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EDITORIAL

SIX-HOUR SUNDAY AQUATICS

Ten years ago, decent aquatic outlets in garden centres were not quite as widespread as they are today. In fact, few garden centres had an aquatic section of any kind in those days (though there were some notable, excellent exceptions).

Today, this sector of the market is booming, and being able to do your aquatic shopping throughout the whole of Sunday is now as commonplace as buying your bedding plants or autumn bulbs.

However, this is about to change. The House of Lords has rejected a proposal brought before it which would have granted garden centres an exemption from the law that only allows other large retail outlets like D-I-Y stores to remain open for just six hours on Sundays. Therefore, once the Bill receives royal assent, it will be illegal for garden centres to exceed the six-hour limit... but only if they are larger than 3,000 sq.ft. in area!

I wonder what this means. Does it, for example, apply to the area taken up by the whole garden centre, or to that of its individual parts? For example, if a garden centre covers an area of, say, 10,000sq. ft., out of which the aquatic department occupies only 1,500 sq. ft., will this department (or separately-run business or franchise) have to close down after six hours? Just a thought.

This past Easter there was also the distinct possibility of garden centres being forced to close on Easter Sunday. That crisis was averted, but the new Bill will re-impose the ban, as well as one on Christmas Day opening, if it happens to fall on a Sunday.

I think it is fair to say that the trade is less than amused! What do you think?

John Dawes

KEEPING:

Triggers

Convert **Gordon Kay** sings the praises of some remarkable fish that he was once only lukewarm about.

BILLY WHITESIDE

MAX GIBBS, THE GOLDFISH BOWL, CARDIFF

AQUARIAN

JOHN DAWES

Top left, Everyone's favourite: the incredibly coloured Clown Trigger. Top right, The Pink-tailed Trigger is probably the least aggressive of the aquarium species. Above left, The most commonly kept species is probably the Picasso Trigger. Above right, The Red Sea Picasso is superficially similar to its better known cousin.

I never much liked triggers. They are coral fishes and so, by definition, I was interested, of course. However, I would never go into raptures on seeing one like I do when I see a good butterfly specimen.

Because of this, I never took time to study triggerfish to any degree — much less planned ever to keep one. Until, that is, I had a disaster which wiped out my entire butterfly and angelfish collection.

I decided to try a different type of challenge and now keep brutes like lionfishes, moray eels, puffers, large angels and a Blue Trigger — a big, fat beauty of a Blue Trigger — and all of my preconceptions have disappeared. Triggerfish can be so full of personality that they take on true pet status for many people. After keeping a trigger for a couple of years, it's easy to see why.

Shared features

Triggerfishes (subfamily Balistinae) — along with their cousins the filefishes (subfamily Monacanthinae) — belong to the family Balistidae. They all share the same basic characteristics: rather deep bodies, with a spiny first dorsal fin, separate teeth which are located in the jaws and no pelvic fins.

Their eyes are also set well away from their mouths, atop their rather high foreheads. It becomes apparent why this should be so when one considers that the natural diet of triggers is sea urchin.

Triggers are also well known for their interesting dorsal spines. The first is very large and, when erected, is locked into place by the small second spine. This second spine acts as a trigger (hence the name) which must be released before the large spine can be depressed. When attacked or alarmed, triggerfishes bolt into crevices with their dorsal spines raised. This effectively locks them in, while still

leaving their horrific-looking teeth free to snap at their attacker.

The Balistids are usually found in the tropics. They generally live in shallow, inshore waters (coral reefs and Eelgrass beds) although a few species adopt an oceanic lifestyle, and still others occur seasonally in temperate waters. Very often, for example, triggers can be found around Cornwall and Devon in the summer months.

By and large, this family is not important as food, although they are often eaten in some parts of the world. For instance, the Queen Trigger (*Balistes vetula*) is eaten in the Bahamas, where it is called Turbot. On occasions, the flesh of triggerfishes has proved poisonous to humans, so the next time you're in the Bahamas, eat chicken!

JOHN DAWES

The 'monarch': *Balistes vetula*, the Queen Trigger.

Expensive puzzle

Like most families of popular aquarium subjects, the Balistids have a favourite. In this case, it is the **Clown Trigger** (*Balistoides conspicillum*) and, again as in other families, the clown is very colourful, very showy ... and very expensive!

Why the price for this species should be so high, I know not, except that maybe it is because — despite being widespread throughout the Indo-Pacific — it is not commonly encountered anywhere. Its popularity could also have something to do with it, of course!

This species is a particularly puzzling member of a puzzling family. You either get one that is calm and peaceful, or you get one that is an out and out bully. There never seems to be anything in between, but be warned — when you get a bully, you get a really nasty piece of work. Mind you, though, the same can be said for at least half of the family.

The variable Blue or Black Trigger.

MAX GIBBS, THE GOLDFISH BOWL, OXFORD

Benign looker et al

One species of which this cannot be said is *Melichthys vidua*, the **Pink-tailed Trigger.** This species is usually no more aggressive than any other species of aquarium fish. Apart from its rather benign disposition, this beast is a bit of a looker.

It has a nice sort of greenish-brown body, distinctive white dorsal and anal fins with fine dark lines, plus the lovely 'descriptive' pink caudal fin. Only trouble is, you won't see *Melichthys vidua* very often.

Rhinecanthus aculeatus is a particularly bizarre species which bears the common name in this country of **Picasso Trigger.** It gets that name because of its bright, garish colours and its rather 'avant garde' pattern. This is another species which is never usually particularly boisterous, but unlike the previous species, the Picasso usually *is* readily available.

The true monarch of this family is *Balistes vetula* — the well-named **Queen Trigger.** This animal really can take on the pet status that I talked about earlier. Some people even hand-feed it, although a look at its dental arrangements should dissuade all but the most foolhardy.

This species goes against the flow of most in its family in that it hails from the tropical West Atlantic, viz. throughout the Gulf of Mexico and the Caribbean, south to Brazil. This is a very distinctive trigger, with long streamers on its tail and dorsal fins as it matures. The Queen Trigger is one of those aforementioned nasty pieces of work, so is best kept alone.

The final of my own favourites is the one I keep myself — *Odonus niger*, called popularly the **Blue,** sometimes **Black Trigger.** The main reason why this species' popular name involves a battle between two different colours is that the beast can change from black to blue, and even green sometimes, from day to day, according to its mood and/or the reflected light.

Another Indo-Pacific species, as well as being from the Red Sea, *Odonus niger* is a fish which shows itself very well in the aquarium. It is also usually very peaceful and very unusual in that it has red teeth!

Trigger keeping

There is no real secret to keeping triggers successfully, for they are all as tough as old boots. Of course, this doesn't mean that the aquarist need not pay due attention to water quality. In fact, as many of you will know, I think that every effort should be made to provide *superb* water quality — whatever the species being kept. However, I labour this point in everything I write, so let's move swiftly on.

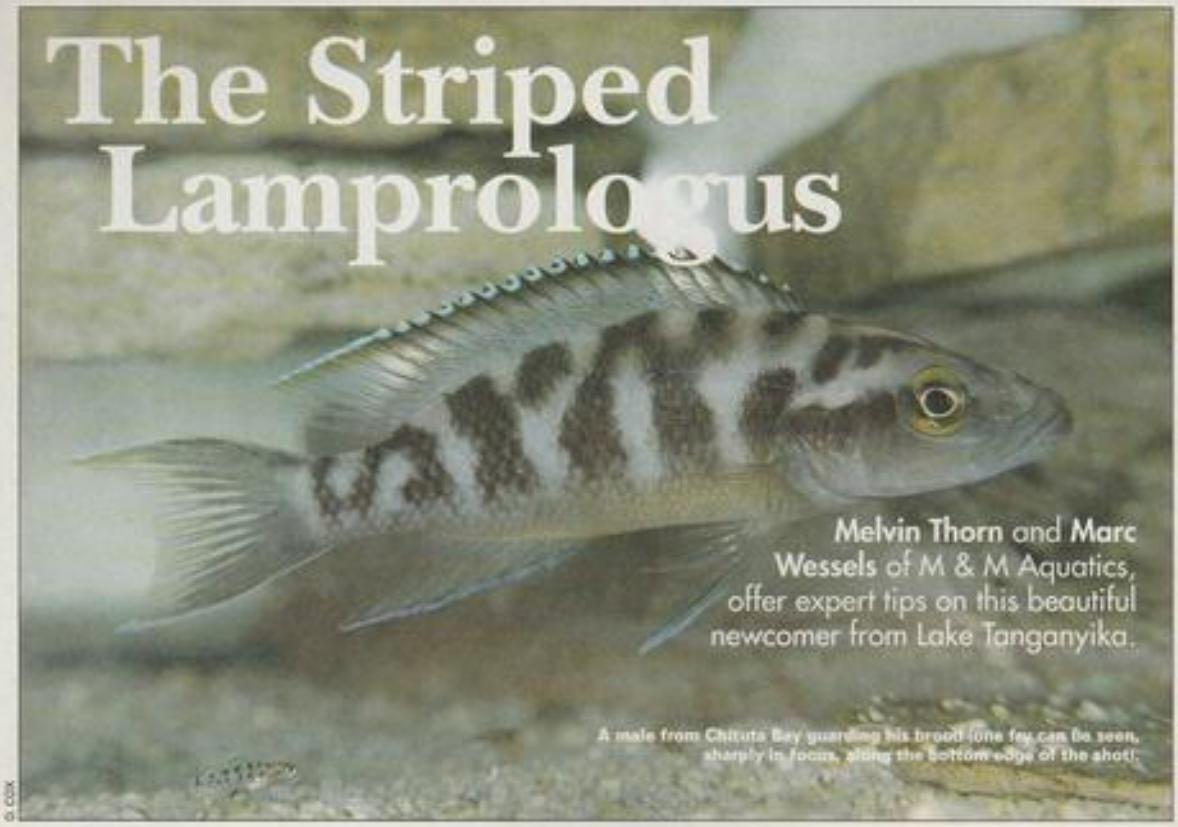
One point I definitely *will* labour is that of behaviour and compatibility. OK, I'm aware that that's two points! As I've mentioned before, lots of triggers are nasty so and so's. Even the most benign can never be completely trusted — so they should never be kept with small species.

