under-do it, in my opinion there cannot be too much filtration, as in small bodies of water such as aquariums the fish are being forced to live in a limited amount of water, which without good filtration, soon become saturated with the waste that they continually produce.

Think of your system as being the sewage works — cleaning and reproducing water fit to drink whilst trapping the detritus in a manner that is easy to remove — if you do this correctly the battle to having fit and healthy fish is won!

Aquarium Decor

RICHARD FRIEND INVESTIGATES SETTING UP A 'DES. RES.' FOR FISHES

PHOTOGRAPHS A&P LIBRARY

Decor could be said to be the core of the aquarium. So what do we mean by decor? The dictionary says decor is a decoration as in the theatre. To many people, their aquarium is a theatre, a place to sit and gaze, look in wonder, let the mind wonder and relax, while a scene from another part of the world takes place in front of them, complete with all the dramas, the romance and the sadness of the theatre.

To many, the aquarium is not just a tank to keep some fish in, so why not let the imagination loose in the first place, and create a realistic scene a natural habitat?

Having established that decor is anything in the aquarium of a decorative nature, rather than strictly functional, what do we actually do with these items? All too often people will take time and trouble to carefully pick the tank that they want, then select the future inhabitants taking an age to browse the dealer's tanks. Then, in the rush to get started, drop in any ornament or novelty that might be handy. Why not instead take time to create a setting that will not only give the aquarist lots of pleasure, but also be pleasing to the fish. A relaxed and contented fish is a happy fish. A happy fish is a healthy fish!

ABOVE CORK BARK ADDS A NATURAL TEXTURE TO THE TANK DECOR

BELOW A ROCKY BACKGROUND PROVIDES AFRICAN LAKE CICHLIDS WITH PLENTY OF RETREATS

START AT THE BOTTOM

Other than in breeding tanks, which are strictly functional, it is usual to have some sort of covering over the bottom of the tank, this is the substrate. Into this plants can be planted and it offers a cushion

for the decor that is to follow. There are, for special circumstances, sands available; however, the more usual choice is natural gravel, about 6mm is fine — you will get the correct material if you purchase it from you aquatic shop, it will still need repeated, and thorough washing, stirring vigorously until the water runs clean.

As well as 'natural', there are other types of gravel available in a wide range of colours, from white through red and blues to black but do make sure that these gravels are 'colour-fast' — you don't want variable colour water any more than you want harmful dyes leaching out which might harm the fish. Always try a sample of gravel in a jar of water first to see how it behaves over a period of time. You won't have success with a 'soft water' aquarium if you use gravel containing calcium or other water-hardening elements — check them out first with a drop of vinegar on a sample — if it fizzes then you've got calcium.

CREATING A BACK-DROP

Having decided on the bottom substrate, the next stage is to tackle the back of the aquarium. This is an important area as it will give your final set-up depth and life rather than just a bland sheet of glass as a back drop.

There are sheets of printed waterproof paper on the market available with a number of different scenes to complement the idea that you have in mind. This is then cut to size and stuck to the back glass on the outside of the tank (it is not that waterproof!).

Your disguising of the back glass need not stop there. Moving to the inside of the tank, bark cork can be cut and siliconed onto the glass giving a very pleasing and dramatic effect. Thin

ABOVE 'ROCK FROM A CAN' IS EASY WITH THIS DIY SPRAY-DECOR

BELOW CLOWNFISHES MAKE FULL USE OF THE LIVING DECOR PROVIDED BY THE SEA ANEMONE.

pieces of slate are also useful for this purpose, again siliconed in place; give this extra support until the silicon has cured. When algae starts to grow on these surfaces the effect is stunning. Do make sure there are no tiny gaps left through which the fish can gain access behind the decor!

A word on silicone, the aquascaper's friend. Always be sure to use only aquatic recommended silicone, make sure also that all surfaces are free of dust or grit, and completely dry. Moderate use of the hair dryer can help here to both dry put the tank and to accelerate curing, which usually takes 24 hours. Do make sure you use silicone in a well-ventilated atmosphere as the fumes can be quite strong.

THE MAIN TANK LAYOUT

Now is the time to move on to the main tank area. By now you should have, from previous research, a good idea what type of materials you should use to recreate the habitat of the fish species you intend to keep (I have also offered some tips later). However, if your dream is to have the underwater scene of a village pond, and very nice too, I would stop short of the miniature old bike, car tyre or supermarket trolley!

Should your choice of gravel have been of the multi-coloured variety, then you may wish to adorn it with some of the many aquatic ornaments that are available. You will be able to choose from Treasure Chests, Ruins, Churches, Castles, Sunken Ships, Barrels and Divers — many with air bubbles emitting from them.

If you are aiming for the more natural look, the choice is also wide. Your dealer will be able to supply you with Bogwood, which is petrified tree root that gives plenty of scope for ideas in the tank layout. Bogwood can be cut to shape, or even drilled, to create cups in which to plant aquatic plants, either natural or plastic. The wood must be soaked well and scrubbed, and as an extra precaution it is a good idea to give it several coats of polyurethane varnish to prevent the leaching of tannins which will discolour the water.

ROCKS

Rocks make ideal decor materials, and again they offer great scope for natural layouts. Slate can be chipped into required shape and size. Pieces laid on the substrate are often used for egg laying, do not use too large pieces that might inhibit an undergravel filter system if in use. Other pieces can be built up in strata fashion, that is layered, also with some leaning against others to form caves.

Tufa rock is available from your dealer, and is ideal when setting up for Mbuna. Tufa can be drilled and cut to required shapes, then rocky cliffs formed with caves and retreats using silicon to assemble the lumps. A word of caution, tufa rock does turn water hard, so check that this suits the fish that you have in mind.

Other rocks might be collected during a walk along the beach, or even an inland walk, although always have conservation in mind

when deciding what to collect. Large flints offer great scope and can often be found with holes, and formed into interesting shapes. Think big, as two larger rocks can have a dramatic effect, compared to a scattering of smaller stones.

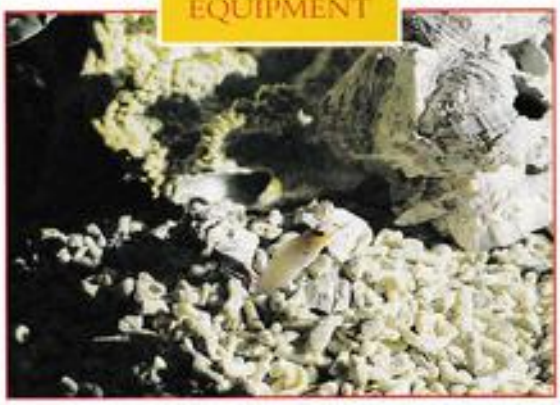
A word of warning, some rocks (like some gravels) will effect the water chemistry. Ones that will — and are therefore best avoided — are limestone, coral, shells and marble. Always clean and scrub all rocks and stones thoroughly before use, whatever their origin.

OTHER MATERIALS

Also often used for aquatic decor are flower pots; small clay ones make ideal caves and often are taken up as private egg-laying sites especially by small cichlids. Well-washed coal or coke (not the drink or drugs type) give scope for colour contrast. There is also on the market, decor that can be sprayed from a can. this then swells up into a solid mass and allows you to create splendid scenes.

Synthetic logs, branches and tree stumps created from safe resins make excellent, natural-looking decorations and of course this material has also been widely-used to create sunken archeological features too, with complete safety to the fish.

We should not leave out plants. Plants help to finish an aquatic scene. Picking the ones to suit the type of habitat that you are aiming at should prove no problem. Should you feel that you do not fancy underwater gardening, there are a vast amount of plastic varieties available, which are very realistic-looking particularly when covered in a film of algae.



A DEEP SUBSTRATE OF CRUSHED CORAL SUITS THE BURROWING YELLOWHEAD JAWFISH

POSSIBLE LAYOUTS

Thinking big? Perhaps an Oscar is your choice, then make the decor big to match. A large piece of bogwood (slate especially if you have a breeding pair), a suitable-sized flower pot for a retreat and complement the scene with plants, which will have to be plastic to avoid the attentions of the inhabitants.

A community tank might contain bogwood, slate, large pebbles and plastic, or natural, plants.

A coldwater community looks good with large rocks, mixing in larger leafed plants which must also be plastic. Avoid sharp substrate, coldwater fish like to grub around in the gravel.

An Amazon river scene should have brown substrate, large pebbles, bogwood, and the plants should include an Amazon Sword plant which is a favourite breeding site for Angel fish. The lighting is lower in this set-up so some difficulty might be found growing real plants.

South-East Asia is some people's choice: here, if kept clean, sand looks good with large bright pebbles, and Water Wistaria and Java Fern complementing the scene.

For Cichlids, think rocks — with plenty of hiding places and caves. A few tougher plants might be used, but if they do not suit them, the fish will soon rearrange them in no uncertain terms! Flower pots are a favourite.

POINTS OF CARE

When setting out the materials, use them to disguise the essential tank equipment. Heaters and internal filters can be hidden or blended in. Make sure that there is still sufficient water flow around such items.

Handling large rock needs care, especially with wet hands. Flints are exceptionally slippery — Sod's Law says that that rock will go pop out of your hand just as it is over the tank. Also give larger pieces a good bed of substrate as a cushion, a very thin layer of gravel could mean that all the weight of the rock is resting on one particle and pressing on the base glass, which could cause a fracture.

I hope that this has given you plenty of food for thought when setting up that new tank, or changing your existing one; give careful thought to decor, it makes all the difference. Besides would you like to live in your lounge with furniture that you do not like, or no furniture at all? Why not make your fishes' home a home from home?

Is Something Missing From Your Aquarium?

CHRIS ROSAM SAYS CARBON DIOXIDE CAN BE MORE VITAL IN THE AQUARIUM THAN YOU MIGHT REALISE

PHOTOGRAPHS BY THE AUTHOR UNLESS OTHERWISE STATED

Of all the aquarium types arguably the two most attractive aquarium types are the freshwater planted aquaria (Dutch if you wish), and the marine mini-reef types. Perhaps this is because these two aquarium types come closest to mimicking natural aquascapes. Without doubt they can present the greatest challenge to the aquarist. They may also have much else in common apart from their obvious beauty, and share many aquarium

THERE ARE CALCIUM AND CARBON DIOXIDE CONSUMERS APLENTY TO BE FOUND IN THIS PHOTOGRAPH.

LEFT A SMALL BASIC CO_2 DOSING KIT.

RIGHT CO_2 BUBBLES FIERCELY FROM SPECIAL TABLETS IN THIS INTERNAL DIFFUSER UNIT.

Photos: A&P Library

technologies although these may not be immediately apparent.

Some are quite obvious, such as the need for good lighting albeit at different colour temperatures to enable the plant life in both aquaria types to photosynthesise effectively. They both will normally use biological filtration of one kind or another and naturally they will be heated to tropical temperatures and may even as a result of the high lighting load require cooling during the summer.

But equally there may be something missing from many planted and reef set-ups which prevents the aquarium reaching its full potential. Something that has been around since life evolved, and is one of the basic building blocks around which all life depends. Something that at first glance would appear to have nothing in common with the planted and mini-reef aquariums, and indeed could not be used to more different effect — the answer — carbon dioxide.

Carbon dioxide is a much maligned gas cited as the principle gas causing global warming and regarded by many aquarists as a waste gas to be rid of by aeration. Certainly in high concentrations it is deadly. But its presence in the right quantity is absolutely vital for plants of all types to photosynthesise and produce the oxygen that higher forms of life require.

Carbon dioxide diffusion systems, when used correctly, will not only improve plant growth and development but can also assist in the control and stabilisation of the aquarium waters pH. The salient difference in usage of CO_2 in the two aquaria is that in the planted aquarium the CO_2 can be used to lower pH values, and conversely in the mini-reef to raise pH. To understand how this can be so and what the advantages are to the respective aquariums a few principles showing the chemistry of how CO_2 reacts in water needs to be understood.

THE CHEMISTRY

When CO_2 is added to freshwater (H_2O) carbonic acid (H_2CO_3) is produced. If calcium carbonates are present (the elements that produce carbonate hardness and often quoted in units of KH) it will associate with the carbonic acid to form calcium bicarbonates ($Ca(HCO_3)_2$). This process effectively binds up all, or some of the CO_2 present. It therefore follows that the greater the carbonate hardness of the water the greater the amount of CO_2 that will need to be added before this buffering effect (or Acid Binding Capacity) is overcome. Only then is CO_2 freely available to the plants and the carbonic acids can begin to decrease the pH. So it can be seen that in setting up a CO_2 system the amount of gas required to be added to the water to create the desired effect will be dependent upon the carbonate hardness of the water and its volume.

THE RESULT OF CARBON DIOXIDE FERTILISATION IN THE FRESHWATER AQUARIUM IS OPTIMUM PHOTOSYNTHESIS AND THE FORMATION OF OXYGEN BY PLANTS, NOT TO MENTION IMPROVED GROWTH RATES.

