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(See page 52)



CONTENTS

JULY 1994 VOL. 59 NO. 4

COME AND SEE US AT THE HAMPTON COURT PALACE FLOWER SHOW BETWEEN 6-10 JULY. WE CAN BE FOUND, WITH OUR SISTER MAGAZINE THE WATER GARDENER, ON STAND NO. A910 WITHIN THE AQUATIC VILLAGE

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Features

Spotlight on Orfe: Do's and don'ts on this graceful pondfish from **Dick Mills** **8**

97 Species and Counting: **Colin Grist** concentrates on **First Fry Foods** for marines **12**

Matters Pineal: Jason **Endfield's** thoughts on the possibility of fish-human communications **16**

COMPETITION RESULTS: All the winners in our **John Allan A&P 70th Birthday Competition** **23**

Breeding Angels: Useful tips from top breeder and exhibitor **Derek Lambert** **24**

Koi Summer Health Watch: Enjoy a trouble-free season with a little help from vet **Lance Jepson** **27**

Keeping and Breeding: The **Silverbelly Nanochromis:** All you need to know from Norwegian expert **Aif Stalsberg** **32**

The Anti-Cat Pond: Yes, it's possible... and safe! **David Mullan** has all the details. **40**

Black Mollies Revisited: The true identity of this popular tropical community species is revealed by **Ross Socolof** **48**



Popular Pond Plants: **Barry James** rises to the challenge and selects eight of his favourites **56**

The Pineapple Connection: The absorbing and unusual story of Malaysian bogwood as experienced by Finnish aquarist **Tor Kreutzman** **63**

Keeping and Breeding: Red Shiners: Special tips and pictures from Belgian coldwater fan **Jean Lambinon** **69**

Protected Wonderland: Dr. Robert Goldstein goes diving and photographing on the reefs of **Bonaire** **86**

Regulars

Editorial:	
Tribute to Billy	3
News	5
Tomorrow's Aquarist & Tetra Competition	6
Seaview	10
Fascinating Fish Facts	11 & 42
Ponderings	14
Coldwater Jottings	19
Out & About:	
Kew Marines	22
Question Time	35
Helping Hand	44
Discussions	54
Water's Edge	
Pet Index Special	60
Frogs & Friends	66
Traveller's Tales	72
Society World	81
Koi Calendar	83
Write Back	85
Books	89
Trade Talk	90
Next Month/ A&P Subscription Form	91

EDITORIAL TRIBUTE TO BILLY



It's never easy to write about death. It's particularly difficult when the death in question is that of a universally loved man like Billy Whiteside.

Billy's thousands of fans worldwide will be as shattered as we all are at A&P at the tragic news of his distressing and premature departure after a hard and painful fight against cancer.

An avid A&P reader since the early 1950's, and a regular contributor via his popular monthly column **What's Your Opinion?** and numerous articles for more than 30 years, Billy will always be remembered for his genuine modesty, 'quiet' impressiveness, total, 100% reliability and loyalty, and for a remarkable ability to communicate with his readers on a uniquely personal basis. This last elusive quality is one that many strive for, but few achieve.

My last conversation with Billy during the final few weeks of

his life was charged with emotion, and his last letter, a particularly touching and heart-rending one in which he virtually bade goodbye to us all.

That letter ended in a P.S. that said: "Reading A&P for 40+ years and writing/photographing for it for 33+ years have been great therapy for me. My kindest regards to my readers".

We have all lost one of the few true gentle people of this earth, one who has enriched our lives over many years, and one whose untimely death has left a gaping hole which none of us will ever be able to fill.

Our deepest sympathies go to Marianne, Pat and Colin. Our thoughts are with you.

John Dawes

FIRST AWARD TO AMANDA



Dr. Amanda Vincent

The first Whitley Award for Animal Conservation has been made to Dr Amanda Vincent, a marine biologist at Oxford University, for an extensive study of the biology and conservation of seahorses.

The award has been created by the Whitley Animal Protection Trust and is administered by the Royal Geographical Society to provide funds for conservation projects.

Canadian-born Amanda has studied seahorses and closely-related pipefish, in Sweden, Florida, the Caribbean, and Australia. She is recognised as the first person to study seahorses in the wild and spends much of her time under water with them. She intends to use the award to survey the condition of seahorses in China, India, Indonesia, Thailand, Vietnam and the Philippines.

"The award will enable me to study the basic biology of exploited seahorse populations and to assess the conservation implications of the trade," she says.

Possible future options for her include establishing some level of protection for seahorses, promoting seahorse agriculture, and/or modifying fishing practices. She thinks they would be valuable flagship species for protecting their seagrass, mangrove and reef habitats.

Japan defies whaling ban

Japan has threatened to continue killing whales around Antarctica, in defiance of a plan to create a new whale sanctuary in the Southern Ocean. When the Antarctic sanctuary is added to the Indian Ocean, declared safe in 1979, a third of the world's oceans will have been closed to whale hunters.

Twenty-three countries, including Britain and the US, voted, at a meeting of the International Whaling Commission in late May, to create the new sanctuary which

will cover 8 million square miles. It will also impose an indefinite ban on the commercial hunting of about 90% per cent of the world's great whales.

Whale is a traditional food in Japan and there is a belief in that country that it is the victim of an emotional crusade.

In Tokyo, the Fisheries Minister, Mr Mutsuki Kato, has said he will study the possibility of an appeal, the possibility of continuing research whaling and he will also study the commission itself.

Tetra's Hampton show helps charity

Profits from fish foods and pond treatments sold on Tetra's stand at Hampton Court Flower Show (6-10 July) will be donated to the National Deaf Children's Society.

No less than 50% of profits raised will be allocated to the society's annual Gold Rush Appeal, while the remainder will be donated direct to the society itself.

Fish food and pond treatment manufacturer Tetra will be one of the major exhibitors within the show's Aquatic Village, and the

company has appointed award-winning garden designer Ross Moyle to create an exhibit entitled 'A Secret Water Garden', which will incorporate two ponds with a wooden bridge leading to a planted garden area.

Tetra's display at Hampton Court two years ago won the show's supreme prize, The Tudor Rose Award, and Cliff Nash, UK business manager of Tetra remarked, "This is our third year at this event, and I am delighted to think that our exhibit will benefit a charity."



One of Tetra's past prize-winning entries at Hampton Court. This particular garden was designed by Tony Howells.

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Tomorrow's Aquarist

BY GINA SANDFORD



Puzzling questions

Back in May I took a bit of my own advice and went to a convention. For once, I wasn't involved in lectures, so I could sit back and enjoy the talks, one on water plants by Philip Swindells and the other on Rill Lake Cichlids by Mary Bailey, both of which were enjoyable. Now, if I come away from an event like this having learned one thing, I'm happy — I got a bonus this time!

There have been a couple of questions that have haunted me over the years, such as: "Where do waterily aphids go in winter?" and "How come Water Soldiers (floating plants) sometimes float high in the water and you can see the flowers, and, in other ponds, they sink below the surface?" This is the sort of thing you ponder over while gently teasing blanketweed from

between the coarse leaves of the Water Soldier on a warm summer evening as you are being bitten to death by gnats and midges.

It turns out that waterily aphids are sneaky. They spend the winter as eggs on cherry trees — the last place you'd think of looking! So, if you or your neighbours have a cherry tree, now you know where to find the overwintering eggs.

These hatch out as the weather warms, and the winged insects infest your waterilies. At this stage they produce wingless young and it is not until they need to leave the waterily for another host that winged young are produced. So, to get rid of, or at least reduce their numbers, spray your cherry trees in winter to kill the overwintering eggs.

The other long term query that was answered related to the

Water Soldier. This floating plant makes an attractive addition to the pond, but one thing that had always puzzled me is that in some ponds it floats well up at the surface so that you can see its flowers, while in others, it sinks below the surface and hovers some 6 inches or so below the surface.

It would appear that, in alkaline waters, the Water Soldier rides high in the water, while in acid waters, it sinks beneath the waves.

Right, that seems to answer my original query but now my imponderable is: why? But I suppose that's one of the beauties of this hobby, we are never, ever, going to know everything there is to know about our fish and plants.

[See also the article Popular Pond Plants by Barry James elsewhere in this issue of A&P.]

T-shirt competition result

Got a lot of entries for this one — and only a couple of people got it wrong! The answer to 'Do catfish have scales?' is 'No'. Although there are those catfish, such as members of the Loricariidae and Doradidae, which have body armouring, they are, in fact, covered with bony plates as opposed to 'real' scales.



The winner of the 'Clint Bogwood T-shirt' is J. Cox from Liverpool. My thanks to the Northern Area Catfish Group for donating the prize.

'Holos', 'paras'... and others

Looking through a scientific paper a friend suddenly asked, "What on earth is a holotype?" A holotype is the original fish (in our case, although it could be used for any organism) that was used to describe the species. This specimen is then preserved for future reference and is often referred to as the 'type specimen'.

Now, it may be that several specimens were collected at the same time and the scientist then has to pick one as the holotype, and if the rest are mentioned in the description, they are referred to as paratypes.

Fishes that were described many years ago may have had their original holotype lost over the years and then another specimen has to be selected to replace it. This is known as the neotype.

In some descriptions, the ichthyologist doesn't actually designate one specimen as the

holotype, so someone else has the task of selecting a specimen from those available that matches the original description — this is the lectotype.

If the new species is so variable that no single specimen can be used to describe it and several specimens have to be mentioned in this original description, each of these is called a syntype.

The point of all this is that, should you have an undescribed fish, you can refer to the literature to see which specimens resemble it and, if need be, you can use the holotype as a reference point to ascertain whether or not this is the creature you are about to describe. If they turn out to be identical, you have a name for your previously unknown fish. If, on the other hand, they aren't, you are part way to perhaps having a new species to describe.



These specimens are paratypes of the livebearer *Poeciliopsis fasciata* (no common name). Until the mid-1980's, only females of this species had ever been collected.

Tetra TA COMPETITION

Holiday hints

How are your plans going for the summer holiday? Fishkeepers are more fortunate than other pet owners, as fish can be safely left for a few days, or even a couple of weeks, providing you have taken a few simple precautions.

Don't introduce any new fish or plants to your aquarium in the month before you go away. That way you won't run the risk of affecting the harmony between the existing fish, or upsetting the biological balance between filter and stock level. But most importantly, you won't be running the risk of introducing infection into the tank.

About three weeks before your holiday, carry out a large partial water change and give the aquarium a good clean. Change around 50% of the water and make sure you remove any debris accumulated in the tank or gravel.

The greatest worry among fishkeepers is that their pets will starve while they are away. But don't worry, fish are able to tolerate long periods without food; just think: this often happens in the wild.

Anyway, aquarium or pond fish will be able to eat algae, insects,

You could win a Tetra T-shirt, like the one worn by the young girl in the photo.



larvae and pieces of uneaten food, should they be needed. In fact, it's often surprising how healthy your fish appear when you return! However, if you are away for more than 10-14 days — or have fry in the aquarium — one of the commercially available automatic feeders is a good investment.

If you are going to ask a friend or neighbour to keep an eye on your fish, it's advisable to measure out their daily rations and leave them in a separate container. This will ensure your friends don't overfeed the fish, which can be so harmful. Also leave a list of items to inspect: checking water temperature, ensuring airstones and filters are working, etc. — and make sure they know what to do in an emergency.

If you have living plants in your aquarium, lighting is essential, but two or three weeks of subdued lighting will not harm healthy, established plants, although they will look rather drawn and pale when you return.

A Holiday Hints Information

Sheet is available free of charge from Tetra, Lambert Court, Chestnut Avenue, Eastleigh, Hants SO53 3ZQ.

The Competition

We have 10 Tetra T Shirts to give away this month — ideal for your summer holidays. Just answer the three questions below and send your answers, with your name and address, to Aquarist & Pondkeeper Competition, Lambert Court, Chestnut Avenue, Eastleigh, Hants SO53 3ZQ.

- 1 Can you introduce new fish or plants into your established aquarium two weeks before you go away?
- 2 When should you carry out a partial pre-holiday water change?
- 3 Name two things which fish will eat while you are away on holiday.

The closing date for receipt of entries is 31 July and the first 10 correct entries to be drawn will each receive a Tetra T-Shirt. Don't forget to tell us whether you require a size 28 or 30in chest.

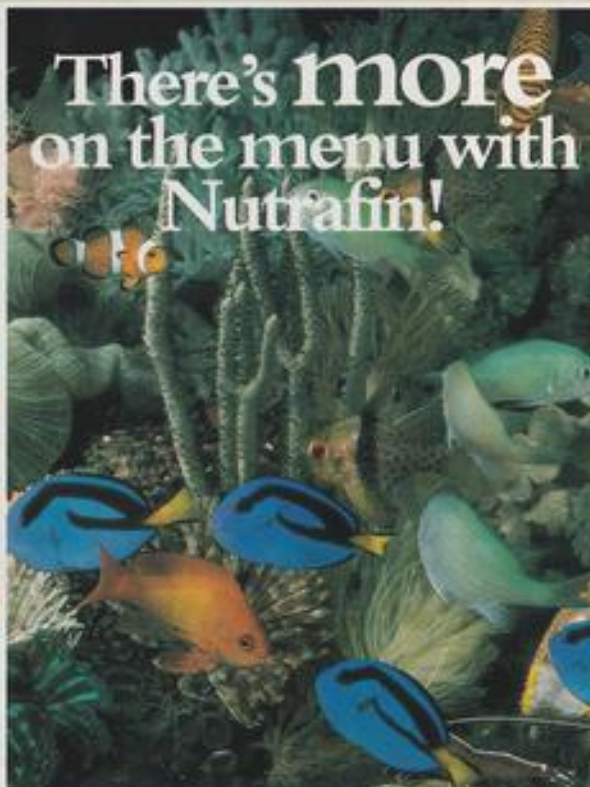
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Many pondkeepers see the Orfe as an 'optional extra' when it comes to pond fish, yet it is one of the more easily-seen species, even from the bank of a large pond or lake thanks to its constant activity.

Related to the Dace, *Leuciscus leuciscus*, and often confused with the Chub, *Leuciscus (Squalius) cephalus*, the Orfe, or Ide, *Leuciscus (Idus) idus*, can be distinguished from the latter by its smaller mouth, smaller scales and concave anal fin (this last difference caused it to be originally classified as *Idus*). For many years there were two distinct forms of Orfe — the Silver and the Golden — but more ornamental forms have been introduced more recently, eg, the Blue Orfe.

Originating in Europe, the Orfe has a large distribution, ranging from central Europe, north of the Alps, to the Baltic and even Siberia. It does not occur naturally in Britain, but it does as an importer into countless ponds and ornamental lakes. Formally described by Linnaeus in 1758 as a silver fish, it is reported that in a certain area in southern Germany, the fish changes colour naturally to gold, an event that is celebrated locally.

As can be seen from the accompanying illustrations, the Orfe is a very smart-looking fish. Even the natural silver strain has red in some of the fins, and the lateral line is clearly defined. One immediate visual impression is that, with the exception of the pectoral fins, the remaining body fins (dorsal, pelvic and anal) are set well back past the 'halfway mark' and deepest part of the body.

Speedy fish

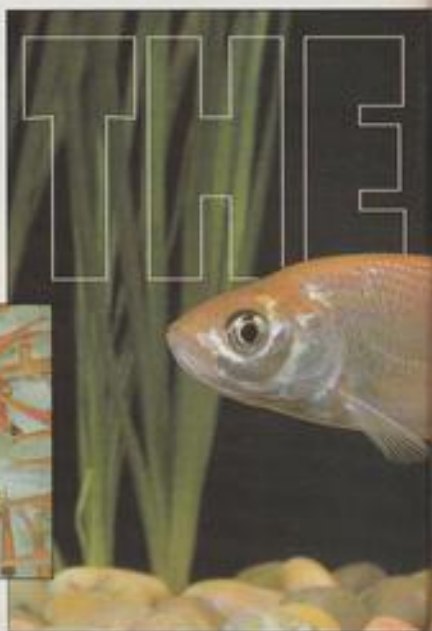
Looking at its streamlined body, it is easy to see that the Orfe is clearly built for speed, an ability it puts to good use in its daily quest for the insects, crustacea and small fish that make up its main diet. This appetite for insects and crustacea can be taken advantage of when creating a new pond when there may well be a 'population explosion' of insects etc (from establishing plants) before the fish stocks are properly introduced; using Orfe will help keep down the numbers and the plants will not be disturbed as much as would be the case by more bottom-foraging fish.

Orfe are constantly active fish, so their pond should be large enough to give them room to live accordingly. This fish can grow to quite large proportions: 38cm (15in) is not uncommon, and a monster 4-pounder (approximately 2kg) was recognised by the British Record (Rod Caught) Fish Committee in 1976. Coupled with this ability to grow large, comes attendant longevity, and 15-20 years cannot be unexpected.

Orfe thrive best in still, or slowly flowing waters, but on warm sunny days, they will appreciate the fountain being turned on. One of this species' idiosyncrasies is to leap from the water (whether in chase of

SPOTLIGHT

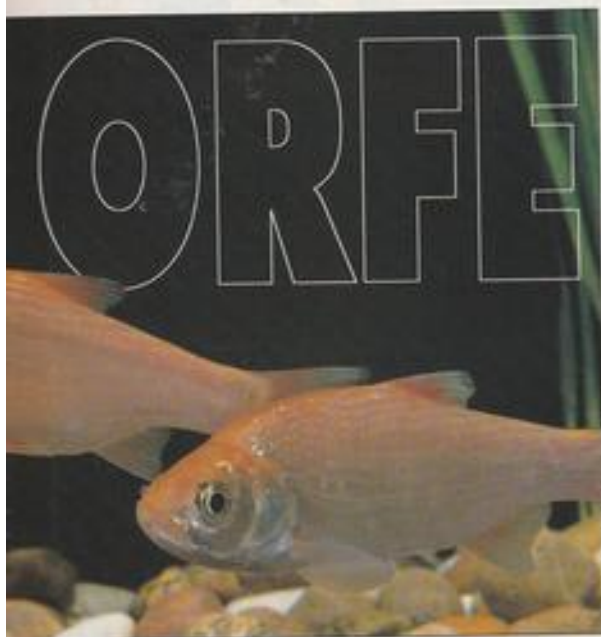
Dick Mills focuses on the attributes, weaknesses and requirements of this elegant, lightning-fast, popular pond fish.



Below, Golden Orfe: the most popular variety available.

Below left, one of the newer varieties is the Blue Orfe.

Inset, young Orfe on sale at a garden centre



insects, or simply from joie-de-vivre, is not always clear), so keeping Orfe in a small pond is asking for trouble, with fish often being found in the middle of the lawn.

Despite their avid appetite for live foods (worms included), they will accept flake and floating stick foods too.

Spawning between mature adult fish, around 3-4 years old, occurs in April/June (male fish show the typical cyprinid breeding tubercles on the gill covers), and is likely to take place on the gravelly bottom or among plants at the bankside. Many thousands of eggs are laid by the female and hatching takes around 10-20 days.

Sensitive medicine

Despite the foregoing, although the Orfe is, to all intents and purposes, an attractive and ideal pond fish, there is one slight area for caution. Should disease strike the pond, it might be prudent to remove the Orfe while adding medicants to the water. This beautiful fish is, unfortunately, very sensitive to certain remedies, metrifonate (trichlorfon) being a typical example, and will be the first of the pond's inhabitants to exhibit signs of distress. Some modern-day pond treatments (though not all) take this characteristic into consideration, so watch out for these. They are well worth the search.

ORFE FACTS

Scientific Name: *Leuciscus idus idus*
 Common Name: Orfe or ide
 Distribution: Central Europe to Siberia
 Forms: Silver, Golden and Blue
 Size: up to 40cm
 Sexing: Males develop spawning tubercles; females plumper
 Diet: Insectivorous mainly but will take small fishes and prepared foods
 Lifestyle: Active, surface shoaling
 Remarks: Best in larger ponds, takes care when using medications

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SEAVIEW

BY GORDON KAY



Pollution threats

There was a very interesting piece on pollution in the latest campaigning members' update from the **Whale and Dolphin Conservation Society**. The article said that, while we are quick to recognise the threat to dolphins and whales from harpoons and fishing activities worldwide, we continue to overlook the threat posed to the animals around our own coasts.

There has been a measurable decline in numbers of cetaceans around British shores during the last few decades, all due to the increasing imbalance of the marine ecosystem — which could well be reaching crisis point. The Government is failing to help the situation and, in some cases, is positively encouraging activities which threaten the survival of, not only cetaceans, but also other forms of wildlife.

We have already talked about lethal fishing methods, but pollution levels are also horrific. Very high levels of mercury and lead have been found in seals and Harbour Porpoises. Elevated levels of cadmium were also discovered in Striped Dolphins in the Irish Sea. In '91, the UK discharged almost two tonnes of PCBs and 500 tonnes of toxic heavy metals into the sea. Access to prime dolphin habitat was granted to the oil companies in 1993.



OCEAN VOICES INTERNATIONAL

Life-friendly tuna?

After campaigning against the use of the dreaded driftnet for some considerable time, I was both dismayed and disappointed to learn in April that the European Union had given in to the French and sanctioned their use for a further year.

For the benefit of those who have been living on another planet for the past few years, driftnets are tuna nets — up to three miles long in some cases — which are highly efficient at catching the fisherman's prey. Unfortunately, they also trap anything else which happens to be in the area, regardless.

For instance, last year alone, around 83,000 Blue Sharks, 1750 dolphins and 100 turtles died in driftnets in European waters. This does not include several whales, nor the 100 seabirds which also met their maker.

Most of the nations in the Union had wanted a ban on nets of more than 1.5 miles long. Now, just take a second to visualise a journey which you know to be 1.5 miles long and then imagine the amount of death and destruction which a net of that length could cause. Doesn't bear thinking about, does it?

The RSPCA has written to Gillian Shephard — the Secretary for Agriculture and Fisheries — and demanded Government action. I say — whatever happened to the campaign for "Dolphin-Friendly Tuna" which was so successful a couple of years ago? Have we all become so complacent that this issue is now forgotten? Maybe we should resurrect the campaign, with knobs on. Better still, how about a campaign for "Life-Friendly Tuna"?

Despite advice from its own conservation advisers, the Government still waits to see what the effects of all this will be before it acts. This is in spite of

Net fishing may be replacing cyanide fishing in the Philippines, but we've still got a long way to go.

international agreements under which it is committed to abide by the precautionary principle. The Government refuses to act until there is evidence of a threat.

If you feel strongly about this issue, then write to the Rt. Hon. Tim Eggar MP, Minister for Energy, Department of Trade and Industry, Ashdown House, 123 Victoria Street, London SW1W 6RB and tell him so. You may also write to John Gummer MP, Secretary of State for the Environment, 2 Marsham Street, London SW1W 3EB and ask him why his department is failing to stand up to the DTI who issue the exploration permits.

Still some way to go

Still on the topic of conservation, several years ago, I used to bang on about cyanide fishing in the Philippines and other areas in the East. Another of my 'soap-box' subjects was the use of coral skeletons in the aquarium and the sale of said skeletons in the curio shops around the World.

SNIPPETS



CHRISTOPHER BOYD

Upwardly mobile coral (this is Lettuce Leaf Coral — *Agaricia tenuifolia* photographed in Roatan, Honduras). Vertical growth is affected by sea levels.

1

As coral organisms live in the sea, vertical growth of the coral depends on the sea level. Over the past 100,000 years, the sea level has been rising, allowing coral to grow at the rate of over one centimetre a year in an upward direction.

2

Some oceanic creatures undertake long journeys, or migrations. Many of the Baleen Whales travel thousands of miles each year between their feeding grounds in the plankton-rich seas around the poles and their breeding grounds in the tropics. Each species uses its own feeding and wintering grounds. Some, like Humpback, Grey and Right Whales, have separate populations living in each hemisphere. Because the seasons are opposite in each hemisphere, one population is feeding in polar waters, while the other is giving birth to its young in the tropics.

Yet another issue about which I made much noise was deforestation and the reef siltation which resulted from this activity. I also seem to remember bringing up the issue of turtle conservation and strongly decrying the development of prime turtle nesting sites.

Well, since those dark distant days, more and more people have become aware and — please don't think that I am claiming any credit here — making their thoughts known, voting with their wallets and collectively saying,

SNIPPETS

3

Krill is not confined to the Antarctic. There are about 90 species of Euphausiids distributed widely throughout the world. However, the greatest commercial interest is centred around the Antarctic species *Euphausia superba*, which occurs in vast numbers and which is the species we all commonly know as Krill.

"No more".

Slowly but surely, we have seen conversion of cyanide fishermen to nets. We have seen the introduction of brilliant synthetic corals for the aquarium, which look every bit like the real thing once in water (it should be noted here that exporting corals has been illegal in some countries for years). We have seen all manner of support for the rainforest, from all manner of people — including rock stars. We even have local conservation projects working for turtles in all the known nesting grounds around the Mediterranean (you may recall that I spent some time with one such group on the island of Cephalonia in 1991). I'm happy now, right? Sorry, no!

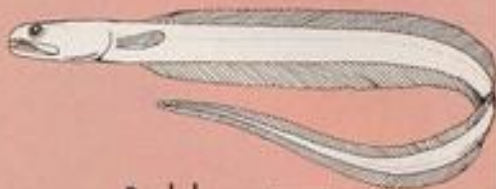
Despite all of this environmental awareness, the coral reef is still under enormous danger. Not from anything new, but from the same issues. I still see animals which show classic symptoms of cyanide poisoning. The rainforest is still being plundered and there are still horrible great developments going on behind turtle beaches.

My point is this: we have become complacent — sell righteous even — in the midst of all this campaigning. We must continue to fight as hard as ever, in order to save what is the most wonderful habitat on our planet.

FASCINATING FISH FACTS

The deceptively 'normal' Pearlfish.

DUKE FARMHOUSE



Backdoor retreat

This remarkable tropical marine fish known as the Pearlfish (*Carapus bermudensis*), lives close to large sea cucumbers (relatives of starfishes, despite their name), retreating tail-first, up the anus of the cucumber when danger threatens.

The advantages of this relationship — from the Pearlfish's point of view — are obvious ... (?) Sea cucumbers can exude toxic substances which predators avoid and, in this way, the cucumbers offer the Pearlfish (which appears to be immune to these compounds) a considerable degree of protection.

From the sea cucumber's point of view, however, the benefits, if any, of the relationship are difficult to fathom out. Even more difficult to work out is just how such a unique ... and 'freaky/friendly' relationship could have evolved in the first place. The mind boggles!



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that they can be cultured either in freshwater or saltwater.

There is no doubt that culturing foods for marine fish larvae is not an easy task. However, obtaining starter kits is now no longer a problem*. In fact, it has been possible to buy rotifers and suitable algae for around 20 years, especially in the States.