Remember that these creatures have the capacity to reach 10/12in (25-30cm) long in captivity and bear due regard to this fact. They should never be kept with shy, retiring animals, like butterflies, neither should they be trusted with invertebrates. They really are best kept with things like large angels, groupers and puffers.

Triggers have been a revelation to me, and I'm sure that they will be to you. Beware, though — triggers have a habit of getting under your skin. However, it's unlikely that you will ever spawn them. I know of nobody who has managed this particular feat — unless, of course, you know different ...

KEEPING AND BREEDING:

The Striped Lamprologus



Melvin Thorn and **Marc Wessels** of M & M Aquatics, offer expert tips on this beautiful newcomer from Lake Tanganyika.

A male from Chituta Bay guarding his brood (one fry can be seen, sharply in focus, along the bottom edge of the shot).

© COX

Lake Tanganyika, as has its neighbour, Lake Malawi, supplied the aquarium hobby with an enormous number of new cichlid species over the last decade or two. As the flood of new species starts to turn to a trickle aquarists are turning their attention to the different colour forms of the same species and possible similarities between undescribed and well known cichlids. One such species is the Striped Lamprologus (*Neolamprologus buescheri*).

This attractive fish lives in the steeply sloping rocky shoreline of the lake, along with many other lamprologine cichlids. It is very shy, both in captivity and in the wild, where it lives at depths greater than 15 metres in the crevices and caves formed by rocks piled up on top of one another.

Variable characteristics

N. buescheri was first caught near Cape Kachese in Zambia, but it can be found from near Gombi in Zaire, through Cameron Bay and Cape Kachese, to Chituta Bay, Zambia, at the southern tip of the lake.

The basic colour pattern is one of two horizontal stripes and several vertical bars, depending upon the area of the lake the fish come from. Those from Gombi, for example, have predominantly vertical striping, whereas those from Kachese have horizontal stripes. The variety which one of us has kept and bred successfully is the one from Chituta Bay.

The body is shaped like a slim torpedo and the head has a pointed snout. The tail is quite distinct, being lyrate in form, with filamentous extensions on the upper and lower lobes. The soft dorsal and anal fins also have these flowing extensions and the pelvic fins of both sexes are long and pointed.

Pairs show very few sexual differences, of which size is the most important. They take about two years to mature, whereupon the males are 3½ inches (c9cm) and the females 3 inches (c7.5cm) long.

The base colour of the body is a creamy brown, over which lie two broad dark brown horizontal stripes and a number of wide irregular brown bars which create the mottled pattern seen in one of the accompanying photographs. The eye is a dark yellow/'English mustard' colour, which makes it quite conspicuous.

The dorsal fin has a bright blue edge with a dark submarginal band; in the female, this blue edge is narrower. The upper and lower edges of the tail and the leading edge of the pelvic and anal fins are similarly marked. The fry develop this colour pattern at a very early age and appear as miniatures of the adults.

Tank requirements

To keep and breed this species successfully requires the correct conditions to be met in the aquarium. Ideally, a species tank should be established, although a pair will hold their own in a Tanganyikan community tank.

A 48×12×15in (120×30×38cm) tank is required for a breeding adult pair. The substrate can be fine gravel or well washed coral sand, depending upon what type of filtration is used. A suitable amount of rockwork should be included and numerous caves created so that the fish can defend a territory centred around their chosen cave.

The lighting should not be too bright, as this will tend to make the fish somewhat shy and, as plants are not required, there ▶

The Striped Lamprologus

Care Tips

Tank size: 48×12×15in (120×30×38cm).
pH: 7.5-8.5.
GH: 10+.
Temperature: 78-82°F (25.5-28°C).
Decor: Rockwork necessary.
Diet: Flake, granules, frozen and live foods.
Breeding requirements: As above (as species tank). Trickle spawner — 10-20 fry every three weeks. Tolerant of older fry within territory.

Compare the colour patterns on this fish with those of the male in the other photograph (see text for details).

Factfile

Scientific name: *Neolamprologus buescheri.*
Common name: The Striped Lamprologus.
Description: Staeck, 1983.
Size: Males 3½ inches (c9cm), females 3 inches (c7.5cm).
Distribution: Endemic to Lake Tanganyika. Found from Cameron Bay, through to Chituta Bay; each area with its own different colour pattern.
Habitat: Territorial rockbound cichlid found at depths of 40 plus feet (12+ metres).

is no need to be critical about this. The tank temperature should be kept at 78-82°F (25.5-28°C) and need not be altered for breeding purposes.

Water quality for any Tanganyikan cichlid is important. It must be alkaline in nature (the pH of our tanks is about 8). Many cichlids from the lake breed in relatively soft water, but moderately hard to hard water simulates natural conditions, so water of a GH and KH of 13 is used. This species is very sensitive to metabolic nitrogenous end-products, so good filtration should be employed.

The breeding pair is kept in a tank with a centralised filtration system but under-gravels, internal or external canister filters can all be used, provided they are all matured properly before the fish are introduced. Regular partial water changes are a must, but only 10-20% should be changed weekly, as large-scale water changes upset the fish and this may lead to fighting.

Breeding

To establish a pair we would recommend buying half a dozen one-inch juveniles which can then grow on and pair off naturally. Once a pair has established itself, it is better to remove the other fish, since the pair will kill all other members of the group.

The male is very territorial and defends his 'patch' with great vigour and is especi--ally aggressive to conspecifics (members of its own species).

The female tends to hide away for much of the time and the male quite often pushes her back into her cave should she appear. It is therefore important to ensure that she gets plenty of food, otherwise the drain of egglaying etc will pull her down. Provided they both receive plenty of good food in the form of flake, granules and frozen or live food, they will start to breed when about a year or so old.

No stimulus is needed to induce breeding, and when the female is ripe, the male can be seen displaying in front of her in her cave with erect fins and darting movements. In the pair we bred, brood size was only two fry to start with, but now that the pair is mature, an average of 10-20 fry are produced every 20 days or so.

Fry care

The female tends the white eggs which hatch in 48 hours, while the male aggressively defends his territory. Once free-swimming, the small (10-14mm long) fry scavenge for food within the parents' territory. They can be started off on newly hatched brine-shrimp nauplii and micro-worms, but as they grow, crushed flake and larger live foods should be offered.

As the male defends the territory so efficiently, the fry develop and grow on without too many predation problems. Interestingly, in the lake itself, very small fry of other lamprologus-like cichlids are accepted by *N. buescheri* and develop under their protection.

As with many of the other rock-dwelling cichlids of Lake Tanganyika, successive generations of fry can be kept with the adults, but once they reach about an inch long, they should be removed, as they are then viewed as a threat by the parents and are usually expelled from the territory or killed.

Quite often, 'pulse breeders' such as these cichlids, will have a rest for a few weeks, so there may be a lull in breeding activity before they again start producing batches of young.

The Striped Lamprologus is probably one of the most colourful lamprologus-like cichlids from Lake Tanganyika, but recent discoveries of two other undescribed species: *Neolamprologus* species 'Ubwari Buescheri' and *Neolamprologus* species 'Kavalla', add to the variety of colour forms and closely related fish which may soon be available to the aquarist.