THE PRINCIPLES

So you may ask why when carbon dioxide is present in the air do we need to consider adding more to the aquarium? AtmospHeric air contains approximately 0.03 per cent carbon dioxide, which is clearly enough to sustain terrestrial plants and is of course constant. However, this adequacy does not usually extend to the closed environment that is the aquarium. In the planted aquarium the little CO_2 that diffuses in from the air or that is being respired by fish is quickly used by the plants or is mopped up into

calcium bicarbonates. In addition at the surface of the water (the laminar layer) a gas exchange is constantly taking place, and as a result the gas content of both water and air try to equalise. Since normally air has a higher oxygen content than water aquarist have long known by agitating the surface the oxygen level in the water is increased. The more the surface area is disturbed the thinner the laminar layer becomes, and thus the rate of gas exchange is increased. Whilst this is generally good news for fish, it is not so good for plants. If the aquarium is aerated or has a highly agitated surface then what small amount of CO_2 there is effectively forced out back to atmosphere until an equilibrium of 0.03 per cent is reached.

Nonetheless, some plants have the ability to unlock the carbon dioxide from the calcium bicarbonate, but in doing so cause calcium carbonate to be precipitated ($Ca(HCO_3)_2 - CO_2 = CaCO_3$) which will appear as chalky deposits around the tank and cause a rise in pH. This process is known as Biogenic decalcification and in extreme cases the pH may rise until no aquatic life can exist, but long before that the plants that have little or no ability to extract CO_2 in this way will have perished.

If CO_2 is added at a measured rate then we can ensure that the pH of a planted aquaria is prevented from rising and if necessary reduce the pH to a value of 6.6-7.0 that most plants prefer, and of course ensure their CO_2 needs are constantly met. If the pH is not to plummet, some form of control is needed and this can take the form of bubble counters, diffusion bells with a specific surface areas or if money is no object micro-processor-based control systems exist which can be preset to hold a specific pH.

IN THE MINI-REEF

The need for carbon dioxide in the reef aquarium is no less important as it is required by both macro algae and zooxanthellae algae within the hard and soft corals. Tanks with a good deal of Caulerpa growing well will show a marked difference in the pH level prior to the lighting switching on and when they switch off as CO_2 is absorbed. As with the freshwater aquarium this variance in pH can be prevented by adding CO_2 in a very controlled manner as a drop in pH below 8.0 should not be allowed. Since the marine environment is one of almost constant stability the animals and plants that inhabit the seas are often unable to tolerate variable water conditions.

The addition of CO_2 will also have another beneficial effect in the marine mini-reef which is not relevant to its freshwater counterpart. Not only are their consumers of CO_2 present but the corals and coralline algae use large quantities of calcium as they grow, thus reducing the calcium and carbonate concentrations within the water. This in turns reduces the waters acid buffering capacity and can lead to an undesirable drop in pH.

This effect can be prevented by good quality and regular water changes. Even though the aquarium may include a good deal of calcium carbonate ($CaCO_3$) in the substrate or within the decor a deficiency may occur as calcium carbonate is not particularly soluble.

Some aquarists have advanced this process further by developing calcium reactors which feed calcium bicarbonate rich water into the aquarium.

A calcium reactor consists of a vessel filled with a calcium rich substrate such as crushed dolomite. The aquarium water is passed through the vessel as it returns from a filter and back to the aquarium. CO_2 is also added to the vessel to form a carbon dioxide rich atmosphere and thus the creation of calcium bicarbonate. It is essential that these systems are finely controlled as left to there own devises they would continue to raise the carbonate hardness and increase the alkalinity and pH. At present the only reliable way to achieve this is by an electronic pH controller and gas solenoid valve on the CO_2 delivery system. The main draw back of these systems is their price. What such systems do provide in return is an answer to decreasing pH levels and any deficiency of carbonate hardness in the mini-reef.

THE DIFFERENCES

So it can be seen that whilst carbon dioxide reacts in the same manner in freshwater and saltwater the objective of its use in each aquarium type could not be more different. In the freshwater aquarium we

THE MINI-REEF REQUIRES THAT PH AND CARBONATE HARDNESS VALUES REMAIN CONSTANT. HOW CAN CO_2 HELP?

wish to ensure there is sufficient CO_2 available to enable plants to photosynthesis efficiently, to perhaps lower the pH and prevent it from rising. As an added benefit the amount of oxygen produced by the plants may well equal or exceed any amount that could be provided by aeration.

Conversely in the mini-reef aquarium CO_2 can be added to produce soluble calcium bicarbonates which will be readily available to corals and algae. The carbonate hardness can thus be kept stable and pH prevented form falling.

The other major difference is cost, a system for a freshwater planted aquarium can be controlled fairly crudely and therefore will be a good deal cheaper than any system used in conjunction with calcium reactors. The latter will demand state of the art electronic control to ensure close control of pH is achieved.

THE GAS THAT PRODUCED LIFE?

In general aquarists pay great attention to oxygen levels as it is an obvious requirement of animals. Oxygen may be regarded by many as the most important gas for life to exist on earth. But it may surprise many to discover that when life began on earth the atmosphere contained 98 per cent carbon dioxide. Only when the first simple plants began to photosynthesis was oxygen produced as a waste product and introduced to the atmosphere. It can perhaps be concluded that without CO_2 there would have been no life on earth. Perhaps it is little wonder that the inclusion of carbon dioxide into the aquarium can, when well controlled, reap such benefits.

IS THE PLANTED AQUARIUM CLOSE TO A NATURAL BALANCE? MAYBE, BUT SOME OUTSIDE INTERVENTION IS OFTEN NEEDED

Jackie's Juniors

Hi, Junior Fishkeepers, it's time for fun again. The Wordsearch this time is bigger and harder than usual. This should help pass the time now the evenings are longer.

I wonder how many of you have used your hobby to gain badges for Brownies, Cubs, Guides, Scouts or other youth groups. You could go for your hobby badge, pet care or animal lover, the Scouts have the smallholder badge and of course the collector badges. I would love to hear about how your hobby helped you to gain extra badges for any of the organisations. If you have not thought if this yet, have a word with your leader. There are always members of local societies prepared to come and talk to youth groups and help with assessments. Should you have any problems finding someone, just write to me and I'll put you in touch with the right person.

Many of you will have changed schools recently. I'd love to hear about your new school. Do they have an aquarium? What is it like and who looks after it? Could you encourage your new school to have a community aquarium for all to see and be proud of! Do write so I can tell everyone and draw a picture if you can. Don't forget your name, age, address and if you belong to a local Society.

Remember, those lovely people at John Allan Aquariums are giving a prize for the best received — SO DON'T DELAY — DO IT TODAY!
Please write to: Jackie's Juniors, c/o A&P, MJ Publications Ltd., Caxton House, Wellesley Road, Ashford, Kent TN24 8ET.

JOKER TIME

Thank you for sending in your jokes. Here are a selection of those that made me laugh:

Q. Where do fish go on holiday?
A. Finland.

Q. Why is a Scorpion Fish good at maths?
A. He has lots of spines to count on.

Q. What is a frog's favourite game?
A. Croquet.

What's the best name for a Weather Loach?
A. Michael Fish.

Boy: 'Mum, if I wan to try to breed Livebearers, would you buy me two tanks so I can keep single species for my chosen fish?
Mum: 'That is very sensible of you, yes of course dear, what species do you want?'
Boy: 'Rays and Great White Sharks!'

WORD SEARCH

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

WORDS TO FIND

ACID
ALKALINE
ANGELFISH
BOGWOOD
CATFISH
FILTER
FOOD
GRAVEL
GOLDFISH
GUPPY
HEATER
LIGHTS
NETS
PEAT
PLANTS
PLECO
POND
SHARK
TAIL
WATER

GLORIOUS GUPPIES

DEREK LAMBERT

POINTS THE WAY TO SUCCESS WITH THESE LONG-ESTABLISHED FAVOURITES

PHOTOGRAPHS BY THE AUTHOR

Of all the lovely aquarium fish the Guppy ranks as one of the most beautiful. Even in its wild form it has pretty splashes of colour over much of the body, but since aquarists started breeding for brighter colours and larger finnage the Guppy has been transformed into a real stunner.

The Guppy first made its way to Europe in 1861 when von Tremezzo brought back fish from Barbados but these soon vanished into obscurity and it was the 1866 import of live fish from Trinidad which launched the Guppy both in the hobby and as a world traveller. These fish were brought back to England by John Lechmere Guppy and were described as a new species by Gunther of the British Museum (Natural History). Gunther named them *Girardinus guppii* after the collector, but realised it was very closely related to a fish already described by Peters in 1859. The two species where finally recognised as the same fish by Rosen and Bailey in 1963 and the current scientific name of *Poecilia (Lebistes) reticulata* established. Gunther's original scientific name may no longer be valid but the common name of Guppy which arose from it is known the world over, as is the fish.

Even today the different races of this fish cause confusion about their name. Some time ago a fish was imported to the UK and sent for identification at the British Museum. Jim Chambers, who was working there at the time, looked at it and decided it was nothing more than a race of Guppy. Instead of writing back to the aquarists concerned saying this was the case, he wrote and said this fish was 'Endler's Livebearer'. Now, as anybody who reads scientific papers on the behaviour of fish would know, Dr Endler has published many papers on *Poecilia reticulata* and Jim came up with 'Endler's Livebearer' as a joke. This, however, backfired when the name 'Endler's Livebearer' started appearing in specialist publications and

LEFT
BLUE DELTAIL GUPPY FEMALE

BELOW
DOUBLE SWORD GUPPY MALE

RED DELTATAIL FEMALE GUPPY

the various Federations which control fish shows around the UK added this name to their size lists and put the fish into Any Other Variety of Livebearer class instead of Guppies! This has finally been sorted out but it has taken a lot of time and quite a few arguments to convince people it was nothing more than a joke which went wrong.

Apart from being the origin of the common name, the Trinidadian Guppies also began a great voyage of colonisation. Because of their appetite for Mosquito larvae someone had the idea of introducing them to habitats around the British Empire to combat Malaria. The result of this is that Guppies can be found in almost all tropical and many sub-tropical parts of the world today. Most of these fish are descendants of the original import although some have escaped from aquarists tanks in more recent times.

Guppies have the reputation of being tough fish and the wild form certainly is. It can survive in temperatures ranging from 55°F to 95°F and in very soft acidic water as well as very hard alkaline water. In addition to this it can survive in the most appalling pollution. I have even caught them in what amounted to raw sewage. The cultivated forms however, whist still quite hardy, are not so tolerant. They need reasonably clean water of between 70-80°F. The pH can range between 6.2 and 8.2 but any change has to be made slowly. Dumping a guppy in acidic water when it has been living in alkaline water may well kill the fish, or in some cases burn the fins right off. So take a day to acclimatise a guppy to any drastically different water.

Sexing guppies is really easy. In adult males the anal fin is modified into a rod like structure called a gonopodium which is used to channel sperm from the males vent to the females. Males are usually much more brightly coloured and have more developed finnage as well. You can, however, sex very small Guppy babies which have not developed the gonopodium. This is done by looking at the area just above the anal fin. In adult grey-bodied females this area is black and is called the gravid spot. During pregnancy the gravid spot becomes larger and blacker until the babies are born when it reverts to it original size.

In gold coloured females the gravid spot is not coloured but is still present and can be seen as an absence of pigment. The developing babies' eyes can usually be seen through the mothers sides. What very few people realise is that the gravid spot is present even in very small fish, 90 females can be picked out long before males sex out.

One of the common myths in the aquarium hobby is that Guppies can change sex — they cannot. The sex of a Guppy is fixed by its chromosome make-up in the same way as a human's is. Accidents of nature do happen and fish with an odd chromosome make up occur. These accidents may look like females but later turn into males. They are, however, sterile and do not give birth to young before they turn into a male and never father babies afterwards. Old female Guppies which have given birth to babies sometimes develop male characteristics but these fish are also sterile by this time. Functional sex reversal has never been proven — despite many a learned authors' pronouncements.

When you set out to buy Guppies there are a few things you should take a close look at. Firstly, look for bright perky fish which are swimming around the aquarium. Avoid fish which can not carry their large tails properly. These are usually old or weak fish which will not survive long in your tank. Their fins should be open and well spread with any damage being limited to a few nicks. Ragged or badly torn finnage may not heal well and can be a sign of disease rather than accidental damage. Obviously check for any dead bodies in the aquarium. Every shop has losses from time to time, but if two or three fish have died in the same tank, then it may be a

TROPICAL Glorious Guppies

sign of a problem with all the fish in that tank. So it would probably be best not to buy any fish from this aquarium.

Another tell-tale sign of trouble is shimmying. When Guppies are ill or unhappy with their environment they tend to clamp their fins and, whilst standing in the same place, wag their body from side to side in a weaving motion. Once again it is a good idea not to buy any fish from this tank.

If you are buying Guppies for your community tank it is a good idea to buy two females to one male. This is because male Guppies only have two things on their minds — food and sex, with sex being first and foremost! They continually chase females around trying to mate with them. Whilst much of this activity is ignored by the females it is nice for them to have a break from the male's constant attention. With two females to every male in the tank each female should, theoretically, be left alone for half the time.

Once you have your fish home you should put them in your quarantine tank. 'My what?' I hear you ask. I said 'your quarantine tank'.

Every aquarist should have a small tank where they can keep any new fish for a two week quarantine period before they are placed in their permanent home. I have lost count of the number of times I hear very experienced aquarists saying they have lost a tank full of fish to a strange disease. A quarantine tank would have prevented this disaster from happening. Oh, and if you think your shop quarantines all their fish before they sell them, think again. I know of very few aquarium shops which do this. The best you can hope for is that they will not sell out of a tank where there are obviously ill fish.