Nowadays, it is possible to purchase inoculating cultures of rotifers and microalgae and the necessary nutrients to support the algae. Apparatus for culturing the rotifers and algae can be very simple and not too dissimilar in their operation to the techniques used for rearing brine shrimps. Of course, for more intensive rearing, the apparatus will have to be more sophisticated.

Culturing rotifer food

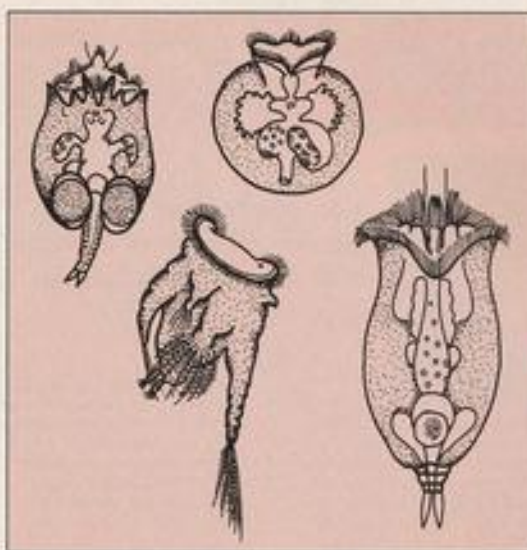
The first thing to do is establish a viable microalgae culture. The algae can be referred to as phytoplankton, and represent the baseline in this classic example of a food chain where the rotifers, or zooplankton, utilise the algae, and, in turn, the fishes utilise the rotifers. Algae, like higher plant life, require light for photosynthesis. However, many species of *Chlorella* can utilise nutrients directly from their culture medium and, therefore, do not essentially require high levels of light.

Simple culture vessels can be made out of plastic soft drink bottles. For a permanent culture system of reasonable size, it is best to mount 4 x 40 watt fluorescent tubes horizontally on a wall behind the vessels. To improve the efficiency you can add some light enhancers, or reflectors, of the types that are now commercially available; sections of white plastic guttering are also useful for this purpose.

The water which will be used for the culture medium must be as sterile as possible, so you should either use distilled water, or run it through an ultra-violet unit first. The main reason for this is to eliminate the possibilities of undesirable species of algae finding their way into the system to compete with those required to feed the rotifers. It is also possible for the culture to be killed off by protozoa and bacteria.

The culture medium ideally should be a synthetic seawater mix of around 30 parts per thousand, which is the density of natural seawater (specific gravity of 1.022-1.025), as this will match the conditions the rotifers need to be grown in, although rotifers can withstand densities up to 60ppt.

To effect rapid growth, start a culture off with a 50ml inoculation of microalgae into 1 litre of fresh, lightly aerated seawater and add a proprietary nutrient enrichment formula to the culture medium as directed by the manufacturer's instructions. However, always be aware of the



A selection of rotifer species. Young marine fry love them!

FACTFILE

- 1 Adult rotifers are about half the size of newly hatched *Artemia* (brine shrimp), and are therefore more suitable for relatively small marine fish larvae.
- 2 Rotifers reproduce rapidly, up to 8 offspring per day, making it easy to culture enough to supply the needs of the fish larvae.
- 3 Culturing systems can easily be made by using a combination of standard aquarium equipment and household items. Air pumps, airline, valves, heater/stat, small aquarium tank and soft drink bottles can be used together to make a simple set-up.
- 4 Kits can be obtained from marine specialist shops; this makes it a lot easier to get cultures started.



Fry menu: rotifers and algae salad! This is a simple culturing set up in the corner of a kitchen.

risk of culture crashes, as these will occur when the number of algal cells increase to a point where they can no longer be sustained.

To avoid these crashes, harvest off 50% and top up the culture vessel with fresh, nutrient-enriched seawater. The amount harvested can be used to start another culture going, or it may be necessary to waste it, but this is preferable to losing the lot. Practice will help determine the best time to harvest.

Rearing rotifers

The rotifers can be reared in a small aquarium, or anything non-corrosive, although wide and shallow containers are most suitable, as they provide plenty of surface area for oxygen exchange. The culture medium should be synthetic seawater of the same salinity

as that used for the microalgae; however, rotifers do have a preference for aged water, so do not use any that has been freshly mixed unless there is no alternative.

Light aeration is recommended without the use of an air stone, as fine bubbles can strip the rotifers out. Temperatures should be between 70-80°F (21-27°C).

Rotifers are tough little organisms and reproduce rapidly if well fed. In fact, a single rotifer can produce up to eight offspring a day! To start the culture off, inoculate around 1,000 rotifers, or if using Resting Rotifers from Florida Aqua Farms*, first hatch out the cysts as directed.

The rotifers need feeding as soon as they hatch, so maintain enough algae in the rotifer tank to keep the water a pale green. As a rough guide, 2 litres of algae per week to 22 litres (5 gallons) of water in the rotifer tank should be sufficient.

Rotifers will start to reproduce when they are only about eighteen hours old, but they are quite short-lived, with males lasting around two days and females around six. Nevertheless, it is obvious that the population can increase substantially in a short period of time if correctly fed.

If the rotifers' tank is very small, it will be necessary to transfer the entire population to a larger container, and a fresh culture can be started in the smaller one. Be sure to keep regular checks on pH, as too much algae in the rotifer tank could cause an increase; at the other end of the scale, do not let the pH drop below 7.9.

With a bit of luck, the reason for establishing a rotifer culturing system is because you have some hungry marine fish larvae to feed. The fish larvae are going to be delicate, so it is not advisable to allow any water from the rotifer tank into the fish rearing system. It is best to obtain a proper plankton hand net for transferring the rotifers to the fish larvae.

(TO BE CONTINUED) **117**

PONDERINGS

Filter thoughts

In one of my previous articles concerning simple pond maintenance, I made no mention of filters. This was because I think, rightly or wrongly, that for most ponds they are unnecessary.

I am not against filtration, of course. My fish house, for example, uses a small pond type filter as part of the water circulation system. Then two of my large floor tanks are assisted by a couple of home-made trickle type devices, and they really take some of the work out of running a Goldfish set-up.

By contrast, the outside ponds are not filtered. My current water works consists of three small ornamental ponds supporting some of the usual submerged plants, a few water-lilies, and various marginals.

There is also a row of what I call working ponds. These are square-shaped, just over sixty square feet each, and have no plants at all, except some naturally occurring algae.

The fish stocks in all of these ponds varies almost constantly. At times, they will contain adult fish, sometimes current year youngsters. I have been known to clear a pond of yearling Shubunkins in order to 'turn out' a crop of eight-week-old Orandas, or I might 'put out to graze' an assortment of adult breeders that have completed their allotted duties in the fish house. All my available water space has to work hard... and it has to work well.

These ponds, although they are not filtered, are well maintained; at least, I think so. In some respects, I treat them in much the same way as indoor



Alex Stephenson offers his second collection of thoughts and views for pondkeepers.

Illustrations by the author.

aquaria: partial water changes and debris collection etc.

Because they are all separate units, filtration would mean individual pumps and filters for each one. Apart from the huge initial outlay, the running costs would not be justified by any small benefits.

There could also be some possible disadvantages; for instance, a reduction in the amount of naturally available food organisms. This could certainly affect the growth rate of baby fish.

Well supported case

I appreciate why many people are firm believers in constant filtration, and it isn't only because it's a way of getting round the problems of a poorly designed or badly managed pond.

For Koi keepers, for example, elaborate purification plants seem to be mandatory. Most commercial establishments also use large and often complex systems, so the case for filtration is well supported, and well advertised. The average newcomer (the one with two point four child-

ren) could therefore be forgiven for thinking that fishkeeping without filters is almost impossible.

The common practice of overstocking leads many people to employ costly filtration equipment. What they are, in effect, doing is similar to putting too many people in a room and providing mechanical ventilation. Life is certainly possible, in the short term, under these conditions, but you wouldn't call it 'living'. Poor feeding is another widespread reason why some ponds need help; often it is the amount of food poured in, but it can also be the quality or type of food used.

If you regard filters as optional extras, rather than essential parts of your set-up, you are — in my view — on the right track. I see filtration systems as mechanical aids to assist — in certain areas — good fishkeeping practice, their most valuable contribution being in the high density-low volume situations like indoor tanks.

By contrast, ponds need not normally be subject to the same pressures.

I am not knocking the commercial world for proclaiming their products and showing us how vital they are to our success, of course. How else would we know what is available? Without all the options, we wouldn't have a choice

to make. That — in fact — is what it's all about, isn't it? Choice.

Green water views

Let me now turn to something completely different: green water, the appearance of which has been known to cause hysteria.

Opinions vary, sometimes strongly, about how to deal with it. As all ponds are a lore unto themselves, I can only suggest you read the books and come to your own conclusions.

There are those who firmly insist green water is beneficial — a valuable food source and so on, while the other faction proclaim it is harmful, using up oxygen at night, etc. The silent majority however, which includes most pond owners, probably hate the sight of it, because it obscures the fish.

My own feelings about green free-floating algae vary. A mild infestation, I consider to be no problem. There has to be food value in it, especially for young fish.

The problems arise when things get out of hand and the water becomes 'pea soup'. During the day, plants — algae included — do a grand job, but at night, all this changes.

Let me explain: all green plants consume oxygen in much the same way as other living things. However, under natural light, they also begin feeding and growing. This feeding — via a process known as photosynthesis — entails absorbing carbon dioxide and water, together with a whole range of minerals and nitrogen compounds. One of the

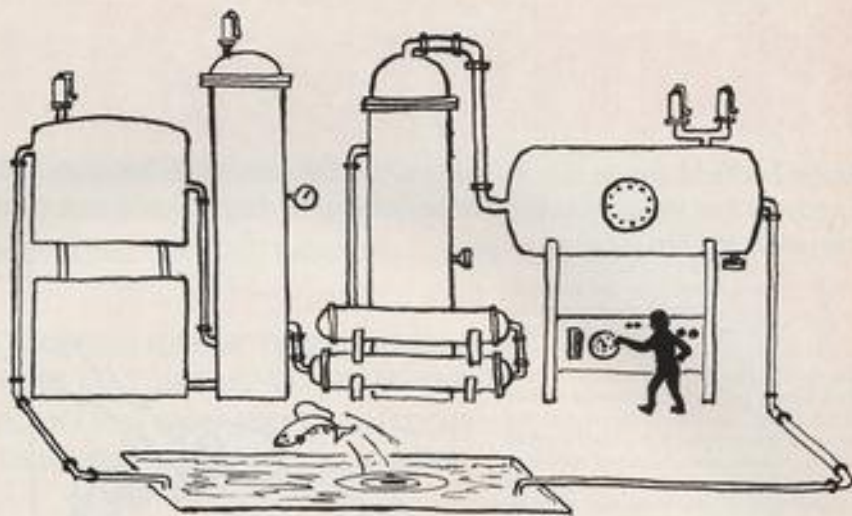


waste products from this processing is oxygen.

Under daylight conditions, the amount of oxygen produced far exceeds the amount required for respiration by the plants. When the sun goes down, though, photosynthesis stops and so, as a result, does oxygen production. However, the plants still need to continue to breathe and so are now just using up oxygen, rather than producing more than they can use.

In a well stocked pond with thick green water, the oxygen demand can be greater than the water surface gas exchange can provide for. Under such conditions, fish become distressed, the larger ones keeling over first.

So, if you have this problem and see fish breathing heavily at the surface, do something quickly. I have found that the most effective thing to do is run the hosepipe into the pond and let it overflow gently for several hours. Any harm this may do is nothing to what is likely to happen if you don't act.



The shape of things to come?

Gas bubble problems

As though you hadn't got enough to worry about, there is a condition known as 'gas bubbles', which can occur when fish

are subjected to water containing so much oxygen or nitrogen that they can't deal with it.

The evidence shows up in the finnage as bubbles, and that's exactly what they are. In hot weather, algae can easily raise oxygen levels dangerously high so that it can encourage the

development of the condition, which has similarities with the 'bends'. Any divers reading this will know what I'm talking about. If fish can't be removed to a safe environment, then it's the hosepipe treatment again.

There is one more factor with thick green water. The circum-

stances which promote it are much the same as those required for population explosions of many harmful organisms. So beware, your pond is a time bomb!

On the whole, therefore, I am not in favour of green water... except for the very mild form.

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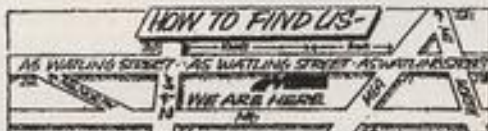
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Matters Pineal

Jason Endfield delves into the realms of communication between species and discovers that we may well have something in common with our own fish ... a 'degenerate third eye'!

This is going to be the third feature I have penned regarding my theory of telepathic communication between man and fish. In the previous two articles, I have dwelt on the somewhat humorous aspects of this theory, but I have to say that the implications of such a possibility of thought transference between man and animal are quite immense. That said, it is probably time to offer some sort of explanation in support of my findings.

Readers might remember that in a series of experiments carried out with two of my fish (an Oscar and a Polypterus), I discovered the somewhat alarming possibility that they were able to receive thought vibrations sent to them by me. For new readers, that is going to sound totally incredible, and I can only refer them to the previous articles which led my other readers up the more gentle road to my conclusions (March and November '93). Suffice to say that, for now, you will have to accept my theory at face value.

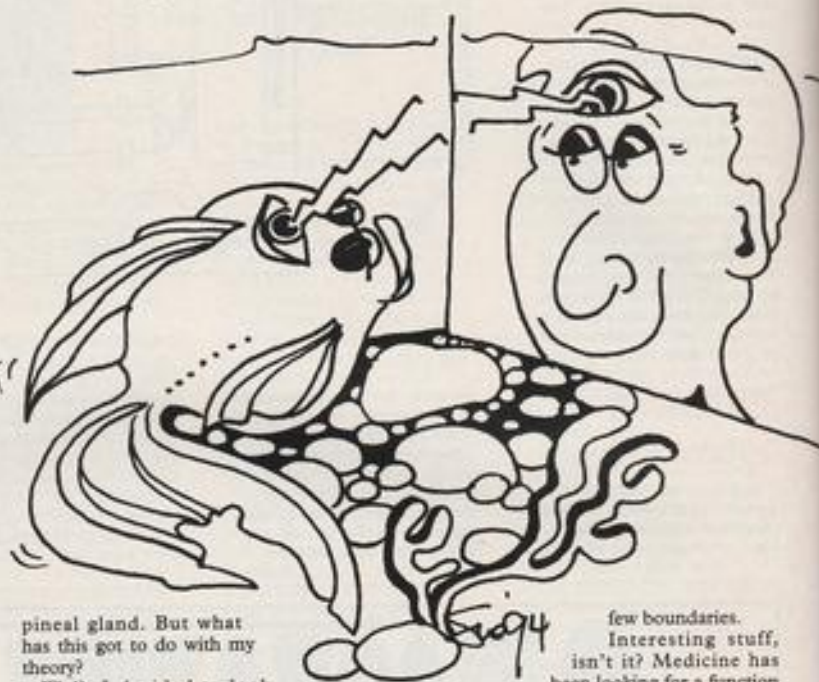
But, like I said, it was time, I felt, to look for some sort of explanation for my findings, and as I 'sought', so did I 'find', and what I found was, for me, quite absorbing.

Third eye research

I decided to look into the subject of telepathy and what had been written about it through the ages. In every work on the matter, it became clear that a common strand of thought ran through each one of them — a theory that remained constant, whether the work was ancient Greek or modern American in origin.

It seemed that every great thinker on the subject of thought transference referred to an 'organ of telepathy' that they said existed in every human being. Not only that, but they actually identified the 'organ' in question. It is what we call today the 'pineal gland' — a tiny gland at the base of the brain. This gland, whose function is unknown to modern science, is always highly developed in children, gradually degenerating as we get older. It is interesting to note that children are generally considered to possess more 'psychic' abilities than their elders.

The ancient Egyptians called the pineal gland the 'Third Eye' and it has been associated with mystical powers in every culture, in every corner of the world at some stage. That's the introduction to the



pineal gland. But what has this got to do with my theory?

Well, I decided to look into the possibility of pineal glands in other animals, in particular, fish. And guess what? It turns out that fish have highly developed pineal glands! Surprised? I wasn't. I kind of expected they would have.

That's not all either. In a highly regarded scientific work by no less authorities than Harmer, Herdman, Bridge and Boulenger, the pineal gland is described in some detail and, they say, it actually forms part of a degenerate third eye — yes, the same third eye no doubt that the ancients told us we had ... in the human pineal gland.

So, you see, it all begins to fit together quite nicely. If the pineal gland is indeed the 'organ of telepathy' that the ancients taught about, then it makes sense that we would be able to communicate with others using this mutual 'radio transceiver' — at least, those of us with highly developed pineal glands.

So one animal with a highly developed gland would be able to transfer thoughts to, and receive thoughts from, another animal with a highly developed gland. Presumably, it doesn't matter whether they are of the same species or not, because energy, which is, after all, what thought is, recognises no language and

few boundaries.

Interesting stuff, isn't it? Medicine has been looking for a function for the pineal gland for years.

Perhaps we can now say that it is our organ of telepathy, and that really makes it one of the most important parts of the human (and animal) body.

The implications would, naturally, be astonishing — being able to communicate with nature using thought energy has endless possibilities — and all of those possibilities are positive; we can only benefit the world, and each other, indeed all living creatures, by communicating with one another.

Thought, as I said earlier, recognises no boundaries, and we aquarists are in a particularly advantageous position, living, as we do, in such close proximity to fascinating animals — our fish — they, in turn, possessing, as I've discovered, well developed pineal glands. This could facilitate inter-communication between keeper and fish, providing the keeper's organ of telepathy is well toned. Children, especially, should have no trouble in 'talking' with their fish.

I should stress that, at this stage, it seems that we are able to communicate only 'feelings' to one another, so the days of holding meaningful conversations with Goldie or Oscar are only in the realms of fantasy.

COLDWATER

JOTTINGS

BY
STEPHEN J. SMITH



Of algae, oxygen, and blanketweed

With the promise of warm summer weather being fulfilled by now we should be having a great time by our ponds. However, far from being able to enjoy the sight of your pond fish as you sip your lemonade(!) at pondside, all you can see is a green soup where your pond water used to be. The only sight you get of your fish is one of their gasping mouths at the surface as they clamour for air.

What can be done? How can I get clear water so that I can actually enjoy the fish? And what can I do about oxygen shortage in the pond? These are just a few of scores of questions I receive at around this time of year; it never seems to get any better.

Hopefully, there are some reasonable answers. If it is of any comfort, everybody who keeps a pond gets the same problems, to some degree, regardless of whatever measures are taken to reduce them.

I shall endeavour to shed some light on the last question first. Surprisingly, oxygenating plants can produce quite the opposite effect you are seeking. True enough, during the daylight hours, the plants will absorb carbon dioxide and release oxygen through photosynthesis, much of which is absorbed by the water (on a particularly bright day, you may actually see streams of oxygen bubbles rising

SOAPBOX



Hundreds of Fancy Goldfish are shown at specialist societies throughout the UK — but very few are seen at the 'general' open shows.

PUTTING UP A SHOW

Why is it that, when the specialist coldwater shows are so well-supported, so very few coldwater species are seen in the coldwater classes at 'general' shows?

My experience of the Goldfish Open Shows at Bristol, London, Atrincham and Scotland is that hundreds of Fancy Goldfish, as well as other coldwater varieties, are proudly displayed, with upwards of 400 entries at one show I remember. But go along to an Open Show organised by a 'general' fishkeeping society, and the number and quality of coldwater specimens on the showbench is sometimes a very sad sight.

Now, I am not knocking those who do take the time, trouble and effort to put their fish on show, quite the opposite. And, while there is a small number of hobbyists who show at both the specialist Open Shows and the more general events, I am left only to wonder why the specialist coldwater fishkeepers are so reluctant to make their presence felt on the 'wider' show scene.

So, with the show season now in full swing, let's see more of the specialist coldwater societies at the shows organised by FBAS, A of A, and others. Surely, the enthusiastic members of Goldfish societies, for example, could get together and ensure that the Goldfish classes at their local aquatic Open Shows are well-represented by the high-quality, and often quite breathtaking, examples which are seen at their own Open Shows.

Such a positive step would only be good for the coldwater hobby itself, as well as the fishkeeping hobby in general. Any thoughts?

STEPHEN SMITH



A number of treatments are available to help pondkeepers to keep algae and blanketweed at bay.

Remarkably, blanketweed can be all but eradicated by continuously passing pondwater through a magnetic field.

from the leaves. This is the -None-excess oxygen that the plant doesn't require for respiration).

However, don't be fooled. At night, photosynthesis stops, so oxygen is no longer generated. It is, of course, still absorbed by the plants which convert it into carbon dioxide. And the plants get the oxygen before the fish!

This situation is made worse by the fact that warmer water holds less oxygen anyway, so the result is that your fish will be seen 'gasping' at the pond surface in an attempt to absorb oxygen from the surface water, or even direct from the atmosphere itself!

Solutions

Two things can be done to alleviate the problem in the long term. One is to ensure that you do not overstock the pond. Simply because five dozen fish will fit into a pond three feet by four, doesn't mean that they should!

My 'rule of thumb' for average-sized Goldfish, for example, is no more than one fish per square foot of water surface area. Thus, a pond roughly three feet by four feet would contain no more than twelve 'average-sized' fish. If you are keeping large Goldfish or even Koi, then these numbers, of course, would need to be reduced.

Secondly, a simple filter system can make all the difference. Not only will it help to remove some (but not necessarily all) of the waste material (liquid and solid) which is produced by the fish, but the circulation of the water itself, especially if it is returned via a fountain or cascade, will enable the water to absorb more oxygen. The filter may consist of a box filled with a medium such as gravel, or could be a sophisticated proprietary model incorporating several chambers with different filter media in each.

Don't assume that the strainer affixed to the inlet of the pump is an adequate filter; it isn't, and was never meant to be. It really is only a strainer and will serve to do little more than restrict large pieces of debris from damaging the impeller (and, especially during the summer, may need to be rinsed through on a regular basis).

Blooming algae!

This brings us to the subject of algae. Quite simply, these single-celled water-borne organisms like nothing better than warm, oxygenated water, and there is very little that can be done to change their opinion! A filter will help, but only up to a point. There is a way of killing off the algae, and which I have found to be extremely effective, and that is to install a U/V unit. This is usually installed in conjunction with a filter, and works by passing the water over an ultra-violet tube (rather similar to a fluorescent light tube) which is enclosed in a quartz sleeve. The light kills all the microscopic organisms which pass over it, including bacteria and, of course, algae. Although these units are not cheap to buy (from around £80, depending on the size of your pond), they are cheap to run and are very effective.

However, they will not cure that most dreaded of pond problems, blanketweed. And, despite new ideas, equipment and treatment, the problem still provides one of the biggest challenges to the outdoor aquarist.

Don't despair, though, the fight is being won, albeit slowly. Surprisingly, the best results have been obtained by what is one of the simplest of methods. It has been found from my own experience that, by passing water over a magnet before it

enters a filter, blanketweed in that pond has been all but eradicated! (As a bonus, I understand that such a device will also help to overcome calcium deposits on the quartz tube of a U/V unit, if the magnet device is fitted in the flowline before the water enters the U/V.)

pH control

If the pH is fairly high, blanketweed is more-than-likely to occur anyway, even with the magnet, so I would recommend that you try to keep the pH of your pondwater below 7 to give things a better chance of doing the job.

There is also a wide range of

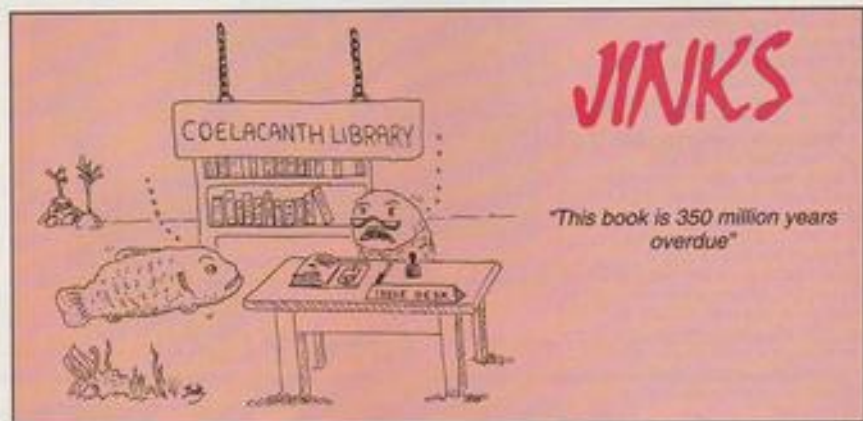
chemical treatments which will assist the pondkeeper in keeping blanketweed at bay. But I stress, they can only keep it at bay! I can recall speaking with a pondkeeper who had used a treatment which makes a claim (justifiable, from my experience) that blanketweed will be removed following the course of treatment, which itself helps to restore the chemical balance of the pond.

She explained that the treatment had worked — for the first few weeks. Then, she said, the blanketweed had returned. Well, of course it will. Using a gardening analogy, I would become a millionaire overnight if I could invent a lawn treatment which would effectively eradicate dandelions... forever!



Blanketweed — a scourge of all pondkeepers.

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OUT AND ABOUT



Left, even sponges do well in the main coral reef habitat tank.

Bottom left, look for the Palm House; the Marine Display is directly underneath!

Bottom right, the impressive central circular tank (left) houses 25 species of fish. The other aquaria are every bit as interesting as well.

Below, Lemon Tang feeding on algae. Each tank aims at displaying a balanced community of both animals and plants.

KEW MARINES

by Linda Lewis

Photographs by the author

The Royal Botanic Gardens at Kew are world famous for their extensive collection of all things botanical. Two years ago, they unveiled their latest attraction — the Marine Display — situated beneath the Palm House.

In the early 1980s, it became

necessary to renovate the Palm House completely. It was at that time that it was decided to look at the feasibility of enlarging the existing basement areas to create an area in which to display marine plants.

First of all, Kew experimented



with two trial aquaria containing tropical green algae, and only when these fared well, was the decision made to go ahead. A marine biologist, Peter Morris, was then employed so that he could be in at the design and research stage: the result of this painstaking care and attention to detail is a triumph.

The exhibits are not merely plants or animals, but habitats, designed to resemble reality as closely as possible. Four main habitats are featured: a British salt marsh, a rock shore (such as might be found in North Wales), a coral reef and a mangrove forest.