AEP

FASCINATING FISH FACTS

Versatile electricity

The use of electricity among fish is well known and tales of Electric Catfish knocking over horses are not uncommon. However, some fish use electricity for less violent reasons, such as finding their way about. In a murky environment, an electric field can be used to 'map' out the surrounding area in a similar way to the use of sound waves by bats.

Elephant-nosed Fish (e.g. *Gnathonemus petersii*) also use electricity to 'weigh up' any rivals that trespass on their territory. In a series of exchanges, each fish measures the other's fitness from its electrical discharges. The weaker fish will simply turn pale and withdraw, avoiding direct conflict. Instead of being used to harm or kill, electricity here actually prevents injury.

Linda Lewis

Elephant-noses can use weak electric currents in several ways.

POND

For those who have read the books, gained the approval of household management, and are keen to make a start, it only remains to decide what sort of pond will suit you best. This is a light hearted look at some of the options. The type of pond we prefer can reflect the kind of people we are!

Alex Stephenson presents his final wry 'ponder' of the season.

Illustrations by the author

Traditional

This pond could belong to someone who has worn a uniform in his or her career. The clean lines are dead straight and all edges accurately levelled. He (she) can, no doubt, tell you exactly the capacity of this pond.

Further exploration is likely to reveal a manicured lawn bordered by neat rows of plants. A wholesome discipline operates here!

Easy-going

The designer of this pond likes to lead a relaxed lifestyle ... when allowed. Avoiding the constraints of straight lines and difficult fussy areas, this pond gives the impression of being made up as he (she) went along.

Don't be misled, though. This design needs a lot of thought and a bit of flair. Possibly a ladies' pond this one.

Unorthodox

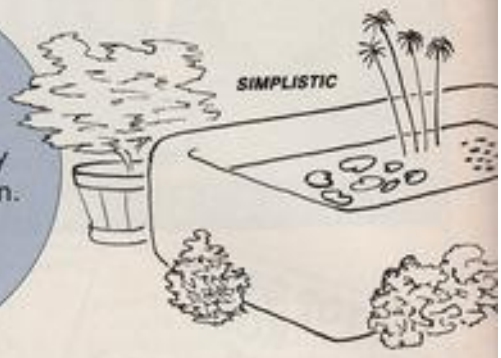
These creations come in very many forms; almost any concept is possible. Unusual visual combinations and the use of unlikely materials allow free rein to the surrealist artist.

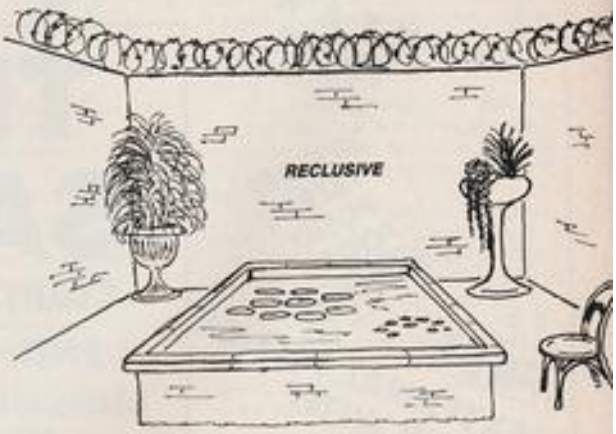
A lot of modern artworks involving water can be found in public places, but they hardly ever contain fish.

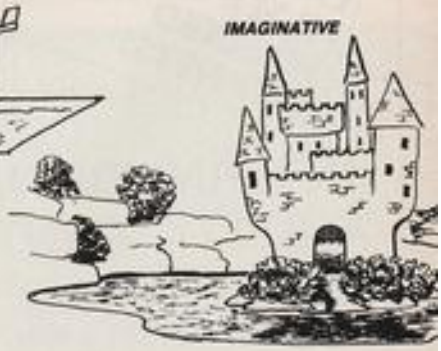
Simplistic

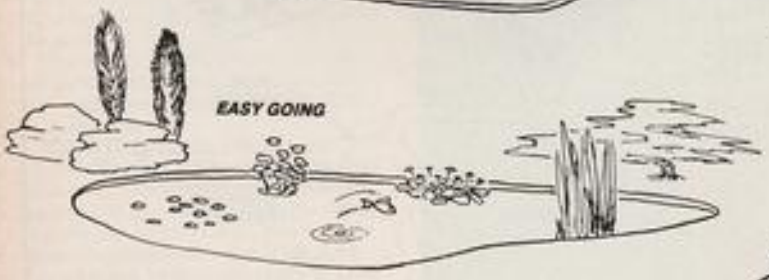
This little pond occurred when the owner fell over a disused sink in a remote corner. With a touch of ingenuity and very little work, it was transformed into an attractive miniature water feature.

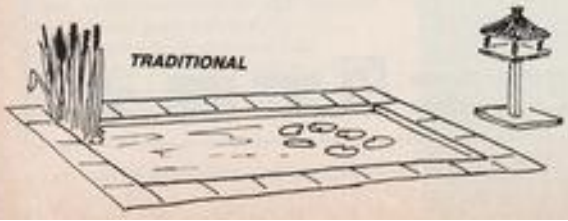
Easily cleaned and maintained, containers like this can be turned into 'little gems', for those who want quick results on a small scale.











ERINGS

Indecisive

For the fishkeepers who can't make up their mind, or for the person bent on getting the best out of both worlds.

A combination of formal and informal is certainly possible. Careful thought and some sympathetic compromise can achieve surprising results.

Defeatist

Unless you get someone else to dig out your pond, you will almost certainly go through this stage. It usually comes with the discovery that the amount of earth you need to remove is out of all proportion to the size of the hole.

It is always advisable to know where this earth is going before you start!

Rich

The owner of this pond is almost always innocent of any involvement in its design. Chances are it was commissioned by some ancestor several generations ago. Now, like it or not, the inheritor is stuck with it.

Unless there's an abiding interest in ponds, this type of system may turn it into a sunken garden.

Protective

For really serious fishkeepers who want to provide optimum conditions for their hobby, the polytunnel offers some advantages: protection from certain predators, as well as some effects of the weather; water temperatures can be maintained a few degrees higher etc.

Also, disappearing into the tunnel must be almost as satisfying as locking oneself in the fish house!

Practical

Many designs, all shapes and sizes, have to be considered when deciding which is best for your particular purpose. Commercial establishments and some amateur breeders tend to prefer a regimented row of ponds, the visual effect being sacrificed for ease of management.

This is definately for the fish person who doesn't care what the pond looks like, as long as it works.

Recluse

This kind of set-up is of special interest to the man or woman who has had enough of the world and everybody in it. Don't we all feel like this on occasions?

This walled enclosure, with central raised pond and single chair, says it all.

Imaginative

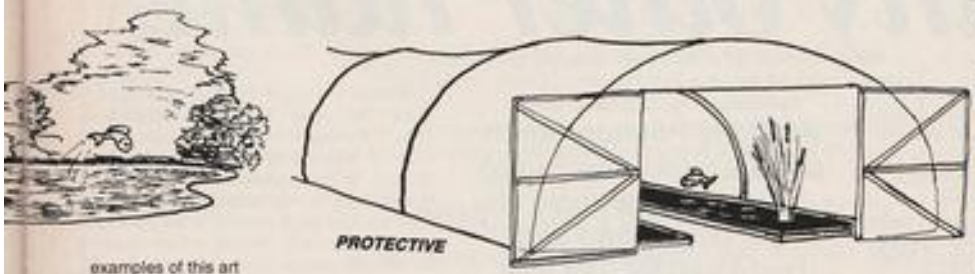
The person who designed this may enjoy fairy tales such as 'The Hobbit', King Arthur' ... or magazine articles like this! If not, then perhaps a historically based novel like 'The Count of Monté Cristo'.

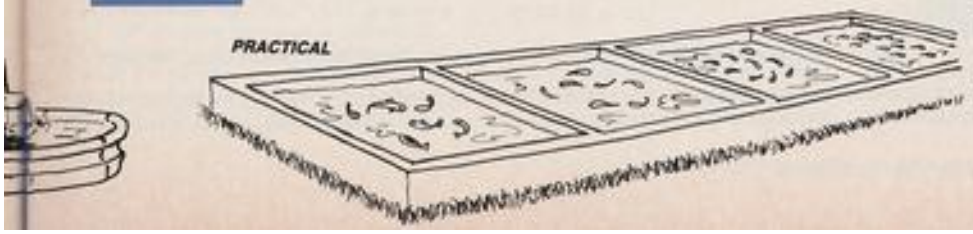
Whatever prompts them, flights of fancy like these are great fun, and with a little thought, completely functional. The scope for indulging your particular brand of escapism is limitless.

Classical

Appealing to both the scholar and the collector of statues, this is unashamedly an artificial monument; a bit like the cows of Milton Keynes.