Feeding your Guppies is simplicity itself. Any good quality commercial food will do but try to feed some live food once a week as well. This will help keep all your fish in the peak of health. You will often read how important vegetable matter in a Guppy's diet is. Don't believe it! Remember, Guppies were originally used for mosquito control, not weed control. A herbivore diet is totally unsuitable.

One thing to remember about Guppies is that they have a very long gut but no real stomach to speak of; this means they can only eat small amounts of food at any one time, however, they will be ready to eat again in about 20 minutes. So try to feed them three or four small feeds a day rather than one or two large ones.

Obtaining fry from a Guppy is easy but breeding good quality Guppies is one of the most difficult tasks in the hobby. First of all you are going to need three separate aquaria to do the job properly. One of these can be your main community tank but two others have to be just for rearing your Guppy babies. These tanks should be set up with filtration of some sort (avoid power filters because small fry can be sucked up in these) and the temperature set at 75°F.

If you already have a female Guppy and want to save some babies from her then place her in one of the fry tanks by herself. It is a good idea to have some plant in the tank to provide cover for the new-born babies and it also helps settle the female down. In theory a female Guppy will give birth every four weeks to fry. In fact some females are not so obliging and you may have to wait a couple of months before the expected fry arrive! These are usually born during the night so make sure you check the tank every morning for babies. When the female has given birth she should be moved back to the adult tank.

How well the fry develop will depend very much on the way they are fed by you. The large-tailed Deltas require good food fed as often as possible for the finnage to develop to its full potential. This means feeding them at least three times a day. If you go out to work then feed them live food first thing in the morning. Newly-hatched Brine Shrimp is best for this but Microworms can also be fed. Then when you arrive home in the evening feed your babies with a high protein growth food. You can give them their last feed about an hour before you turn the lights off. Ideally this should be live food again but growth food will do. This feeding regime is the minimum needed to produce good quality Guppies and better fish will be produced if you can feed them more often.

The other important factor in producing good quality Guppies is water quality. Guppies are very

WILD GUPPY, LAGUNA DE SANTA MARIA, COLIMA, MEXICO

sensitive to poor water quality caused by overcrowding. So make sure you change at least 50 per cent of the water several times a week and never overcrowd the tank. I work on one fish per 1in of tank length in aquaria which are 10in wide. So in a 24in long tank I will house only 24 fish. Initially you can have more but you must thin them out to this number by the time the fish are two months old. This thinning out process is needed by this age anyway because the fry will be sexable by this time and the males should be moved out to the other fry tank as soon as possible.

Over the next few months your baby Guppies will develop their finnage and adult colouration. You will now be able to see which are the best fish.

Select two or three of the best females and the very best male and give these a tank to themselves. The second and third best males should be moved into the adult tank and the other fish sold or given away. You will now have an empty tank again which should be cleaned out in preparation for the first babies from your own bred fish. When your best female is close to time move her into the empty tank and save the babies. When these babies are sexable move all the adults into the adult tank and split the brood into males and females again.

You can carry on in this way for as many generations as you like but eventually you are likely to need a an outcross from a closely related line. This will help put size and vigour back in the strain. Ideally you will have somebody else working with you on the strain and can swap some fish with them. Alternatively, you could have six tanks devoted to two separate lines of the same strain and you can cross them, otherwise you will have to obtain a fish of unknown background and try the outcross. Keep the old strain going in its pure form while you experiment with the outcross just in case something disastrous happens but, once you are sure, you can phase out the old line and continue on with the outcrossed line.

If you are interested in joining a specialist Society for Guppies, Viviparous — The Livebearer Information Service — runs a Fancy Guppy Section which is in contact with Guppy breeders both in the UK and abroad. To join send a cheque or PO made payable to the Livebearer Information Service for £8 to the Treasurer, Viviparous, 'Northside', Spridlington Road, Faldingworth, Market Rasen, Lincs LN8 3SQ.

VIENNESE GREEN DOUBLE SWORD MALE GUPPY

Female Guppies Prefer a Tough Guy

BY **TONY KEEGAN**

For Guppies, beauty may be more than fin-deep. American scientists have established that female Guppies prefer bright, colorful Guppy-mates to otherwise drab males.

At first glance, this might seem rather strange given the fact that the flashy bright-coloured males are a much easier target for hungry predators in the wild. But according to Jean-Guy Godin, a researcher at Mount Allison University in Sackville, New Brunswick, the brighter males have 'superior overall quality' and better survival skills. A female who mates with such a partner will increase her chances of producing offspring with better odds of outsmarting whatever larger animal is trying to turn them into lunch, therefore promoting the survival of the species.

In research appearing in a recent report of proceedings of the National Academy of Sciences, Godin reports on experiments where females picked the male who acted boldest when confronted with a predator. When the predator was removed from the experiment, the females exhibited a clear preference for the more protective and invariably brightly-colored males.

And the bad news for their drab counterparts who might dream of making up for their dull looks with wit, charm or attentiveness, is that Godin concludes: "Female mate choice was influenced directly by the defence criteria and not by male courtship."

Lock up your Lionheads ... and Pamper your Pandas

THE BLUE CROWDA

STEPHEN J. SMITH SAYS WINTER IS ON ITS WAY!

PHOTOGRAPHS BY THE AUTHOR

Yes, the summer came and went to quickly and the pond season is almost over. As the daylight hours become shorter, you can, of course, still enjoy your pond by the glow of patio lights and pond illuminations. For me, this is one of the most enjoyable times of the pondkeeping season.

But the time has come also to prepare your pond so that it and its inhabitants will survive the ravages of the forthcoming winter: before you know it even the autumn will have passed, so it is important now to make plans to ensure that your pond is clean and in good shape, and that your fish are tidily tucked away for the cold season.

For many fishkeepers summer is a time when some of the more exotic Fancy Goldfish can be kept in outdoor ponds. This presents little problem while the water temperatures are reasonably warm and stable. However, with the onset of frosts and more turbulent weather conditions, the more sensitive 'Fancies' should be bought indoors, where they can be appreciated in an aquarium (which, after all, is what the round-bodied Fancy Goldfish varieties have really been developed for, anyway).

True, I know breeders who do overwinter Moors and Veiltails, Lionheads and Fantails, in outdoor conditions. But remember, these fish are youf pride and joy! You want to appreciate their beauty all round — so what better place to put them than in an aquarium in your lounge — AND you want to ensure that the fish which remain in your pond will be healthy enough to survive through to next season. So, what is to be done?

PLANTS

The condition of your plants in the pond will have deteriorated throughout the season, as new leaves are generated and old leaves die off. This is particularly true of lilies, which also have a high turnover of blooms, leaving a rotting closed flowerhead where once was a magnificent flower.

Therefore, remove all your plants from the pond, if they are in baskets. If they are semi-permanent, then it is a good idea to pump out some of the water so that the plants are fully exposed — and accessible!

Trim off any dead or dying leaves or blooms, and as close to the rootstock as possible. Lilies, again, tend to produce long stems for both leaves and flowers, and the stems, too, will rot as soon as that leaf or flower has died, so remove the whole length. So-called 'oxygenating' plants tend to

COLDWATER
Lock up your Lionheads

be prolific throughout the summer so these should be trimmed right back — they will soon grow just as prolifically next season so

don't worry about overdoing it! And, in discarding the trimmed vegetation, it should be remembered that water plants are ideal for the compost heap. The only 'plant' which I simply CANNOT get to rot down is the blanketweed from my Koi pond — but that is another story!

It is also a good time to repot your plants if you can, and even split them up into several pots. Thus, you get two, three, or even FOUR times the number of plants you had before you started the job. And if you don't have room, you could distribute them to your friends — or even donate the surplus to your local aquarium society.

FISH

Throughout the summer you may have supplemented your stocks of pondfish with some attractive Fancy Goldfish — maybe one of the Veiltail types of Goldfish — which can be most attractive in an outdoor setting.

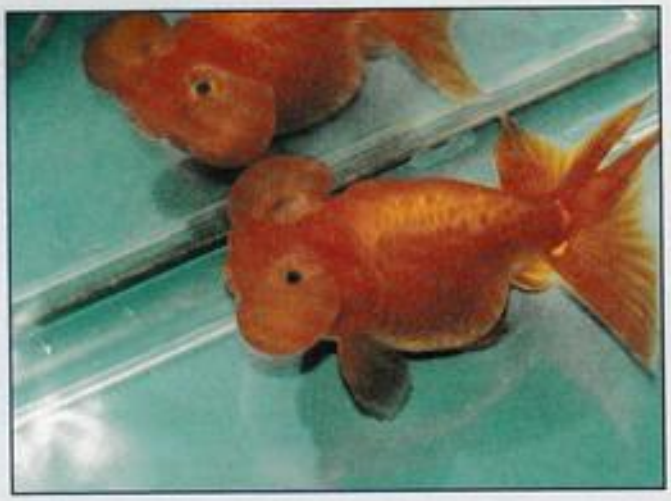
However, with the onset of colder nights, and thus unstable temperatures, it is advisable to transfer these fish to indoor quarters. Not only do the autumn months bring occasional frosts, but they can also bring 'Indian Summer' conditions, with temperatures reaching almost those experienced in the height of summer itself, then followed by a sharp dip in temperature as the sun sets. Such fluctuations are not good for fish, which prefer stable conditions, and these rollercoaster conditions lead to stress in the fish which can herald the onset of more serious diseases.

A further problem encountered with the fancy varieties of Goldfish is known as embolism. This condition shows as apparent bubbles of air in the fins — especially of the long-finned varieties such as Orandas, Veiltails, or Moors, and this is just what they are. The condition arises from too much oxygen in the water, and is more common in the summer months (but can also arise in exposed ponds at any time of the year). The two most common causes of such oxygen 'overload' in your pond water are too many oxygenating plants, and/or a bloom of algae. So, as mentioned previously, try thinning out your oxygenating plants on a regular basis, and introduce measures to combat algae in your pond, by providing shade, for example. An immediate measure to get rid of embolism in your fish is to flush out the pond water and replace with clean, fresh water, having first treated this with tapwater conditioner.

Other varieties of Fancy Goldfish which are most attractive as summer pond inhabitants are Bubble-Eyes, Celestials, and Lionheads. The latter variety are particularly sturdy, having short fins and a stocky body-shape. But I have found from experience that, again, they are most susceptible to fluctuations in temperatures. For me, although these are marvellous pond fish in a small water feature, I much prefer to see them in an aquarium setting. Bubble-Eyes and Celestials present similar challenges: these really are beautiful fish for small water features such as wooden barrel ponds, where they can be viewed from above. However, if these features provide only a small body of water, then temperature fluctuations become greatly exaggerated.

CLEANING THE POND

With the onset of winter, our main priority for our ponds is to give them a thorough cleaning. An old bath or a secondary pond is useful for holding the pond fish while you undertake the task, while large aquaria can also be put to good use. Removal of the fish from the pond will also enable you to undertake a visual check on their health: you may be surprised at just how much they have grown!



ABOVE THE Elodea FAMILY OF SO-CALLED 'OXYGENATING' PLANTS WILL HAVE GROWN PROLIFICALLY THROUGHOUT THE SUMMER AND SHOULD BE CUT BACK DRASTICALLY.

RIGHT BUBBLE-EYE.

Using a submersible pump, the pond water should be removed to waste (or even to water the garden) and it is a good idea to save some of this to rinse the filter media. It is at this point that you begin to realise just how bad things can get at the bottom of your pond! Especially when the pond has not been cleaned for some time a black 'sludge' is discovered in the depths of the pond, supplemented by rotting leaves, fish waste, and I have even heard of people finding the odd fish skeleton in the mire!

It is this decomposing material which would otherwise have caused so many problems over the winter, leading to ailing and even dying fish at the onset of springtime. So it's set to with the dustpan and brush, and a bucket, and remove all of this waste. (Again, the garden can benefit by using this as mulch — if you can stand the smell!).

Having removed just about everything from the pond, the lining itself, whether concrete, PVC, fibreglass, or rubber, should be scrubbed thoroughly with clean water. On no account must cleaning agents be used, as they will inevitably cause problems with the fish. I find the use of a stiff handbrush in conjunction with a hose of slowly-running water ideal for the final clean-out.

Once cleaned, the pond can be filled from the hose. Now leave the pool to stand for a day to allow elements in the water, such as chlorine, to dissipate, and for the temperatures to equalise. Then the repotted and pruned plants, as well as the fish, can be returned to their quarters.

FILTER

Having given your pond a thorough cleaning, the one job that you really do NOT have to contend with is to *strip down your filter.*

I have been amazed at how many people I have met over the years who believe that they must thoroughly clean the filter and switch off the water pump through the winter months. However, these same people have often been the first to let me know about their fish losses early in the following spring!

In my opinion it takes at least a year (ie, a complete annual cycle) for a filter to reach maturity — perhaps longer. One Koi-keeper I know has the opinion that three years is nearer the mark. During this time the bacterial colony within the filter has had time to develop and to reach a balance, so that it can cope readily in breaking down organic matter suspended and dissolved within the circulating pond water.

Don't forget, your filter medium is home to millions of microscopic living organisms which are working 24 hours a day, 365 days a year, to keep your pond water as clean and as pure as possible, whatever the weather.