Plants found in low concentrations in their natural home, are kept that way at Kew. By matching numbers of plants, invertebrates and fish to those found in nature, it has been possible to produce a picture of what might actually be seen on a dive in places as diverse as a coral British shore or in tropical seas.

Anyone who has walked along a beach will have seen seaweeds of every shade of red, green and brown. At Kew, the true beauty of these plants can be appreciated as they grow and show their colours. Tropical varieties of red algae add other shades, from pale pinks and purples, though to nearly black, and help demonstrate the great diversity of shape and form found



In the centre of this shot are some very 'alive' Dead Sailors Eye Balls seaweeds.

among marine plants. Some can even be calcified, like coral, or soft and fleshy, branched or filamentous, tiny or large.

The coral reef displays are popular with visitors attracted by the magnificent

array of colours sported by the fish. Several different species of tangs, or surgeon fish, can be seen, along with various butterflyfish and other attractive species. Then

there's the central, circular tank — home to about 25 species of fish, full of motion and interest.

Yet, for a longer look, the main coral reef display is even more interesting. As well as brightly

coloured fish such as clowns, there are gobies to be seen taking refuge in crevices, plus many invertebrates, including a spectacular sponge. Watching the display it is easy to imagine that you are looking through a window out into a real coral reef.

The mangrove swamp also attracts many people. The view is primeval, with the majestic plants forming a forest out of the mud. Four mudskippers patrol this, their own small world. The stocking level may seem low (this display is one of the largest), but it is governed by the fish themselves. Mudskippers

are highly territorial and zealously guard their own patch of mud and roots, so any neighbour who strays too close will be chased away.

Other aquaria contain their own jewels, including seahorses, cuttlefish and a delightful Porcupine Pufferfish. At first, the pufferfish used to be fed in the morning, which resulted in the fish hiding from view during opening hours. It is now fed in the evening and swims about in full view, as if to remind the staff that it is still waiting.

As each aquarium holds animal life as well as plants, it is inevitable that the former steal some of the attention meant for the algae. The information displayed above and around the various habitats and aquaria uses this to advantage. In most cases, fish are not pictured, so visitors must read the entire notice to find out about the fish. They discover, instead, some of the fascination of the plants themselves.

Behind the scenes, vital work goes on as Kew continues to lead the way in botanical research. Successes here inspire students who come from all over the world to study. They return home with the knowledge that if marine plants can be grown in a basement in London, with no natural light, then how much easier must it be in the wild.

John Allan

70TH BIRTHDAY COMPETITION WINNERS

We asked you three questions, stood back and waited for your answers to pour in. They did! The correct responses are:

- 1 A&P's original name was *The Amateur Aquarist*.
- 2 The first issue was published in May 1924.
- 3 The name of our first editor was A.E. Hodge.

THE LUCKY WINNERS

First Prize: **John Allan
Supreme
Combination
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J. Eley
(Chelmsford)

Second Prize: **Eheim 2211
Filter:**
B. Stygall
(Hounslow)

Third Prize: **Eheim 2006
Filter:**
**Brian
Fletcher**
(Swadlincote)

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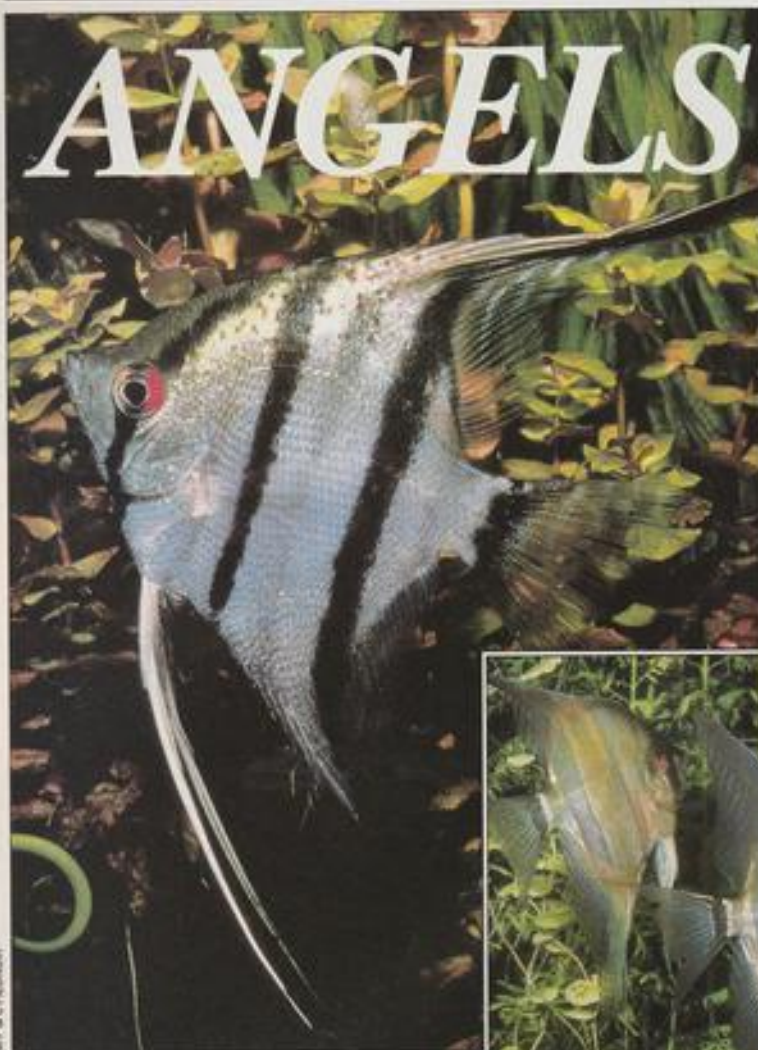
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Martyn Peter Smith
Richard John Carr
Brian Longton
Leslie Young

Sincere congratulations to all our winners who will shortly be receiving their prizes from **John Allan Aquariums Ltd.** to whom we are grateful for their most generous sponsorship. Thank you, too, to **Stephen Smith** for his 70th anniversary article **Back to the Future**, on which our competition was based.

BREEDING:



A magnificent adult wild-caught Common Angel.

At present, only three species of freshwater Angelfish are known to aquarists. The commonest, and the one from which all the colour varieties and fancy-finned forms have been developed, is the Common or Silver Angel, *Pterophyllum scalare* (Lichtenstein, 1823). This species has also been known under the synonym of *Pterophyllum vimeketi*, and you will still come across it under this name in some books and aquatic literature.

The next commonest species you may come across is the Altum Angel, *Pterophyllum altum* Pellegrin, 1903. This differs from the previous species in having a much deeper body and even longer dorsal and anal fins. This must rank as one of the

A pair of elegant Altum Angels.



most beautiful and graceful of all freshwater fish. Unfortunately, it is also very delicate, expensive and has only very rarely been bred in the aquarium. This is one species which can only really be recommended for the experienced aquarist wishing a real challenge. A cross between the 'common' Angelfish and this species produced youngsters with long pointed finnage and which were resistant to Fin Rot — a common problem with Altum Angels.

The third species aquarists have worked with is the Long-nosed Angel, *Pterophyl-*

Derek Lambert offers some expert tips on spawning and rearing these 'top-ten' community aquarium favourites

lum dumerili (Castelnau, 1855). This species has a more slender appearance than the other Angels and, although the basic body coloration is similar to the previous two species, there is an additional dark spot under the beginning of the dorsal fin. This species has been successfully bred by Jorgen Eriandsson, a Swedish aquarist, who reported it bred in much the same manner as *Pterophyllum scalare*.

Selecting broodstock

Breeding the Common Angelfish is relatively easily accomplished in captivity, although obtaining a compatible breeding pair can be problematic. The easy option would seem to be to go along to an aquarium shop and buy a so-called "breeding pair".

Unfortunately, it is usually nowhere near as simple as that because an adult pair of Angels will often not settle into a new setup and may never breed again. Alternatively, the 'pair' you bought may actually be two females which lay eggs regularly and look after them until they fungus. The previous aquarist who reared them up and tried to breed them eventually gave up and sold the fish to the local dealer as a "Breeding Pair"... not a con, just a genuine mistake which can end up costing you a lot of money and a great deal of wasted time and effort.

Personally, I always prefer to start with six or eight young fish of about 2in (5cm) in length and rear them up myself. This way, I have a good likelihood of obtaining a compatible breeding pair from the group.

The aquarium I use is at least 18in (45cm) tall and about 3ft (91cm) long. The extra height is needed so that the finnage of young Angels can develop properly. All too often, Angels are reared in tanks which are too shallow for them and this stunts the development of the finnage, making it short and bent.



Cultivated Angels come in a wide range of colour and fin configurations.

This fault can also be caused by a genetic factor, so take a close look at the finnage of the young fish you are buying. The dorsal and anal fin should be almost equal in length to the body depth and all the rays must be straight. The pelvic fins must also be without kinks and sweep back in a graceful curve. These develop more as the fish mature. In Veiltail Angels look for fish with good fin development without any rips or tears.

These young fish will take about six months of good feeding to rear to spawning size. During this time they should be fed on a good-quality flake food combined with daily feeds of live foods, such as bloodworms and *Daphnia*. Small pieces of beefheart can be added to the diet as a pollute, but care must be taken not to pollute the water with this food.

When the youngsters become sexually mature, they will start to pair off. At this time, they will be seen flashing their fins at each other and making darting movements to intimidate the other fish. Occasionally, they will grip each other by the mouth and wrestle. After a week or so, your prospective breeders will have settled into pairs and taken up residence in various parts of the aquarium. The surplus fish can now be removed, leaving the best pair in the tank to breed.

It is wise to check the sex of your 'pair' at this time. To do this look at the fish head on, ideally when they are looking towards the surface. A cube of freeze-dried *Tubifex* stuck on the front glass under the water surface usually makes the fish take up the correct position. Above and behind the pelvic fins, there will be a bulge in a female and a slight indent in a male. Males can develop a slight bulge after they have been fed a heavy meal, so try to do this when the fish are hungry.

Spawning tank

The breeding aquarium needs to have nothing more than a tall piece of slate propped up against the side and a small internal power filter in one corner. The water temperature should be set at about 80°F (26.5°C).

If you live in a hard, alkaline water area,

you would be advised to reduce the hardness and lower the pH by the addition of rainwater to the aquarium. This should be done over a period of time so that the fish are not shocked by a large change in the water conditions.

One of the methods I have used to do this, is by removing half the water from the tank and topping it back up with rainwater of the correct temperature over a period of a week. Chemicals can also be used to produce the desired water conditions.

Breeding

When your breeders are about eight months old, they should start to breed. At this time, the pair will carefully clean the piece of slate prior to laying their eggs on it. The pair will show their ovipositors for a day or two before spawning, and these can be used as a final confirmation of sex. In the female, this will be about 1/4 inch long with a blunt end. In males it is shorter, thinner and more pointed.

The pair usually start to mate during the late afternoon or early evening. The female lays her eggs in rows starting about halfway up the slate. Each row is about 3in (7.5cm) long. The male follows the female, spraying milt onto the eggs. During the spawning, up to 400 eggs are laid over a period of several hours. These take three days to hatch and the fry hang on for a further four days before becoming free-swimming on the eighth day. The parents fan the eggs and look after the fry until they are old enough to look after themselves.

Hatching and rearing

At last, that is the theory. In practice, the parents usually lay their eggs on the filter and eat them just after they have hatched! Most aquarists, therefore, remove the eggs as soon as they are laid and place them in an 8 x 6in (20 x 15cm) aquarium filled with water from the breeding tank. A small airstone is set up near the eggs to mimic the adults' fanning action, and Methylene Blue is added to the water at the rate of 5-7 drops of 5% aqueous solution per 2 gallons (9 litres) of water. This prevents the eggs from fungus.

Unfortunately, it also kills any infusoria

in the aquarium, which will be the babies' first food. For three days after the eggs have hatched, therefore, partial water changes are used to remove most of the Methylene Blue so that when the fry become free-swimming on the eighth day, infusoria can be fed.

A day or two after the fry become free-swimming, they can be fed a little newly hatched brine shrimp. This should be introduced gradually over a period of a week and the infusoria phased out once all the babies can be seen to have pink stomachs from eating the shrimps.

Great care needs to be taken at this stage not to pollute the water in the rearing tank. Small partial water changes should be carried out with water from the breeding tank on a daily basis. The piece of slate can be returned to the breeding tank at this time.

As soon as the fry are large enough, they should be transferred to a 24 x 10 x 10in (60 x 25 x 25cm) rearing tank. It is not a good idea to net such small fry as this, so, instead, carefully tip the entire contents of the hatching tank into the rearing tank.

Filtration must be fairly gentle at this time, so a bubble-up corner filter or a sponge filter can be used, but not an internal power filter, which will suck the babies into the canister.

Feeds should be little and often. Ideally, six feeds a day, but a minimum of three feeds a day (one of these in the morning), will be necessary to obtain good growth rates.

The fry will grow quickly once they are eating brine shrimp and, as soon as they are large enough, other live foods can be added to the diet, as can a proprietary growth food. This should have a higher protein content than the normal staple flake foods; the fry need this during this stage of their development.

At about a month old, the juveniles will need to be culled. Any fish which is deformed or cannot swim properly must be removed at this time and destroyed. You will also need to split the young into several more tanks if the brood is a large one.

If you are unable to do this, then it would be better to pass some of the fry on to your friends or a local dealer, rather than stunt them by trying to rear too many fish in one aquarium. Once the babies are 2in (5cm) long, there should be a ready market for them at local aquarium shops.

MIKE SANDFORD

Baby Angels look very different to their parents.





All carp, including Koi and Goldfish, are able to survive water with poor oxygen levels by a combination of gulping at the surface and using anaerobic metabolic pathways.

Koi like it warm; they are most definitely not 'cold'-water fish. In fact, happy Koi have a preferred body temperature of around 18-25°C (64-77°F). Therefore, during summer, their whole metabolism is working at its optimum, food intake and digestion are at their most efficient and their immune systems are primed for maximal response. Yes, summertime is a good time to be a Koi ... usually.

Unfortunately, every silver lining has a cloud, and summer brings with it its own set of problems. The following is a brief overview of diseases and problems associated with our summer months, but before you reach for the paracetamols, remember our 'Disease-equilibrium Equation':

FISH + PATHOGEN ≠ DISEASE

By maintaining high standards of water quality and fish management you can influence this equilibrium, helping to keep it firmly to the left, away from disease.

Environmental problems

1 O₂/CO₂

What distinguishes summer from winter are, mainly, two factors: higher temperatures and more sunshine, both of which are important triggers to plant growth.

Algal blooms can therefore become problematic, and not just from an aesthetic point of view. Certain suspended algae, such as *Chlorella* and *Pyrenomonas*, for example, secrete toxins which can interfere with breeding. A massive die-off of such algal blooms can produce a lot of decaying material in the pond, producing a serious oxygen depletion. Heavily planted ponds can also suffer from a lack of oxygen during the night, when the plants are no longer able to photosynthesise (which produces oxygen) but continue to respire (which uses oxygen).

Carp are able to survive in water with poor oxygen levels by a combination of gulping in atmospheric air at the surface, and using certain anaerobic (non-oxygen-requiring) metabolic pathways, but it is still very stressful for them.

During the night, not only are the plants using up oxygen, but they are also releasing carbon dioxide as a byproduct of respiration (as do fish). This carbon dioxide is very water-soluble, forming the acidic carbonic acid.

During the day, as the plants photosynthesise, carbon dioxide and even bicarbonate ions are removed from the water,

which, in turn, causes an increase in pH, reaching a peak shortly before sundown.

Ponds with an overwhelming plant growth can therefore experience major pH swings over a 24-hour period, the pH rapidly falling at night, only to rise once more the following morning as the dissolved carbon dioxide is removed from solution by the plants photosynthesising again.

Ponds experiencing extreme algal blooms may be subject to super-saturation of the water with oxygen during the daylight hours. Fish in such ponds will often show signs of Gas Bubble Disease, with bubbles of oxygen forming in the blood vessels of the skin, fins and behind the eyes.

2 Sunburn

Koi swimming close to the surface, in clear water with no cover, may suffer from sunburn. This should be suspected if there is a lesion on the dorsal aspect (back) only, possibly including the dorsal fin. White areas, lacking the protection of pigmentation, may be particularly affected.

3 Herbicides and pesticides

All these compounds should be regarded as poisonous to fish and have no place in or around a water garden. The

KOI SUMMER HEALTH WATCH

Perfect weather does not necessarily mean trouble-free Koi keeping, as Lance Jepson explains.



Spawning is a turbulent affair which can be quite traumatic for the pair concerned.

risks are too great. For example, a random gust of wind may blow a mist of the chemical over your pool surface; or rain-water may wash it into the pond; or dead or dying insects may drop on to the water surface, where they are greedily consumed by your beloved Ogon ...

4 Medications

Formalin lowers the levels of oxygen in the water, as well as being toxic to gill tissue. Combine this with warm water, with its reduced oxygen-holding capacity, and there could be trouble.

Malachite Green is more toxic at temperatures greater than 21°C (70°F), injuring the gills and blocking digestive enzymes.

5 Spawning

Not a disease, nor a disorder, of course, but a very frantic, physical and potentially traumatic event, which leaves the fish exhausted, stressed, often damaged and susceptible to secondary infections.

Fungal diseases

Branchiomycosis

Branchiomycosis sanguinis infections are usually referred to as Gill Rot, because this fungus invades the gill tissue. Affected fish gasp at the surface, and appear weak and lethargic.

The gills appear marbled, or 'rotted'. Although the disease is often fatal, some fish will recover, regenerating their damaged gill tissue.

Gill Rot is often associated with poor water quality, overcrowding, algal blooms and temperatures over 20°C (68°F).

Bacterial diseases

1 Pseudokidney Disease

This is caused by *Lactobacillus piscicola*, regarded as a normal commensal (a 'co-



External parasites

1 Trichodiniasis

Actually, there are three genera falling under this title — *Trichodina*, *Trichodonella*

and *Tripariella*.

Infested fish produce excessive mucus and so have a greyish cast; later, skin erosions can form. The gills are also badly affected. In fact, in Koi, infestations may be limited to the gills alone. Affected fish will scratch, and may show laboured breathing or inflamed gills.

Trichodina infections result in excessive mucus production.

habiting' organism that doesn't usually produce adverse effects) which may cause problems following spawning or rough handling. Often presents as a septicemic condition, with internal haemorrhages, ascites (dropsy) and kidney granulomas.

2 Edwardsiella Septicaemia

E. tarda has been known to cause septicemia in Koi. Infections are probably associated with poor water quality, high water temperatures and overcrowding.

3 Columnaris Disease

Outbreaks due to *Flexibacter columnaris* usually occur at temperatures over 15°C (59°F) in conditions stressful to Koi.

External tissues are attacked first of all, with the fins and gills being prime targets. Erosions appear, often with a reddened rim. Eventually, the bacteria invade the bloodstream and there is a terminal spread to the internal organs.

4 Botulism

In deep earthen ponds with a heavy sediment layer, anaerobic conditions can develop, which at temperatures over 12 to 15°C (54-59°F) can favour the growth of *Cloustridium botulinum*.

Intoxication can occur following ingestion of the sediment or disturbance of it. Affected fish are initially uncoordinated, eventually becoming paralysed and dying.



A severe *Bothriocephalus* (tapeworm) infestation.

SUGGESTED TREATMENTS

Algal Blooms

All the problems associated with algal blooms can be avoided by installing ultra-violet units, and increasing the pool aeration. Increased aeration will even help to prevent oxygen super-saturation, associated with Gas Bubble Disease.

Sunburn Herbicides/Insecticides

Provide access to suitable cover. Avoid using these compounds around ponds. Due to the wide range of chemicals used, each with different effects, diagnosis is difficult and treatment rarely possible.

Medications

Always make sure that the water is well aerated, especially where products containing formalin are concerned.

Spawning traumas

Clean up and treat as appropriate. Remember that the scales are embedded in the skin, so scale loss will produce a serious skin defect.

Branchiomycosis

No known effective treatment. Concentrate on maintenance of optimum water quality and stocking densities.

Pseudokidney Disease, Edwardsiella Septicaemia and Columnaris Disease

Antibiotics (based upon laboratory sensitivity tests) by injection, in food or in a special treatment bath. Columnaris may respond to benzalkonium chloride at 1-2mg/litre bath for one hour.

Botulism

Trichodiniasis

No known cure. Proprietary formalin-containing products should be effective, or give salt bath at 10-15g/litre for twenty minutes.

White Spot Disease Velvet Disease

Use a proprietary medication, containing either formalin or copper.

Fish Lice (*Argulus*), Anchor Worm (*Lernaea*) Gill Maggots (*Ergasilus*)

Can be problematic — best to remove individual *Argulus* and *Lernaea* manually, with pond treatment for all three with dichlorvos (licensed for use in salmon and available only through your veterinary surgeon).

Skin and Gill Flukes

Praziquantel (available only from your veterinary surgeon) as a 3-hour bath at 10mg/litre, or 400mg/100g food daily for 7 days. Advisable to repeat treatment after 3 weeks for the egg-laying *Dactylogyrids*.

Hoferellus cyprini

No known treatment. Attempt to restrict access of Koi to tubificid worms.

Tapeworms

Praziquantel as above. Probably not feasible to control intermediate hosts.

Trypanosomes *Sanguinicola inermis*

Control by elimination of leeches. Oral praziquantel may be effective (see above). Use of molluscicides to control snail population.

NB: Praziquantel, dichlorvos and antibiotics are prescription-only medicines, available via your veterinary surgeon, for fish which are under higher care.

2 White Spot

Caused by *Icthyophthirius multifiliis*, the optimum temperature for reproduction is 24-26°C (75-79°F), with the entire life cycle being completed in four days at these temperatures.

Infections can build up rapidly, and mortalities can occur, especially if the gills are heavily parasitised. If they survive, Koi will develop good immunity to the disease.

3 Oodinium (Velvet Disease)

O. pillularis can cause explosive outbreaks of disease, affected fish showing the characteristic greyish velvet-like film on the body surface.

Infected fish are itchy, constantly scratching, and may stop feeding. The gills may also be affected. *O. pillularis* contains chlorophyll and, under ideal lighting and temperatures (23 to 25°C — 73 to 77°F), can become infective within 2-3 days.

4 Argulus

Visible to the naked eye, this flattened crustacean parasite not only causes irritation to its host, but may also introduce secondary infections on its mouthparts.

Egg production starts at 16°C (61°F), and, at ideal temperatures, the life cycle takes around 40 days.

5 Lernaea (Anchor Worm)

The head of this crustacean lies buried in the skin or gill tissue of the host, creating some irritation and a site for secondary infection. Mature females possess two egg sacs near the posterior of the body, producing a Y-shape. The lifecycle cannot be completed below 15°C (59°F).



Gill Flukes (*Dactylogyrus*) on a pair of badly affected gills.

6 Skin and Gill Flukes

Skin Flukes (*Gyrodactylus*) are live bearers, and can be the cause of skin irritation, with areas of increased mucus production. Occasionally, the gills are affected.

More usually it is the Gill Flukes (*Dactylogyrus*) which cause problems with these organs, where they can be very destructive. Dactylogyrus are egg layers, with their life cycle shortened to a few days at 22-24°C (72-75°F).

7 Ergasilus (Gill Maggots)

These copepod crustaceans are found usually attached to the gills, where the females with egg sacs are readily apparent. Gill damage can be severe, and may provide a source for secondary infection.

2 Tapeworms

The tapeworms, *Bothriocephalus* and *Khawia* are found as adults in carp, with intermediate stages occurring in copepods (*Bothriocephalus*) and in tubificid worms (*Khawia*).

Peak infection time for *Bothriocephalus* is mid-summer, whereas *Khawia* has a peak in late spring, falling in midsummer, then increasing from mid-July onwards. Unlikely to be a problem in adult Koi, both parasites can be devastating in young fish.

3 Blood parasites

Trypanosoma damilewskyi is a blood parasite that is transmitted by the fish leech, *Piscicola geometra*. These parasites are really only a threat to debilitated fish. Affected fish are lethargic, with pale gills due to anaemia.

Sanguinicola inermis are digenetic trematodes (flukes) which live as adults in the major blood vessels of carp. The fish are infected by eating the intermediate hosts — aquatic snails. The eggs lodge in the gill vessels, where they hatch, damaging the gills and causing haemorrhage and extensive damage.

The above is just a sample of potential problems that can afflict Koi during the summer. The list could go on, with filter breakdowns, stress through travelling to shows and so on, all of which attain progressively greater significance as summer wears on and autumn begins to loom.

As ever, though, the vast majority of these problems can be avoided by attention to water quality and management, thereby keeping the disease equilibrium to the left ... and the paracetamol safely in your medicine chest!

Internal parasites

1 Hoferellus cyprini

Discussed in the **Spring Health Watch** (*A&P* April '94), this kidney parasite can cause the demise of Koi during the summer.

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INTRODUCING:

The Silverbelly

Norwegian aquarist **Alf Stalsberg** introduces a striking, small, relatively-easy-to-keep-and-spawn cave breeding cichlid from Zaire.

Photographs by the author

Over the past few years several new fishes of the genus *Nanochromis* have shown up, much to the pleasure of many aquarists.

One of these is *Nanochromis* sp. "Kisangani". I got my fishes from Holland, where they were listed as *Nanochromis* sp. "Silberbauch" or Silverbelly *Nanochromis*.

This beautiful fish originates from Kisangani in Zaire, West Africa. The first specimens brought to Europe were collected and brought back to Germany in 1986.

When this *Nanochromis* was distributed among European aquarists, many thought that it was actually *Nanochromis dimidiatus*, but it was not. As far as I know, this fish has, so far, not been described, so I choose to use the trade name "Silberbauch" or *Nanochromis* sp. "Kisangani."

Silver belly basics

This is a rather small fish, the male growing to about 7cm (2.75in) and the female to about 5cm (2in).

The name "Silberbauch" or Silverbelly, refers to the silvery colour on the flank.

and near the anal opening on the female.

These fishes do not need a large aquarium; in fact, the five specimens I had purchased were placed in a 65-litre (14-gal) tank. The size of the aquarium was OK in the beginning, but I eventually learned that it should have been larger when they began to pair out.

Despite this, everything went alright, thanks to the way I had decorated the aquarium. This was done in such a way

that when the dominant pair was chasing the other fishes around, none were hurt or killed, since they were able to find plenty of hiding places.

Cave digger

The Silverbelly *Nanochromis* is a cavity spawner, and it seems that the smaller the size of the cave, the better it is. I can understand this, because a smaller cave is easier to defend against the other fishes in the aquarium (or in the wild, of course).

If the tank is well decorated with plenty of driftwood and stones, the fish will dig their own caves. However, since I was interested in trying to take some photos of the fish in action, I made small caves by



Above, well-coloured male Silverbelly.