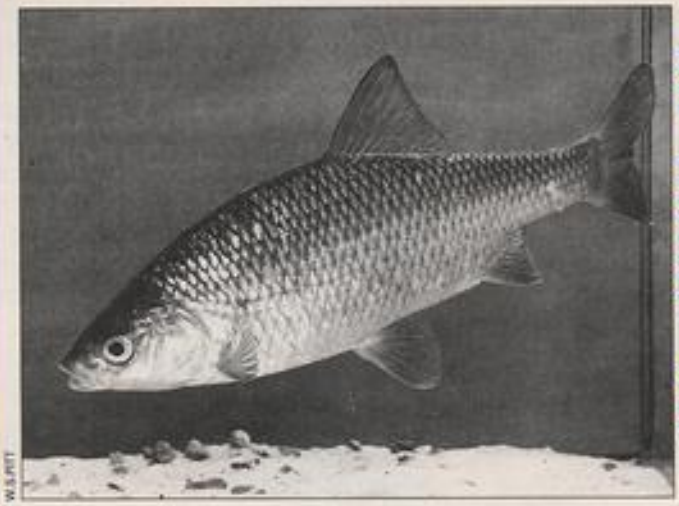
Nevertheless, very fine examples of this art form are possible... providing you can afford them.





FISH NAMES: PRESENT & PAST

Eel: oel
Trout: tructa, truht, truite, troute
Pike: pic, pik, pijke
Carp: carpus, charpho, carpe
Bream: bresme, breme
Minnow: menuise, menuse
Lamprey: lamproie, lampreie (included, though lampreys are not really true fish)
Sturgeon: esturgeon, sturguin
Perch: perche
Tench: tenche
Gar: garfische
Stickleback: stikeling, stekelingh, stichelinc
Roach: rokke, rocka, reihe, rouhe, reohhe



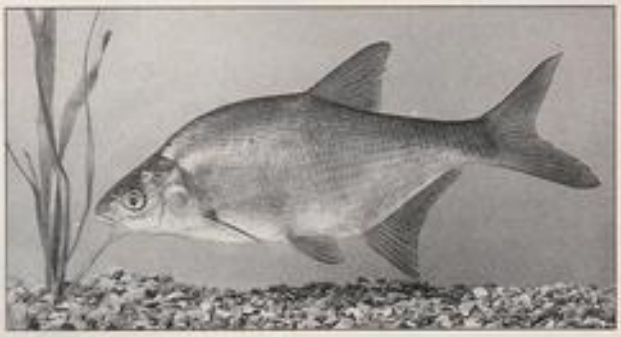
W.S.PITT

Left, some of the Roach's previous names are quite dissimilar to its present-day one.

Below left, the carpus, charpo, carpe ... or even carp(!). Photographed from a coloured lithograph by A.F. Lydon from Rev. Houghton's *British Freshwater Fishes* (1879).

Below right, the Bream's earlier names are pretty similar to its present one.

LAURENCE E. PERKINS



A fish by any other name

Anthony Poulton-Smith offers a quirky, fascinating insight on how some of our best-known and best-loved fish got their names

While coldwater fish have been swimming in our lakes, ponds, streams and rivers for thousands of years, it is only comparatively recently that the names of the vast majority have been coined.

Prior to the arrival of the Romans, these islands were the home of the Britons, also known as the Celts. Their tongue is the most ancient of Britain's many languages to have developed writing. Earlier dialects had no writing and are therefore almost unknown, except by association with other Indo-European tongues having a common root.

Working through the centuries, we shall encounter many different languages: from the Celtic British, through Latin, Anglo-Saxon, Old English, Old Norse, Danish, Scandinavian, Old French and mediaeval Middle English, to the modern English first standardised by Doctor Samuel Johnson in his dictionary published in 1779.

Where better to start than with the word "fish" itself. The Anglo-Saxon word "*fisc*", dating from the 5th century, is clearly related to the modern form. Indeed, in comparison with most words, the change is very small. Interestingly, until the Normans arrived in the mid-11th century, the only species which merited individual names were the trout family, the pike and the eel. Others were merely fish! This is a clear reflection on their food value.

The eel was highly prized as a food source, and "*eels*" are mentioned in Domesday, as they were subject to tax.

Meanwhile, the trout has undergone a gradual name change over the last thousand years. From the Latin "*tructa*", to Old English "*truht*", then Old French

"*truite*" to Middle English "*troute.*".

Pike, too, have undergone a similar change, albeit to a much smaller degree. Gaelic, Old English and Middle English refer to the "*pic*" (pronounced pike), very similar to the Swedish "*pik*" and the Middle Dutch "*pijke*".

The carp has been known as such since the 14th century. It comes from the Latin "*carpus*" which led to Old High German "*charpho*" and Old French "*carpe*".

Salmon too, were known by this name 600 years ago, it being derived from the Old French "*saumon*".

Anonymous names

As I have already stated, many freshwater fish were anonymous until the arrival of the Normans. Bream, perch, tench, minnow, and the rare lamprey and sturgeon all fall into this category.

The evolution from the French through Middle English, to the modern versions is clear. From "*bresme*", through "*breme*" to "*bream*"; "*menuise*", through "*menoue*" to "*minnow*"; "*lamproie*", then "*lampreie*" and "*lamprey*"; and "*esturgeon*" to "*sturgiun*" and, finally, "*sturgeon*".

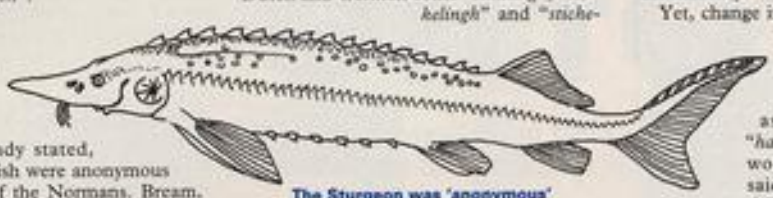
Both "*perche*" and "*tenche*" from the Old French only lost the final 'e' in the modern form, while the gar is first recorded in the 15th century in the Middle English "*garfisch*".

Like the gar, the earliest record of the roach and stickleback dates from mediaeval times. That they both had names prior to this is certain, as we can find very similar references to these fish in differing languages from the same period. This can only mean that each is derived from a common root word, although we have been unable to trace these to date.

From the mediaeval forms of English, Dutch and German come "*stikeling*", "*stekelingh*" and "*stichelinc*", respectively, all with near identical pronunciation and leading to the modern diminutive "*stickleback*".

Similarly, Old Danish "*rokke*" and Old Swedish "*rocka*", along with Middle English "*reihe*", "*rouhe*" and "*reohhe*" (depending on the dialect), gave rise to "*roach*".

The modern names have evolved from the originals in a remarkably short time.



The Sturgeon was 'anonymous' until the Normans arrived.

I am often asked if our language is likely to evolve further in the future. Although we cannot be certain if it will, we can be sure that any changes will be much slower in the centuries that follow.

Previously, language has evolved from the numerous dialects contained within the common tongue. Thus, it was possible for a community, or even an individual, to affect the language by misspelling or mispronouncing a word. With today's global communication, though, change is less likely, owing to little or no influence by the minority.

Yet, change is still probable. Two common pronunciation errors which are becoming increasingly evident, are the failure to aspirate the 'h' as in "*halibut*" and "*haddock*", and words beginning 'th' being said with an 'f', as in "*fick*" and "*fin*".

Therefore, it may be possible that the menus of the future could contain such delicacies as "*a naddock*" or "*a nalibut*"!

Makes you "*fink*", dunnit? ASP

Do you know of any other 'old' fish names ... or fish names which have been incorrectly spelt and have given rise to a confusing or humorous situation? If so, please drop us a line.

Books

Nature Aquarium World

By: Takashi Armano
Published by: **T.F.H. Publications, Inc.**
ISBN: 0-7938-0089-7
Price: £21.95

We have often heard it said that those who dare, win. When it comes to book publishing daring is a rare phenomenon, with publishers tending to be cautious, or even ultra-cautious, both in the presentation and the content of their books.

No-one could level that criticism at T.F.H. ... and most certainly not with regard to this absolutely gorgeous book. The title may be a bit unwieldy and could have done with a re-think, but inside, the contents are adventurous, exciting and — for the most part — unbelievably spectacularly presented.

Don't expect, therefore, anything approximating the 'standard' approach to an aquarium book. If you are looking for this, search elsewhere. Here, the presentation largely consists of stunning laminated photographs of furnished layouts, accompanied by a data list which includes the lighting, capacity, environmental and other parameters relating to the aquascape in question.