So why kill them all off at the end of each year, just as they are beginning to get into their stride? By all means rinse some of the medium through to remove debris which has accumulated by mechanical filtration and which may be beginning to clog the media. But, please, give those bacterial friends a chance. Let them thrive and your pond and its fish will be healthier for it.

Indeed, for the sake of a weekend's work, you will have ensured that not only will your fish and plants have benefited, but you, also, will have increased enormously the enjoyment of your pond and your hobby, and will have helped to ensure that the pond inhabitants will thrive throughout the coming seasons.

WANTED
Couple to be married in underwater ceremony

DEEP-SEA WORLD, Scotland's National Aquarium

Deep-Sea World, 'The National Aquarium of Scotland', is Scotland's third largest paying visitor attraction, and has welcomed over 1.5 million visitors since opening in March 1993 helping visitors of all ages discover Scotland's gateway to the marine environment.

Deep-Sea World's mission statement is to 'enlighten, increase knowledge and further raise interest in our marine environment in an interactive, appealing, entertaining and sustainable manner.'

Our current award winning facilities feature the world's longest underwater tunnel where visitors receive a diver's eye view of over 4,500 fish from 40 species native to British coastal waters along with Europe's largest single collection of Sand Tiger Sharks.

Our Exhibition Hall hosts 20 interesting and interactive exhibits ranging from Scotland's biggest Piranha collection, to the UK's largest rock pool, displays of Wolf Fish, Octopus, Sea Horses, Clown Fish, tropical and coral fish, and a host of many other exciting exhibits.

One of Deep-Sea World's greatest successes is the role it plays in education for curricular related work on the marine environment. The exploration programme ranges from pre-school to graduate level with over 20,000 pupils visiting our purpose built classroom per year on organised trips.

Another great success for the highly popular visitor attraction is hosting a wide range of corporate and private events from cocktail parties, theme parties, dive evenings, children's parties, conferences and wedding receptions. In fact, they are looking for a couple who would like to be the first to be married in an underwater ceremony witnessed by 4,500 fish and eight Sand Tiger Sharks, as well as their guests watching in the world's longest underwater tunnel.

Deep-Sea World can arrange for a minister to officiate the special event in a diver's dry suit and guests will hear the marriage vows through a new communications system which allows divers to communicate with visitors in the 112 metre tunnel.

Any couple looking for a wedding with a difference should contact the Promotions Department on 01383 411411 to get further information on what must be one of the UK's most unique venues for hosting weddings!

Growing Tips

BY
BARRY R JAMES

One of the stands that attracted my attention at the recent GLEE in Birmingham recently was that staged by Ausfern Nurseries UK Ltd of Brentwood. This enterprising company is an importer of ferns from Australasia.

Included amongst their range are a variety of Tree Ferns imported in various sizes from frondlings to specimens two metres high. They also had species from the colder areas of Australia such as Tasmania and Victoria which have proved hardy in the United Kingdom. Several larger species are suitable for bog gardens. Some of the larger tree ferns represent some 60 years of growth.

These specimens are collected when road schemes mean the inevitable destruction of strips of vegetation so in effect the company is performing a rescue service.

Dicksonia antarctica — The Tasmanian Tree Fern has been imported into Britain since Victorian times and many are still flourishing in many Western counties today. This species along with *Dicksonia squorrosa* — a New Zealand Tree Fern — might well be tried in the bog garden by pond keepers in the South-West and other sheltered areas.

Another large fern which the importer assured me is extremely hardy is *Todea barbara* — The Austral Tree Fern. This New Zealand species naturally grows in boggy areas where it forms clumping trunks up to two metres in height although they are unlikely to reach more than 60cm in the UK if bought as small plants.They thrive in a compost made up of equal parts of sandy loam, leaf-mould and peat with a little charcoal added to it These evergreen ferns have delicate and semi-transparent fronds.

Another interesting novelty was *Blechnum nudum* — The Fishbone Water Fern. Hailing from Tasmania and Victoria this species has a striking black trunk with attractive rosettes of Lime green, and fishbone-like, fronds. It makes an ideal marginal fern for bogs and other damp areas. It reaches a maximum height of 120cm.

Ferns are naturally associated with damp cool places and it is surprising that only a minority of water gardeners take advantage of the luxuriant and exotic effect that ferns bring to the garden. In Victorian times it was thought de rigueur to have a portion of the garden devoted to ferns. Imported species were in great demand and certain rare native species were practically wiped out by excessive collecting. Those contemplating a fern collection should bear in mind their basic requirements.

Most require damp but well drained soil while others such as the Royal Fern (*Osmunda regalis*) are happiest in boggy conditions. Most prefer soils high in humus such as that recommended for tree ferns. Most ferns are now supplied in pots and can be planted out at any time of the year. Transplanting of established ferns should be carried out in early autumn or in spring just before growth starts. However, I have successfully transplanted specimens outside these periods but it is essential to move them with a large root-ball . Above all avoid planting ferns in exposed places strong winds will desiccate them.

I would recommend the following groups for those starting a fern collection:

Dryopteris, which includes our native Male and Broad Buckler Ferns.

Phyllitis, The Hart's Tongue Ferns. A native broad-leafed fern with many varieties.

Matteucia, The Ostrich Feather Ferns.

Athyrium, The Lady Fern.

Onoclea, The Sensitive Fern. A useful fern which will even creep down and colonise the surface of water

And last, but not least, *Osmunda*, The Royal Fern.

DRYOPTERIS, WHICH IS RECOMMENDED FOR THOSE STARTING A FERN COLLECTION.
Photo: Barry James

BUY LINES

BARRY JAMES' round-up of the latest innovations for your pond and aquarium

Before I proceed with this month's products, we have some information held over from last month's GLEE report due to space limitations.

Interpet

It seemed to be a fortuitous event that one of Interpet's earliest products should be almost afforded pride of place on their extensive display, for it was way back more years than I (or Neville Carrington) probably want to remember that Liquifry was launched and to which the Company owes its very existence today.

Gone are the familiar, traditional red and green tubes to be replaced by modern dispensers in their eye-catching packaging but still in red and green liveries to denote suitability for egg-laying or livebearing fish suitability respectively.

Today, the Interpet range covers every conceivable aquarium need from decoration to more essential items such as Gravel Cleaners and even Food. It would be wrong too, not to mention the pond equipment side, as great strides have been made there with such innovative equipment such as the Pond Worker range of in-pond Filters and Ultra-violet Clarifiers.

The Gravel Cleaner allows any amount of fine detritus to be cleared from the gravel whilst leaving the gravel in place; this serves important functions — not only removing dirt which may otherwise be stirred up by the fish but also ensures that adequate waterflow is maintained through that other important Interpet item, the biological, sub-gravel filtration system. Associated with the Gravel Cleaner are Fresh Start and Trizyme Biostart, whose actions in maintaining important bacteria actions in the aquarium are fully explained in the accompanying leaflet and packaging.

The Nautic Treasures range of aquarium ornaments is sure to attract the younger fishkeepers with highly-detailed models of wrecked sailing ships complete with real roping and nets. Additionally Architectural Ruins and Rocks, also modelled in inert safe, polyresin are available.

Fishkeepers, like their fishes, seem to be traditionally wary of new foods so to allow both to try out the new product Interpet have introduced trial-size sachets of their Zooplankton. Once the fish have grown accustomed to it which shouldn't take very long at all according to Adrian Exell, brand manager for Interpet, you can easily upgrade your purchase to the 50g and 100g jar sizes. Each jar when opened should be stored in the refrigerator to maintain the food in its optimum condition for up to a month or, as it is likely to prove, far shorter once the fish get a taste!

More good news is that the Aqua Air range of pond air-pumps have been improved but at no extra cost. With Dualife diaphragms and carbon-impregnated air filters they represent excellent value for money considering their high quality performance.

Full details of all Interpet products from: INTERPET LTD, VINCENT LANE, DORKING, SURREY RH4 3YX. TEL: 01306 881033. FAX: 01306 885009.

LEFT THE SHIPWRECK — ONE OF INTERPET'S NEW RANGE OF NAUTIC TREASURES FOR YOUR AQUARIUM.

BELOW INTERPET'S ZOOPLANKTON FISH FOOD.

Stuart Turner

The popular range of Submersible Pond Pumps, Surface Pumps and Pumps for indoor water feature applications made an impressive display. The range of pumps available from this high-quality source can therefore be used to cover almost every water-moving requirement you may have from decorative indoor fountains and statuary to outdoor Koi ponds; flow rates range from the order of a few gallons up to 3,500 per hour.

New for GLEE was the Isis, a choice of six attractively-boxed fountain kits with pump outputs from 110-880gph and three blister-packed pumps outputting 66-

17gph. The pumps are capable of sustaining heads ranging between 0.7 and 4m depending on the model. The fountain sets contain telescopic tube, diverter tap, spray, mushroom and connector, and come with 10m of cable and a two year guarantee. Isis indoor pumps come with 3m of cable and a one year guarantee.

In addition to the pond range of pumps, the portable Jet Power Pumps can be used where perhaps more non-fishkeeping applications are featured — washing cars, emptying wells, garden irrigation, etc.

Details from: STUART TURNER PUMPS, 47 MARKET PLACE, HENLEY ON THAMES, OXON RG9 2AD. TEL: 01491 572655. FAX: 01491 573704.

Now for the latest products ...

Burco Electrical Appliances

BURCO ELECTRICAL APPLIANCES have introduced a new concept in keeping ponds free of ice in the winter. Instead of the usual idea of having a small submersible heater in one corner of the pool they have manufactured a Flexible Heating Cable which is completely submersible. These cables are manufactured in 12 and 50m lengths and are have earth protection braid over the entire length. The plastic coating is fully waterproof and has 3.5m of cold cable lead in. Fitted with state of the art electronic temperature control the device has an automatic self-regulating heat output. Maximum heat output is 12 watts per metre at 240 volts. The control box must be fitted in a dry covered place and it is recommended that it be fitted to the mains via a circuit breaker. The 12 metre model will be suitable for a pool of a surface area of approximately 25sq ft whilst the larger model will cope with pools up to 125sq ft in surface area. This will give total protection under normal weather conditions but by placing the cable in tighter loops in a smaller area a smaller proportion of the pool may be kept ice free. It is recommended that the cable be softened with hot water to render it more flexible when installing it. The cable is best held in place in pools by sucker clips as sold for aquarium cable heaters. For concrete pools the suckers could be glued to the surface with silicone rubber solution. At the moment the manufacturers do not supply suckers with the unit as it is also used for soil warming in greenhouses and for protecting water pipes from freezing. I shall be testing one of these units in my own pool this winter after which I intend to use it in Spain to heat the water in early spring to raise the temperature in my tropical lily pool.

Further details from: STELLA COTTON, DE BRUS MARKETING SERVICES LTD, 31-33 WARWICK STREET, ROYAL LEAMINGTON SPA, WARWICKSHIRE CV32 5JX. TEL: 01926 881352. FAX: 01926 452143.

THE CYPRIO BIO-PAC FISH DISPLAY SYSTEM.

Barrons Educational Series Inc.

In an earlier *Buy Lines* I commented on the excellent value presented by the series of aquatic literature produced by Barrons Educational Series Inc of the USA. I have just received more of their books to review and am equally impressed by their content, layout and general presentation.

The New Saltwater Aquarium Handbook is an ideal beginner's handbook which deals with the setting up of marine aquaria, selection of invertebrates and fish, nutrition, maintenance and disease control. Written by George C. Blasiola it has numerous drawings and over 80 full colour photographs.

For the coldwater enthusiast Water Gardens by Peter Stadelmann is a concise but informative treatise on ponds and their care. Goldfish is a beginner's guide but has a full complement of advice on the subject. Goldfish and Ornamental Carp takes a more in-depth look at the subject and also encompasses Koi. I liked the emphasis on breeding techniques, so often downgraded in most publications.

The Aquarium Plants Manual by Ines Scheumann has 90 colour photographs of aquatic plants and a wealth of information for the aquarist new to this branch of the hobby. It does not however deal with the more technical aspects of plants growing, but it should whet the appetite of the reader to read more widely on the subject.

All in all this is a delightful series of books which deserve to be more widely stocked by aquatic outlets.

Further details from: D. SERVICES, 6 EUSTON STREET, FREEMANS COMMON, LEICESTER LE2 7SS. TEL: 0116 2547671. FAX: 0116 2544670.

Trident Water Garden Products

Trident have introduced the Clearflow 250 Biofilter for pools. Selling for under £20 this is a compact top-in/top-out filter with inclusive spraybar. It is also available as a combination unit with a built-in 4 watt Ultra Violet Sterilisation unit. Also recently launched is their new Universal in-pool filter. It has been designed to reduce the need for frequent cleaning on pre-filters and will also act as a stand for pumps. Their new range of ten self-contained water ornaments are designed for both indoor and outdoor use retail at just £149.50 including pump. A new supplement detailing these new units will be available shortly.

For further information contact: MARIAN RYAN, TRIDENT WATER GARDEN PRODUCTS, CARLTON ROAD, FOLESHILL, COVENTRY CV6 7FL. TEL: 01203 638802. FAX: 01203 638775.

PART OF THE TRIDENT PRODUCT RANGE.