Left, female *Nanochromis* sp. in breeding colours.

Below, *Nanochromis* sp. "Kisangani" pair. Note that the female has turned on the colour to make the male interested.



Nanochromis



Far left, the opening into the PVC tube is so small that the female has to swim on her side to get in and out.

Left, a batch of eggs hanging from the ceiling of the cave.

cutting 10cm (4in) long pieces of 5cm (2in) PVC tubing. The PVC-tubes were buried in the sand with the opening too small even for the small female.

However, she soon sorted this out and made the opening larger so that she could get into the tube. Then, it was just a question of waiting to see if anything was going to happen.

Female initiative

I fed the fishes well with *Cyclops*, *Daphnia*, black mosquito larvae, flake food and Star Gold pellets. Star Gold pellets are something all my fish are very fond of, so they receive regular feeds of this type.

It did not take too long before things started to happen, much in the same manner as in "Kribensis" (*Pelvicachromis pulcher*). The female starts by showing off in front of the male, curving her body in a U-shape and displaying her ripe violet belly, to signal to the male that she's ready to spawn.

At first, the male doesn't show any particular interest, but after a while, he starts to respond to the female by touching her abdomen with his mouth during her display ritual.

Then the female begins to try to lead the male to the cave, constantly showing

off. The female's way of displaying also dampens the male's aggression towards her and, in the end, leads to spawning if all the signals are right.

Once the female has the male interested, she leads him to the cave, cleaning several stones and objects on her way. Once inside the cave, she starts cleaning the roof.

With my fish, this went on for several days, sometimes even longer, accompanied by the female digging sand out of the PVC tube. All the time, she was continuing to show off in front of the male to keep him interested.

Then, one day, they unexpectedly started spawning. The female laid some eggs on the roof in the cave, then swam out to let the male in to fertilise them. This went on until they were finished.

Hatching and rearing

The pH was 6.5 the dH 2° and the temperature 24°C (75°F). At this temperature, the eggs started to hatch after about two days.

The eggs were rather large, compared to the small size of the fish, and the colours were yellow/white and opaque.

The number of eggs was not easy to estimate, since they were so well hidden in the cave, but a large female in good condition could probably produce between 50-100.

When the fry were free-swimming, they could be counted (approximately only). There were between 30-40, this amount decreasing over time, especially with other fish in the aquarium.

If you want to end up with more than 10-15, you probably need to keep the pair alone, or just together with a target fish, such as Swordtail or any other harmless fish. Alternatively, you could move the fry to a separate aquarium and feed them there.

SILVERBELLY NANOCHROMIS FACTFILE

Scientific name: Not yet decided. Currently referred to as *Nanochromis* sp. "Kisangani".

Common Names: Silverbelly, Nanochromis or Nanochromis, Silverbauch.

Distribution: At the moment, this fish is known from Kisangani, Zaire, West Africa.

Size: Male — 7cm (2.75in); female — 5cm (2in).

Suitable conditions: pH 6.5; dH 2°; temperature — 24°C (75°F).

Diet: flake, pellets, small livefoods.

I usually try to avoid moving the fry to a separate aquarium, because part of the charm of cichlids is to study their breeding behaviour. This includes the signals between them when the whole family swims around together. But this is something you will have to decide for yourself.

Worthy jewels

All in all, these small jewels are well worth a try. They do not require a large aquarium if you are short of space. And besides, they are a good alternative for those who feel that African Rift Lake cichlids are everything.

Silverbelly *Nanochromis* exhibit interesting behaviour, have nice colours and are not too difficult to keep. In addition, as I have said, if you just have one or two pairs, they do not need a huge aquarium.

So, look out for these goodies from West Africa. Maybe you could put a little pressure on your local dealer, and one day soon, you might be lucky to find this great little fish available in your local shop. **ESP**



QUESTION TIME

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Each query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. Please indicate clearly on the top left hand corner of your envelope the name of the experts to whom your query should be directed.

All letters must be accompanied by an S.A.E. and addressed to:
Question Time, Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN.
Herpetology, Julian Sims, Koi, John Cuvelier, Tropical, Dr David Ford, Coldwater, Pauline Hodgkinson, Plants, Barry James, Marine, Gordon Kay.

MARINE



Rags and blotches

I have only three fishes so far in my 20-gallon aquarium. They are doing OK, and feed well, except that their fins seem all raggedy and there are red blotches at the base of the fins. Help!

There are all manner of alarm bells ringing in my head. Your fishes are certainly NOT doing OK, but appear to be suffering from Bacterial Fin-rot, which is caused by poor water quality.

Your letter says that you have three fishes "so far", suggesting that you intend to buy more. You don't say how large they are, but the absolute MAXIMUM carrying capacity of your aquarium is 10in (25cm) of fish — even after a year. Your letter infers that you have just started.

I also suspect that you over-feed. Stop feeding immediately and perform small water changes until you have changed the whole contents of the tank. Clean out the filters as you do so, and go back to reading a book or two. When you do resume feeding (no earlier than one week from now!) then do so very sparingly.

If you ignore this advice, then you will continue to kill every animal you buy. Are people like me talking to ourselves?

Cleaning flukes

Some of the fishes in my aquarium seem to be having problems breathing. They also appear to be scratching themselves and their gills are a funny colour.

I have had disasters when treating with chemicals in the past and would like to get rid of this problem naturally. How can I when I don't know what is wrong?

You must know that trying to diagnose by 'phone or short letter is nigh on impossible, but it sounds very much to me like your fish are troubled by flukes.

I can understand your reluctance to use chemicals — although it should be remembered that proprietary brands of medication can be invaluable when treating certain ailments.

I suggest that you buy a pair of Cleaner Wrasses. Note that I said a pair; they seem to do far better in twos and — after all — if you keep only one, then who cleans the cleaner?

As this picture shows, Cleaner wrasses will remove parasites not just from the body of a 'host', but from the gills as well.

JOHN DAVIES



HERPETOLOGY



Anole or Chameleon?

Why are anoles sometimes called "American chameleons"? What is the most popular species kept in captivity?

Anoles are members of the Iguanidae family. They have a natural distribution throughout the islands of the West Indies and are also found in parts of mainland Central and South America.

These reptiles have been given their misleading common name because many species have the ability to change their colour. However, anoles are not related to the true chameleons, which have their own family, the Chamaeleonidae.

True chameleons also have a very different geographical distribution, being found in Africa,

Green Anole. Its only similarity to the true chameleon is its ability to change colour.

Madagascar, south Asia and southern Europe but NOT the Americas.

The most commonly kept species of anole is the Green Anole (*Anolis carolinensis*). This is the only species indigenous to North America, where it occurs in the southeastern United States, from central Texas to Northern Carolina. Green Anoles are active by day, searching for insects in the trees and bushes they inhabit.

Other species which have been introduced into the Green Anole's range and which are replacing it, especially in Florida, include the Largehead Anole (*A. cybotes*), the Knight Anole (*A. equestris*) and the Brown Anole (*A. sagrei*).

KOI

Aims and transfers

I have just moved house and have dug a shallow temporary pool for my Koi. It measures 10 x 5 x 2ft. I am already in the process of building my permanent pool which will eventually measure 14 x 7 x 3ft.

My ultimate aim is to keep small and large Koi and get them to breed. Am I likely to experience problems transferring the fish from their temporary quarters (which have become rather long-term)? Also, will my new pool dimensions be adequate for my needs?

I must first try to persuade you to abandon the idea of a Koi pool of only three feet in depth. If you seriously wish to keep Koi, then the absolute minimum depth should be four feet, five feet being even better! Koi need this depth if they are to prosper, both from the point of view of maintaining a stable temperature during the cold months of the year, as well as from that of achieving their classic long and slim looks.

Apart from the extra labour involved, an increase in size will not be very financially burdensome and will give you and your Koi much more satisfaction.

If your temporary pool is outside, then there should be no problem in transferring your fish into the new pool, provided that you very carefully check that the water in the new pool is wholesome and contains no nasties, such as alkalis from cement etc.

In addition, the fish should not

Koi require more than 3ft of water if they are to grow to their maximum length... and depth.



LAURENCE E. PERKINS

be added until the water has been circulated for, at least, three days to ensure any residual chlorine has dispersed.

Incredible barley straw

I keep hearing about the incredible properties of barley straw as a cure for green water and as an aid to maintaining clear-water conditions in ponds.

I would therefore like to use it in my Koi pool. What's your opinion?

I would also welcome your advice on how best to use the straw.

I feel I should point out that there is no concrete evidence I know of that confirms that adding straw to a pool will actually reduce the algae therein, although it's safe to say that those who have tried it seem to think it works... and it certainly appeared to work for me.

I found that placing a bundle in a net made from 'Netlon' fruit netting seemed to retain it very well, but if you are worried about it spreading and making a mess, why not try an old nylon pillow case if one is available?

I would recommend you to wash the straw very well before use, just in case there are any remaining herbicides or other contaminants present in it. 100 grammes per 300 gallons of water, or so, should be ample and you should be prepared for a wait of about six weeks for any effect to be apparent.

TROPICAL



JOHN DAVIES

'Whisker' disease

My fish seem to get a creamy/white spot above the nostrils which seems to lead to a breaking down of the lower jaw. There appears to be a kind of growth — rather like filaments or whiskers — sticking out. Is it a fungus? After a period of about a week, the fish die.

What is this disease and how can I treat it?

The problem you describe is not Fungus, which is a parasitic vegetative growth, but Columnaris, which is a bacterial infection.

The bacterium, *Chondrococcus columnaris* or *Cytophaga columnaris*, is a slime bacterium (Myxobacteria) which flourishes in tanks with excess biological loads (too many fish and/or too much food or faeces). The bacteria usually attack the mouth area (infection during grubbing in the bacteria-loaded gravel) and grow in their usual 'column' pattern, giving the appearance of fungus strands.

The best treatment is antibiotic, available from your local veterinary surgeon (see Yellow Pages). Chloramphenicol (Chloramphenicol) at 5 to 10 mg/l, or Aureomycin (Chlortetracycline) at 10 to 20 mg/l for 48 hours (then do a 50% water change) are effective against this disease. Oxolinic Acid is also effective if fed to the fish; again, the vet will have details.

If only one or two fish are affected, local treatment may be preferred: swab the mouth area with Lilly's tincture of mercuriolate, or 4 grains of Brilliant Green in just sufficient ethanol to dissolve the dye. A 'baby bud' is the best swab for this treatment and the vet or a chemist shop with a pharmacist may have the chemicals.

Remove the cause by improving the water quality. Make the tank less crowded, reduce feeding levels, increase

Female Gouramis (this is an Opaline) can suffer serious injuries when attacked by males in breeding condition.

frequency (but not volume) of partial water changes, clean the gravel and consider a power filter; this removes the dirt from the fish's environment.

Aggressive Opaline

I have a pair of Opaline Gouramis in my community tank. Everything was OK until quite recently when the male started blowing bubbles, became darker and started attacking and injuring the female.

What's gone wrong? I really don't want to have to get rid of my fish.

The Opaline/Cosby, Three Spot, Gold or Blue Gourami (all forms of *Trichogaster trichopterus*) show typical labyrinth-fish breeding behaviour. When conditions are right the males blow bubble-nests and search for a female for spawning. They then guard the family, chasing off the female whose only function is seen as providing eggs.

Females that are ripe will swell with eggs and this triggers the paternal instinct in the male. I suspect your female Gourami is not ripe, perhaps too young or infertile, so the male sees her as a potential rival or a female that doesn't respond, hence the aggressive reaction... and the injuries.

Since such behaviour is in the genes, nothing can be done except to separate the fish. I note you do not want to part them, but it need only be temporary. If the female fattens with eggs after separate conditioning, you could then breed the fish. If you do not want to spawn them, obtain some more Gouramis to stop the one-to-one relationship.

PLANTS



BARRY JAMES

Water Poppy in flower among a range of other plants. Some of its oval, thick leaves can be seen growing above the surface.

Alkaline pagoda stone

I have seen some very interesting rocks called Pagoda Stone in my local shop, and I was thinking of adding them to my Discus tank, where I plan to grow soft-water plants such as *Cryptocorynes*. Would you recommend their use?

No, not really. I've tested these rocks myself and have found that they contained quite large amounts of lime. They would therefore be fine for Rift Lake Cichlids and livebearers, plus hardwater, alkaline-tolerant plants, but should not be used where one wishes to keep the water as soft as possible.

Fish-safe poppy

I have built a pond in my conservatory, in which I intend to keep Fancy Goldfish. Would you recommend a plant with nice flowers that the fish will not eat?

Provided that you can maintain a minimum temperature in winter of 50°F (10°C) why not try the Water Poppy, *Hydrocleis comersonii*?

This is a very attractive perennial aquatic from Brazil. It has thick, oval, floating, deep-green leaves and handsome three-petalled flowers. These are light-yellow 2-2½ in (5-6.5cm) across, and stand well above the water. The Water Poppy is free-flowering and blooms for weeks on end, starting in early summer.

COLDWATER



Filter confusion

I am a newcomer to fish-keeping but I have decided that I would very much like to keep some varieties of Fancy Goldfish. I intend to buy a 48 x 15 x 12in glass aquarium but I am just a little confused as to which type of filter system would be best for my set-up.

The choice is really a matter of personal preference, and your local aquatic retailer will have a good selection for you to choose from. You can have a simple box type filter which, if well maintained, can be very effective, or a more expensive, external power filter which I would strongly recommend.

However, you should not forget the importance of regular partial water changes.

One very important rule is that you should never over-stock with

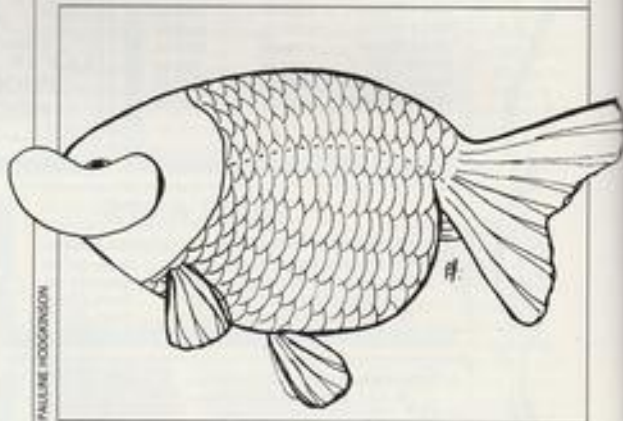
As this drawing of a Bubble-eye shows, it is hardly built to be comfortable in the sort of turbulent environment that can be produced by strong power filters.

fish, even with a filter system. Allow about 30 square inches of surface area per 1 inch of fish. This stocking level will help you to control water quality and will go a long way towards providing a suitable environment for your collection of fishes.

Bubbles and filters

I have been contemplating installing a power filter in my tank of mixed types of Fancy Goldfish, including Bubble-eyes. Would this type of filter be suitable?

I really do not think that a power filter is such a good idea where Bubble-eyes are kept. A foam filter or a box filter is a better option, as far as the safety aspect of this delicate variety is concerned. Choose the largest filter you can get and, provided it is properly and regularly maintained, it will do an excellent job.



PAULINE HODGKINSON

White spot is the most common disease problem in fish keeping

W.S.3.

THE

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THE ANTI-CAT



I had never considered the idea of having a fish pond until my wife and I were sitting in the garden one summer evening, enjoying the last of a bottle of wine after a splendid meal, and quietly contemplating things in general, before retiring for the night.

I was in a nice, mellow frame of mind, and Jacqueline had obviously spotted this in the way that wives can, when she suggested quietly, "Wouldn't it be nice to have a fish pond? I've always wanted one. It would be so relaxing to sit beside a pond". She went on to explain how I would only need to dig a little hole in the ground, pop in a liner, get a few fish and away we'd go.

Two-foot surprise

The next day being Saturday, I agreed to make a start and, anyway, Jacqueline said it would only take five minutes.

Saturday dawned bright and clear. By the time I had done a few little odds and ends, like one does on a Saturday morning, it's early afternoon, the digging is going well and, as it's a warm day, I'm just into my second pint.

A little voice at my left elbow says, "Of course, you know it has got to be about two feet deep in order to protect the fish from ice in the winter, don't you?"

I didn't know... and it began to dawn on me that this was no five-minute job. Even I could work out that a two-foot deep hole, in order to avoid near vertical sides, would have to have a diameter larger than the three feet or so that I had envisaged the previous evening. Contrary to the advice: "When you are in a hole, stop digging", I kept digging and by Sunday afternoon, I had a pond-shaped hole about nine feet by seven by two feet deep, plus a goodly pile of earth.

I considered this a reasonable effort and retired to another sort of pond in the bathroom to ease my bones and consider the prospect of making a rock garden and a pond all in one go.

Next thing: the liner. On the grounds of cost, some idiot suggested two layers of heavy gauge builders' polythene on a bed of soft sand, as they put it under house floors for damp proofing, you see, and houses last a long time, don't they, so it should be OK. And OK it was, except that after about two years, where the polythene is exposed to air around the water's edge, it becomes brittle and cracks.

This was a mistake, and quite a big one, but I struggled on and by this time I was getting quite interested in fish, even becoming fond of them. I find that it is relaxing and pleasant to sit by the pond just watching the fish, pond life in general and, of course, the polythene liner which is getting worse, almost by the week.

Disappearing fish

I began to notice that we were losing fish and decided this was due to cats, and was one of those things that had to be accepted as part of keeping a pond.

However, I got a bit fed up with this, so I made a metal fence to put round the pond. This was eight inches high, with four horizontal bars. After installing it, I stood back triumphantly thinking, "That will fix it". Not a bit! The fish still disappeared at about the same rate.

Came the time I had had enough of the polythene and decided to bypass the idea of liners altogether. Concrete was to be the order of the day, so I set to with the mixer. Part of the plan was to create a ledge around the pond, six inches wide, and carefully levelled so as to have a depth of water $\frac{1}{2}$ in deep.

An overflow pipe to a soak-away was installed to control the water level during periods of heavy rain, evaporation loss being made up from water stored in a butt for the purpose. At the same time, I installed a horizontal pipe from almost the bottom of the pond to a dry chamber built from brick, which was to house our new pump, and these bits worked very well.

Now, in case you think this is getting serious, it is! The idea was that fish wouldn't swim in shallow water and cats, not being fond of water, would not wish to get wet in pursuit of their snacks. All reasonable thinking, I supposed.

So impressed was I with this apparent stroke of genius that I scrapped the metal fence straight away. "The Ledge", as it became known, worked quite well until the breeding season, which goes on for some time, when the fish like to do things in shallow water, apparently oblivious to all else. I don't believe they know what a cat is anyway.

If you think you are ahead of me, you are quite right. The local felines must have thought I was on their side! The next step was a net over the pond. This, I found quite horrible for many reasons, which I am sure you will be familiar with: access to the water, skimming off debris etc., so I couldn't stand this idea for long and it was discarded.

Enough is enough

I got up one morning to find my stock had been reduced to four Goldfish and one Shubunkin. Now I'm beginning to get really annoyed. In desperation, and having some bricks in the garden for a future project, I arranged some of these three-high all around the pond as a temporary measure, and left for work muttering darkly, "I've got four Goldfish and one Shubunkin and

POND

Desperate situations demand desperate measures. However, as David Mullan

shows, you can protect your fish without harming those unwelcome visitors that call with nothing but food on their mind!

Photographs by the author



Far left, from this highish angle, the brackets are perfectly visible, particularly when everything around the pond is bare.

Left, as the surrounding area and the pond begin to fill up with vegetation, the electric fence becomes a little less obvious.

Below, close-up of one of the vitally important brackets.



that's what I expect to still have when I get home tonight"... and so it was.

Cats are most agile, however, as I was to discover to my disbelief later, and anyway, whereas the brick arrangement might have attracted a four-figure sum as modern art, it was not appealing to me.

Somewhere in the midst of all these goings on, I even purchased and placed in position, a look-alike heron just for good measure. Like the metal fence, it is now in the local rubbish dump.

Special favourite

My pond is nothing special, and normally contains only ordinary Goldfish, a few Shubunkins... and so on.

Nevertheless, I got fond of them and probably, like you, I have favourite ones, some of which I can feed by hand. I had one special favourite who was hatched in the pond and I was enjoying watching him grow up, changing colour and growing lovely flowing fins and tail. When I came home from work one day to find him

gone, I was furious, and decided I had had enough.

I had been toying with the idea of some sort of electric fence for some time, but had been resisting the idea as it seemed so drastic. On losing my very favourite fish, though, I was stung into action and decided to bring technology to my assistance, regarding myself, as I do, of superior intelligence to, at least, a cat.

I had a colleague at work make up some brackets from aluminium (doesn't rust) to my design, as illustrated in the accompanying photographs. These brackets were fitted with insulators and installed around the edge of the pond so as to carry two strands of bare wire. The wires were connected to an electric fence unit purchased from the local farmers' supply shop, and sold for the purpose of controlling animals by this means.

By the way, an electric fence cannot be used against humans, so you must not festoon your back door with it against burglars. Apart from that, there is nothing illegal or wrong about it, and such systems are commonly used on farms the length

and breadth of the land. Just to be sure, however, I wrote to the Feline Advisory Bureau and received a favourable reply.

The brackets are dimensioned to support the wires three inches above the paving, so not to impede the passage of frogs which I regard as part of normal pond life. They are also spaced sufficiently apart to outsmart any cat that might just learn to otherwise position itself to avoid a single wire.

Also, part of my reasoning was to deter any long-legged bird that might wish to wade into the pond for a spot of lunch, or to covet my fish from the edge of the pond, in which case I considered that such a bird would sooner or later touch one of the wires with its foot, thereby learning a valuable lesson. I understand from Birdworld, near Farnham, that these birds do not favour landing on water but rely on wading into the pond or alighting on some object protruding from the water and then hopping down, whence to dine at my expense. Apart from some plants, I have no such objects protruding from the water.

Safety factors

I make no claim for the system to be effective against herons, as Birdworld told me that their feathers insulate them from electric fences, but the foregoing seems to me to be logical; perhaps someone more knowledgeable could advise. Small birds that come to bathe are safe for the same reason: dense feathers.

While surveying the range of electric fence units available, I chose a mains operated model, as I didn't wish to be troubled by recharging batteries, although the battery models will run for about one hundred days on one charge. The "energiser" as it is called, works by sending a pulse of electricity into the pond protection system at the rate of about one pulse per second, and the pulse of electricity has a duration of a fraction of a second. An added bonus is that they cost next to nothing to run.

The energiser unit, if mains operated, is mounted on a wall in the house, and this means I don't have the problem of mains cable in the garden. The route of the cable from the energiser to the fence is not critical, and if cut or broken, will not be dangerous. The battery model can be mounted anywhere, provided it is protected from the weather.

Plant problems

During a lengthy discussion with the manufacturers of the electric fence energiser, I was assured that the current produced from the unit will not damage or kill small animals and anyway, it was never my intention to do so.

My attitude is, live and let live... especially my fish!

Looking at some of the pictures of

beautiful ponds in *A&P*, I doubt if this system would be suitable for every pond. If you have profusions of plants which grow on or near the pond edge, this, of course, is just where you want your protective wires. If the plant grows over the wires and would obviously be in contact with them, then, in wet weather, the plant would cause the current pulses to leak to ground, thereby reducing the effectiveness of the system. (See diagram "How it works").

There is a way round this by incorporating a section of insulated cable which would normally connect the actual fence to the energiser, where the protective wire is required to pass through a plant. However, I don't like this idea as the plant now becomes an access point for a cat. There are plants in our pond or outside the pond, but nothing on the edge, and this is because my prime interest is the protection of the fish.

Jacqueline is in charge of plants and I see my job as one of technical management, for want of a better description. It is, after all, my wife's pond, constructed, as I said earlier, as a five-minute job.

Child safety

Another problem is small children. Weren't they always? Them and thrips are said to be the gardener's worst enemies. Small children, in my view — as a father of three now grown up — should not be allowed to play unsupervised in a garden which contains a pond. That much is commonsense and needs no more comment, except that if you do pop into the house for just one minute to answer the phone, and return after ten minutes having become engrossed in conversation, during which time your child could have drowned, you could consider an electric fence to be a useful feature.

Please understand, that in no way do I suggest to you that there is any substitute for adequate adult supervision at all times, when it comes to small children and ponds, and that includes electric fences around ponds. **Better still, switch it off for children.**

If a small child touches the bare wire, the result is unpleasant and will produce a sharp yelp. The same applies to your domestic pet. Being curious, I deliberately touched the wire on my system. The effect is fairly mild in dry weather. In wet weather, however, i.e., when the ground is wet, this effect is rather more powerful and not recommended.

Whacking experience

I will now relate to you, the effect of sheer laziness. On one occasion, I was removing wind-blown flotsam from the surface of the pond using a metal colander which I stole from the kitchen, and had taped to a piece of metal for a handle. This device was purely temporary and, like lots of temporary things, became permanent.

I couldn't be bothered to switch off the fence, and although I kept moving nearer the protective wire, I kept thinking, "Oh, I won't touch it"... and then I did! Due to being connected to the water via the metal device I was using, this produced a perfect

etc., but on that occasion, I got the full treatment due to making a perfect connection from my foot to the water via the metal handle.

I cannot say in complete honesty, if herons are a major problem where we live which is a built-up area. I have seen them around here but only occasionally. I do know for sure that cats were a major problem, and I can say that this system is 100% effective in repelling them without injury. In fact, they don't even come into the garden at all for about two months after touching the fence. Then, they seem to forget and come back for another try. Perhaps the temptation is too great, but they always fail.

Warning sign

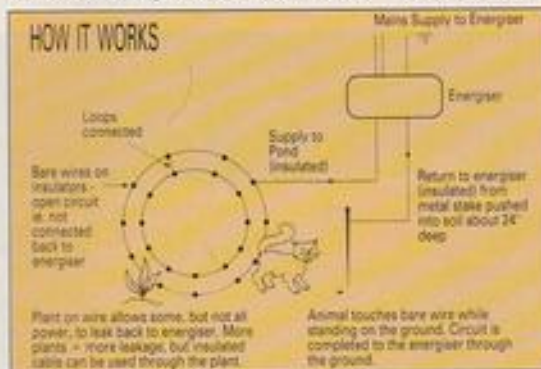
I have a small warning sign indicating the fact that there is an electric fence around the pond. This is for the benefit of visitors, but they all know by now. I don't think it is really necessary in my case, but I remain hopeful that, one day, a cat will learn to read and tell the others not to bother.

I have done my best to point out the good bits and the bad bits, for nothing is perfect. I would much prefer to have no wires or anything else around the pond, but supplying the local cats with snacks is, quite frankly, plain silly, and most irritating to boot.