There's about 150 pages of awe-inspiring arrangements, followed by some 30 pages of the more practical type of text, attempting to show us mere mortals how to begin thinking like the author, and how to begin to put some of the techniques into practice, with the emphasis being most definitely on the plants, rather than fish, throughout.

While being absolutely knocked out by the longer first section, I was, I must admit, a little disappointed with the practical section, partly because it, inexplicably, consists — with one exception — exclusively of black and white photographs, and partly because I think that there should have been more detailed practical guidance.

Then, again, as the author says in 'My Mother's Notebook' — one of several delightful anecdotal passages scattered throughout the book — 90% may be explicable scientifically, "*but the remaining 10% is based on many years of experience and is a kind of intuition ...*"

It would certainly take many years to master even just the scientific theory side of Takashi Amano's precious art. Gaining the extra 10% intuition would take a lot longer. But what a fantastic journey that could turn out to be!

John Dawes

The oceans: A celebration

Compiled by: The Living Earth Foundation
Introduction by: David Bellamy
Published by: **Ebury Press**
ISBN: 0-09-177882-4
Price: £19.99

The Oceans is a celebration and exploration of the aquatic world and a warning of the consequences of ignoring the current acute threats of pollution and global warming. Including 220 of the finest colour photographs, which provide breathtaking insights into this fascinating world, the focus is not on the damage and destruction of recent decades, but on the positive picture. The book highlights the vast wealth of the world's marine environments, the huge range of life they support, and the human communities that depend upon them.

The text consists of ten essays by the world's leading authorities in the field, covering subjects such as: an introduction to the huge diversity of plant and animal communities that dwell in the oceans; the oceans' evolutionary development through the ages; the interreaction between climate and the oceans; the spectacular plant and animal life — coral reefs, mangroves, deltas — that exists when the ocean meets the land; and man and the sea, including the myths and religions bound up with the oceans, the food we depend on from there, and what the future holds for the oceans in the light of acute problems which threaten it. The photographs throughout are exceptional and capture the wonder and excitement of the text.

NOTE

The Living Earth Foundation is a UK registered charity, based in London, with education as the key focus of its work. All royalties from this book go to support projects in Cameroon, Venezuela and Brazil, which aim to empower local communities to conserve and maintain their environment and manage their natural resources for the future. *The Oceans*, like the first book in the series, *The Rainforests: A Celebration* (1990), aims to raise awareness of environmental issues and provide funding for **Living Earth's** vital educational work.

FASCINATING FISH FACTS

Yellow-headed burrow builder

What do you do if you are a small, plankton eating fish that would make a good snack for many a predator? Jawfish solve this life and death problem by building burrows into which they can retreat when threatened or disturbed. The burrow may be up to 20in (50cm) deep, giving the tiny fish plenty of room to hide from danger.

The Jawfish's name comes from its surprisingly large mouth which it uses to carry away any pebbles or stones that fall into the tunnel. It also strengthens the walls of the burrow with pieces of shell or coral, again carried in its mouth — a bit like a builder carrying bricks in his mouth instead of using a hod carrier!

At night, Jawfish carefully block the entrance with a stone or shell, securing themselves safe inside. During the day they are usually seen hovering near the entrance and, at the first sign of danger, will dart backwards into the burrow like a tortoise withdrawing into its shell.

Linda Lewis

LINDA LEWIS

A Yellow-headed Jawfish hovering at the entrance to its burrow.

Test tube shark at Sea Life Centre

Portsmouth Sea Life Centre has produced what is believed to be the first shark to have hatched in captivity, following the find of an egg by a man walking his dog along Southsea beach. The find, in May, was five months into its development and was identified as belonging to a Bull Huss, *Scyliorhinus stellaris*, a common member of the Catshark family.

Explained **Lee Marshfield**, displays manager at Portsmouth Sea Life Centre, "A tiny shark embryo could be identified within the egg case, but the finder's dog had partly chewed through the protective casing, causing the life-preserving embryonic fluid to leak out."

The delicate embryo was transferred into a test tube by Lee and **Dave Wolfenden**, an aquarist at the Sea Life Centre, and the tube was placed into a tank of seawater. Explaining the process of hatching, Lee continued: "The tube was open at each end, so that fresh oxygenated water could pass through. Initially, by using a syringe, embryonic fluid was drawn from an unfertilised Bull Huss case and then put into the tube, replacing the fluid that was lost after the egg case had been chewed. The fluid gradually leaked out of the test tube naturally, leaving oxygenated seawater to pass out freely."

According to Lee, the embryo would, at first, use its tail to fan oxygenated water over its external gills but, as the shark developed, the external gills degenerated and it breathed exclusively though its mouth.

"In general, no problems were encountered while the shark was in the test tube, although there were occasions where little or no movement was seen from the embryo," added Lee, who explained that this problem was initially solved by darkening the tank in which the tube was kept, as an embryo is very sensitive to light.

Once the shark has been released from the test tube, it will be kept in a nursery display at Portsmouth Sea Life Centre and will, hopefully, eventually be released into the sea.

Project award

Ladymead Community School in Taunton has received a £3,600 award to create a new garden designed specifically for disabled people and incorporating both a wildlife and an ornamental pond.

The award is part of the 1994 **British Gas Grassroots Action Scheme (GAS)** which has been devised to encourage conservation charities, community groups and secondary schools to work together to improve their local environment. Every year, £100,000 is made available and, this year, 56 winners received awards, ranging from £10,000, to just £32.98.

An impression of the garden at Ladymead Community School.

OFI (UK) helps marine research

Ornamental Fish Industry (UK) has provided assistance to two marine management projects being conducted in the Red Sea and Belize. A bursary of £300 has been awarded to **Dr Alasdair Edwards** of the Centre for Tropical Coastal Management Studies at Newcastle University, while a set of SCUBA equipment has been presented to **Coral Cay Conservation**, a charity which is researching coral reefs and marine populations of the coasts of Belize.

Dr Edwards is setting up a project to study similarities between fish species in the Red Sea and coastal Indian Ocean to determine if there are any genetic differences between these related populations.

Dr Alasdair Edwards, left, receives a bursary cheque on behalf of Ornamental Fish Industry (UK) from Keith Davenport, chief executive of OFI(UK).

Keith Davenport, chief executive of OFI(UK), said: "One of the central aims of the organisation is to encourage good husbandry and the efficient management of all ornamental fish populations. These projects will provide important information and should lead to the valuable marine stocks in both locations to be managed in a sustainable manner."

KEEPING AND BREEDING:

THE QUETZAL CICHLID

As **Martin Chandler** and **Terry Molloy** of the British Cichlid Association prove, big does not have to mean bad and nasty ... or difficult.

M-P & C PIECHOWSKI

The male in this shot (front fish) is digging in preparation for fry care (he's actually got a stone in his mouth). Note the 'battle scars' on both fish, inflicted during their courtship ritual.

MARTIN CHANDLER

TERRY MOLLOY

The large, solid-looking, hump-headed Quetzal or Pink/Reef/Firehead Cichlid — probably best referred to as the Synspilum, *Paraetheraps* ("*Cichlasoma*") *synspilus* — must be about the most popular of all the Central American cichlids.

It is a substantial, highly coloured and relatively peaceful fish which is quite widely available. Currently, however, there are lots of very poor examples of this species doing the rounds, mainly due to inbreeding and/or breeding from small specimens.

This species is also found on sale as "*Cichlasoma*" *melanurum*, a very closely related Central American cichlid. We have therefore put together the following article to show the species at its best and, hopefully, help future purchasers select only the best-quality specimens.

Found on the Mexico, Belize and Guatemala border countries, the Synspilum is quite a widespread species. It favours murky, turbid waters, is found in both rivers and streams, and can even be found in slightly brackish waters.

Striking colours

Adult specimens are beautifully coloured fish which, in large enough quarters, can reach a total length (TL_t) of 10in (25cm) or more and full coloration in as little as a year!

Males and females are identical in basic coloration, with the colours tending to be more defined and brighter in the males. Males also develop a nuchal ('forehead') hump, which may vary from a slight

SYNSPILUM FACT FILE

Common Names: Synspilum, Quetzal/Pink/Red/Firehead Cichlid

Scientific Name: *Paratheraps* ("Cichlasoma") synspilum; also referred to as *Theraps synspilus* or — in older books — as *Cichlasoma synspilum*

Size: 10-12in (25-30cm) common; up to 14in (35cm) under appropriate conditions

Distribution: Central America, including Mexico, Belize and Guatemala

Habitat: Murky, turbid waters in streams and rivers, even extending into slightly brackish water environments

A pair guarding their eggs.

MARTIN CHANCE

Newly-hatched Synspilums.