Cyprio

The display of pondfish might be considered seasonal and Cyprio have produced Bio-Pac Fish Display Systems, each a complete self-contained merchandising unit for pondfish that not only does the job admirably (each four, six or eight fish-holding tank unit contains a submersible recirculation pump, UV Steriliser and

BUY LINES

Cyprio Pond Filter) but can be dismantled when not required, or when space is at a premium. Each System is designed to hold a definite number of fish thus cutting out the trial and error systems often found and lessening the risk of over-stressing the fish due to overcrowding or even over-heating during summer. Suggested fish-holding capacities are 20, 20 and 40kg respectively.

Details from: CYPRIO LTD, HARDS ROAD, FROGNALL, PETERBOROUGH PE6 8RR. TEL: 01778 344502. FAX: 01778 348093.

JMC

To complement the existing Catfish Pellets and High protein fish food range, JMC is launching a new food, Hi-Grow Granules.

Hi-Grow is a new high-protein food suitable for coldwater or tropical fish which comprises granules that are larger than those normally associated with similar foods, and is ideal for ponds or aquaria. This new food meets popular demand from fishkeepers for a larger granule, high-protein product whose slow-sinking qualities make it perfectly suitable for all types of surface-, middle- and lower-feeding fishes.

Hi-Grow granules are available in four pack weights from the large 650g to the handy 80g size at pond and aquarium centres, pet shops and garden centres nationwide.

For more information, contact: GEOFF NOAKES, SQUARE ONE RELATIONS, STONE HOUSE, 27 CHESTERFIELD ROAD, DRONFIELD, SHEFFIELD S18 6XA. TEL: 01246 290111. FAX: 01246 290183.

PART OF THE JMC FOOD RANGE

Tetra COMPETITION

FEED A FISH AND SAVE A WHALE

The title may appear familiar and that is because we highlighted the link between Tetra and the Whale and Dolphin Conservation Society in our June issue. A £10,000 minimum donation is being made to the WDCS to help them in their quest to protect and conserve whales and dolphins.

Despite all the excellent work that has been achieved to date, stories in the media of the countries that still hunt and kill these magnificent creatures shows that there is still much to be done.

There are special promotional tubs of Tetra food clearly marked 'Save the Whale' — the more food purchased the more money that goes to the WDCS. You also have the chance of winning a whale-watching holiday and finding out how to own a soft cuddly whale. Full details are in the tubs.

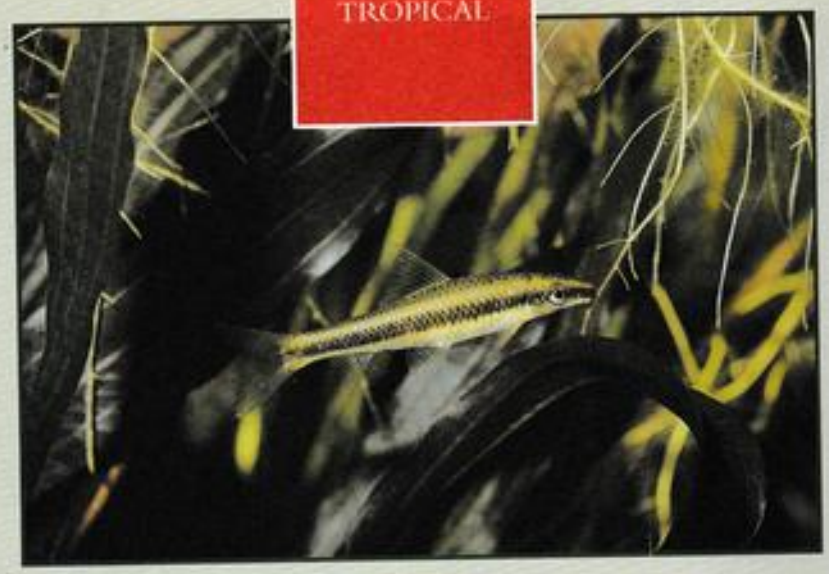
The more ambitious may like to collect 30 gold foils and then be able to adopt a Whale. That may particularly appeal to schools or groups, or indeed shopkeepers have collected them from their customers on behalf of a local organisation. Now, however, Tetra are offering that opportunity to five readers of AQUARIST AND PONDKEEPER. You will receive a special Certificate and an update, every six months, on what your whale is doing and where it is in the world.

Just complete the following in no more than 15 words: 'I would like to adopt a whale because ...'

Put your answer on a postcard or the back of a sealed-down envelope, put on your own name and address, and a daytime telephone number, if possible, and send to: Dept AW, Tetra Competition, PO Box 2162, Bournemouth BH2 5ZA, to arrive no later than 6 December 1996. The five winners will be contacted by 13 December.

No correspondence will be entered into.

CLIFF NASH, COUNTRY BUSINESS DIRECTOR OF TETRA (LEFT) WITH TONY PEASE, CORPORATE LIAISON OFFICER OF WDCS



The Siamese Algae Eater and its Relatives

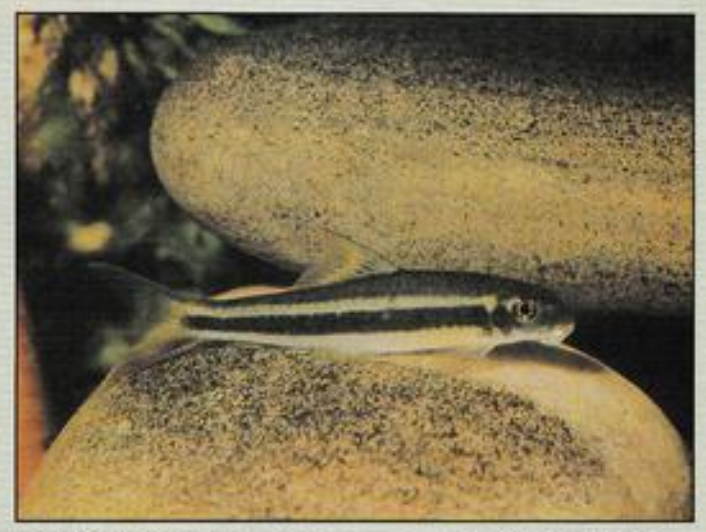
LISA SARANKONTU AND **NEIL FRANK**

DETAIL A USEFUL SPECIES THAT WAS LITERALLY CAUGHT IN THE NET.

PHOTOGRAPHS BY NEIL FRANK

TOP OF PAGE
SIAMESE ALGAE EATER, *Crossocheilus Siamensis*, MAY BE THE ONLY KNOWN FISH THAT EATS THE FURRY BEARD ALGAE (*Audouinella*)

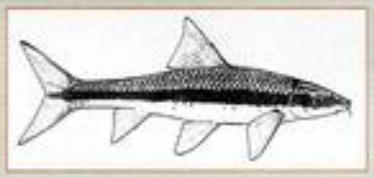
RIGHT
Discognathus Rossicus, WELL KNOWN TO RUSSIAN AQUARISTS WHO SAY IT WILL ALSO EAT RED ALGAE. COMES FROM TURKMENISTAN IN CENTRAL ASIA



THE 'FALSE SIAMENSIS' (GARRA TAMBRA OR EPALZEORHYNCHUS SP.) DOES NOT EAT RED ALGAE

The Internet, the international computer network, provides, among other things, the opportunity for discussion among aquarium hobbyists throughout the world. Most of participants are from the USA and Canada, but Europe, Asia and Australia are represented as well. During 1994 there was discussion of how to get rid of red brush algae and how to find the Asian fish that eats it — the Siamese Algae Eater, or 'SAE' to its friends. This fish is well known and regularly available in many parts of Europe, but until recently was nearly unknown in North America and other parts of the world. Often, some other related species are sold under its name, like the Flying Fox and a fish we call the 'False Siamensis'. Occasionally, one may even find the Chinese Algae Eater (Sucking Loach) labelled as the SAE.

The discussion on the 'Net' did not proceed smoothly; people appeared to be confused, because many current books pictured the 'False Siamensis' as the Siamese Algae Eater. The situation was remedied when two hobbyists decided to combine their knowledge and experience and write an article about the real Siamese Algae Eater and some of the other fish with which it is often confused. Neil Frank, a plant enthusiast from the USA, is Editor of *The Aquatic Gardener*, the journal of the Aquatic Gardeners Association. Neil acquired his SAE during a trip to Germany in 1993 and became fascinated with these red algae eating cyprinids. Liisa Sarakontu, a Finnish hobbyist whose favourite fish species also happens to be the Siamese Algae Eater, was able to offer the European perspective where these fish are commonly available. During the time this article was written they had never met (or even spoken on the telephone) but had only communicated electronically with computers.



SIAMESE ALGAE EATER

The Siamese Algae Eater, *Crossocheilus siamensis* (Smith, 1931) is a slender, schooling Cyprinid and might be the only fish that effectively eats and controls red algae (*Audouinella*). It comes from Thailand and the Malay peninsula. It was first brought to Europe in 1962, but became popular there during the 1970s when its ability to eat red algae was noticed. It was initially classified in the genus *Epalzeorhynchus*.

The torpedo shape indicates that the Siamese Algae Eater is adapted to running water. Maximum length is reported to be 15cm (6in) and might be obtained in two years, if the conditions are optimal. In captivity it normally grows slower and seldom exceeds 10cm (4in) but can live over 10 years. The greyish-brown upper and silvery white lower parts of the fish are separated by a broad, black stripe with distinctively zig-zagged edges. It goes from the nose to the fork of the tail. There is a darkish spot in every scale on the upper body, which make the top look reticulated. When a fish is aggressive or stressed the black stripe fades significantly and that area looks reticulated as well. All the fins are transparent without the dark or reddish pattern common to some of its relatives. However, there is a slight greenish sheen on its fins when light comes from the right direction.

The lively and active Siamese Algae Eater is a fast swimmer and a good jumper, and should not be kept in an uncovered aquarium. It thrives best in a school or at least in pairs, in which case it does not bother other fishes, whereas a lone specimen might harass other inhabitants of the tank, but does not normally harm them. The swim bladder is not very well developed, so it has to swim constantly or it sinks to the bottom. Young fish are normally constantly in movement; older specimens often rest on the bottom or on broad plant leaves keeping the body propped up with their tail, pelvic and pectoral fins. The Siamese Algae Eater is a hardy and tough-lived fish. Suitable temperature for it is 24-26°C (75-79°F) and pH 6.5-7.0, but it can tolerate pH levels from 5.5 to 8.0. Hardness should be less than 20 DH and the oxygen level should be high. Young specimens can be kept in a small aquarium, but the minimum tank size for an adult fish is at least 100 litres (25gallons). There are no records of breeding this species in captivity.

The Siamese Algae Eater is omnivorous but it needs lots of vegetable-based food. It does not normally harm

plants when eating soft algae from them but might eat such soft floating plants like Duckweed or *Limnobium* when there is not enough other green food. It does not favour older algal growth but can counted on to prevent new red algae from growing on plants and other surfaces of the tank. Although they still eat algae, adult captive fish seem to prefer flake food.

There is a rumour that a dam has been built somewhere near the Thailand and Burma border which might make catching wild Siamese Algae Eaters more difficult. We'll see in future if this is true or not, and if local fishbreeders will start working on captive reproduction of this species.

'FALSE SIAMENSIS'

The fish most commonly sold instead of the real Siamese Algae Eater is known as the 'False Siamensis'. There is still some obscurity of the true identity of this fish species. Markku Varjo states that it is the Siamese Stone Lapping Fish, *Garra taeniata* (Smith, 1931), but some other experts, like Heiko Bleher, do not think that it belongs to genus Garra but to the genus *Epalzeorhynchus* or *Crossocheilus*. We are waiting for more information on this subject.

This algae eating cyprinid strongly resembles the real Siamese Algae Eater by its appearance and habits and it even comes from the same geographic region. It might be sold as a Siamese Algae Eater even in Finnish aquarium shops, although these two species are normally not mixed there. On the other hand, in the US this fish has been much more common than the real Siamese Algae Eater. Incorrect pictures in some of the most commonly available aquarium books do not make the situation better.

The 'False Siamensis' is easy to tell apart from the real one when you know what to look for: the edges of the black horizontal band are rather smooth, not zig-zagged, and the band stops at the base of the tail. When the fish is frightened the stripe fades to solid light gray. There is a distinctive narrow light-coloured, sometimes even golden, stripe over the black band. The Siamese Algae Eater merely has a vague light area which fades to the darker back. The dorsal region of the 'False Siamensis' is solid dark greyish brown without the dark scale pattern. All fins except the pectoral are yellowish, and there is an indistinct dark band near the base of the dorsal fin. There is sometimes some red or pink around the mouth. It also has one pair of barbels. It seems to stay a little smaller than the Siamese Algae Eater. Ideal pH is about 7.0.

The young fish sold at shops are often under 5cm (2in) long, and some of the differences between these two species might be hard to see at this size. If you can compare them with each other (and sometimes they might be found in the same tank!) you should be able to see the following differences:

Length of the black horizontal band, although it might not be distinctive in the tail with some young Siamese Algae Eaters; 'False Siamensis' has a light stripe over the smooth edged black, a dark pattern in the dorsal fin and some red around the mouth (these are not always seen) and a slightly broader head and darker back.