So there you have it: the five-minute pond. A drastic solution? Yes, maybe, but I can go hither and yon in the knowledge that the fish are safe from cats, and so far I have not lost a fish since installing the system two years ago.

It has worked for me. If you think it would work for you, I would be happy to help, or possibly to produce a batch of the necessary parts if there was sufficient interest.

A&P



earth situation and I can assure you I will not do that again! It was, in fact, quite a whack, and is one to be avoided, but it did me no harm.

The system, you see, is designed to produce sufficient current to still be effective with poor contact i.e., animal fur, soles of shoes, a certain amount of leakage to earth

FASCINATING FISH FACTS



Red-tailed or Pakistani Butterflyfish (Chaetodon collare). Its distinctive 'uniform' allows it to recognise — and be recognised by — other members of its species.

LINDA LEWIS

Fish in uniforms

Butterflyfish come in a whole range of bright colours and patterns. Have you ever wondered why?

A coral reef is a source of all kinds of foods and, as each species of butterflyfish has a slightly different diet, several species can live side by side without competing for food. A butterflyfish can recognise fish with different patterns and leave them in peace, but, unless it is looking for a mate, will chase away others of its own kind, thus keeping its food supply safe.

When it comes to looking for a partner, any fish not wearing exactly the right uniform will not be considered. If this didn't happen the subtle differences between species could disappear through interbreeding. The resulting fish would then all want the same kind of food, and war would break out on the reef!

HELPIN HAND



BY KEVIN FOX

Never been better!

What's Up Doc? Or, to be more precise, what's your problem? For quite a number of years now, doctors and hospitals have been stuffing pretty coloured pills into me, causing goodness knows what effect. Recently, I rebelled! I wanted to control my life. After all, I know more about my body than anyone else ... I live in it! Being absolutely 'piled-up' all of the time has been slowing down my mental processes considerably.

After consultation with my various doctors, it has been discovered that: not only can I stop taking certain drugs completely, but I can also manage very well indeed on exactly half of everything else! And do you know what? I have never felt so well for more years than I can remember! My brain is firing on more cylinders than even I thought it had, and I am enjoying my fishkeeping more as well.



M.P. & C. PETERSON

Fish 'n' Tips

Tired with the same old fish? Sick of seeing the same old faces smiling back at you through the glass? Shame on you!

Seriously, many aquarists go through a 'dormant' time when nothing much changes in the tank for a very long time. Why not ring the changes? Just as you get bored living with the same old wallpaper year after year,

Cichlids: 'terrible ... or lovely?'

your fishes would appreciate a little change from time to time.

So, why not re-model the aquascape for them? Unless you're keeping cichlids, of course, in which case, nothing much stays the same from minute to minute! 'Orrid things, cichlids! Well, go on then ... write in and complain: "What's wrong with cichlids?"'

Neither is it just me; friends and family are all saying how much better I am. It's just far too easy to tranquillise, rather than spend precious time analysing, especially people like us: the long-term sick.

Law & disorder?

At the moment, there is a Bill passing through the various stages of the Houses of Parliament which will outlaw the

horrendous amount of discrimination from which disabled people suffer. As an all-party consensus is present, the Bill stands a very good chance of becoming law. Unfortunately, there are vested interests who may 'jerrymander' until the Bill times-out.

In all of the so called 'Civilised West', we stand alone, unprotected by any legislation. In the UK you can't discriminate against colour, race or sex, but you can easily stop a disabled person from going to the toilet!

In practice, and assuming the Bill becomes law, this will give us

something many of us despair of: ACCESS. An end to the indignity of being hoisted out of your wheelchair and being carried up stairs. To have the choice of where and when we will go without employing a researcher first to do all of the pathfinding! How many times have you met with disappointment when you've wanted (tried?) to visit a particular aquatic shop, for example?

Hopefully, assuming the ultimate success of the Bill, we will have the same protection by law as other groups of people who are in some way at a disadvantage already have. Nice to know that we can apply for an appropriate job and stand as good a chance as anyone else!

Mailbag

Thanks Graham Seddon for another smashing letter. Graham, you will remember, is involved with the **Viviparous L.I.S.**, and is seeking disabled aquarists to assist in a programme of breeding very high Guppies — something which is much more difficult than you would think.


Of course, Guppies are not called Millions Fish for nothing, but although their offspring are numerous, getting them of the desired quality is a very different matter indeed. Anyone still interested in this very useful and absorbing aspect of fishkeeping will find Graham's address at the end of this piece. ▶

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By the way, Graham, I can't in all honesty see me attending the 'Big Un' — the annual aquarist festival at Weston-Super-Mare in November. However, I will — by the time you read this — have been at YAF (Yorkshire Aquarist Festival) at Doncaster Racecourse; probably on 10 April. Some of you may have seen a blue and white blur whizzing around the show on wheels. That was me!

Mr Brown of St. Athan, Barry — should now be in possession of the Hagen 55 Bio-Life Filtration Unit first prize which he won in our recent competition. I was sending off your prize when I received your letter Mr Brown. I do hope that you're pleased with what is a first class, innovative product.

The delay in posting was caused by me suddenly losing the use of my right arm! Overnight I found that when awakening next morning, I couldn't move it at all. Intensive physiotherapy from the community 'physio-terrorist' has restored partial use, but I still have a long way to go yet. As for the two runners up, hang on in there, you WILL receive your prizes very shortly.

My thanks to Claire Ellison of Langford, Bedfordshire, for a lovely letter offering her help to NADA. Thanks for writing Claire. As always, I like to receive readers' letters, and for you to let

Shop-watch

Although I have mentioned pet and aquarist shops before, I still haven't received any real feedback from you — especially our disabled colleagues. Many disabled people complain verbally to me about the state of some pet shops and specialist aquarist stores throughout the country. Mostly, these complaints revolve round access, but I do receive the odd note about display tanks with dead fish left in them, dirty water etc. in all: bad management.

There is something YOU can do for yourselves where you see cases of apparent neglect. Firstly, ask! There could be a perfectly valid explanation. But don't rush in like a bull in a china shop. Next, all pet shops must have a licence from the local

council; they are examined every year to ensure that all animals and fish are kept in suitable conditions etc. and the council has the right to either withdraw or refuse to issue a licence.

If you have doubts about a shop, such as is it a properly licensed and inspected business, enquiries to OFI (UK) should be a first important step before you go to your local town hall to register your disquiet.

If you have any horror stories about certain shops, or, indeed, any experiences of outstanding service, I would like to hear about them. Let's applaud good service and sensible advice, which are the stock-in-trade of the properly licensed and well run establishments. Let's also hear about shops that offer adequate access for the disabled.

me know what you're thinking. If you have problems or difficulties, or any information ... then this is the place to find out. This is the small version of my original NADA plans: to put people in touch with each other, and to supply information. Maybe you're just lonely and want to talk to

someone, I'm here!

Finally, please try to remember that the work I do for Aquarist & Pondkeeper magazine is only part of my complete workload (albeit the most enjoyable part!). The rest is divided between writing books, magazine pieces, writing and directing corporate

training videos and 'thumb sucking' (read sloping off). If you write (with an SAE of course) to me, then you will receive a reply. It's just that it might take a little time.

And finally

By the time this goes to press, I hope to have met as many of you as possible at YAF in April. It's always nice to put faces to letters. It has been a long time since I have been in a position to attend an aquarist festival, so I am — as I write — really looking forward to the YAF bash.

I know how isolated many disabled fishkeepers can feel. They have their favourite magazine and their aquaria, but no one much to talk fish with.

To such people — and please, ALL event organisers note — a show is, to us, much more than a simple day out. In certain circumstances it may be the only time in the year that a disabled fishkeeper can get out and enjoy their hobby to the full. So when we do get there, we don't want to find mountains of stairs to climb, inaccessible toilet facilities etc.



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BLACK MOLLIES

Revisited

Ross Socolof — one of the 'founding fathers' of the tropical aquarium industry — reveals the true identity of the Black Molly.

A great Black Sailfin Molly — a far descendant from Bill Sternke's 1930's original black fish

HARRY GRIER/FLORIDA TROPICAL FISH FARMS ASSOCIATION

I have been keeping fish for sixty two years (so far). In those years I — like almost any other fishkeeper — learned how to kill my share of fish. By the time I retired, I had built a Florida tropical fish breeding establishment with some 1,000 large dirt ponds and over thirty thousand feet of indoor hatchery space. I utilised over six thousand glass aquariums and had almost one hundred employees.

I also was not having as much fun as I had in years past, and that is when I decided to retire (I have more fun now!). Once I retired, I had time to work with fish, and in the process I learned a few helpful things which I enjoy sharing.

In a recent issue of *Aquarist & Pondkeeper* (October 1993) material about Mollies was offered by Tor Kreuzman. Most of it was accurate, but some information was misleading. I am therefore going to write about the history of the so-called "Black Molly" and, once and for all, document it.

Early days

The wild Florida Green Sailfin Molly (*Poecilia latipinna*) is a spectacular fish. It is a livebearer and was one of the first that provided the impetus to popularise the tropical fish hobby. Green Sailfin Mollies were available from the state as early as 1915.

In Florida, before 1930, there were only two fish collectors offering native fish. The fish were shipped north by rail in metal fish cans to the major markets. The Sailfin Mollies were the most wanted wild Florida fish and were usually sold in trios (two females-one male). A few fish were sent to Europe as early as 1903.

Males appear to be a minor percentage of the wild population and the reason is explained by the following. No one knew then (few do now) that *P. latipinna* throws two distinct types of male: a fast-develop-

ing, and smaller, male fish that is mature in a matter of two months, and a late-developing male fish that will take as long as ten months to develop.

Before the late-developing male fish develops distinctive male fins, he carries an anal fin identical in appearance to a female. It looks like a female, and is a large fish. When such late developing males mature, the anal fin changes to a gonopodium (the

characteristic male mating organ of live-bearers) and the dorsal fin dramatically expands. It is not a question of sex reversal, as many people still believe. These males are merely sexless large immature fish becoming sexually mature. The fish never were female... they just looked like females.

Another interesting biological strategy was discovered by Dr. Harry Grier almost 20 years ago. He found that female *P. latipinna* will not develop eggs until more than thirteen hours of daylight occurs each day.

The 'imperial' *P. petenensis*. Note the amazing dorsal fin and the tiny black sword on the tail of this specimen which I collected near Campeche on the Yucatan Peninsula.



ROSS SOCOLOF

'Blotched' specimens/ varieties like the Marbled Molly can be traced back to some of Jack Beater's original stocks.



HARRY GRIER/FLORIDA TROPICAL FISH FARMS ASSOCIATION

Blotched beginnings

A man named Jack Beater, calling his business Florida Fish Farm, was located in Ford Meyers. Beater was the major supplier of wild Sailfin Mollies. In 1923, he started to collect and keep the better and rarely found black-blotched specimens.

His only entry into fish raising started when he constructed two outdoor concrete vats to propagate these black blotched fish. He eventually developed an almost-black fish. It was not born black (grey was the predominant colour), but as it aged, it grew more and more black. If the babies had no black when born, they never developed any black colour. The better black-blotched fish got blacker and blacker with age. He sold his culls for as much as £5.00 US. The Black Molly was offered for sale by Jack Beater in early 1925 for \$3.00 each.

The first Black Molly he produced was actually an almost-black fish that produced a very small percentage of black babies. It was not a good strain, but it was the first. This Black Sailfin Molly offering was shortly followed by one from Bill Schomburg of the Crescent Fish Farm in Slidell, Louisiana. His strain was a great improvement over Beater's.

German influence

A man named Bill Sternke emigrated from Berlin to the USA in 1908 when he was 16 years old. His stepfather, in Berlin, was a tropical fish breeder by profession and that is where he learned how to propagate tropical fish.

Sternke built a real commercial fish hatchery in Daytona Beach, Florida, in 1925. He was the first tropical fish breeder in Florida, and he called his business Sunnyland Fish Hatchery. He started with Beater's fish and, after another five years, developed it into the wonderful permanent-black strain of Black Sailfin Mollies. This fish was born black and stayed black.

He could not supply the demand when he first offered his fish for sale at \$25.00 a trio. This was an enormous amount of money in the early 1930's. This fish produced by Sternke is the commercial Sailfin Black Molly we know today.

Sailfin Mollies are difficult fish to maintain. They are found in the wild almost always in brackish waters running into the sea. Tens of millions of them are raised each year in the very hard and alkaline fish ponds in Florida. They can and will prosper in salt-free freshwater, but they do best if the water is on the hard and alkaline side.

Black Sailfin Mollies, if not handled by the fish farmers with extreme care (more than is usually possible), will fall apart during the winter months. They develop "Shimmies", which is often followed by White Spot or Mouth Fungus. This is a major problem.

Bill Sternke worked to develop a Black



Three 'confusing' sphenops-type Mollies which I collected. The specimen with the orange band on its spread-out tail comes from Teapa in Mexico. The one with the black spot on the base of the posterior edge of the dorsal fin is from the Rio Motagna in Guatemala. The other specimen was collected in the Rio Segovia in Spanish Honduras.

Molly that would resist the "Shimmies" problem. He crossed the wild *P. sphenops* from Central America with his Black Sailfin strain and developed an all-black fish in the late 1930s that did not develop "Shimmies". He called this fish the "Yucatan" Molly, and millions of them are raised and sold today.

The downside of the Black Yucatan Molly is that it has lost the sailfin. It is easy to handle but it is not as large, and certainly not as spectacular, as the Sailfin Black Mollies.

Sternke worked for years with other species of Sailfin Mollies (*P. velifera* and *P. petenensis*) trying to make a hardier fish and still retain the spectacular sailfins. He did come close, but could never eliminate the many unattractive culls. I do, however, think that it can be done.

In 1932 Sternke acquired a single wild male xanthic (gold) molly. From this one fish he developed a strain of Golden Mollies.

After more than 65 years, the Black Sailfin Molly strain has deteriorated badly.

Today's fish are not only weaker, but considerably smaller. The largest of the three sailfin species is *P. petenensis* and this is the one that should be used to 'remake' the Black Sailfin Mollies. There is a small swordlike spike on the lower edge of the caudal of the *P. petenensis* Green Sailfin Molly (see illustration), so why not try to make a Black Swordtail Sailfin Molly?

Confusing sphenops

Southern Mexico and Central America are home to a great number of Mollies. There is the species called "sphenops" which encompasses an enormous number of fish that are either other species, or subspecies. I have no idea of just what "sphenops" is, which is of no great importance. What is important is that the professional taxonomists do not know either!

Three 'new' Mollies have been described this year. Two others are in the works. Several examples of these confusing fish that I have collected are illus-

trated.

Mollies are a wonderful group of fishes. They are what I would describe as 'very plastic'. They can be easily (maybe not that easily) moulded into wonderful new and exciting strains. A good blue fish is a distinct possibility, and now that the red types have been set (thanks to a Florida fish farmer named John Williams) someone should work in that direction. Some years ago I had a very good start on a sail-

fin strain that was close to a solid burnished gold (like a gold tetra), and that, I know, can and should be produced.

Mollies are a favourite fish of mine. My funniest Molly memory is when 5-year-old son Mark (now 45!) was called by his mother, Loise, to watch a female in the process of producing live babies. He got so excited... that he fainted!!



Normally regarded as a 'sphenotype' Molly, the short-finned type is a descendant of the Yucatan strain developed by Bill Sternke.

MOLLY DATE FILE

- 1821** LeSueur described *Mollienesia latipinna* from specimens collected in Lake Pontchartrain, Louisiana (outskirts of today's New Orleans)
- 1866** Albert Guenther of the British Museum described *Mollienesia petenensis* from fish collected in Lake Peten, Guatemala.
- 1903** first importation of *M. latipinna* to Europe
- 1914** C. Tate Regan described *Mollienesia velifera* from fish collected in Progreso, Yucatan, Mexico (near city of Merida).
- 1918-1923** Jack Beater of Florida Fish Farm in Ft. Meyers, Florida collected and sold occasional rare black-blotched wild *P. latipinna*
- 1923-24** Jack Beater started development of an all-black fish in concrete vats at his home in Florida
- 1925** Beater offered Black Mollies for sale
- 1925-26** William Schomburg of Crescent Fish Farm in Slidell, Louisiana offered a much improved strain of Black Mollies.
- 1936** William Sternke of Ope-Loosa, Florida perfected the black strain, introducing the "Perma"-Black Molly
- 1940** William Sternke introduced the "Yucatan" Black Molly, a cross between his Perma-Black sailfin (*P. latipinna*) and a wild *P. sphenops*
- 1963** Drs Donn Rosen and Reeve Bailey published "The Poeciliid Fishes" which revises *Mollienesia* genus to (today's) *Poecilia*. These authors also state "*latipinna*, *petenensis* and *velifera* may be members of a single polytypic species. They are all allopatric (found in distinct localities), are similar in appearance, and differ in minor characters."

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THE COMPETITION

1 Just read the accompanying Cyprio 'winners' item concerning the Cyprio products featured in our prize structure.

2 Answer the questions in our **Clearwater Guarantee Contest**. All answers can be found in this text.

3 Then fill in your name and address (in full and in BLOCK CAPITALS) and send your completed entry form to: **Cyprio Clearwater Guarantee Contest**. (See **Rules** for full address).

4 Make certain of obtaining a copy of the **November** issue of *Aquarist & Pondkeeper* to see if you are among our 10 lucky winners.

THE QUESTIONS

Answer the five questions below. All the answers can be found on the next page.

1 What product, apart from a Cyprio filter, do you need to install in your pond to benefit from the **Clearwater Guarantee**?

2 What easily removable element of a **Green Machine Filter** provides a large surface area for biological cleansing?

3 How much more effective is the **Philips lamp** used in a **Cyprio UVC** than most other lamps, after 12 months use?

4 From what revolutionary material is the **Cyprio Filterfall 1000** made?

5 Apart from aiding in the control of 'green water', what other useful function does a **Magn-it** perform in a pond?

In addition to answering the five competition questions, Cyprio would welcome the following details regarding your existing pond. There is, however, no obligation to answer these three questions in order to qualify for entry in the competition.

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3 CYPRIO FILTERFALL 1000

Filter tanks aren't particularly attractive, but if you have a pond up to 1000 gallons containing Goldfish, or one up to 650 gallons containing Koi, then the **Filterfall 1000** could be the answer. The **Filterfall** is made from **Cyprock**, a revolutionary lightweight material that looks and weathers like real rock. It combines the practical function of a complete filtration unit with a waterfall and can form the centre of an attractive water feature.

4 CYPRIO PRIMA FILTER PUMPS

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THE RULES

1. Write your answers to the competition questions on a postcard or stuck-down envelope.
2. Write your FULL name, i.e. including full first name and address, in **BLOCK CAPITALS** on your entry.
3. Send your completed entry to:
Cyprio Clearwater Guarantee Competition, Hards Road, Froggatt, Peterborough, PE6 8RR.
4. Closing date: entries must

be received by **30 September, 1994**, at the latest.

5. Only **ONE** entry per household will be accepted.
6. Entrants must be over 18 years of age.
7. No correspondence will be entered into regarding the competition.
8. The judges' decision will be final.
9. No responsibility is accepted for entries lost, delayed or damaged in the post, and proof of posting will not be accepted as proof of delivery.
10. The prizes will be awarded in order to the first correct entries drawn at the end of the completion.
11. Winners may choose **Cyprio** products of a smaller capacity should their allocated prizes be too large for their needs. No cash alternatives will be given.
12. The winners' names will be announced in the **November 1994** issue of **Aquarist & Pondkeeper**.
13. This competition is open to all residents of the UK, excluding employees and families of **Aquarist & Pondkeeper, Dog World Publications** and **Cyprio Ltd.** and their agencies.

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A suitably brown Brown Discus — *Symphysodon aequifasciata axelrodi*.



The 'Originals'

In 1840, Dr. Johann J. Heckel, an Austrian ichthyologist, made the first scientific classification of the Discus. Details can be found in Pellegrin's monograph, on the Discus family.

In 1960 Dr. Leonhard P. Schultz, an American ichthyologist completely revised the genus *Symphysodon* and its subspecies. This is the scientific classification we know today.

- 1 Heckel Discus**
(*Symphysodon discus*
Heckel 1960)

- 2 Blue Discus**
(*Symphysodon aequifasciata haraldi*
Schultz 1960)
- 3 Green Discus**
(*Symphysodon aequifasciata*, *aequifasciata*
Pellegrin 1903)
- 4 Brown Discus**
(*Symphysodon aequifasciata axelrodi*
Schultz 1960)

The Blue Discus was very popular for many years in the earlier days of Discus keeping. This fish was slightly more colourful than the Brown Discus, with exceptional blue striations in

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GOLDEN RULES

- 1 When breeding Discus be sure that your pH reading is not too high: ideally, pH 6.3, but no higher than pH 6.5.
- 2 If Discus fry are observed to be swimming around aimlessly just after hatching, try to lower the water level in the aquarium to the height of the parents. This will coax the fry to the flanks of the adults and feeding will commence.
- 3 Never use 6.5pH buffer with Discus, as they are often affected by the high salt concentrations and other chemicals that are present in the powder.
- 4 If your Discus refuse to eat for no apparent reason, raise the temperature to 34°C (93°F) for three to four days. Be sure to add an airstone to release the carbon dioxide, and to improve aeration, as oxygen is present at lower levels at high temperatures.
- 5 Always quarantine/acclimatise new stock, even if the fish appears to be fit and healthy. Quarantine tanks should be equipped with their own siphon hose and net, and hands should be cleaned when administering foods. Treat for parasites as a precaution, as fish can suffer from Gill Fluke or other infestations after transportation, due to close proximity to other fish within the transport bag.

DISCUSSIONS

BY STEVE DUDLEY

the head and gill plate region, but never into the body.

However, a new type of Discus was discovered by collectors at Lake Manacapuru in Brazil. In most cases, this fish had blue striations throughout the entire body.

In order to distinguish it from the 'common' Blue Discus, this new fish was named the Royal Blue. It had a magnificent red background coloration and was, at the time, very expensive.

Green Discus were found in three areas and all were different: the Tefé variety from Brazil and the Colombian and

Peruvian Green Discus.

The Tefé and Peruvian were the most colourful, red spots being apparent throughout the body. The dorsal and anal fins were bordered with a dark band and the eye colour varied from yellow, to orange, to red.

'Modern' Discus

There are many other types of Discus kept in aquariums all over the world today. Most, however, have not been scientifically classified, for they are hybrids



One of the latest varieties to come out of Singapore is the Tomato Red Discus.

which descend from those which are true species and subspecies.

The species *Symphysodon aequifasciata* and its subspecies have acted as the foundations for all our present-day strains, particularly through selective breeding from the Royal Blue, Peruvian and Tefé Green.

After many years of hybridisation of Discus worldwide, colours have been enhanced, and other valuable characteristics, such as body shape and unusual patterns, have 'evolved' to complement the appearance of these Discus.

There are now over forty varieties of Discus available, but only few will breed true to the characteristics of their parentage. When this happens, it gives rise to a new fixed strain.

Far East creations

There are now some very unusual strains being developed in the Far East, on a large scale. Although some of these new types may not be everyone's cup of tea, they are 'different'.

What is confusing, though, are their names. For instance, there are **Golden Crowns** (also called **Opals**). If there happens to be a blue sheen in the body, such a fish can be called a **Ghost Discus** or **Golden Blue**.

A **Golden Crown** with a very clean mother-of-pearl coloration is also known as the **Opal**. The cleaner the body without markings or lines of a second colour, the more expensive the fish.

Pigeon Blood Reds also come in two variations, one of which is not red, but — instead — has an orange background colour with black speckles.

Although an attractive fish, this variety, too, has a few different names. For example, a fish with black fins and no black speckles on the body can be known as a **Red Panda** or **Red Dragon Fish**

commanding a much higher price if the body is clean orange.

Tangerine and **Tangerine Turquoise** are similar to the **Red Alienquer**, but you can see the beautiful tangerine coloration as opposed to the brown-red of the **Alienquer**.

There is also a **Pearled Turquoise** of this variety which is absolutely superb, but, again, commands a very high price.

Discus Plague update

Thankfully, the infection is on the decline. Very few keepers escaped this dreadful disease, though. Some suffered great losses and even complete wipe-outs.

Discus Plague happens so quickly and so severely that you just don't know what to do for the best. Even now (and yet again), nobody has come up with a remedy that will control the disease, which is fatal.

For now, at least, not all seems to have been lost. Many keepers have survived, but there's a lesson to be learned from this: **Quarantine all new arrivals!** Why take the risk?

INVITATION

What do you think of the growing number of new varieties of Discus originating from the Far East? Do you like them... or not? Should we have more... or fewer? How do they compare with the 'old' established types? Drop us a line on these or any other aspects of Discus keeping. Queries should not be addressed to **Discussions**, but to **Dr David Ford**, our tropical expert, c/o **Question Time**.

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POPULAR POND PLANTS

Barry James takes on the daunting challenge of selecting eight top plants for garden ponds.

Photographs by the author

When our editor asked me to compile a small list of plants which I would use in a small garden pond, it posed a bit of a teaser. Out of the 180 or so varieties in the nursery, where do you start to make a selection? I was allowed just a couple of marginal plants, two floaters, two oxygenators, one water lily and one deep marginal, so here goes.

First, I had to establish the criteria I would use for making such a selection. To start off, the plants needed to be attractive, both in flower and out, so attractive foliage was a must. Secondly, the flowering period needed to last as long as possible. The plants chosen should also be compact and not so rampant as to overwhelm the pool. Lastly, they should be bone-hardy in the worst of British winters.

Lily choice

I chose *N. pygmaea* 'Helvola' as my water lily. This little gem was introduced by Mariac around 1879. It is thought to be a cross between *Nymphaea pygmaea* and *N. mexicana*.

The leaves are some 2-5in (5-7.5cm) in diameter, olive green and beautifully marked with streaks and blotches of maroon.

This variety is happiest growing in about a foot (30cm) of water, and should be potted up in a large round container around 12in in diameter.

The flowers are freely produced, and are about 2in in diameter, star-shaped, and canary-yellow in colour. They are produced from mid-May until early October.

Marginal South African

For my deep marginal I chose *Aponogeton dinachys* — The Water Hawthorn. This delightful plant from South Africa belongs to a small group of tuberous rooted aquatics of which only two or three are hardy.

The plant is slightly 'out of sync' with our climate and often flowers in the dead of winter, its biological clock telling it that it is the time of the South African summer?

Although capable of growing in 3ft (90cm) of water, it is equally at home in just 12in (30cm). From an oval tuber the

size of a hen's egg in adult plants, the Water Hawthorn throws up long narrow stems which terminate in large oval, bright-green leaves, sometimes blotched with maroon. While these leaves are capable of reaching a foot in length, they grow smaller than this in smaller pools, generally stopping at around 4in (10cm).