AQUARIUM CARE CHART

Size of tank: 48 × 18 × 18in (120 × 45 × 45cm) for a pair; 72 × 18 × 18in (180 × 45 × 45cm) for a community

pH: 7.5-8.5

Temperature: 24-29°C (75-83°F) — the higher end of the range is recommended for spawning

Diet: Most foods, including livefoods, pellets, deep-frozen, freeze-dried, and incorporating a vegetable component of peas and lettuce

Spawning: Provide flat horizontal surfaces; up to 1000 eggs are laid

Fry: Hatch out after about 48 hours; free-swimming five days later

Fry foods: Newly-hatched brine shrimp and finely powdered fry foods at first

bump, to a hump of monstrous proportions, giving the fish an almost right-angled forehead profile. This hump can make the males look a lot more aggressive than they actually are.

The head is a deep pink colour from the dorsal fin down to around the pectoral fins and then down to the pelvic fins. The flanks and unpaired fins have a metallic golden coloration which has to be seen to be believed. Some of the scales may be tipped with orange, but this varies from fish to fish.

There is a black band on each flank, running forward from the base of the tail to about one third along the body length. This band is not normally solid and uniform and can be broken in one or two places. In some specimens there may be a smaller black mark below the dorsal fin as well. This is the standard coloration, and there are one or two variations known, from a red-headed form to a more yellow-green form.

The Synspilum is a deep-bodied fish which, as it gets older, can become very heavily built. It is one of the more peaceful *"Cichlasoma"* and large specimens can be real show-stoppers.

Aquarium needs

Males and females grow to a similar size: about 12in (30cm) is the norm — 14in (35cm), a certainty in a large enough tank. Indeed, one of us currently has a 13in (32.5cm) male, which is a very deep-bodied and heavy fish and shows the species' full potential in every way.

A large tank is therefore required for this species: 48 x 18 x 18in (120 x 45 x 45cm) for a pair, or a 72 x 18 x 18in (180 x 45 x 45cm) for a community tank.

Outside breeding time these fish are quite peaceful, except when they are kept with similar-looking species. They therefore make an ideal addition to a community tank of large, diverse fish. Synspilum should, however, never be kept with its sibling species, *Paratheraps "C." melanurum*, as hybridisation is likely, or with similar, more aggressive, *Paratheraps* such as *P. "C." bifasciatum*.

Other than during the breeding period, *P. "C." synspilus* is not an excessive digger, so undergravel filtration driven by power-heads is ideal and gravel tidies are not really necessary.

The water should be maintained at a pH of 7.5-8.5, with temperature between 24-29°C (75-83°F), the higher range being used to induce spawning behaviour.

Feeding is easy, as the fish will accept most pelletted food, earthworms and — most importantly — vegetable matter. In the wild, they feed on fallen fruit and leaves, but you can substitute cooked peas and lettuce, instead.

Breeding

As previously stated, sexing Synspilum is not that difficult. To aid the situation, the female develops a jet-black stomach from tail to head as she comes into breeding condition.

Dividers are rarely needed and we know of a breeding pair that have been maintained in a 4ft tank for nearly two years with a divider hardly ever being used.

A 2in juvenile — probably a male.

MARTIN CHANCE

Spawning is on a flat horizontal surface, so strategically placed pieces of slate provide ideal sites. Both fish will clean the chosen spawning spot and there will be localised digging near the slate. At this time, the male will become aggressive towards any other fish present, so for their own sake, they should be removed.

Spawning takes place in typical *Paratheraps* fashion, with the female laying 10-20 eggs at a time, which the male immediately fertilises. A mature pair may lay up to 1000 eggs in a single spawning over a period of about 2 hours.

The eggs will hatch after two days, with the wriggling fry being transferred to a nearby pit. After a further five days, the fry will be free-swimming. Feed them a little but often, using newly-hatched brine shrimp or powdered fry food. After six weeks, the young will be nearly 1in (c2.5cm) long and should then be separated from the parents to grow on.

Final comments

The Synspilum is one of the more tolerant larger Central American cichlids, but be careful not to be led into a false sense of security, especially during breeding. It is probably still one of the most colourful and spectacular species, even though it has been around for a while now.

Certainly, this spectacular fish can be recommended to anyone wishing to keep Central American cichlids for the first time. However, choose your specimens carefully and, if buying from a breeder, always insist on seeing the parents. If they don't come up to scratch, it is likely that their offspring won't either.

There are lots of wild specimens about and these or their young should prove to be far better fish, providing you can obtain them through a reputable source. AKP

SEAVIEW

BY GORDON KAY

Captive-bred cuttles

Earlier this year, I got hold of a paper which was accepted for publication by the Zoological Society of London in June '93. It proves a rather dull and heavy way to read of something which is, in fact, rather exciting — the reproduction of the Cuttlefish, *Sepia officinalis*, in captivity.

The paper was presented by JW Forsythe, RH Derusha and RT Hanlon, of The Marine Biomedical Institute at the University of Texas.

Basically, hundreds of *Sepia officinalis* were hatched and raised through their life-cycle in each of thirteen populations. Two genetic lines were maintained, one for seven generations, the other presently in its fourth. Each of the generations, except one, produced animals in excess of 1kg (2.2lb) in weight, and seven out of eight generations had mean weights of between 1 and 2 kg (2.2-2.4lb), with the largest cuttlefish weighing 2.6kg (5.7lb) in the males and 2.9kg (6.4lb) among the females.

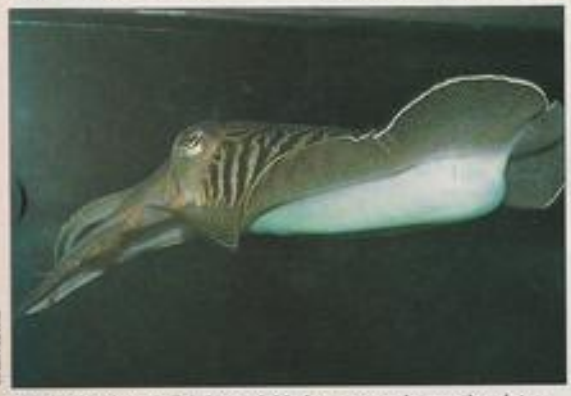
The most interesting point was that of fertility levels dropping with later generations. In fact, the seventh generation laid barely any eggs, and none were fertile.

This observation notwithstanding, there was a trend towards larger individuals and longer lifespans in subsequent generations. Overall, survival over two months typically exceeded 90%. The filtration system used was nothing very advanced: simple undergravels, employing crushed oyster shell 6-8cm (2.4-3.2in) thick, mechanical filters and charcoal with protein skimmers for chemical filtration.

The water was also passed through UV sterilisation.

What was interesting was the depths of the aquariums in which all this was achieved. Because they found that cuttlefish prefer to distribute horizontally, depths as shallow as 5cm (2in) were used at hatching, which still only increased to 30 or 40 cm (12-16in) for adults.

The paper is entitled *Growth, Reproduction and Lifespan of* Sepia officinalis *(Cephalopoda: Mollusca) cultured through seven consecutive generations*, **J. Zool** (1994) **233**, 175-192.



LINDA LEWIS

Captive-bred cuttlefish have yielded some very interesting data.

Remarkable barnacles

Barnacles are small crustaceans referred to as Cirripedes, which are well known for clamping themselves, head down, to hard surfaces such as rocks, the bottoms of ships and to the uprights of piers.

The most common species is the Acorn Barnacle and even this species is colonised by smaller Goose Barnacles.

Some barnacle species also attach themselves to whales and other sea creatures.

These species collect food more easily than their rock-dwelling cousins, who have to work hard to catch passing organisms. Barnacles living on whales have food delivered to them by the water flow created by their host's swimming.

Humpback Whales have different types of barnacle encrusting different parts of their bodies. One species lives under the whale's jaw and on its stomach, while another is found along the tail. Yet another species of barnacle joins the show, but not directly on the whale. This time, though, the barnacle attaches itself to other barnacles. Stacked barnacles often attach themselves to the back edge of a Blue Whale's tail.

Some whales seem irritated by barnacles and even swim into river mouths to get rid of them, the freshwater killing the barnacles, whereupon they simply drop off.

JOHN GWYN

The unremarkable-looking while patches on the rocks are acorn barnacles exposed during low tide. Biologically, though, they are extremely remarkable.

Sex-life of the goby

There are around 500 species of goby, which live all over the world, in both temperate and tropical seas. A great many of these find their way into the aquarium trade and are becoming great favourites, especially with miniature reef keepers.

Most, being small — some only as long as the average little

SNIPPETS

1

Female plaice produce up to 100,000 fertilised eggs, which are spawned offshore during late winter and early spring. There is a correlation with temperature. In higher latitudes, plaice tend to spawn later. There is an important spawning area in the North Sea and there is another in the Irish Sea. The eggs are slightly bouyant and float in the surface layers for two or three weeks of embryonic development. Around 80% either die or get eaten.