The behaviour and appearance of the 'False Siamensis' are much like the closely related Siamese Algae Eater, but it is not a schooling fish. You should not keep more than one adult 'False Siamensis' in a tank, because they are aggressive towards each other and sometimes

FLYING FOX, *EPALZEORHYNCHUS KALOPTERUS*, IS THE MOST COLOURFUL OF THIS FISH GROUP

towards other similar looking species as well. This fish, too, might eat some algae but does not touch red algae. In nature they probably seek small animals from algae growths. Anyway, this slender fish earns a place in a community tank as long as enough room and hiding places are provided for it and it is not provoked by adding its own species or too many other bottom dwellers to the tank. It has been often seen in shops in both Finland and the US, but very rarely under its own name. Normally it is labelled as the 'Siamese Algae Eater', 'Thailand Algae Eater' or 'Flying Fox', and occasionally even as the 'Chinese Algae Eater' (Sucking Loach).

The Flying Fox, *Epalzeorhynchus kalloptenus* (Bleeker, 1850) is a third very similar species, and is also named the Trunk Barb. It is the most colourful species of this fish group, and it has gained popularity in the US over the two previous species.

FLYING FOX

The Flying Fox can be told apart from the Siamese Algae Eater by the following features: The dorsal region is very dark greyish or brownish, there is a distinctive golden stripe over the black and dorsal, anal and pelvic fins are colourful. The fins have a dark band in the middle and white in the tips. The black horizontal stripe goes from the nose to the fork of the tail like on the Siamese Algae Eater, but the part going through the tail fin is darker and broader. It has two pairs of barbels, but that is hard to notice if the fish is still small.

Its behaviour and requirements much resemble its two close relatives, the Red-tailed Shark and the Rainbow Shark (*Epalzeorhynchus bicolor* and *E. frenatus*, also known as *Labeo bicolor* and *L. frenatus*), which are known to be aggressive. It is a loner, defending its own territory aggressively and harassing all fishes which have similar appearance, including for example Black Neon Tetras. Its companions should be carefully chosen and all fishes with similar body shape or with a dark horizontal stripe should be avoided.

GARRINAE
FISHES & SAE
LOOKALIKES

Some other members of the subfamily Garrinae could be confused with the real Siamese Algae Eater, but they are normally not seen in aquarium shops.

Crossocheilus oblongu

(Cuvier and Valenciennes, 1842), which does not have a common name, could be found among a tankful of Siamese Algae Eaters. It looks very much like the 'False Siamensis', but all the fins are transparent and it has two pairs of barbels. Its behaviour and needs are probably same as the the previous three species.

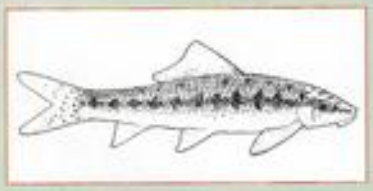
An SAE might in theory be confused with some other species from the

THE 'GREEN GARRA', SOMETIMES AVAILABLE IN FINLAND, IS SEEN HERE WITH A COUPLE OF PAKISTANI LOACHES. BOTH LOHJOHATA.

Crossocheilus, *Epalzeorhynchus* or other Garrinae genera (like *Paracrossocheilus*), but these are probably not imported regularly (if ever), nor presented in most aquarium books. At least one member of genus *Garra*, the 'Green Garra', is sometimes available in Finland. This greyish, thick-headed and suckermouthed fish cannot be confused with Siamese Algae Eater. It is an effective green algae eater and does not seem to get very big in captivity. As an adult it might show some aggression towards other Garrinae fish. Several of these *Garra* species from Asia and Africa are mentioned in the scientific literature, but their algae eating abilities are generally not known to us.

One of these Garrinae fish comes from Turkmenistan and Iran in Central Asia. It is called *Discognathus nasicus* and is well known to Russian aquarists. *Discognatus* is a synonym for *Garra*. Russian aquarists say that this greyish coloured fish will also eat red algae.

It would be interesting to see *Parodon pongoense* or other *Parodon* species. They are South American Tetras, which resemble the Siamese Algae Eater by their colour, size and shape. The Baensch Atlas mentions that at least one of them is an algae eater, too. This is an example of convergence; where evolution has 'produced a similar answer to a similar problem', although these fishes are not related to each other.



CHINESE ALGAE EATER

The Chinese Algae Eater or Sucking Loach, *Gyrinocheilus aymonieri* (Tirant, 1883), belongs to the family Gyrinocheilidae, but it resembles both Loaches and algae eating cyprinids. Its English name is not very accurate, because it comes from Northern India and Thailand, not from China and it isn't a Loach either! It is sometimes called the Indian Algae Eater or just Algae Eater. It might occasionally be sold under the name 'Siamese Algae Eater', but it looks very different.

The most prominent feature is a large sucker mouth, which it uses for scraping algae and clinging to objects. There is a special opening on the upper part of the gill cover for water intake so the fish can breath without using its mouth, a similar feature is seen on Suckermouth Catfishes. The fish is light brown and there is a dark gray or brown horizontal pattern on its sides, which can be either a zig-zag edged solid stripe or a row of separate spots or anything between these two. There are some dark patches at the back and small brown spots at the tail. Maximum reported length is 27cm (11in), but in captivity it normally stays much smaller and does not exceed 15cm (6in). Its breeding in captivity has recently been successful, and both albinos and partial albinos have also been available. Some strains of these albinos are pure light yellow, some have a brownish horizontal pattern on the sides and the bottom colour is light brownish or yellowish. The name 'Golden Algae Eater' is sometimes used for these colour morphs. It is an efficient green algae eater especially when young, but this inclination decreases when the fish gets older. As an adult, it is might get very aggressive towards its own kind and even towards other fish.

Some specimens like to scrape mucus from the sides of other fish and might badly damage fish even larger than themselves. It most often attacks flat-bodied, slow swimmers, and this tendency might have to do with lack of proper food.

The Chinese Algae Eater is not very demanding on water conditions: pH may vary from 6.0 to 7.5 and temperature from 22°C (72°F) to 28°C (82°F). It eats all kinds of foods, but must get enough algae or plant material. It is reported that it will stop eating algae if the temperature drops below 20°C (69°F).

AVAILABILITY OF THE SAE

The Siamese Algae Eater, *Crossocheilus siamensis*, is quite common in Europe. In fact, it is one of the top 20 fish sold in Finland. Although it became known to the American hobbyist in the 1980s through the English translation of European literature, the fish has been virtually absent from the American aquarium scene. This might be attributed to several factors: first, some English language books did not publish the correct picture of the true SAE: secondly, the true SAE is thought to be less colourful than several of its relatives. Now, we know several suppliers of this fish in the US. The fish may be listed by different names — Small Flying Fox, Thailand Flying Fox or Siamese Flying Fox. We hope this important fish is available in the United Kingdom.

Discussions on Internet news groups alt.aquaria, rec.aquaria, sci.aquaria and sfnet.harrastus.lemmikit during 1994 and 1995. Authors' email addresses are lsarakon@hila.hut.fi and nfrank@nando.net.

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Memories of '96

A&P COLDWATER CONTRIBUTORS REMEMBER THEM WELL

When the Editor asked me for my most memorable memory (item or event) of 1996 I immediately thought that I would have no difficulty in satisfying his requirement but the truth of the matter is that I have had many such memories, some good and some very, very bad!

So, which of the memories give me most pleasure? It has to be the visit of the Crouch Valley Section of the BKKS to some of the Heart of England Koi Society ponds early in the year.

The weather was having one of its good spells so much so that shelters had to be erected to shield visitors from the sun rather than the rain! This meant that this coachload of ardent Koi keepers, both new and long standing, were able to do that which all good Koi keepers do … talk of filters (mains input water and system cleansing), talk of fish (the only way to improve appreciation of these wonderful pets), talk of the novel ideas found in the systems they saw (a wealth of good thinking is done in the name of Koi) and finally talk of food. The human variety is generally consumed, with accompanying liquid refreshment, in great quantities, at the end of the day.

An example of how these events are enjoyed is when the coach driver, 99 per cent of the time someone without an interest in fish, let alone Koi, joins in the day's fun with just as much enthusiasm as the Koi keepers.

I always feel rejuvenated at the end of these events but I do feel, however, for the (generally) ladies who spend the day making cakes and coffee and tea and lunch and finally the departing meal. Thank you all, visitors and Club members alike all around the country, for all the hard work and effort expended to create extra enjoyment of the hobby known as Koi keeping.

DAVID TWIGG

CROUCH VALLEY SECTION BKKS VISIT TO HEART OF ENGLAND KOI SOCIETY
Photo: David Twigg

Like David Twigg, **BARRY GOODWIN** thought there'd be no problem in choosing his great moments of '96 but he too had a lot to choose from:

Having had such a frenetic Koi calendar during 1996 I hardly know where to begin.

I suppose the best of my memories has to be the formation of a new Koi Society in Lincoln — The Witham Valley Koi Society — of which I am the manager and of course all of the associated friends and events that are connected with belonging to a local Society such as this.

Coming a close second has to be my visit to the South Devon Koi Section of the BKKS whilst I was on holiday in June. Coupled to a talk for the section during my visit I saw many spectacular ponds and met many wonderful people, not only from Devon but Wales, too, as they were visiting the South Devon ponds as well on that day.

1996 Koi Shows were also quite pleasant to remember especially as many Clubs made extra efforts to ensure water quality was as good as possible, something that can only bode well for the Koi hobby as a whole. I like to think that this was in no small way due to the efforts of myself and others who have been hammering away in the Koi Press for a couple of years now. Still with Shows I was pleased to see a return to the 'Japanese style' of showing by some Clubs, as not only is this a return to the roots of Koi showing but it is considerably easier to manage water quality with the fewer number of vats required for this style of showing.

Being asked to speak at the 'National' — Koi '96 —

was an honour, too, that I will count among my high-spots of the season.

Through my association with Lincolnshire Koi on the Show circuit I've noticed that Koi hobbyists are becoming even more discriminating over what they buy in the food and equipment lines, being rightfully sceptical over some new products, some of which cannot be described as 'wholly suitable' for Koi applications. Of the many dealers I visited, Derek York of Klassic Koi at Leigh, Trevor Pearson of East Riding Koi, and not forgetting Mount Pleasant Koi near Beverley or Selective Koi at Norwich, all provided lingering memories of pleasant people and superb Koi — who could ask for more?

Any clouds on the horizon, not just mine but those of Koi-keepers throughout the land, were quickly dealt with by the expert assistance of Paula Reynolds of Lincolnshire Fish Health Consultants at Boston.

Then there was the pressure of meeting the deadline for my forthcoming book, 'The Enigma of Koi Keeping', which wouldn't have been achieved without the assistance of Liz Donlan, another stalwart of the Koi-keeping world.

OK, I'll be the first to admit that I took on far too much during 1996, turning my hobby into a bizarre merry-go-round with everything else — work, garden, my caravanning — all being sidelined. So, next year I will have to be far more selective but I still expect to have just as many pleasant memories as I have now — thanks to everyone else associated with this wonderful hobby.

I hope the coldwater regulars won't mind me sharing my own coldwater memory of '96 with you but it is one that will stay with me for a very long time. On holiday this year I witnessed the spectacle of salmon moving up shallow streams in order to spawn and, regrettably, to die. The brilliant bright red colours of the 'cock' salmon moving amongst the harem of 'hens,' dorsal fins breaking the surface as they ploughed across the gravel, was amazing but then seeing the exhausted fish gasping their last made the point just how unremitting Mother Nature can be. Seeing it all on close-up television from the comfort of the armchair is one thing but when it's 'real' there's no chance of an action replay, sad to say.

DICK MILLS

SALMON SPAWNING. Photo: A&P Library

On the other hand, ALEX STEPHENSON remembers:

From a goldfish keeper's point of view 1996 was not without its problems. Take the weather for example. I don't know what it was like in your part of the world but here in East Anglia the winter seemed to go on for ever. It wasn't until June that pond temperatures managed to struggle up towards 60°F. Although the few good weeks which followed allowed young fish to grow a little, it wasn't enough as September saw temperatures back down in the 50°F's.

All this means any retained youngsters will have to be wintered inside the fish house. Like most fish keepers my tank space is limited and so few fish will be kept. People have often asked me why British bred fish are usually more expensive than imported fish. Well, one important reason is our climate. To get fish to an acceptable size within a reasonable time requires heat.

On a brighter note, the mystery deaths I had last year were not repeated this year. Last season a frightening number of my fish 'popped their clogs' for no apparent reason. Post mortems, done professionally, failed to find the cause. My main concern was a virus but tissue samples studied found nothing. Thinking the problem may be seasonal I waited and watched closely to see what would happen this year; with the '96 season just about over now I am relieved to say all of my fish are alive and well.

The best of '96? For me? Healthy fish, every time!

TECHNICALITIES for beginners

Peter Moon
looks at a specialised form of water purification — Protein Skimming

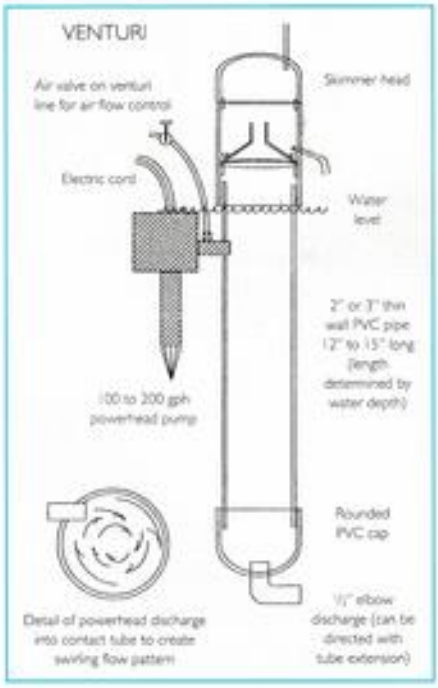
The method of Protein Skimming or Foam Fractionation is not a new one. It has been around since the early 1890s, but the principle has only been applied to Marine Aquaria since the 1960s. However, as far more than just proteins are removed from the aquarium water, perhaps 'foam fractionation' is a more accurate term.