Swiftly following the leaves in the growing cycle, the white flowers are of a unique shape, being forked with black stamens and giving off a delightful perfume resembling vanilla. Both leaves and flowers float on the surface.

Aponogetons should be planted in round baskets and need to be split up after about four years when they have filled up the basket and are potbound. Seedlings are freely produced and should be grown in pans in shallow water no more than 9in (c23cm) deep for the first couple of years.

Floating duo

For the first of my floaters I chose a British native plant *Stratiotes aloides* — The Water Soldier. Once common in East Anglia, it is now rare. However, thanks to water gardeners, it is in no danger of extinction, being widely distributed in ornamental waters throughout the land.

The Water Soldier is a unique plant, and the only surviving member of its genus. Quite atypical of the sort of struc-

Far left, *Nymphaea pygmaea* 'Helvola' — my top choice water lily.

Top, the Water Hawthorn is a South African deep marginal that is extremely popular in the UK.

Above, the almost-pineapple-like Water Soldier.



Fairy Moss — a carpeting floating fern.



The variegated Yellow Flag (Iris) is attractive even before the flowers are produced.

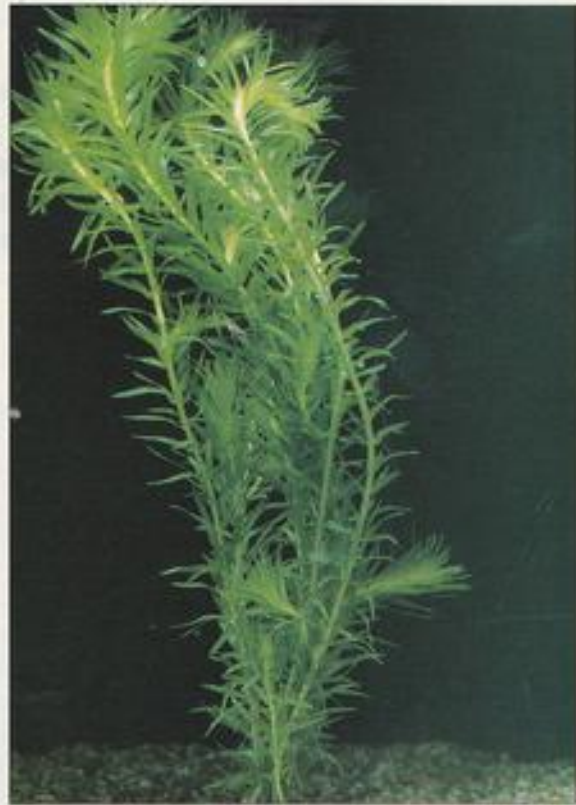


My top marginal: the double form of the Marsh Marigold.

tures found in water plants, it rather resembles certain succulent plants or bromeliads.

It grows in the form of a rosette, with long 1in (2.5cm) wide tapering leaves which reach up to 9in (23cm), giving a whole plant a diameter of up to 18in (45cm) although 12in (30cm) would be more normal in a small pool.

Older plants are very brittle, the dark green almost reddish coloured leaves being armed with recurving prickles, which make the Water Soldier a tricky customer to handle. Young plants are produced as runners and are soft in texture. From the base, one or more long white roots are produced which anchor the plant to the base soil of the pond.



Egeria dense is, in my view, more attractive than 'Crispa', its close relative.

During the summer months, the plants rise slightly above the surface and produce to paper white flowers. As autumn approaches, the leaves secrete lime in their tissues, making the plant sink to the bottom. Here it remains safe from ice until the spring when, once more, it journeys to the surface.

For my second floating plant I chose *Azolla filiculoides* — the Fairy Moss. This may seem a surprising choice, seeing that this species is only reliably hardy in the south of Britain.

However, the other alternatives such as *Trapa* (Water Chestnut) and *Eichhornia* (Water Hyacinth) are killed by frost and the delightful *Hydrocharis* (Frogbit) has a nasty tendency to be destroyed by snails or blackfly every year.

Azollas are, in fact, miniature ferns (despite the 'moss' part of their name). They form mats of their light green lacy fronds, which can overwhelm a small pool if not controlled by being thinned out occasionally with a hand net. The fronds turn crimson in the autumn and are a lovely sight.

I always take a small portion of *Azolla* into the kitchen and overwinter it on the windowsill in a small pan of water, just as an insurance against a really hard season.

If allowed to cover the pool for a time Fairy Moss will smother out blanketweed



Wavy Pondweed, while having attractive submerged leaves, produces insignificant blooms.

and green water and is great at removing excess nitrates and phosphates from the water.

Top two marginals

Marginal plants pose me some difficulty, as there are hundreds of suitable and desirable candidates. However, to brighten up the drab April days and give a promise of joys to come, the Double Marsh Marigold — *Caltha palustris plena* — cannot be bettered. A variety of our native King Cup which clothes our streambanks in golden patches in early spring, this variety has very double flowers and is of a more compact habit.

Grow it in just a couple of inches of water, and watch the clumps increase in size every year.

For later flowering and interesting foliage, the Variegated Yellow Flag or Iris

— *Iris pseudacoma* var is superb. Growing to a height of around 18in (45cm) in a basket, this variety has bold, sword-shaped leaves striped in yellow and green.

The golden-yellow flowers are borne in midsummer on stems 2 feet (60cm) high. Propagation is by division as the seeds do not come true.

Submerged selection

Although the most popular oxygenator is without doubt the Curly Pondweed or 'Crispa' — *Lagarosiphon major* — I prefer the South American *Egeria densa*. Despite being popularly thought of as being only suitable for indoor aquaria, this plant is quite hardy in many parts of the country.

The huge whorls of soft, bright-green foliage are extremely attractive, and in the summer in my garden, I am also rewarded with a show of paper-white flowers which stand proud of the surface on short stems.

My other choice would be Wavy Pondweed, *Potamogeton crispus*. This native plant closely resembles the bladderwrack of our seashores, but unlike the seaweed, does not have the bladders. The stems and leaves are olive-green to dark-red in colour, and form dense foliage.

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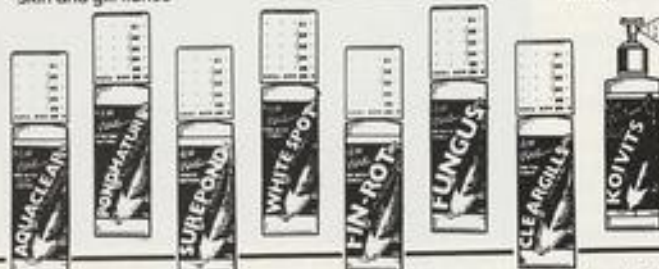


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BioPond Blackpeat masks the many irritants and abrasives (to fish) found in domestic tapwater, thus protecting fishes' delicate gill membranes. Blackpeat's organic compounds act as a chelating agent, allowing vitamins and trace elements (which would have been previously oxidised) to be absorbed naturally through the fish's skin and, incidentally, plant membranes too. Also containing humic acid (again benefitting aquatic plants), Blackpeat simultaneously inhibits algae and blanketweed growth.

The new circular-shaped BIOPLAST POND FILTER features an innovative design: incoming water is dispersed (by forcible contact with the lid) over the total filter diameter, to pass through a foam medium layer and a spirally-wound high-surface-area biological filter before returning to the pond. Several filters can be stacked together, making a very versatile system for almost any size of pond.

BIOBAKTOL is a micro-culture medium to ensure rapid colonisation of the filter and newly set up aquarium (freshwater or marine) with micro-organisms; it will also assist the reduction of waste in highly-stocked aquariums. PLANKTOSAN is an ideal source of micro-food for marine invertebrates, meeting all the demands made by different species. Alternatively, it can be

THE INDEX WATERGARDEN REVIEW WEDGE BY DICK MILLS

used as a first-food for freshwater fry.

Details from: **BIO-PLAST (UK) LTD**, Unit 1, Old Railway Goods Yard, Kildwick Crossing, Crosshills, Keighley, West Yorkshire BD20 7DA. Tel: 0535 630230; Fax: 0535 633690.

New ponds made easy

People thinking seriously about putting in a pond, especially after a visit to a well-laid out garden, Chelsea or Hampton Court Flower Shows, should not be without *The Water Garden Book*, from **BLAGDON WATER-GARDEN PRODUCTS** which shows not only how to do it constructionally, but also how to choose the correct type of pond and equipment for any particular need.

Well over half of the catalogue is devoted to pond design and installation: pond type selection (natural ponds, fish and plants, Koi), pond materials (preformed, liners etc), pumps, watercourses, cascades, fountains, underwater lighting and pool accessories.

No longer just an excellently-illustrated shopping list, the catalogue provides real depth in explaining the theory behind all of the equipment: the filtration section untangles the mysteries (for many newcomers) of what is necessary, and why, in maintaining clear water; the

Gardener's Calendar timetables tasks throughout the year; Plants (aquatic and marginals) bring natural beauty; Fish, together with the very necessary Fish Foods; Pool Clinic to sort out early problems and stoneware (from Hent Studio) add the final decorative touches to complete the pool scene.

The complementary side to Blagdon's range of products now includes aquaria. Here, again like the pond, the whole subject is detailed with all component parts on display and fully explained — just in case you want to bring your fishkeeping talents indoors after that successful year in the water garden.

Catalogues are at your stockists now, or write to: **BLAGDON WATER GARDENS PRODUCTS** plc, Bristol Road, Bridgwater, Somerset TA6 4AW. Tel: 0278 446464; Fax: 0278 446155.

Time-saving filter

INTERPET have introduced their **POND WORKER**, an innovative type of pond filter. It completely reverses traditional submersible pump-operated pond-filtration techniques by putting the cart before the horse, sorry, the filter before the pump.

This simple arrangement means that all the pondwater is filtered both mechanically and biologically ahead of the pump, which can then give all its power to your pond's moving water

features, such as a fountain or waterfall; no need for something technical to be hidden alongside the pond.

Its strange shape matters not, for it is located out of sight on the pond floor, connected to the pump inlet by a length of wide-diameter tube. A visible float attached to it by a nylon line betrays its actual position, and hauling on this line lifts the filter out for a simple 'twist, empty and clean'. The large capacity, double filter action body provides another bonus: it saves hours of pump protective-filter cleaning too.

Details from: **INTERPET**, Vincent Lane, Dorking, Surrey RH4 3YX. Tel: 0306 881033; Fax: 0306 885009.



Products on the move

The innovative range of products from **LAHAINA** attracted much attention, particularly the specially designed **PROFESSIONAL** range of **VENTURI PROTEIN SKIMMERS**.

Models VPS 420 and VPS 620 — 4 and 6in diameter units respectively — employ the latest 60/60 (co-current and counter current) technology and fully utilise the **OTTO PH2000** Powerhead's ability to produce 8 cubic feet of fine air bubbles per hour through the **MAZZEI** Venturi Valve.

Model SKM 624 works on the continuous regeneration principle and comes complete with the **Rainbow-Lifeguard** 'Quiet One' Pump and **Mazzei** Venturi Valve which manages an incredible



12 cu ft of air per hour. Other models in this range include 36, 42 and 48in sizes.

The ABC (ANAEROBIC BATCH CYCLIC) DE-NITRIFICATION SYSTEM will produce zero nitrates in both freshwater and marine systems. Previous troublesome drip-adjusting valves and outdated feeding techniques have been eliminated and replaced by 'state of the art' electronic controls of the very sophisticated ABC TIMER, whose workings are far too complicated to go into here. Suffice to say that when coupled with the DE-NITRIFICATION FILTER, the beneficial results include far fewer major water changes and improvement in pH levels.

Lahaina is also on the move, location-wise. In the not-too-distant future, the company will be based in the South-West of England. Full details (when known) will follow in a later issue of ASP. Meanwhile, details of all products from (at time of going to press): LAHAINA AQUARIUM SYSTEMS, Kellas, Elgin, Morayshire IV30 3TW. Tel: 0343 89209; Fax: 0343 89296.



statistics, permutations (and prices) into the stock-control database!

Less demanding, as far as actual numbers of items involved, is the addition of details of the range of WHISPER airpumps, now added to the Tetra stable, but all nonetheless completely fulfilling the air supply needs of any sized aquarium.

For the mariner, there is an exciting range of artificial corals — CORAL CREATIONS — all designed to combine beauty with practicality, as well as doing away with the need to collect natural corals from the wild. Available in both natural colours or in bleached forms, Coral Creations are reproduced with 100% accuracy in detail and are more impervious to medication absorption than natural coral skeletons.

Details from: TETRA, Lambert Court, Chestnut Avenue, Eastleigh, Hampshire SO5 3ZQ. Tel: 0703 620500; Fax: 0703 629810.



TREATMENT PADS, while their product-packed display stand featured the new intriguing BIO-CHEM STARS.

Placing no more than four of these black stars in the filter system produces enough biological filtration for each 75 litres of water. The secret lies in the external and internal structure of the stars. There are no dead end internal micro-pores to clog up, the space-age polymer material allowing rapid transfer of aerated water at all times. One Bio-Chem Star is claimed to have 33 times more bacteria-growing area than the ubiquitous plastic ball and even the black colour plays its part by denying growth-inhibiting light.

The stars can be floated in any outside open-topped power filter, anywhere within a canister power filter or combined with any other material in wet/dry trickle filters. Note that these stars are for biological filtration purposes only; they can be used with other trapping materials such as floss for complete water purification if desired.

Also on display was a large POND CARE range featuring liquid-based reagent test kits — three pH TEST KITS (low and high ranges plus a deluxe version with pH adjusting solutions); test kits for CHLORINE/CHLORAMINE, AMMONIA (NH₃/NH₄), NITRITE (NO₂), and WATER HARDNESS.

Alternatively, the DRY-TAB MASTER TEST KIT FOR PONDS — pH (5.0-9.0), AMMONIA (NH₃/NH₄), NITRITE (NO₂) and NITRATE (NO₃) — use pre-sealed tablet reagents.

Details from: AQUARIUM PHARMACEUTICALS INC., P.O. Box 218, 50 E. Hamilton St., Chalfont, Pennsylvania 18914, U.S.A. Tel: 01-215-822-8181; Fax: 01-251-822-1257.

European Address: AQUARIUM PHARMACEUTICALS E.C., INC., 32 Hamilton Road, Summertown, Oxford OX2 7PV. Tel: 0865 58653; Fax: 0865 58692.

Smaller filters

If it wasn't for attractive, eye-catching packaging, you could easily miss seeing the new DUETTO MULTI-FILTER internal filter from UNDERWORLD PRODUCTS/AQUARIUM SYSTEMS.

This small unit (hardly bigger than a personal stereo system) features a 3-stage filtration system combining mechanical, chemical and biological processes in one shell. Filter media cartridges (combined carbon and zeolite, plus sponge pre-filter) are easily replaced without disturbing the biological filter section. An optional extra is a special bracket which clips on the side to hold the aquarium thermostat/heater unit.

Adjustable waterflow, completely rotating water outlet, aeration device for maximum oxygenation, plus multi-use possibilities give the Duetto more functions than apparent at first glance.

Details from: UNDERWORLD PRODUCTS, Units 1 & 2, Belton Road West, Loughborough, Leicestershire LE11 0TR. Tel: 0509 610310; Fax: 0509 610304.



DICK MILLS

Kits and treatments

AQUARIUM PHARMACEUTICALS INCORPORATED were winners of best new aquatic product at the PETINDEX Exhibition at the NEC with their AQUARIUM

Something for everyone

Developments at TETRA have resulted in some new product lines. The very large range of plastic replica plants come in three definite styles — the natural green PLANTASTICS, the SUPER-NATURALS (vibrant colours) and the TWIRLS OF PEARL (colours with a hint of a pearly sheen).

Each style features around nine 'species' which, in turn, are available in four sizes (6, 9, 12, 15 and 18in). Computer freaks can just imagine typing in these



DICK MILLS



Top ten foods

"TEN" refers to the acronym **Total Essential Nutrition**, the only complete "all in one" line of floating food sticks and pellets for Goldfish, cichlids, community fishes and reptiles.

Manufactured by the **Wardley Corporation** and handed in the U.K. by **ZENTEC**, all the foods contain natural attractants, natural colour enhancers, Multivitamin Supplements and Stabilised Vitamin C, and provide complete diets within themselves, eliminating the need for different foods for growth or colour enhancement.

Other foods in the Wardley range include **TOTAL GOLD-FISH** and **TOTAL TROPICAL**, both described as the ultimate flake foods for these fishes. *Spirulina* forms the basis for yet another range of **VEGETABLE FISH FOODS** suitable for all tropical and marine fishes — *Spirulina Plus* (flake form), *Spirulina Sticks* (floating mini-sticks) and *Spirulina Disks* (sinking disks for bottom feeding species). **SPECTRA IV** is the specialised colour enhancing food for all aquarium fish.

Details from: **ZENTEC**, 10 Lloyds Court, Manor Royal, Crawley, Sussex RH10 2QX. Tel: 0293 400128; Fax: 0293 400129.

Aquarium furniture

Billed as "the Furniture Builder's Approach to Aquaria", the aquarium cabinets from **AQUAFURN** certainly look up to the very particular demands made upon cabinets required to house such furniture-threatening devices as extremely heavy, condensation-making aquariums, heat-producing lighting systems and vibration-making pumps and filters.

Close inspection shows that the stoutly-made, cabinet-maker's proper joints and superb lacquered finishes mean that

these cabinets would not only stand up to everything fishkeeping would throw at it, but also look good in the process.

Standard sizes are available: 30, 36, 48, 60 and 72in and cabinets come with two doors below and matching hood on top. Add to this a Corner Unit (one door and hood) and an Octagonal Cabinet (one door and hood) and you can see that most designs are already catered for. American Red Oak veneers can be finished in either Medium Oak or Honey Oak shades, and Mahogany veneers are finished to a Natural Mahogany shade.



Details from: **AQUAFURN**, W.L. Daggart & Son Ltd., Lamont Avenue, Newtownards, Co Down BT23 3NW. Tel: 0247 812348; Fax: 0247 820214.

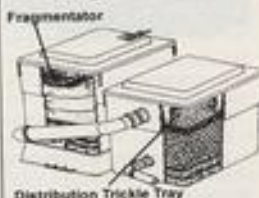
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Using real wood in aquascaping is a good way of building up a natural looking environment for our tropical fish. These days we can choose between several different types of wood, such as bogwood or driftwood; we can even (sometimes, at least) be offered true mangrove roots.

But is everything what it seems ...?

Soft v hard woods

The most common type of wood sold in my part of the world, Scandinavia, is imported from Singapore. The pieces come in different shapes and sizes. Most of these pieces are very hard and look completely natural, as they are not cut or formed by hand. In a big shipment of this kind of wood you sometimes find softer pieces. These — of course — are not suitable for aquarium use.

Before we can introduce this wood into an aquarium, it has to be cleaned. The dirt can be simply removed by soaking the wood and then brushing it hard.

These lumps are the hard pieces of trunks, branches and roots that remain buried once all the soft parts of the tree have disappeared over the years, leaving only the hardest tissues known as the heartwood.

One of the advantages of hardwood pieces is that they remain under water when you put them in your tank. Further, they don't break down when kept submerged, so they don't need lots of preparing before use. The only drawback is the tannic acid which dissolves out from the wood. This softens the water and may cause problems with the pH. It also colours the water brown.

Pineapple surprise

But what is this 'driftwood' (as it is often referred to in the trade), and where is it actually collected?

For years I had seen shipments coming in and had been wondering how this wood could be collected in such quantities without destroying complete forests.

When I spoke to the shippers, they told me that it was collected in Malaysia in some place far away which was hard to reach.

I was in luck! It so happens that I go to Malaysia regularly.

Once, when returning from a fishing expedition in Johore in southern Malaysia with my good friend Fong Chin Loon from International Aquarium, we found ourselves with some extra time on our hands. We therefore told our local guides that now was the time to show us driftwood collecting, and they agreed.

So off we went ... to a pineapple plantation a few hours away! This place was not a farm, it was truly a plantation which reminded me of those you see in old American movies. Armed guards opened the gates for us. I am sure that no one



Prodding for 'driftwood' in a burnt out field

The Pineapple Connection

Finnish aquarist and explorer **Tor Kreutzman** uncovers some unexpected 'wooden' secrets in deepest Malaysia

Photographs by the author



When I say that the pineapple plantation is big ... I mean big!



Newly 'harvested' piece

without permission had any chance to get past them.

Driving by the gates and factory buildings we came to the pineapple fields. There were pineapples as far as the eye could see. I don't know how far this was, but we drove for miles and only saw pineapples growing everywhere. I was somehow expecting us to reach the seashore, or a river bank, or something like that. After all, driftwood comes from the water, doesn't it?

Charred evidence

Well not *this* driftwood! It was, in fact, being collected from the plantation itself.

All the enormous fields were divided into smaller sections and every section had pineapples at different stages of ripening. This means that you can harvest pineapples all through the year.

When the fruits are harvested, the stems are left to dry up in the ground. After a couple of days, everything is burned down. Then the field is left to rest for some time before a new crop is planted.

This burning helps to explain why some pieces of driftwood clearly have marks of fire on them. Sometimes, one whole end of a piece is all black, sometimes it's even more.

This had also puzzled me. When, for example, was this driftwood burned ... and why?

During our tour of the plantation, we came to one such field which was in a resting state. Close by was a small forest left standing in the middle of the pineapple fields for some strange reason. We drove up to the trees and there, well hidden, we found a small hut, some chickens and children.

Driftwood harvest

Here lived a young Philippine family, illegal immigrants who had escaped their home country to come here and do this work for almost no money.

The young man came out to the field to show us how to collect the wood. He took a wooden pole and walked around prodding the ground. With the pole he could feel if there was anything in the ground. When he found something he simply dug it up. There did not seem to be any stones in the ground. When he located something it was always a piece of wood.

He took the wood and checked it to see if it was suitable. If it was accepted, he threw it into a heap of other such pieces. Sometimes, he used his axe to cut off some broken part of the root.

In no time at all, he had collected twenty pieces of wood. He does this job all day long, and every day a car comes and takes the load away.

The harvest is taken to the export facilities, where the pieces are sandblasted to remove the dirt. After that, all pieces are sorted according to size and packed in



Java Fern finds the driftwood ideal as an attachment medium



Cleaning does not require any sophisticated equipment

sacks. These are then shipped to Singapore and exported from there all over the world.

When new pineapples are planted on the plot he's been working, the young man moves on to the next one, where he will continue his work. The Malaysians told us that they had been working like this on this very plantation for many years now and still they had not collected wood from all parts of the plantation.

'Growth' industry

They say that new pieces of wood 'grow' up from the ground continually. There appears to be no end to the supply. When I asked them how long they

believed they would be able to continue working on this plantation, they answered, "Forever!" The plantation is so big that they really believe that no end is in sight. And the beauty is that this collecting is for everybody's good.

These pieces of hardwood had been a big problem in the past. For example, they had to be collected at great cost and destroyed when they came to the ground surface. Nowadays, other people collect the wood and keep the fields in good shape. It is just pure good luck that these people have been able to make a business of it.

As far as the hobbyist is concerned, it is a great comfort to know that nature is not being destroyed as a result of this wood business and that resources seem endless.

I am not quite sure about the history or 'evolution' of this so-called driftwood. One thing is certain, it is not any kind of driftwood. Driftwood is only a commercial label.

The pieces of wood are probably what's left of the original forest when the pineapple plantation was founded. Pieces of the trunks and roots were probably left in the ground and the cultivation of the fields simply brings them up to the surface. These leftovers are the pieces that have survived in the ground over the years, the hard parts that are most suitable for aquatic use.

Aquarium uses

I have used these driftwood pieces for years in my tanks because I keep quite a few catfish such as plecos (*Hypotomus*), Bristlenoses (*Ancistrus*) and Whiptails (*Loricaria*) species.

This sort of wood, which has absolutely nothing to do with driftwood or bogwood, or any other wood emanating from water, has proved to be most suitable for my aquaria. It looks good hidden among the green plants, and the fish find places to hide in beneath it; many species also use their shelter to rear their fry.

Catfish that live on algae seem to find quite a lot to eat off the wood. Some species, like *Panaque nigrolineatus*, keep the wood clean and 'shining' all the time

(the wood is important for their digestion). Some pieces, however, clearly diminish with time as the fish subject it to this working over.



Upside-down Catfish sheltering under an overhang

The only problem I have encountered has been a chemical one. I keep such large quantities of driftwood in my tanks that they inevitably affect the water quality.

The tapwater in our district is quite soft from the outset, so this could present a problem for some species in any case. The

difficulty is easily solved, though. Water changes and the addition of some more minerals as buffer are all that's needed, but you have to be aware of this possibility.

There are lots of other hardwoods on the market which probably do the same job for you as this driftwood does for me. My choice has been this Malaysian wood because it is easily obtained and not too expensive to buy.

Furthermore, I like the general shape of the pieces; they are all different but their overall structure is the same, if you know what I mean. Looking like pieces that have been formed by waves, this wood also provides an excellent growing place for Java Fern (*Microsorium pteropus*) or Java Moss (*Vesicularia dubyana*). A tank decorated with driftwood pieces which are overgrown by these deep green plants, certainly makes an aquarium interior look like a piece of nature itself.



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Tracking down the turtle highways

Research using a satellite tracking system has revealed that female Leatherly Turtles (*Demochelys coriacea*) follow definite underwater routes when they leave their nesting beaches on Costa Rica in Central America. These regular routes or 'highways' follow underwater mountain ranges and skirt the edge of continental shelves.

For example, after nesting, female turtles which had used the beaches on the east coast of Costa Rica, either swam north to Cuba, or eastward into the Caribbean. Individual turtles

followed similar underwater routes along the steep continental slope.

Turtles on the west coast of Costa Rica, immediately enter the Pacific Ocean on leaving their nesting beaches. The marine reptiles which were tracked by satellite, avoided the deep abyssal plain of the ocean but followed the volcanic Cocos Ridge. This underwater mountain range led to the Galápagos Islands, approximately 1100 kilometres (685 miles) southwest of Costa Rica.

This information about the underwater movements of ten different female Leatherly Turtles was collected by attaching a radio transmitter to the carapace of each reptile. A space satellite then picked up the signals from the different transmitters when the turtles surfaced to breathe. The whereabouts and speed of movement of each radio-tagged turtle was then recorded. It was discovered that female Leatherbacks move steadily at up to 60km per day.

The research findings from this tracking experiment have important implications in the development of a protection plan to help conserve this species. Drift nets and fishing lines, for example, cause the deaths of hundreds of turtles every year. If these fishing methods were banned along the turtle highways during the nesting season, then such restrictions should lead to a significant reduction in the number of turtle deaths.