2

The Caribbean Slug, *Tridachia crispata*, feeds on seaweed. Not only does it obtain food, but it uses the plant's energy-fixing chloroplasts for its own ends. These structures are not digested, but are absorbed whole and relocated onto the slug's back, where they continue to photosynthesise and produce food substances for the animal.

3

Oceans can reach some unbelievable depths. The floor of the ocean, like the surface of the land, undulates in a series of valleys and ridges. Neither flat nor even, half the ocean floor is 3,500 metres down. However, in ocean trenches, the depth can reach 11,000 metres. Deepest of all is the Mariana Trench, off South East Asia, which is deeper than Mount Everest is high!

finger — make particularly good subjects for this type of collection.

At breeding time, the male goby finds an old shell which he clears of sand. He then turns its opening down, enters it and then sweeps sand over the outside with his fins. In this way, he has created a small chamber beneath a sandy mound on the sea bottom.

The male now sits with just his head poking out of the entrance to the shell, waiting for a female goby to pass by. When he spots one, he dashes out to attract her attention and lures her into his nest.

She turns herself upside-down and lays a batch of sticky eggs on the ceiling of his shell home. The male then fertilises the eggs and stands guard over them until they hatch.

And finally...

And finally, congratulations to my mate **Stephen Smith** (he of **Coldwater Jottings** etc.) on the birth of his daughter, Elinor. Our best wishes go to Pamela and Stephen. Especially good wishes from Tracey, Lucy and myself, I couldn't be more pleased.

SNIPPETS

4

The tropical Trumpet Fish has an unusual way of hiding from its prey. In order to get close unseen, it approaches behind another fish! A relative of the seahorses, the Trumpet Fish has a long, thin body and a trumpet-shaped snout. So closely does it drift beside its larger cover fish, that it appears to be attached to it. If the cover fish is a predator, then it could easily lose its dinner to the Trumpet, which can shear it from under its nose by sucking it through the tiny mouth at the end of its snout. Sometimes the Trumpet Fish hides behind a vegetarian, which makes it easier to sneak up on an unsuspecting victim.

5

The speed with which a dolphin produces clicks — up to 700 a second — is much too fast for the analytical capability of the human ear and brain. At 20-30 clicks a second, our ears fuse the sounds together, so, to us, the echo-location clicks that can be heard sound like the squeaks of a rusty hinge. However, a dolphin can distinguish each tiny item of sound. Returning echoes inform it about the object it is investigating and whether it is animate or inanimate. Dolphins in captivity can distinguish between plates of aluminium and copper painted the same colour. They can also tell a hollow tube from a solid one.

6

The Walrus is noted for its exceptionally fine moustache.

A Walrus' whiskers are there for something other than mere adornment.

which is, in fact, a vital aid to finding food. During the long Arctic winter, Walruses feed in total darkness on the ocean floor; even in the summer, visibility is never very good. The animal uses its whiskers: each one set in an area of thin sensitive skin, to locate clams, cockles and mussels. Once it has located a shellfish, it uses a tougher ridge of hard skin to dig it out.

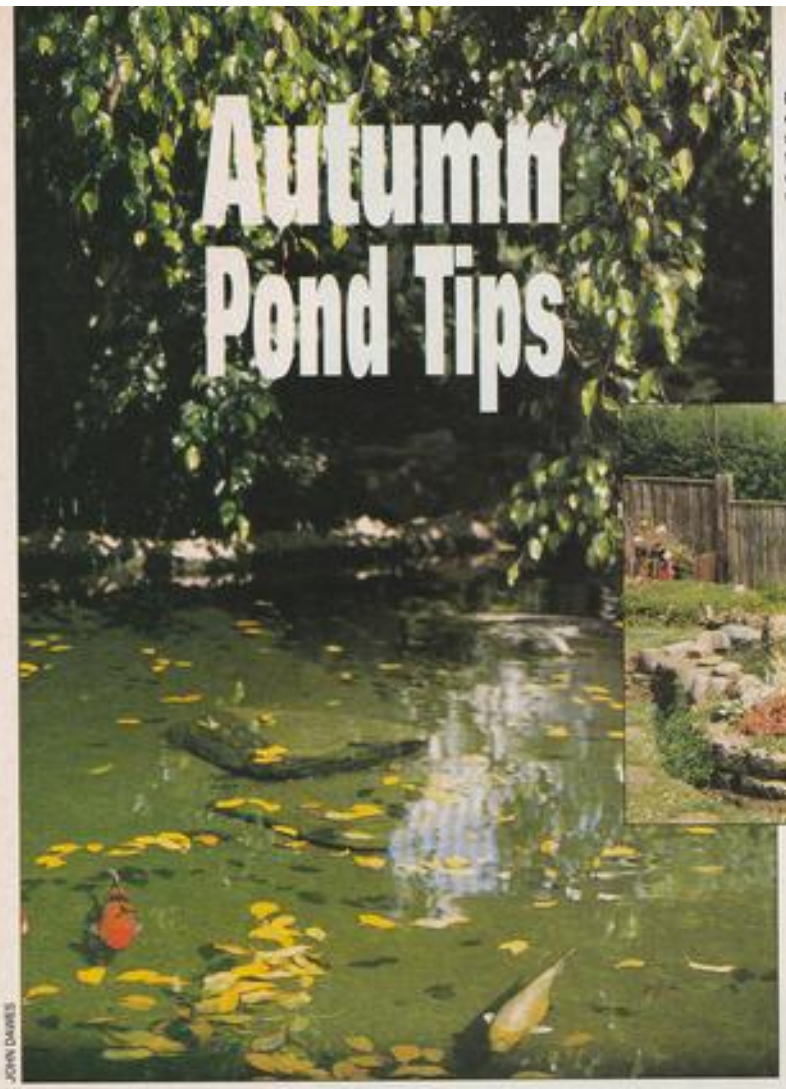
7

Although it is one of the fastest colour-change artists in all of the animal kingdom, the octopus does not have colour vision. Yet it is so adept at changing its coloration that it can match its background in less than a second!

8

At night, Parrotfishes encase themselves in a cloak of jelly-like mucus which is so transparent that it would be invisible, were it not for the grains of sand which become attached to it. Why they do this is not clear, although the most likely explanation is to hide their scent from nocturnal predators which hunt by smell.

Autumn Pond Tips



JOHN DAWES

Potentially dangerous situation: falling leaves on the water surface.

MAKE YOUR POND SAFE!

R. FRYER

Netting will provide autumn protection, not just against falling leaves, but against predators as well.

Autumn is a good time to thin out excessive growth. This pond, photographed in early summer, will require such treatment if it is to be kept 'viable' for the next season.

J.A. GAT

Susan Stephenson offers a seasonal care guide aimed at providing a safe winter period for the pond and its inhabitants.

As the days grow shorter and cooler towards autumn, it is time to start preparing the pond for the colder months ahead. Whether the pond is large or small, formal or natural, it is important to carry out a few basic tasks to ensure the environment remains ideal for the vigorous renewal in the spring.

Even in cold weather, decaying leaves and other organic matter that has fallen into the pond may produce toxic gases. The water can turn black and foul and the plants and animals living in it may suffer. Autumn tasks are therefore aimed largely at reducing the chances of this happening and at protecting those plants which will not survive our harsh winters.

For instance, a major hazard for plants and fish in a garden pond over winter is long periods of ice covering the surface. This may prevent gases escaping and allow little or no air to reach the plant and animal inhabitants overwintering there.

Plant care

As leaves and flowers die, they should be removed. Plants like the Water Mint (*Mentha aquatica*) should be trimmed well away from the water's edge in autumn. They will divide readily in the spring. Some species, like various Water Plantains (*Alisma*), are vigorous seeders and old flowers should be removed as soon as they begin to fade to prevent over-population the following year.

Bog plants, such as the Marsh Marigold (*Caltha palustris*) should be tidied and weeded and old vegetation removed.

Some plants like *Thalia*, *Saracenia* and

JOHN GAMES

Water Hyacinths are tender plants which need winter protection.

Elephant's Ear (*Colocasia esculenta*) are known to be unreliably hardy in our climate and should have been planted in pots. These should be lifted and put in a frost-free place well before the first frosts arrive.

Poolside reeds and sedges should be cut down to prevent them from becoming cosy overwintering places for pests. Large-leaved plants like Hostas should have old leaves removed where necessary.

It is not only leaves and vegetation from water plants which can cause problems, but those from other garden trees and plants, so in some cases, a net placed over the pond to trap them during autumn to allow easy removal is often the best idea.

Water lilies, such as *Nymphaea alba*, should be alright over winter, as long as they have 18 inches (45cm) or more water over them, but the more succulent ones, such as *N. rubra*, should be lifted, the corms dried and stored in sand over winter.