There is nothing mystical about how a protein skimmer works. Protein (organic waste) in the aquarium water is known as as a surfactant and naturally collects at the air/water interface or, in plain English, where the water meets air (usually at the water surface). By deliberately creating such a condition within a tall cylindrical chamber (the reaction chamber) protein can be attracted here and deposited into a collecting cup from where it can be easily discarded.

There are two types of skimmer available to the hobbyist at present, they are:

1. Air Operated, by means of an air pump.
2. Venturi Driven, by means of a powerhead or water pump or a combination of air-operated and venturi.

The most cost effective method of protein skimming is by way of an air pump powering one or two airstones.



These are normally made out of limewood or oak and need replacing at least once a month.

Venturi Skimmers, on the other hand, are more powerful and suited for larger aquariums of 75 gallons plus. As the name suggests they utilise a 'venturi valve' which is a device that mixes air and water under pressure to produce a constant stream of bubbles just the right size for organic particles to adhere to. Naturally, these units command a higher price, but even so the valve either co-current or counter-current format (see diagrams). These units mainly fit inside the aquarium and come complete with the necessary fittings. They must be installed according to the manufacturer's instructions for optimum efficiency. Airstones are

needs periodic attention to ensure particles do not clog up the tube. These are designed to sit in a sump underneath the aquarium.

In my opinion a skimmer is a must, even a small aquarium of less than 30 gallons will benefit enormously with one added, but the one chosen must be of the correct size for the job in hand. You need to turn the contents (water) of the aquarium at least 1-1½ times per hour through the skimmer, a little more than this won't hurt. It would be better to have a slightly larger skimmer than is required, than a smaller under-performing one.

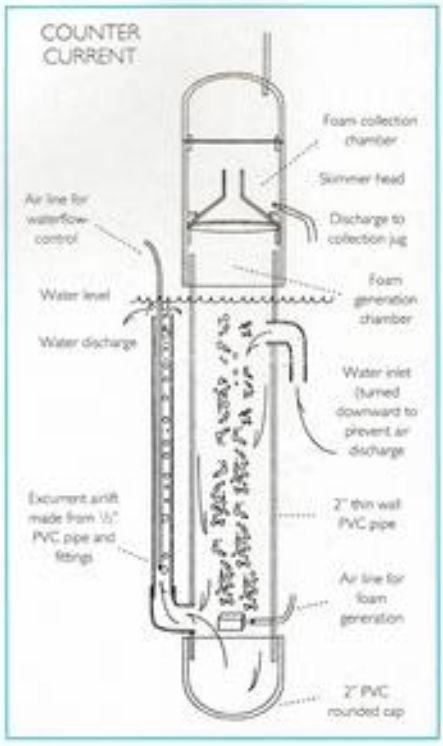
Once you have installed your skimmer as per the instructions and adjusted the water flow accordingly it will only be a matter of time before organic foam and soup begin to appear in the skimmer cup. This obviously needs to be discarded on a regular basis. You will notice that just after feeding the skimmer will go into overdrive to deal with the extra load placed on the system.

Installing a skimmer gives extra advantages, such as increased redox potential, allows safe addition of ozone (providing your skimmer is ozone resistant) and, of course, increased water quality.

Unfortunately, skimming can take out essential trace elements such as, Iodine, etc, and these elements will need to be replaced on a weekly basis or as required, depending on the animal load in the system.

To conclude; seek the advice of a good dealer before purchasing a unit and if possible see various models in operation and make sure that the one you choose is of the correct size for the volume of water in question and ensure that it will fit on or in your particular aquarium or sump.

UNTIL NEXT MONTH — HAPPY FISHKEEPING



Dear Sir,
I read your article 'Fishkeeping's Hidden Agendas' (**A&P August**), with a great deal of interest, particularly where you mentioned the leaching of metals. A few more 'clouds' float around and it is important to be aware of two general problem areas associated with metals in water for fish when considering water purification media or techniques.

(1) Metals Leaching: Some purification media are purposely designed to add metals to water. For algae control the two main metals added to water are copper (which you mentioned) and zinc. The safe levels of these particular metals in water for long-term fish health are very low, ie, copper varies between 5 to 15 ppb and zinc is 30 ppb. At such low acceptable levels it is important for fish safety not to add any more of these metals to the amounts already present in the tap water.

Metals are also used to control bacteria. The standard industry methods for controlling bacteria through water purification techniques are by passing water through various materials (from wool to activated carbon) which have been impregnated with a mixture of copper and zinc, or aluminium dioxide, or silver.

These techniques are fine for the protection of people, but MUST be avoided for fish. A good guide is that any purification medium which offers a bactericide effect should NOT be used to treat 'fish' water.

(2) The second problem area can be the failure of purification media and equipment to reduce metals sufficiently for fish. *Often it is because we expect far too much from standard purification media/cartridges and reverse osmosis membranes.*

For instance: Reverse osmosis membranes reduce a percentage of the metals in the water supply and the rest of the metals pass through the membrane to the fish. As the amount of any metal varies radically in the different water supply zones some R.O. treated water will contain sufficiently low amounts of metals but some R.O. treated water could well contain metals at too high a level for fish safety.

Perversely, at times, properly specified purification media can reduce metals to a lower level than reverse osmosis membranes!

Currently there is a fashion of using American Domestic Water Purifying Cartridges to reduce metals in water for fish. Unfortunately, at times, fishkeepers seem to expect these cartridges to do far more than they are actually manufactured to do. To explain a little more fully: a variety of 10in height x 2+in diameter water treatment cartridges are manufactured in the States. There is a range of different cartridge lifetime ratings (all in the smaller US gallon). The lifetime ratings tend to vary from between up to 750 US gallons to around 3,000+ US gallons.

Some of the modern cartridges are lead specific, ie, they will only reduce lead and do no reduce other metals. Not a lot of use to fishkeepers!

Cartridge which are capable of reducing mixed metals still tend to have the lifetime rating based on the reduction of lead and mercury only. Lead is the easiest of metals to reduce and only uses relatively small amounts of purification media compared to other metals. Therefore, a cartridge rated for about 2,000 US gallons for the reduction of lead and mercury, although capable of reducing other metals, may well have only an extremely short life for the reduction of aluminium, etc.

How do you identify American Domestic 'Metals' Cartridges? The majority of American, mass-produced, domestic cartridges have a netting covering round the sides. The plastic end caps (top and bottom of the cartridge) can be in a variety of colours including grey, black, pale blue and green. White plastic ended cartridges are not usually manufactured to reduce dissolved metals. American manufacturers in general produce excellent specification sheets. These can be a useful source of information for fishkeepers and readers should refer to them for precise information about individual cartridges and the 'metals' protection the cartridges will, or will not, offer to their fish.

Finally, no purification media will have exactly the same length of effective life on all the different types of water found in the UK and metals, in particular, can radically shorten the life of purification media. It is totally unrealistic and unscientific to expect a set media life! That is why it is so important to get drinking water reports.

The reports should be used to 'rate' the effective life of purification media (in or out of cartridges) to match individual tap water supplies. Influent tap water should also be checked against reverse osmosis membrane performance. Purifiers are not magical in performance, unless *purifiers are rated to individual tap waters it is quite possible that fish are not actually protected and that fish continue to be at risk.* Unrated purifiers are definitely a 'cloud' and not a 'silver lining!'

I hope this additional information will be of assistance to your readers.

Ann Telford,
AllClear Water Purifiers,
Brentwood, Essex CM14 5AG

Dear Sir,
With reference to your article 'Fishkeeping's Hidden Agendas' (**A&P, August**) and in particular references to the use of bi-metallic media to remove or regress undesirable elements, as a supplier of such media I would like to offer my comments for your review.

My job function brings me into contact with a whole host of water treatment applications and the relevant solutions for industrial, commercial and domestic situations are wide ranging. One type of treatment we currently market and distribute is a redox alloy media.

Before offering the use of this process media to an end user, a certain amount of accurate information and integrity must be gathered to assist in planning of water treatment systems for its use in cooling towers and other recirculatory systems, drinking water improvement, dechlorination, iron, H_2S and heavy metal reduction and control of bacteria, algae and hard scale.

When considering the use of the process media it is important to understand that the media works through REDOX principle (gaining and losing of electrons). Depending upon certain applications this principle could lead to the re-deposit of ionic metals, through the redox alloy media's slight elution (release) of copper and zinc. In many applications that are commercial, industrial or domestic, the elution has no consequence to the system or the vast majority of people involved, however, it could possibly be detrimental to ornamental fish if there is no additional finite removal of these ionic metals down to the considered fish safe levels required.

As a supplier of water treatment equipment and packages we have a responsibility to ensure that end user requirements are met and that satisfactory water treatment is achieved. Water supply quality is sometimes erratic and far greater accuracy for removal of resident 'contaminants' is required for ornamental fish than in many other water treatment areas.

Although field and lab testing results are available for the use of our process media, when comparing the measured quantities of redeposited copper and zinc from redox alloy media against published and accepted fish safe levels we feel, at this time, that the promotion of our process media into the ornamental fish keeping market as a feasible integral component of standardised water filtration systems is not a responsible act without first establishing set parameters.

It may be possible to offer the use of our process media as part of a combination filtration stage whereby adequate control and contact time for the treatment to take place is achieved. Stage treatment would necessarily include the use of finite or corrective and supplementary medias to remove eluted ionic metals from the treated water. Due to inherent complexities of using redox alloy media this would be brought about by exhaustive testing and on-site trials of managed systems in order to determine filtration stage design for individual applications for the achievement of identifiable certification. By undertaking corrective measures to remove ionic metal elutions on the treated water, redox alloy media function for bacteria and algae control could be impeded.

I hope that this information will be of benefit to your readers in that it clarifies our position in the market and the possible concerns of installing systems that incorporate bi-metallic media using the redox principle.

S. D. Burrluck,
Uni-Flo Services Ltd,
Brough, E. Yorks HU15 1YQ

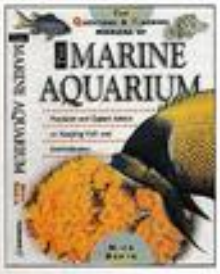
Dear Sir,

I am in the process of planning and setting up a new Aquatic Web Site on the Internet. The plans are well advanced to make this a valuable resource for fishkeeping enthusiasts. The site will feature articles, news and advice. It will provide extensive links to information provided by aquatic suppliers. Very soon it will be possible to place orders direct with suppliers by Credit Card.

In order to get the site off to a flying start I would be pleased to hear from anyone who may be able to offer their expertise and advice — and perhaps photos — on any aspect of fishkeeping. Initially payment may be limited but once the site builds I'd be happy to discuss proper recompense for contributions.

Please write to: Iain Fairweather, 24 Chilton Road, Long Crendon, Aylesbury, Bucks HP18 9BU.

BOOK REVIEWS



Question & Answers Book of the Marine Aquarium

Author: **Nick Dakin**

Publisher: **Salamander Books**
ISBN: **0 86101 861 3**
Price: **£14.99** (See A&P Readers Special Offer, this issue)

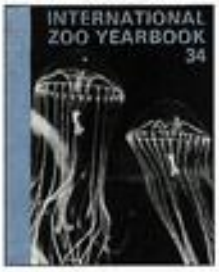
A good book should certainly hold the attention and stimulate ideas but often even the very best books leave the reader with some questions needing to be answered. Not necessarily problem-based questions, but also the 'I wonder if ...' type questions, too. How often have you wished you could interrupt the author's flow and say 'Just a minute, what about ... Well, now you can.

A&P marine columnist Nick Dakin has written a book that literally answers questions as it goes along. In each chapter of the book (divided into three main sections — Setting Up, Fishes, Invertebrates) each double-page spread features authoritative text and illustrations, pertaining to the subject under discussion, interspersed with question and answers. So, if you get a bit bogged down with some technical point, it is more than likely that the explanatory answer is just a sideways glance away. However, one must not give the impression that this is a book filled with over-technical jargon: indeed, some of the questions are quite simple, non-technical worries — Are the bubbles rising from slime algae dangerous? Will Starfish topple rocks? Can a bath sponge be used as an ornament in the marine aquarium? But, rest assured, most of the fundamental questions in connection with setting up, equipment performance-related, and health-care queries are answered comprehensively, too.

Once the beginning section of the book is past (it deals with setting up the aquarium, equipment, water qualities, etc), the two remaining sections deal with Fishes and Invertebrates in a uniform manner. In addition to text and photographs, boxes gives extra details on Tank Conditions and Care for each genus together with an expanded list of species within the group. Naturally, details for fish are more comprehensive than for invertebrates with Habitat, Tank Size, pH, Temperature, Ammonia, Nitrite, Nitrate, Specific Gravity, Water Changes, Filtration, Feeding and Health all being considered. Invertebrate details are limited to Habitat, Feeding and Health.