FROGS

By JULIA

Galápagos

During April and May of this year, fires swept across extensive areas of Isabela (formerly called Albemarle), the largest island of the Galápagos Archipelago in the Pacific Ocean. Isabela is approximately 75 miles long and is inhabited by five different subspecies of Giant Tortoise. These occur nowhere else on earth — not even other islands in the Galápagos group.

The Galápagos have been formed by volcanic action. Thus, the islands have never been attached to the South American mainland. This isolation has resulted in the few colonising species diversifying through evolution into a number of closely related subspecies and varieties which exploit the available food.

Geographically separated populations

Being volcanic, fire is a natural part of this environment. On the island of Isabela alone, there are five volcanic craters, each several miles in diameter. A separate subspecies of Giant Tortoise has been described living around each volcano. The shell shape of some of these subspecies is as distinct as for any of the other subspecies living on different islands. This is because the different populations have been kept geographically separate from each other by large expanses of shadeless and impassable solidified lava.

The evolution of different shell shapes among the Galápagos Giant Tortoises has been caused by different environmental conditions on the various islands and in the distinct regions of Isabela. The two extremes in the shape of the carapace (the upper half of the shell) are described as "saddleback" and "dome-shaped".

Saddleback tortoises, for example *Geochelone elephantopus ephippium* which inhabit the drier island of Pinzón (formerly called Duncan), can extend their necks upwards and browse the leaves and shoots from bushes. There is less vegetation growing on the ground in dry environments and so the more usual method of feeding by grazing provides insufficient food. However, the much larger opening at the front of the carapace does not give as much protection to the head and neck as the more characteristic dome-shaped tortoise shell.

This year's fires on Isabela spread west of the dormant crater of the Sierra Negra volcano. This region is inhabited by dome-shaped tortoises. These can be the largest of all Giant Tortoises, although really big animals no longer exist — most were killed in the latter part of the last century as a source of oil.

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IAN SIMS

Galapagos fires



JALIE SMITH

Giant Tortoises mating at London Zoo in 1974. Unfortunately a long term captive breeding programme was never established.

Despite this, an average adult dome-shaped tortoise found today weighs up to 230 kilograms (over 500 pounds) and can grow to a carapace length of 1.25 metres (four feet). Thus, several men would be needed to move each reptile. It is this large size, together with the inaccessible terrain (at least two hours walk across lava to where these reptiles still survive) which would hinder any rescue programme.

A further problem would be the question of where these reptiles should be moved to. The very existence of each subspecies has come about by its isolation, so if any were moved to another island, hybridisation with the local subspecies might occur. Another problem is that dome-shaped tortoises are not adapted to life on drier islands such as Pinzón and Española (formerly known as Hood).

Disappointing projects

In the past, Giant Tortoises have been moved from the Galapagos islands to zoos in North America and Europe. Unfortunately, captive breeding projects away from the Galapagos have been disappointing, with the notable exceptions of successful results being achieved at Honolulu Zoo, Hawaii and San Diego Zoo in California.

Fire has helped to form and shape the Galapagos environment. Due to their great age, many tortoises must have survived similar ecological disasters which have occurred previously. However, these latest fires have been a real cause for concern, not least because only limited resources have been made available from the international community to protect a unique habitat of major scientific importance to the entire planet.



SPHS INTVTS

An American Bullfrog. The large ear drum, behind which the fluid-filled semi-circular canals are located, can be clearly seen in this shot.

HERP FACT Frogs in space

Two North American Bullfrogs (*Rana catesbeiana*) have been sent into space to investigate the effect of zero gravity on the semi-circular canals of the inner ear. These canals are actually sealed tubes containing fluid. They are situated on each side of the head well inside the skull, where they are protected from damage.

The ear drum (shown in the accompanying picture) is the boundary between the outside environment and the middle ear. The semi-circular canals are situated further inside the head beyond this region. The canals enable an animal to maintain its balance by responding to movements of the fluid. The fluid-filled lateral lines of some fish perform a similar function. Children who spend too long on a roundabout in a playground experience the effects of movement of their inner

ear fluid. They therefore feel dizzy after leaving the roundabout, until the fluid in their ear canals also stops moving.

The frogs in space experiment had important implications for humans and life on a space station. For example, how would the average person adjust to the weightless effects of zero gravity and the problems this would cause for balance?

In fact, after 50 hours without gravity, the two bullfrogs showed that their inner ears adjusted to this alien environment and the nerve impulses which the canals sent to the brain slowed down to a normal rate.

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KEEPING AND BREEDING:



Belgian aquarist **Jean Lambinon** relates his successes with this attractive, lively coldwater species.

Photographs by the author — text translated by Mary Bailey

Two magnificent males in full breeding attire.

The Red Shiner

It was 3 or 4 years ago that I first saw the Red Shiner (*Nocomis biguttatus* — now *Cyprinella lutrensis*) in the aquarium trade and I was immediately captivated by the beautiful colours of the male. The species was completely unknown to me and I had to search through my entire library for further details. I finally found some information in one of my aquarium magazines.

Facts and figures

The Red Shiner is a member of the Cyprinid family and inhabits the rivers of the southern United States and the northern part of Mexico. It is thus a fish of tem-

perate zones, rather than the tropics. In consequence, it only requires a temperature of 12-15°C (54-59°F) in winter and 25-26°C (77-79°F) in summer. In fact, there is a real risk of shortening its lifespan if these limits are ignored, so this species should be kept in an unheated tank in winter, which rules out most living rooms.

In my aquarium, I found them to be lively fishes, constantly on the move. They thus require a reasonably spacious, thickly

planted tank. The tapwater in most places suits them perfectly, ie a hardness of between 10 and 20 German degrees of hardness and a pH of 7 to 7.5. Regular partial water changes should be performed, however. Red Shiners also require strong aeration provided by an efficient diffuser attached to a powerful air pump.

Outside the winter period (see above) they can live in a tropical aquarium, where they are always peaceful towards other species and each other.

Feeding poses no problems; they are omnivorous and will take proprietary dried foods just as readily as the usual live ones, such as glassworms, *Tubifex*, *Daphnia*, etc.

In nature males grow to 8cm (3.2in)

Below left, the much drabber female.

Below right, spawning under way. The marbles will hide any loose eggs from the attentions of other fish in the tank.



and females 6cm (2.4in). In captivity, they remain slightly smaller. Males are brilliantly coloured: the pectoral, pelvic, anal and caudal fins are red, while the dorsal is transparent. The body is blue, the head and operculi (gill covers) red-orange. There is a vertical band of darker blue behind the head, followed by another which is red-orange. All these colours are intensified at spawning time. Moreover during this period the top and upper sides of the head in males are covered with white tubercles. Female coloration is uniform grey, so determining the sexes is a simple matter.

Despite everything I have said and suggested above, to be honest, I must admit that, in winter, as well as summer, I kept my specimens at a constant temperature of 24°C (75°F) — except for breeding purposes. In practice, they remained in excellent health throughout, though I do not know whether their lifespan was shorter than in nature as a result.

Breeding

I used a tank measuring 60 x 30 x 30cm (24 x 12 x 12in) for this purpose, 60cm being the minimum suitable length. The aquarium was fitted with a corner filter with a high turnover rate. The water had the same characteristics as those mentioned above, and was kept at a temperature of 25°C (77°F). The bottom of the tank was covered with a thin layer of Rhine sand, with several stones dotted here and there and a few clumps of Java Moss.

My two females were placed in this tank by themselves for a week, while the males lived celibate in the community aquarium. During this period of separation, both males and females were fed heavily, mainly on live foods. Following their transfer from the community tank, the males developed magnificent coloration and tubercles appeared on the upper part of their heads.

They immediately began to pursue their mates, and took up positions in the angles between the substrate and the stones, quivering their entire bodies, as if marking territory — though the actual reasons for this curious behaviour remain unclear. They then renewed their pursuit of the females, positioning themselves at a slight angle above them, trembling from head to tail. I had previously seen similar behaviour prior to spawning in Harlequins (*Rasbora heteromorpha*).

The females were not all ready to spawn and hid behind the stones for a day or two. When a female was ready, the pair would position themselves above a clump of Java Moss, or sometimes right inside it. The male would gently curve his body over that of his mate, who, trembling violently, expelled a batch of eggs which were fertilised immediately.

The eggs were very numerous, semi-adhesive, and measured 1mm in diameter; at first sight, they appeared to be clinging

A four-day egg. The eyes of the developing embryo are visible at this stage.



tightly to the strands of moss, but when touched, some of them would come away and fall to the bottom. They were completely transparent, and could be seen only by shining a light into the tank. They were not only in the moss, but also on the stones, and probably among the tiny grains of the substrate as well.

There is no preferred time of day for spawning, which therefore may take place

equally in the morning, afternoon or evening. The favourite time of year seems to be the month of May. The spawning process lasts for 2 to 2½ hours, after which the adults should be removed.

After a couple of attempts I decided to spawn only a single pair at a time as, even though I can state positively that courting males and consenting females have no interest in the eggs, the same is not true of the others, who devour them gluttonously.

Depending on the temperature, one has to wait 4-5 days to see the alevins (larvae or fry) hatch. During this period, one can observe the progressive development of the larvae within the eggs.



7mm eight-day-old fry.

Fry rearing problems

The fry are very tiny upon hatching: about 5mm long. They are transparent and able to swim free, preferring the surface of the water. They should be fed without delay, as their yolk sacs have already been absorbed by the time of hatching.

This was the stage at which the problems started. As when dealing with the fry of other species, I used microworm and brine shrimp (*Artemia salina*) nauplii as first foods, but by the end of the first week,

By the time they are one month old, the fry are about 1 cm long.





The second month results in great weight gains and growth. This two-month juvenile is 4cm (1.6in) long and is now a replica of its parents.

there was only one survivor.

Following the next spawning, I removed a clump of Java Moss containing a large number of eggs and placed it in a small 10-litre (2.2-gal) tank to be able better to study the development of the fry. Immediately after hatching, they congregated at the surface in a single corner of the tank, something I had previously noted in the breeding tank as well. I was also able to see how they were unable to take the food offered and died not long afterwards.

Before trying again, it was therefore necessary to start an infusorian culture. I filled a jar with tank water, added some rice and a few granules of Protogen, and exposed the whole to sunlight on a windowledge. Every day, I added a drop of Liquifry.

After a few days the water was cloudy with infusorians and a new Red Shiner spawning could be attempted. After hatching, the fry were fed on these infusorians, which were added to the tank 3-4 times daily by means of an old syringe. This time I could see, using a magnifying glass, that the fry were feeding properly.

More accessible

In the large tank, the food was caught up in the current from the filter and was, thus, difficult to catch, whereas the small size of the little hatching tank meant that the infusorians were more concentrated and more accessible to the fry. These measured about 5mm upon hatching and 7mm after 10 days, thereafter growing

slowly to attain about 1cm after a month.

For the first 15 days, they were fed exclusively on infusorians, then on a mixture of these and microworms for a week, and finally *Artemia* nauplii were added to the diet to enable the faster growing individuals to receive adequate nourishment. The juveniles proved capable of attaining a length of 4cm (1.6in) by the age of two months.

The number of fry hatched was somewhere between 150 and 200, and these were divided 50/50 between the two tanks. For the reasons given above, the percentage success rate was low in the large tank (10%), but 70-80% in the small one. I am convinced that transferring the newly-hatched fry to as many as five additional small tanks (depending on the number of fry) would further increase the chances of success. After a month, the fry were swimming all over the tank and had to be transferred to a larger container to permit continued growth to adulthood. **AM**

ACKNOWLEDGEMENT

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otherwise indicated — by
the author

Rising four miles high from the ocean depths is an ancient volcano with five peaks that break through the waters of the Atlantic Ocean 350 miles off the coast of West Africa. The largest peak is the Portuguese Island of Madeira. With a permanent spring-like climate, it is rightly called the island of flowers.

The seawater is 18°C (64°F) in winter and 20°C (68°F) in summer, but despite these warm and stable waters, there are no coral reefs because the island lacks any shelving; the rocky shores plunge steeply down to cold ocean depths.

Flash flood rains in the mountains mean no freshwater fishes either, except for introduced species such as trout, carp and the Mosquito Fish (*Gambusia holbrooki*) collected by our editor many years ago on the island. The ocean, however, teems with fish; over 300 local species, such as shoals of Horse Mackerel (*Trachurus picturatus*, or *Chicharro* in Portuguese) and giant Moray Eels (*Muraena augusti*, the Dotted Moray or *Morea Preta* in Portuguese).

Down in the depths of the ocean, is an eel-like predator that lives and breeds where the water is a constant 7°C (45°F). In two forms, predominantly black and sometimes silver-skinned, with some cross breeding (silver and black) the fish is very ugly — up to 1.2m (4ft) long, 2kg (4.4lb) in weight, a large mouth filled with inward pointing needle teeth and huge eyes for hunting in the dark waters.



JOHN DAVIES

Close-up of the perfect night-time predator from the depths of the Atlantic

This fish rises from its natural home to about 800 fathoms deep at night-time to catch sleeping fishes. That is when the hunter is hunted. Madeiran fishermen go out at night with very long lines baited with Mackerel, let the fish hook themselves and haul them up before dawn, whereupon the fish are rapidly decompressed and arrive always dead, with internal organs protruding from the gaping mouth.

The Madeirans call the fish *Espada* (*Aphanopus carbo*) and refuse to eat it, viewing its always dead arrival with suspicion. The long body is, however, cut into steaks and given to the tourists in the many fish restaurants on the island.

Espada is Portuguese for 'scabbard' and this name was given to the fish because its long black body looks like a scabbard for a sword. Small English dictionaries do not have words like scabbard, so the nearest transla-

tion the restaurateurs could use was sword itself... so the fish is listed in the English section of menus as 'Swordfish'. The real Swordfish is actually *Espardele*, another Madeiran delicacy. In the French section of the menu, it is more correctly listed as *Poisson Noir* (Black Fish).

The black form has a better flavour than the silver, and fetches a higher price in the fish market at Funchal, the Madeiran capital. Dealers pluck out the organs and slice out the needle teeth and huge eyes. The body is then coiled and sold in plastic bags. Restaurateurs slice the fish into steaks or filets, and they are then grilled or baked Madeiran style. This means with a fried banana!

There is nothing special about

The steep rocky shores of Madeira, sweeping down into the ocean depths where strange fish abound.

Espada Preta and a few hybrids (Synphobranchidae family of deepwater eels) on the fish market slab in Funchal, capital of Madeira



combining banana and *Espada* flavours — it is just that EU regulations mean the tiny, sweet flavoured Madeiran banana is too small to be called a 'banana' so it cannot be exported to Europe! This leaves the Madeirans with a lot of bananas to eat, so why not add one to every piece of fish steak...

A of A/FNAS joint convention

The second joint convention of the Association of Aquarists (A of A) and the Federation of Northern Aquarium Societies (FNAS) was held at Chester Zoo and attracted an audience of over 85 people.

A panel of speakers included **Ron Forder**, senior plant judge for the A of A, who presented a video on aquarium plants; **Brian Walsh**, who presented two separate audio-visual shows; **Mrs Lynn Fern**, from the British Cichlid Association, who presented a talk on cichlids of Lake Tanganyika; and **Dr Gordon McGregor-Reid**, curator of Chester Zoo, who presented a comprehensive account of a visit to the Sahara Desert.

New marine society

Marine aquarists in Essex and Hertfordshire are invited to contact **Nigel Jolley**, who is trying to set up a club for marine aquarists in the region. Anyone interested in helping to get things going, or to join, should contact Nigel on 0279 424659.

New society open to all

A club for all fishkeepers, both novices and experienced, is being formed by aquatic consultant **Clive Norris**, from Stroud, Gloucestershire, with fellow fishkeeper **Andy Ramsbotham**, of Longlevens, Gloucester.

Explained Clive: "The society will be open to all age groups. Its main aims will be to promote continued interest in the hobby, and to assist and give advice for successful breeding of species,

SOCIETY WORLD

both marine and freshwater, from across the world. The most important aim is to help members to achieve total enjoyment."

Meetings will be held on the first Tuesday of every month; a bi-monthly newsletter will also be produced. For information, contact **Clive Norris**, tel: 0453 755450 or **Andy Ramsbotham**, Tel: 0452 521609.

Another win for Andy

Mid-Sussex AS member **Andy Feast** kicked off the new show season in the manner of the previous few years with a 'Best in

Show' award for his *Betta sithimunki* at this year's **Grocklemania** (22-24 April).

The show is organised annually by **Isle of Wight AS** and is sponsored by **Aquarian** with the help of the **FBAS**. This year's event attracted no fewer than 274 entries in 36 classes. Named after the name given to visitors to the island (Grockles), Grocklemania provides a full weekend programme for all fishkeepers. The activities include lectures, buffet dance, evening entertainment, local traders (including Newport Nurseries and Newport Vivarium), and the **AquaClub** quiz final. This year's **AquaClub** Champions were Deal and District AS, who marginally outpointed Eastleigh AS in the final.



Dr David Ford, senior consultant to 'Aquarian', hosts the **AquaClub** quiz final between teams from Deal and District AS, left, and Eastleigh AS, right.

NOTE TO SHOW SECRETARIES

This column endeavours to bring you the most extensive advance notice of forthcoming society dates, with events listed, where possible, the month prior to their occurrence. To help ensure that your society events are included in this section, please let us know at least eight weeks before the beginning of the month of publication. Please send your details to: **Diary Dates, Aquarist and Pondkeeper**, 9 Tufon Street, Ashford, Kent TN23 1QN.

FBAS news

1 The Federation of British Aquatic Societies will be in the Hampton Court Flower Festival.

Pondkeepers and water gardeners are invited to bring their problems, fish-keeping ones included, for solving by the Federation's experts and, of course, to take advantage of the Society-Finder service — pin-pointing visitors' nearest local society anywhere in the UK.

2 In similar vein, the Federation will also be at the Town & Country Festival at Stoneleigh, nr Kenilworth, over the August Bank Holiday.

3 Societies throughout the U.K. will be receiving details of this year's Supreme Festival of Fishkeeping (public days 5-6 November) at Weston-super-Mare, together with an invitation to enter Tableaux in a brand new competition (with a free night's accommodation for two of the Society's tableau-building team if necessary). Among the speakers this year will be **Dieter Vogt**.

Details of the weekend, together with a booking form from: **Colin Richards**, **Beechwood Cottage**, Long Grove Wood Farm, 234 Chartridge Lane, Chesham, Bucks HP5 2SG. Tel: 0494 773094.

4 The 1994 British Open Fish Championship will be held in conjunction with the Corby & D.A.S. Open Show on 15 May. The fish taking the title was a *Lamprologus compressiceps* owned by **Colin Osborne** from South-East London A.S.

July

Sunday 3
North West Cichlid Group — Fourth Annual Open Show, Skelmersdale Labour Club. Auction and refreshments. Details: **Karen Horrocks**, Show Secretary, 70 Morton Street, Middleton, Manchester. Tel: 051 843 2764.
Scarborough & District AS — 25th Open Show. Benching 11.30am — 2.00 pm; auction 1.00 pm. Details: **Steve Barker**, Show Secretary. Tel: 0723 353258.

Sunday 10
British Killifish Association — Toothcarp Show organised by the Kent Group of the BKA, YMCA,

West Hill, Dartford, Kent (just off M25 near the Dartford Crossing). Benching: 11-12.30 pm. Entry fee for competition: 20p. Details: **Chris Cheswright**, Show Manager, 2 Cedar Avenue, Wickford, Essex SS12 9DT. Tel: 0268 732531.

Sunday 24
Phoenix Aquarium Society
Blackpool — Tenth Annual Open Show, Blackpool Boys Club, Laycock Gate, Blackpool. Details:

Mrs G Redman, Secretary. Tel: 0253 28185/0253 397362.

August

Sunday 7
Robin Hood AS — Open Show, AofA Superbowl round. Details: **C. Hinton**, 45 Wollaton Avenue, Gedling, Notts NG4 4HY.

Sunday 14
East Dulwich AS — Open Show, Superbowl round. Details: **S.**

Bungay, 29 Pickwick House, Dickens Est., George Row, London SE16 4UT.

Whitley & District AS — Open Show, Tomball Football Ground. Details: **A Thornton**, secretary, 29 Stathes Lane, Saltburn, Cleveland, TS13 5AH.

Saturday & Sunday 27&28
Cymru National Aquarist Association — Festival of Fishkeeping, Newport Centre, Kingsway, Newport, Gwent, Welsh Open Show on **Sunday 28**. Details: **Les Malpas**, 312 Cardiff Road, Aberaman, Aberdare, Mid Glamorgan CF44 6JU. Tel: 0665 877197.



DAVID TWIGG'S

KOI CALENDAR

Thoughts for the month

Summer is now with us and water temperature is at or near to its maximum. Our Koi are at the peak of their health. This, then, is the time to sit, relax and watch our pets meandering their way around the pond.

At the same time, we should be thinking about the future months. I mention this now because if any reader is thinking of covering and/or heating their pond for the first time this winter then **now, not September**, is the time for thought and design.

A well designed cover can be a boon to the Koi keeper. Apart from acting as a wind shield which will help to maintain higher water temperature, it can permit ease of pond maintenance, as well as giving cover when (and I hope it is not necessary) there is a need to treat a fish.

Over the last few years, some Koi keepers, in their efforts to control blanketweed, have tried using a method adopted for a long time by farmers in their field ponds and lakes; i.e. placing barley straw into the water and allowing it to rot. I understand many Koi keepers have had success with this method, although I have not tried it myself.

I have recently been given a copy of the Aquatic Weeds Research Unit's Information sheet *Control of Algae with Straw*. While not having yet identified the active chemical or chemicals which appear to reduce algal growth, the unit field and laboratory experiments suggest that, among other things:

- i) the chemical is not produced if the water in and around the straw becomes anaerobic,
 - ii) insufficient chemical is produced in the first month, but it is then created in significant quantities for the next five months after which production falls,
 - iii) all species of algae tested to date (both unicellular and filamentous) are affected,
 - iv) no evidence has yet been found of any adverse effects upon fish or higher plant life and
 - v) the amount of straw necessary to produce sufficient chemical to affect algal growth is in the range of 5gm (or less) straw per cubic metre (m^3) of water.
- Larger quantities may be more effective and/or produce faster results, and applications of up to 100g/ m^3 have been used. At this level, no deoxygenation in the surrounding water was recorded, but care should be taken to avoid deoxygenation

by introducing excessive quantities of straw. Is this then the answer to the Koi keeper's blanketweed problems? Certainly, a couple of my friends are currently using organically grown barley straw in their system with good effect, but they do have a very light fish load. They have placed the straw in the first of their filter chambers and provided it with extra oxygenation by way of air stones. The water is then pumped back to the pond via a U-V clarifier to minimise any additional bacterial count in the water. I am following their results with interest.

If any Koi keepers using barley straw successfully would be willing to exchange correspondence on this subject, I would love to hear from you.

July shows

Four shows have been advised for this month; one each weekend.
10 — Lower Thames-Side Open Show, Eastwood Junior School, Eastwood, Essex. Contact Albert Radley on 0702 529675.
16/17 — East Riding Section BKKS Open Show, Exhibition Centre, Hull.
24 — Essex Section BKKS Open Show, Aveley Sports Centre, Aveley, Essex.
31 — Merseyside Section BKKS Closed Show, Contact Phil Adamson on 051 220 2970.

Telford success

The International Koi show at the Telford Exhibition Centre was the first show I visited this year. This large indoor venue was set out with dealers around the outside and competitors' show vats arranged for easy viewing in the centre.

It was good to see many new faces among the dealers and a couple that spring to mind are S.C.S. Services who manufacture a range of moulded bowls in many shapes, sizes and depths and for which Koi keepers will find a myriad uses. Hargreaves Nets was the other, with their range of 'keep nets' for holding and examining Koi. These were developed from floating cages designed for use in the fisheries industry and can be made to customer specification using a range of materials with mesh sizes from 'micromesh' to 50mm diamond mesh.

S.C.S. can be contacted at Unit 7, Riverside Business Centre, Cliffe Street, Nelson, Lancashire, BB5 7QR. Tel/Fax: 0282 611577 and Hargreaves Nets at 30 Chalbury Close, Canford Heath, Poole, Dorset, BH17 6BS. Tel: 0202 600010.

But back to the Koi. A tour



Grant Clifton's Supreme Champion Kohaku.

around the show vats revealed some absolutely marvellous fish, one of which is pictured here. Congratulations to Grant Clifton for his success with his wonderful Supreme Champion Kohaku, and to the many other competitors who entered their fish and came away with a trophy. This was a great day out for Lyn and I that I am sure will be the first of many this year.



Exhibitors' vats at the Telford Show.

Rest of 1994

13/14 Aug — **Koi 94 Billing** Aquadrome. Includes Craft fair and children's entertainment. A weekend package with dinner dance on Saturday evening is on offer again this year. Contact **Lou Jackson** on 03224 63669.

28/29 Aug — **South East Section** Open Show. Ravenswood School, Bromley, Kent.

3/4 Sep — **Central Section BKKS** Show. Avoncroft Museum of Buildings, Bromsgrove. Contact **Sue Finney** on 021 747 2733.

12 Sep — **Avon Section BKKS** Closed Show. Blagdon Water Gardens, Upper Langford, Avon. Contact **Larry Lerway** on 0454 898207.

25 Sep — **Northern Koi Club** Closed show. PWT, Fish Industries. Contact **Tony McCann** on 061 794 1958.

25 Sep — **Crouch Valley Section BKKS** Closed Show and BBQ. Contact **Ron ParLOUR** on 0277 840863.

What's on in July

3 — **Eastend Section BKKS**. Speaking on Koi Appreciation is **Gary Pritchard**, Chairman BKKS. 7pm, Wellstead Community Centre, Vicarage Lane, East Ham, London. **Crouch Valley Section BKKS**. Visit members' ponds and BBQ. Contact **Ron ParLOUR**, 0277 840863.

5 — **Yorkshire Section BKKS**. Monthly meeting. Contact **Phil Swallow**, 0422 343674.

6 — **Leicestershire Koi Society**. Open Forum. British Shoe Corporation Social Club, Soudamoor Road, Leicester. Contact **Pip Ostell**, 0533 609707 or **Kevin Luckman** on 0455 250413.

9 — **Heart of England Koi Society**. Contact me, 0926 495213.

10 — **Mid-Somerset Section BKKS** entertain members from West Wales Section. Contact **Alan Purnell**, 0458 72132.

Northern Koi Club Monthly meeting. Contact **Tony McCann**, 061 794 1958.

11 — **West Wales Section BKKS**. Monthly meeting. Post Office Club, Swansea. Contact **Andy Tovey**, 0554 821310.