As might be expected by readers of Salamander Books (although this work is actually produced by Andromeda Books) the quality of illustration, artwork and overall presentation is of the highest category; to assist rapid location of information the top of each page is colour-coded and titled. All in all, a brilliantly-produced book which brings to reality an equally-brilliant concept and one which only leaves you with two more questions (not answered in the book) — why hasn't it been done before! — and when is the next one coming out?

DICK MILLS



International Zoo Yearbook 34

Editors: **P. J. S. Olney, Fiona A. Fisken**

Publisher: **Zoological Society of London**
ISBN: **0074-9664**
Price: **£65.00**

The Zoological Society of London publishes an enormous range of literature and this work's Volume Number of 34 testifies to the subject matter covered just within each International Zoo Yearbook. (Volumes 4, Aquatic Exhibits in Zoos and Aquaria, and 26, Aquatic Exhibits, may also contain pertinent information to the aquarist).

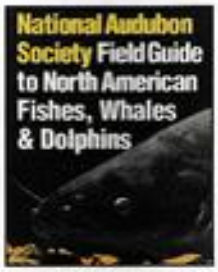
This particular volume will be of great interest to aquarists as it contains several reviews of the trends and developments of modern public aquariums (including their purpose) and with details of many of their more specialised breeding programmes. The use of logos to indicate suitability (or otherwise!) for aquarium-culture, the use of ozone and a simple method of breeding Clownfishes (Amphiprion spp) are but three examples of articles aimed slightly lower down the scientific scale.

The development of zoo world, particularly in connection with conservation of species, is fully discussed, although this section dwells more on mammals than aquatic subjects.

The reference section gives details of locations zoos and aquariums worldwide, together with their current (up to 1993) list of species — ideal if you are a globe-trotter on business or a holidaymaker in foreign parts. The list of species bred in captivity is quite revealing showing that many of our aquarium favourites are available from captive bred stock rather than from the wild. The proportion of marine fishes bred in captivity also appears to encouragingly on the increase.

With a price-tag to reflect its importance and value to the zoos of the world, this book is hardly one to rely on off-the-shelf sales for its income, nor is it likely to appear on the average bookshop shelf; most aquarists will obtain their copies via their local library shelves, but it is well worth a read to see just what is in store for you at today's modern public aquariums — and the reasoning behind their planning and installation.

DICK MILLS



National Audubon Society Field Guide to North American Fishes, Whales and Dolphins

Authors: **Herbert T. Boshung Jr, et al**

Publisher: **Alfred A. Knopf Inc**
ISBN: **0-394-53405-0**
Price: **£25** Canadian (approx £20)

To Europeans, the name Audubon is normally associated with illustrations in ornithological works but it was also in honour of the French-American illustrator John James Audubon (1785-1851) that the current National Audubon Society, founded in 1905, was so named.

As befits a Society specialising in natural history it should come as no surprise that amongst its published Field Guide works is one relating to freshwater and saltwater fishes and mammals; nor should it be surprising that it concentrates on such wild life from Mexico upwards including all of continental United States of America and Canada.

Following the introductory pages, in which physical features of fish are examined and a guide as to using the book provided, nearly 300 pages of photographs of species are encountered. These are roughly divided into the two main habitats — freshwater and saltwater (although for some reason a few Killifishes pop up for a second appearance within a saltwater section). However, sensibly, mammals such as Whales, Dolphins and Porpoises are given a section, comprising some 70 plus illustrations to themselves.

If studying the pictures doesn't lead you to a positive identification then a 12-page set of diagrammatic Keys should do the trick. Once located, species are described textually with a uniform collection of information — General Family Introduction, Description (including size), Habitat, Range (some geographical maps are included as margin illustrations), Related Species, Similar Species and Comments.

A Glossary and full Index (Scientific and Common Names) complete the book. Whilst containing some 850 pages, this flexi-back book is small enough to carry around with you whilst on holiday, so that you can easily identify any new-to-you fish that you might come across in your North American travels or visits to far-flung aquariums.

DICK MILLS

SOCIETY WORLD

Eastbourne's trial by video

Nobody loves a Judge, so it was probably prudent of the Eastbourne Pondkeeping Club to get an outsider to judge their annual Pond Competition! For ease of judging a video was taken of all 18 entries and sent to the Judge (in this case A&P's Editor) for evaluation before a Presentation Evening (together with video viewing and results) at the Club's September meeting.

The evening proved to be both entertaining and informative as the video playback was accompanied on the spot by the Judge's initial reactions and then came the results

THE PRIZEWINNING PATIO-SITED POND IN EASTBOURNE P.C. ANNUAL COMPETITION

— in the best tradition of reverse order! The Most Elusive Fish Award went to the owner of the pond whose Water-lilies were so densely packed that you had to lift a leaf to see the fish! The Best Pond Award went to David Walker's patio-based pond that combined everything in moderation and yet fitted in beautifully within the limited space available for it, just going to show that a good little 'un can beat a big 'un sometimes.

Eastbourne Pondkeeping Club (many members keep aquariums, too) meet every month at the Lamb Inn in the Old Town, next door to the superstore.

Contact Brian Dale on 01323 731369 for details of the Club's activities.

Great time at Pompey ...

says J. Stillwell, Chairman, A.S.A.S

The Association of Southern Aquarist Societies' 3rd Annual Convention held on Sunday, 18 August (sponsored by the Federation of British Aquatic Societies in association with Rolf C. Hagen, Tetra and Aquarian products) was held at the Buckland Community Centre Portsmouth and attended by 68 aquarists.

At 11.30 am the first illustrated talk 'Fishes of Trinidad and Tobago' was given by Dr Peter Burgess, after which he made an urgent plea to aquarists who keep those fishes which can no longer be imported because of disease in their natural habitat to make every effort to breed them in order to preserve those species.

An excellent buffet lunch prepared by Lynn Smith of Mid-Sussex A.S. was then served. Roger Crew of Isle of Wight A.S. was in attendance with the Federation Stand and some brisk business was done before we settled down the afternoon lecture 'The Question is Why?' which began dramatically with visuals showing the Creation with suitable music. Brian Walsh of Darwen A.S. kept the audience on their toes as he invited answers to the questions he posed. The lecture ended in much the same

▶ CONTINUED OVERLEAF

LEFT TO RIGHT: DR PETER BURGESS, LECTURER; JACK STILWELL, CHAIRMAN, ASAS; PAUL CORBETT, SECRETARY, ASAS; BRIAN WALSH, LECTURER.
SEE STORY ABOVE 'GREAT TIME AT POMPEY'

fashion as it started with a musical accompaniment. The Clubs attending included Portsmouth A.S., Isle of Wight A.S., Redhill and Reigate A.S., Bracknell A.S., Eastleigh A.S., Salisbury A.S., Bournemouth A.S., Mid Sussex A.S. and Littlehampton and Bognor A.S. and all agreed that the event was well worth attending as evidenced by the length of the applause for both speakers.

After the tea break Alan Stevens, helped by his Eastleigh colleagues, auctioned 141 lots of fish, plants and aquatic books and equipment. Since Brian was staying, we waited until after dark and took him on a tour around the city. From Portsdown Hill in the North one can see the lights from Hayling Island, across Portsmouth Harbour to the outskirts of Southampton, and as far south as the coastline of the Isle of Wight — a very impressive sight and a final trip along the seafront completed what had been a hectic but very enjoyable day.

Did you collect your prize?

Paul Corbett, the FBAS Trophy Officer, reports that Societies who received Show Packs and other Awards generously donated by manufacturers (Rolf C. Hagen, Interpet, Tetra), through the auspices of the Federation of British Aquatic Societies included the following: BURLEY IN WHARFEDALE A.S., EASTLEIGH A.S., NORTHAMPTON A.S., MALVERN A.S., OLDHAM A.S., YORKSHIRE FESTIVAL, BISHOP AUCKLAND & W.V. A.S., HALTON A.S., KIRKCALDY A.S., STROOD A.S., CAER URFA A.S., ROBIN HOOD A.S., SWINDON A.S., SOUTHEND & LEIGH & D.A.S., ABERDARE A.S., BRACKNELL A.S., GATESHEAD A.S., MUSSELBURGH A.S., ABERDEEN A.S., BOURNEMOUTH A.S., C.A.S.T. 88 ,CORBY A.S., FOUR LANE ENDS A.S., CARDIFF F.K.S., ISLE OF WIGHT A.S., ROTHWELL & WAKEFIELD A.S., ERITH & D. A.S., REDCAR A.S.,TAMESIDE A.S., CASTLEFORD A.S., MERSEYSIDE A.S., WORKINGTON A.S., ST.HELIER A.S., SEASCALE J.F.S., PORT TALBOT A.S., K.A.A.S., GLOUCESTERSHIRE A.S., PETERHEAD A.S., SALISBURY A.S., GLENROTHES A.S., T.T.A.A. SHOW, CRAMLINGTON A.S., BRISTOL A.S., HOUNSLOW A.S., MID-SUSSEX A.S., PLYMOUTH A.S., SILK TOWN A.S., SOUTH OF SCOTLAND A.S., SOUTH INCH A.S., BRISTOL TROP. F.C., DARWEN A.S., HALIFAX A.S., WASHINGTON A.S.P.

Societies are reminded that to qualify for such Show Awards, their Show's Final Show Schedules must carry relevant (and supplied) advertisements for the manufacturers donating the Awards. Exhibitors are asked to make sure such Awards are displayed and presented on the day of the Show and to write to Paul should any not appear for presentation. Awards are supplied by manufacturers on the understanding that these criteria will be met.

New nationwide standards at Goldfish Show

By Dr David Ford, Aquarian Advisory Service

The new Nationwide Standards for Goldfish were used at the Aquarian Sponsored Annual Show by the Northern Goldfish & Pondkeepers Society at Altrincham in Cheshire on Saturday, 28 September.

Judges representing the major Goldfish Societies in London, Bristol, Scotland and GSGB awarded prizes for Comets, Veiltails, Fantails, London and Bristol Shubunkins, Orandas, Lionheads, Pom Poms, Celestials, Bubble Eyes and Pearlscales plus the Common Goldfish.

Best in Show was a Calico Fantail by Scottish Breeder Fergie Brown who brought his winning fish from Glasgow.

Visitors were mainly exhibitors from all the British Goldfish Clubs because they wanted to buy young fish from the NGPS breeders who have long used the new standards in breeding stock. They also saw 245 entries by 28 Goldfish keepers displayed in this annual Show at the Trinity United Reform Church in Altrincham.

Tetra boost information

The Federation of British Aquatic Societies would like to thank Roger Foggitt, of the Tetra Information Centre, for making available several aquatic book titles which became surplus to Tetra's needs. These books have been gratefully accepted by the Federation's Judges & Standards Committee who will use the very valuable species information contained in the books to update the knowledge passed on to Societies.

DIARY DATES

NOVEMBER

1-3 Supreme Festival of Fishkeeping. Pontins Holiday Chalet Centre, Sand Bay, Weston-super-Mare. Saturday 2nd Junior Open Show. Sunday 3rd Open Show & Supreme Championship. Full Entertainments programme on Public Days 2nd-3rd November 10am-5pm.

5 Gloucestershire A.S. Monthly meeting. Bell & Gavel, Cattle Market, St Oswalds Road, Gloucester. Open Forum. Contact Andy 01452 372948 or Christina 01242 520428.

5 Southend, Leigh & D.A.S. Auction. St Andrews Hall, Southview Drive Westcliff-on-Sea, Essex. 8.30pm. Contact Chris 01268 472095.

10 Hemel District Aquarist Society. Open Auction. Apsley Scout Hall, Hemel Hempstead. More details contact Auction Manager David Lee, 01296 661348, or Jackie Bradbury, 01442 233316.

17 Oasis. Auction. Monkwearmouth Community, Sunderland. Contact Avril, 0191 384 1433.

24 FNAS Aquatic Auction. Brinnington Community Centre, Hereford Road, Brinnington, Stockport. Lots to be booked in from 10.30am-12.00 or in advance to Peter Jones 01978 761829.

24 Huddersfield T.F.S. Open Show. Rawthorpe High School, Netherhall Avenue, Rawthorpe, Huddersfield. Benching 12.00-1.45. 39 Classes YAAS Standards. Large Auction 1.30pm. Show starts 2pm. Raffle, Sideshows, Refreshments. Commemorative Plaques awarded for Class winners with Cards for 1st, 2nd and 3rd. Contact David Graydon 01484 538504.

DECEMBER

3 Gloucestershire A.S. Monthly meeting. Bell & Gavel, Cattle Market, St Oswalds Road, Gloucester. Open Forum and Quiz. Contact Andy 01452 372948 or Christina 01242 520428.

20 Gloucestershire A.S. Christmas Party, Photo Competition and Christmas Raffle. Contact Andy 01452 372948 or Christina 01242 520428.

OPEN SHOWS

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

1/3 November SUPREME FESTIVAL OF FISHKEEPING (FB). Junior Open Show Saturday 2nd; Open Show, Supreme Championship Final Sunday 3rd

10 November BRADFORD A.S.(Y)

24 November HUDDERSFIELD T.F.S. (Y)

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@sjspr.demon.co.uk** (please let us have your information at least six weeks prior to publication).