12 — **Nottingham & District Section BKKS**. Speaker is **Paul Stacey**. Western Club, Derby Road, Nottingham, 8pm. Contact **Shirley Hind**, 0602 810923.

13 — **South Hants Section BKKS**. Guest Speaker is **Peter Saal** former Chairman BKKS. 8pm, Danmead Church Hall, Hambledon Road, Danmead, Hants. Contact **George Rooney**, 0420 473169.

16 — **Crouch Valley Section BKKS**. Beginners' Seminar, Laindon, Essex. Contact **Ron ParLOUR**, 0277 840863.

17 — **South Hants Section BKKS**. Coach trip to Hawkhurst Fish Farm and Koi Water Barn. Contact **George Rooney**, 0420 473169.

20 — **Crouch Valley Section BKKS**. Koi Quiz evening. Laindon, Essex. Contact **Ron ParLOUR**, 0277 840863.

23/24 — **Mid-Somerset Section BKKS** enjoy an *Eastern Promise* weekend. Contact **Alan Purnell** 0458 72132.

24 — **Merseyside Section BKKS**. Visit to North Wales Koi Club ponds. Contact **Robbie** on 051 549 2001.

31 — **South Hants Section BKKS**. Members' pond visits. Contact **George Rooney**, 0420 473169. **Leicestershire Koi Society**. Visit from Northampton Section BKKS members. Contact **Pip Ostell**, 0533 609707, or **Kevin Luckman**, 0455 250413.

Invitation

I invite all Koi club secretaries to send me their latest calendar for inclusion in my column. Ideally, I need to have information at least 10 weeks before the date of the event to guarantee publication. Please write to me at your earliest convenience via the Editor, 9 Tufton Street, Ashford, Kent, TN23 1QN or phone me direct on 0926 495213. Thank you.



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WRITEBACK



LAWRENCE E. PERKINS

Disappointing pike?

In April's edition of *Tomorrow's Aquarist*, Gina Sandford states that the Pike (*Esox lucius*) does not pursue its prey.

This will be very disappointing news to millions of anglers who

fish for Pike every weekend. Using spoons and plugs, they go spinning for Pike, retrieving the lures from as great a distance as they can cast them. I have even experienced a Pike pursuing a spinning lure with such ferocity that it beached itself on the bank!

Gina entitled her item **Did You Know?** I think she should change it to **Do I Know?**

Alan Holloway,
Stotfold,
Beds.

Dolphin releases: subspecifics

I would like to add to the comments on the Israeli Dolphin Reef facility and releases of Bottlenose Dolphins (*Write Back*, May 1994).

First, my information on the status of the dolphins at Dolphin Reef is based on information given through my membership of the International Marine Animal Trainers' Association (IMATA) and the European Association of Aquatic Mammals (EAAM). Dolphin Reef's curator of marine mammals is a member of IMATA.

Second, it is true that all Bottlenose Dolphins are nominally classed taxonomically as *Tursiops truncatus*. However, the situation is far more complicated, as this classification is provisional and based on a general lack of global detailed knowledge on behaviour and ecology of this group of dolphins.

For example, in *The Bottlenose Dolphin*, edited by Leatherwood and Reeves (1990), it is made quite clear that research is revealing that this group now appears to contain many

ecotypes, races and possible subspecies. Interestingly, work with captive animals is complementary to field research in the wild in helping us to understand the differences in this species.

The animals at Elat are, in fact, from the Black Sea and considered a subspecies (*Tursiops truncatus ponticus*). I note that in the original article on Dolphin Reef, Jack Jackson mentioned that they also had *Tursiops* from Japanese waters; again, another possible subspecies (*Tursiops truncatus nuuanu*).

Dolphin Reef is situated on the Gulf of Aqaba, which adjoins the Red Sea. This region has its own discrete dolphin populations which would be seriously disadvantaged by the introduction of geographically and genetically foreign animals. I must reiterate that my concerns in this area are supported by the protocols laid down in the IUCN position statement on fauna and flora introduction.

John Dineley,
Willingly-to-School Animal
Training and Husbandry
Consultancy,
Bedford.

Gina Sandford comments:

Yes, I'll admit I don't know anything — about fishing that is, I had to have the terms translated and explained for me!

The Pike is a fish that is built for sudden bursts of speed, not sustained swimming. Consider the placement of the fins, which are situated to the rear of the body and the caudal peduncle is muscular. These all combine to act as 'first gear' if you like; they are the prime movers. The caudal thrust thus provided gives the impetus for the fish to make the sudden dash for its prey and, although Pike can cover quite a distance in pursuit, they are not able to sustain continuous swimming for long distances.

The example of the power created by this combination of fins and body is simply illustrated by Alan Holloway's comment that Pike can beach themselves, especially when the 'prey', in his case, a lure, is being pulled towards the bank; the Pike has nowhere else to go!

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1

BONAIRE

PROTECTED WONDERLAND

Dr. Robert Goldstein goes diving and photographing among the well populated reefs of this Caribbean sanctuary.

Photographs by the author

Bonaire is a small island some fifty miles north of the coast of Venezuela, South America, in the Dutch Caribbean group of Bonaire, Curaçao and Aruba.

Located below the hurricane belt, it receives very little annual rainfall and is a virtual desert. What natural inland waters exist all drain inland, continue to evaporate, and are highly saline. Thus, the only life in these saline ponds are salt-adapted. They include flamingoes, which feed on the algal-infused mud, a few other shorebirds, predatory hawk-like species, parrots and parakeets, bananaquits, yellow warblers, and very few other birds.

The sole inland fish species is a type of Killie, *Cyprinodon variegatus*, but whether it is a distinct species to the one found elsewhere or not, I cannot say. The interior is a desert, rich in old trees that are protected from cutting by law, and hard-scrabble limestone and volcanic rock.

N,S,E & W

The eastern (windward) shore is a low cliff facing the surf of the Atlantic, and is essentially uninhabited. The western (lee) shore is protected by the small land mass of the island, and its middle segment is filled with a cluster of hotels around the capital of Kralendijk.

On the southern shore are the vast Azko solar salt works, where seawater enters low flats, evaporates (and provides brine

shrimp and food for flamingoes), and is further cleaned and dried before being loaded onto freighters for shipment around the world. The freighters are able to pull up almost to the shoreline, due to the almost immediate drop-off of this volcanic island into the oceanic depths.

Here and there are remnants of old slave cabins, in which the slaves who previously worked the salt mines slept. The northern part of the island is taken up by the extensive Washington-Slagbaai National Park, where the unique bird, reptile and plant life is protected, and unusual geological features tell the history of the island and its several periods of rising from the sea. The dry ground everywhere is covered with rushing lizards, and it is impossible to avoid them driving.

Popular sanctuary

A small, uninhabited island, Klein Bonaire, lies immediately off the western coast, and can be reached by ferry. It is exceptionally popular with SCUBA divers.

Tourism is all the island has, and it protects it well. The entire shoreline from the high tide line to 300 feet is protected as a national marine sanctuary, and collecting is forbidden. As a result, the fish are large, not at all shy, and the entire island is the most popular resort in the Caribbean for snorkellers and SCUBA divers.

Oh, one more observation. Most of the tourists here are Dutch or South



4



6



5



- 1 The eastern shore is almost totally uninhabited.
- 2 Living rock is just one of several 'farmed' products cultured at the Fundshon Marcultura facility.
- 3 The unusually coloured female Queen Parrotfish.
- 4 One of the island's many salt lakes or salinas.
- 5 A large shoal of Blue Tangs.
- 6 The fish are friendly.

American, and topless is the norm on the beaches. I didn't notice this until it was pointed out to me!

Farmed ornamentals

One feature of the island of interest to aquarists is the aquaculture facility, Fundshon Marcultura Bonaire, funded by the Dutch government. Originally established to culture overfished conchs, that venture failed when the fishermen ignored the advice of the government and harvested the undersized animals that were stocked.

Subsequently, the facility has explored other profitable ventures, and today grows marine clownfish, Tanganyika cichlids, three species of shrimp, live rock for export to marine aquarists, *Tilapia* for food, and giant *Tridacna* clams, also for reef tank aficionados. An unlimited supply of excellent quality Atlantic Ocean water,

BONAIRE FACT FILE

Bonaire is located fifty miles north of Venezuela and 1,200 miles south of Miami. It consists of limestone and more recent coral atop volcanic rock.

This 112-square mile dead volcano is hilly and dry in the north, sandy and dry in the south; all surface water is saline and undrinkable. Water is supplied by desalination plants provided by the major industries, the Azko salt works and the petrochemical transfer facility.

The land is a desert, with just 22 inches of rainfall annually. The year-round average temperature is 31°C (87°F). Language is Papiamentu, but English is spoken everywhere.

The island is 24 miles long, shaped like a boomerang, with a smaller satellite island, Klein Bonaire, in its angle.

Bonaire was discovered by Amerigo Vespucci in 1499, and occupied by the Spanish, who stripped the island of almost all its trees and dried salt for export to Europe. The Dutch arrived in 1623, and it was briefly occupied by the British in the 1800s.

Today, it is Dutch island, and trees and almost all wildlife are protected. Much of the surface (mostly the north) is national park. All of the ocean is also national park. Sport fishing is encouraged, but skin and SCUBA diving are the national and tourist pastimes.

absolutely free of pollutants, provides a free, albeit filtered, water source.

What are the risks of escape and establishment of Indo-Pacific marine species at an Atlantic island? Not great. Waste water from the entire facility is pumped inland to be disposed of in the salt ponds, where nothing can survive. Storms are very rare, and hurricanes almost non-existent.

Collection restrictions

Prior to coming to Bonaire, I purchased a slurp gun and other collecting gear, but had conflicting information about the legality of taking anything off the island. The director of the marine park, Mrs. Kalli de Meyer, explained the policy of no collecting to me, but did arrange a tour at the aquaculture facility and provided me with a great deal of information about the island.

With no collecting to look forward to, I



A 'mixed' shot, including French Grunts (with the yellow stripes) and a Whitespotted Filefish.



Bluebeard Wrasse (with yellow bodies!) hovering around their coral head home territory.

SOME FISHES PHOTOGRAPHED ON BONAIRE

Spotted Moray	<i>Gymnothorax moringa</i>
Chain Moray	<i>Echidna catenata</i>
Blackbar Soldierfish	<i>Myriopristis jacobus</i>
Bar Jack	<i>Caranx ruber</i>
Lane Snapper	<i>Lutjanus synagris</i>
Smallmouth Grunt	<i>Haemulon chrysargyreum</i>
French Grunt	<i>H. flavolineatum</i>
Striped Butterflyfish	<i>Chaetodon striatus</i>
Four-eye Butterflyfish	<i>C. capistratus</i>
Rock Beauty	<i>Holacanthus tricolor</i>
Queen Angelfish	<i>H. ciliaris</i>
French Angelfish	<i>Pomacanthus paru</i>
Doctofish	<i>Acanthurus chirurgus</i>
Blue Tang	<i>A. coeruleus</i>
Ocean Surgeon	<i>A. bahianus</i>
Sergeant Major	<i>Abudefduf saxatilis</i>
Blue Chromis	<i>Chromis cyaneus</i>
Brown Chromis	<i>C. multilineatus</i>
Bicolor Damselfish	<i>Pomacentrus partitus</i>
Cocoa Damselfish	<i>P. variabilis</i>
Yellowtail Damselfish	<i>Microspadon chrysurus</i>
Spotfin Hogfish	<i>Bodianus pulchellus</i>
Yellowhead Wrasse	<i>Halichoeres garnoti</i>
Puddingwife	<i>H. radiatus</i>
Rainbow Wrasse	<i>H. pictus</i>
Clown Wrasse	<i>H. maculipinna</i>
Slippery Dick	<i>H. bivittatus</i>
Bluehead Wrasse	<i>Thalassoma bifasciatum</i>
Princess Parrotfish	<i>Scarus taeniopterus</i>
Queen Parrotfish	<i>S. vetula</i>
Redtail Parrotfish	<i>Sparisoma chrysopteron</i>
Stoplight Parrotfish	<i>S. viride</i>
Redeye Mullet	<i>Mugil gaimardianus</i>
Redtip Blenny	<i>Ophioblennius atlanticus</i>
Peacock Flounder	<i>Bothus lunatus</i>
Scrawled Filefish	<i>Aluterus scriptus</i>
Orangespotted Filefish	<i>Cantherhines pultus</i>
Whitespotted Filefish	<i>C. macrodon</i>
Spotted Trunkfish	<i>Lactophrys bicaudata</i>
Honeycomb Cowfish	<i>L. polyzona</i>

did the next best thing, and finally bought a (used) underwater Nikonos camera and strobe for the bargain price of \$600.

During my fifth roll of film, I learned that improper closure of the back can result in flooding the electronics of the camera. This was a lesson that cost an additional \$250. Finally, I learned that I could have rented a camera and strobe for \$25 a day, and advise you to do the same. By the way, I have a camera for sale, if anyone is interested!

Volcanic wonderland

Bonaire is built atop a volcano, and its shoreline and beach are steep, short, and quickly drop off to great depths. Within the short underwater distance to the dropoff, several zones are apparent.

Close to the beach, in the shallowest water with the greatest surge, are rubble and knobby Brain Coral. At about five to ten feet, the coral changes to Elkhorn. Finally, when the water gets ten feet and greater, the Elkhorn gives way to Staghorn Coral.

The fish life was wonderful. I noted abundant Rock Beauty Angels, but extremely few Blue or Queen Angels. A previous study on another Dutch Caribbean island, where collecting was once permitted and subsequently stopped, suggested that overcollecting had depleted

the Queen Angels. I suggest, from my observations, that Queens are just not common in this part of the Caribbean, and their absence at that other island had nothing to do with collecting.

The behaviour of White-spotted Filefish was of great interest to me, as I had raised several of them at home from babies collected in Sargassum some fifty miles offshore from North Carolina, and had no idea what the adults looked like. At Bonaire, I noted that the males were very attractive, with a great deal of iridescent rusty coloration. More interesting yet, there would always be one male with one to three females, and the male would attack a diver coming close to the group.

Trumpetfish, it turns out, behave like many Remoras. They would align themselves above the backs of Parrotfishes, and when the Parrotfishes would blow prey out of the sand and gravel bottom, the Trumpetfish would rush in and suck up the food.

Butterflyfish were almost always in pairs, but I did see at least one group of four together. Maybe they were 'swingers'!

Bonaire is a wonderful island, filled with bird and fish life, and pretty much unaffected by development, except in the vicinity of the hotels. It is inexpensive, the food delightful, and snorkelling terrific. I recommend it for a vacation. And, by the way, take your camera and telephoto lens to the beach.

TIPS ON UNDERWATER PHOTOGRAPHY

Don't buy an underwater camera outfit for your first attempt. If, after you've mastered the basics, and if you will get a great deal of use from the camera, or if you normally photograph in cold water regions, you might consider purchase. If purchasing, I would suggest you look to the major photography magazines for used equipment from long-established and very large businesses.

Rent your underwater camera and strobe equipment at a coastal resort dive shop. The standard in the trade is the Nikonos V. Purchase insurance from the rental agent. If a short course on underwater photography is offered, take it. The costs of insurance and the course are insignificant compared to the benefits.

Take film with you to the resort island; prices at these locales are high for film, and they may not have what you want. The best film in terms of longevity and the opportunities to make sales to magazines is the slide film, Kodachrome. Most photographers use ISO 64.

Other films, both print and slide, may be used. One favorite is Fujichrome Velvia, which often wins photographic contests. Ektachrome is sold at resorts because it can be processed in one day, but it is strong in blues and is not favoured by the professionals I know.

Books

The Aquarium — A Complete Guide

By: Angelo Mojetta
Published by: Blandford
ISBN: 0 7137 2396 X
Price: £19.99

I always get a feeling of what, I suppose, could be termed disbelief, whenever a book is referred to as "complete". When that book then sets out to be complete for tropical freshwater, temperate freshwater, tropical marine and temperate marine aquaria, I become somewhat sceptical.

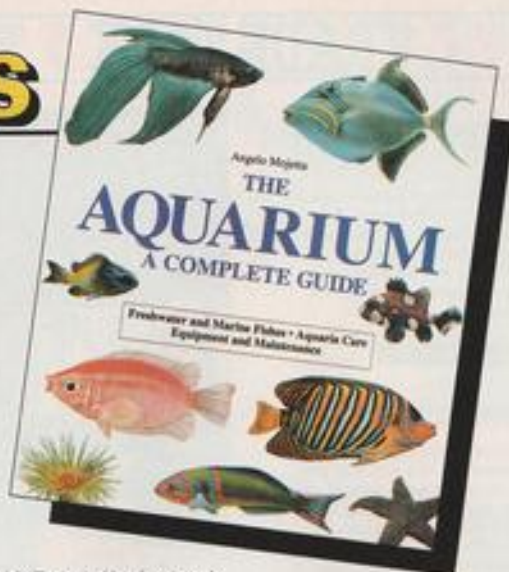
The Aquarium — A Complete Guide is such a book. It is, I must grant, a beautifully packaged book, full of excellent information. What's more, the details given for each of the numerous species which it features are easy to follow, well laid out and, for the most part, pretty adequate.

It also has an extensive Appendix divided into families, a disease guide, a glossary, an index and a bibliography, all of which are helpful in their various ways — though why the entries in the bibliography have not been sorted out either by subject, or even alphabetically, is a bit of a mystery. The section on the families, on the other hand, is very useful indeed, and includes the names of all the various species dealt with in the main text, along with their page numbers. The usefulness of this section, plus that of the individual fish entries, should come as no surprise, though, since they have been compiled by the respected ichthyologist, Donald Wilkie.

The main text is 131 pages in length (in reality, it is 121 pages long, as the first bit of text appears on page 10). Here's where my problems with this spectacularly designed, attractive book start.

I believe that it is far too ambitious to even attempt to cover everything you need to know regarding the selection, establishment, stocking and running of the four types of aquaria I've referred to above, plus provide details on, quote, "all species of freshwater and marine fish suitable for aquarium care" ... plus some invertebrates and plants, in a mere 121 pages. In fact, the total number of pages of text available for this is less, as some of the pictures take up either single full pages or double-page spreads.

If this is really what this



lavishly illustrated book sets out to do, then it achieves its aims with only modest success. If it had set out to provide an introduction to the various branches of the hobby, then one could judge it differently but, according to the press release which accompanied it, it "is essential as it is a complete guide in every sense of the word in that it is useful both to experienced aquarists and anyone who wishes to increase their knowledge of fish".

My feeling with regard to this statement is that *The Aquarium* is, without a doubt, useful for all aquarists, irrespective of our level of expertise. And, yes, all of us who consult it will increase our knowledge ... but "a complete guide in every sense of the word", it most certainly is not, despite what is a very reasonable cover price for such a well illustrated and professionally produced book.

John Dawes

Freshwater Fish of the British Isles

By: Nick Giles
Published by: Swan Hill Press
ISBN: 1 85310 3179
Price: £19.95

I first picked up this book thinking that it was, as its name suggests, a straight guide to our native and introduced exotic species of freshwater fish. There is no by-line on the cover that it is anything but this. However, this most interesting and illuminating book is primarily aimed at naturalists and anglers — as the 'subtitle' on

the first page states.

I, myself, am not an angler; neither are large numbers of our readers. Some, of course, are, so, in *Freshwater Fish of the British Isles*, we have a book that will satisfy a wide range of needs and interests.

The text is very well written and is both eminently readable and informative. Some of the underwater pictures are also very good indeed. The author, Nick Giles, really knows his stuff and this comes vividly through on every page.

The species list (Parts 3 and 4) is truly impressive, including everything from Barbels to Zanders, taking in Wels Catfish, Dace, Minnows, Carp, Perch and all others on the way. Sections on identification, breeding biology, behaviour, growth and fishing advice and information are provided. This, allied to the earlier Parts 1 and 2 dealing with conservation and ecology, and added to a selected bibliography, glossary and very good index, makes this book an excellent buy at £19.95.

John Dawes

The Cichlids Yearbook, Volume 4

Edited by Ad Konings
Published by Cichlid Press, St Leon-Rot, Germany.
ISBN 3-928457-21-7
Price: £19.95
Available from: BCA (AP), 7 Delamere Avenue, Sale, Cheshire.

This April saw the publication of the fourth in the *Cichlids Yearbook* series, edited, as

usual, by Ad Konings. I am pleased to report that it is just as good, perhaps even better, than its predecessors.

This time there are six 'new' authors making their first contribution, as well as others, including Konings himself, who are regulars by now. The newcomers include the American ichthyologist Dr Melanie Slassny, well known to cichlidophiles for her scientific work on Cichlidae, with an article on the Labroids (the group of fishes to which the Cichlidae belong). It is good to see this type of collaboration between science and our hobby, which will, hopefully, be of benefit to both parties.

Also on a taxonomic theme, Martin Geerts explains how recent research suggests that the fishes we regard as cichlids may, in fact, be more than one family. If proven to be the case, this would mean that the family Cichlidae might have to be restricted to South American species!

While the first two Yearbooks contained mainly short pieces, as in Volume 3, the emphasis is now more on longer articles. Ole Seehausen continues his in-depth study of Victorian Cichlids; Frank Warzel takes a detailed look at the *Crenicichla* ("Batrachops") reticulata group. There are articles on collecting in the Americas (South and Central); the description of a new Mbuna; and a remarkable account of breeding *Boulengerochromis microlepis*, the world's largest cichlid. Non-Rift Africans are not forgotten, with pieces on Madagascar and a couple of unusual West Africans. Last, but not least, there is a fascinating article on manufacturing realistic aquarium backgrounds.

All Konings' books are distinguished by their excellent photos, and Yearbook 4 is no exception, with a mixture of cichlid portraits, biotope photos, and 'action pictures' of cichlids in their natural habitats and with eggs and fry. I feel the biotope photos are especially useful, as they tell us exactly what the natural habitats are like, whereas even the most detailed description can rarely convey the true picture.

In reviewing earlier Yearbooks, I have pointed out that they are not 'annuals' in the normal sense, but rather 'instalments' in a continuing compendium of cichlid information. The entire set must be regarded as an essential feature of every serious cichlid-keeper's bookshelf. Aquarists who already have the first three volumes will need no further persuading; and I feel sure that those for whom Yearbook 4 is their introduction to the series, will find themselves eager to obtain the previous three.

Mary Bailey

Half a million investment

William Sinclair Holdings, the parent company of aquatic products manufacturer King British, has announced a half-million pound investment programme for new plant and machinery.

This follows an annual investment by the group of £2m over the past three years, while a further £2m over the next year has been promised by group chief executive Peter Barton. He explained: "The money is going into our core businesses, including the pets and aquatics markets, where we are extremely confident. Competition, both in the UK and abroad, is going to get more and more difficult, so we are, therefore, putting in new plant, machinery and technology, so that we can compete alongside the most efficient."

Added Keith Barraclough, managing director of King British: "The £500,000 investment programme has enabled us to reinforce our position as key players in an ever-changing market, where family fishkeeping is increasing rapidly while traditional aquarists diminish."

Appointments

After 15 years' service to William Sinclair Holdings, Michael Sinclair has been made deputy managing director of aquatic products manufacturing subsidiary King British.

Michael explained that he has gained experience of the company at all levels: "From sweeping the floor to marketing the company's horticultural and gardening products".

A further appointment at King

British is that of David Pope as export agent in Europe. David has worked as an exporter all his life and, according to the company, has an established chain of contacts throughout Europe.

Lowara into Ireland

Water pump manufacturer Lowara UK has acquired Irish distributor Lowara Ireland, and is to build a major production plant at its head-quarters at Axminster, Devon.

The acquisition of Lowara Ireland provides the company with direct control over sales and servicing of Lowara pumps throughout the Republic of Ireland, as well as improving their coverage in Northern Ireland.

Lowara Ireland will continue to supply all Goulds WTG products, including Goulds' Kromm range of borehole pumps.

The production plant, at Lowara's Devon headquarters, will be used to produce a "new generation of Italian-designed high-tech pumps", according to managing director John Thorne who added that the acquisition of Lowara Ireland is an important move for the company: "This consolidates our coverage in the north and south of Ireland and ensures that all our customers have the same high standard of service."

John Thorne added that the move is the latest stage in a "remarkable chronicle" for the British company, which has consistently increased its turnover each year since its formation in 1983, with this year's turnover expected to exceed £6.5m.

Ruinemans UK expansion

One of the world's largest importers of aquarium fish, Netherlands-based Ruinemans Aquarium BV, has achieved significant success in expanding into the UK, boosted by a hugely successful appearance at Pet Index '94 (National Exhibition Centre, Birmingham, April).



A small section of Ruinemans' station in Manaus, Brazil.

Ruinemans Aquarium was one of several new exhibitors at the show, which proved successful in helping them to expand their UK marketing base. The company has developed a high reputation throughout the aquatic trade, over a period of 40 years, for high-quality wild-caught South American and African fish, as well as for tank-raised fish from throughout the world. The company is based at Montfoort, Holland, and has establishments in Suriname, Miami (Florida) and Manaus (Amazonas, Brazil).

Enquiries from trade contacts in the UK would be welcome, and further information is available by contacting Ruinemans Aquarium BV, IJsselveld 9, 3417 XH, Montfoort, Holland. Tel: +3484 72004; Fax: +3484 74299.

New Cyprio premises

Aquatic filtration specialists Cyprio have moved into new premises at Froggall, at Deeping St James, near Peterborough.

Explained Steve Phillips, sales and marketing director of Cyprio: "The move reflects a £400,000 investment by the company, and has been planned to further improve our efficiency and service to our customers worldwide."

The company's new address is: Cyprio Ltd., Hards Road, Froggall, Deeping St James, Peterborough PE6 8RR. Tel: 0778 344502; Fax: 0778 348063.

Catwalk no diversion for Petworld's Martin

All the excitement of being surrounded by the world's most famous 'supermodels' proved no distraction for the cool-headed Martin Harris, recently appointed as aquarium manager at Petworld's, Catford superstore.

The occasion was a fashion show held recently at the Natural History Museum, London, where Martin helped to set up aquariums around the catwalk as part of the set decor. "Just as any fishkeeper would," explained Martin, "I ignored the beautiful girls and simply paid close attention to the aquariums!"

Martin has been appointed as aquarium manager at Petworld after ten years' experience working with invertebrates, marine, coldwater and tropical fish in a retail environment, during which he's become expert on Dwarf Cichlids and Clown Loaches, which he keeps at home.

A further appointment at Petworld's Crickewood aquarium is Yasmin Peters, who has been appointed manager. Yasmin, a competent fishkeeper who breeds Discus, has been promoted from departmental assistant to Darren Burgess, who has himself been promoted to assistant store manager.

Michael Sinclair