Some vigorous species, such as the Water Hyacinth (*Eichhornia crassipes*), are susceptible to frost, so lift some plants and store potted tightly together in damp (not wet) soil in a bowl in a warm, frost-free place. It is also a good idea to lift plants of the Water Poppy (*Hydrocleys nymphoides*) and put them in a greenhouse in October, as they may be killed by sudden sharp frosts. They should be protected until the following May.

Lift a few plants of *Lobelia fulgens* and store in a cold frame for winter as a precaution to safeguard stock. This can be done with any plants where there are doubts about their hardiness. Some bog plants, such as Giant Rhubarb (*Gunnera manicata*) may be protected by simply placing the old dry leaves over the plant crowns.

Turions (winter buds) of *Hydrocharis* (Frogbit) and *Utricularia* (Bladderwort) should be collected before they sink to the bottom of the pool. Keep them in a small amount of water in a cool place until spring.

Waterside Primulas pricked out in June, should be potted up or planted in their permanent sites after clearing space for them in the bog garden.

Underwater oxygenating plants should be thinned out and old water lily leaves

JOHN GAMES

The brilliantly coloured Marsh Marigold can withstand our harshest winters.

JOHN GAMES

A Dwarf Rush (*Typha minima*) in dire need of autumn maintenance.

Autumn Check List

1. Remove fallen leaves from the surface of the pond or cover it with a net to trap them.
2. Dredge out any debris likely to rot in the pool.
3. Cut down dead waterside vegetation.
4. Take any plants grown in pots indoors.
5. Lift a few of the smaller Water Hyacinths and pot them close together in soil. Add a little water and store in a light frost-free place.
6. Lift a few plants of *Lobelia fulgens* and store in a cold frame.
7. Cover doubtfully hardy plants with cloches or polythene and dry leaves. Protect Gunneras by inverting old leaves over the crowns.
8. Sow seeds of aquatics under glass.
9. Keep pool filled.
10. Float ball or block of wood in pool, or install a pond heater.
11. Overhaul pond pumps; remove submersible ones.

Plants to enjoy in autumn/winter

Water Hawthorn (*Aponogeton distachyus*)
Bugbane (*Cimicifuga*)
Cotton Grass (*Eriophorum*)
Gentiana asclepiadea
Hydrangea
Sorbaria
Reed Mace (*Typha*)

Plants which should be hardy in most of Britain

Pickerel Weed (*Pontederia cordata*)
Fragrant Water Lily (*Nymphaea odorata*)
Native species, such as the Marsh Marigold (*Caltha palustris*), Yellow Flag Iris (*Iris pseudacorus*), (*Nuphar luteal*, Arrowhead (*Sagittaria sagittifolia*), Rush (*Juncus*)

Plants requiring some attention

Water Hyacinth (*Eichhornia crassipes*)
Ginger Lily (*Hedychium gardenianum*)
Arum Lily (*Zantedeschia aethiopica*)
Lobelia fulgens
Nymphaea rubra

Plants which should be taken in before the first frosts

Water Canna (*Thalia*)
Saracenia
Elephant's Ear (*Colocasia esculenta*)

Autumn Pond Tips

removed by pulling from the root stock to avoid decaying vegetation at the bottom of the pool and prevent a shortage of oxygen.

Other jobs

Fish should survive, as long as they can get air. During the autumn, they should be fed high-protein food sources, such as *Daphnia* or preparatory feeds to ensure they have enough stored body fat to last the cold spell when they do not feed or have to rely on more easily digestible foods in smaller quantities. Many fish owners allow the fish to tell them when feeding should stop, as they become inactive.

If the water appears dark green or blackish, drain off half the volume and replace. Take this opportunity to remove debris and very old leaves from the base, but leave the mud which will contain the resting buds of some plants and aquatic insects. Be very careful not to disturb the tubers of water lilies, as these often resent disturbance and may take a long time to recover, or may even die as a result.

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

Any repairs or maintenance needed to the concrete of the pool should be carried out in autumn when there will be least disturbance to plants, but before severe frosts arrive, as concrete repairs which freeze before completely setting will be useless.

Tackling ice

Small rock pools and tubs run the greatest risk of completely freezing over and may require emptying, with the occupants being housed elsewhere for the winter; in southern districts they can survive if the pool is covered with boards and sacks filled with straw laid on top. These covers should be removed after each freeze when a thaw sets in to prevent water lilies starting premature growth.

The complete freezing of the surface of the pond can be prevented by the simple method of floating a small ball or piece of wood on the surface.

Put this in place in late autumn and when ice forms over an inch thick, pour some boiling water over the ball or wood. When it becomes loose, remove it, bail out an inch or two of water and cover the hole with a straw-filled sack. Leave this in place until a thaw sets in and then remove it and replace the water. The idea is to keep a hole open in the ice to allow gas to escape while the rest of the ice acts like glass over the surface of the water.

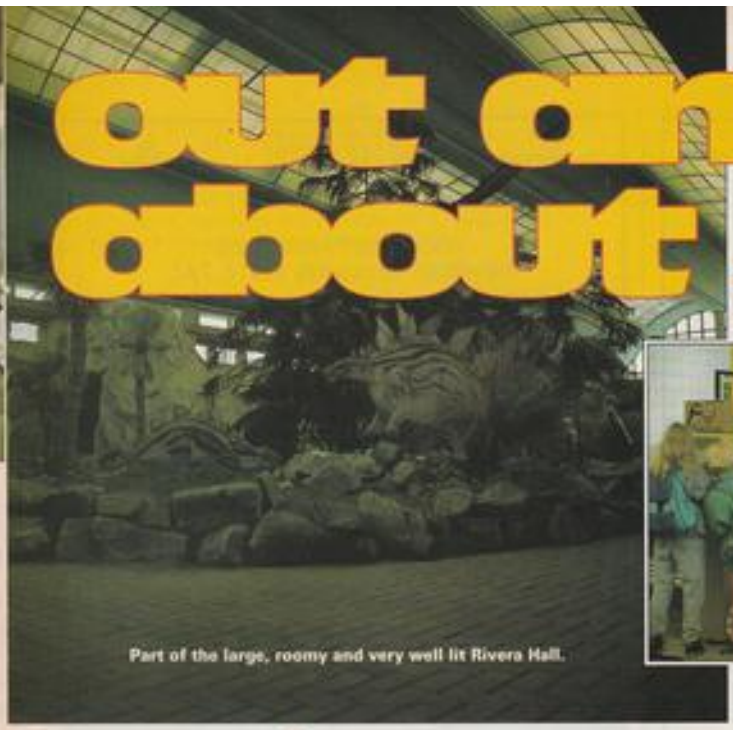
Alternatively, a small heater can be installed to keep a small area of water ice-free or, in an emergency, a tin of boiling water placed on the ice should melt a small hole.

In addition to the other techniques mentioned in the text, an ice-free hole can usually be kept open by means of a pond pump.

JOHN GUMBS

The tasks needed during autumn are some of the most important in the pondkeeper's year and, though sometimes tedious, they can make the pond a suitable overwintering place for plants and animals alike until new and hidden life bursts forth again the following spring. MP

out and about



Part of the large, roomy and very well lit Rivera Hall.

This is the reptile, amphibian and shark hatching and rearing room.

Rotterdam Zoo Aquarium

by David Allison

Photographs by the author

The huge 'three-aquarium' reef tank.

If you visit Rotterdam, a trip to the aquarium at Rotterdam Zoo is a must.

Until recently, Rotterdam Zoo was called Blijdorp Diergaarde, so most road signs still retain the old name. Like many of the older zoos (it was founded in 1857, but moved to the present site in 1937), Rotterdam Zoo is situated not far from the city centre; the main railway station is about ten minutes' walk away.

At present, the zoo is in the throes of a ten-year renewal plan, as a result of which it will become an 'ecological' zoo without bars. There has already been considerable progress, though, so some of the exhibits are very modern and well thought out.

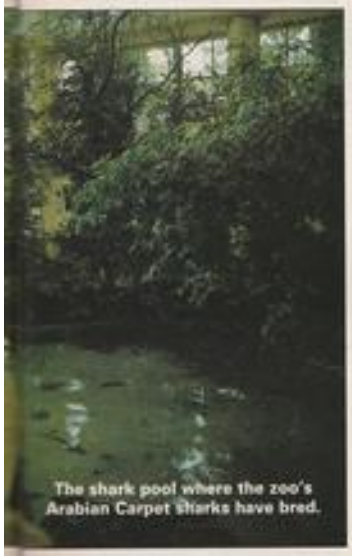
The main focus of attention for visiting aquarists and herpetologists is the Rivera Hall Complex, conveniently situated in front of you, to the right, as you come in through the main entrance to the zoo. The fish and reptile exhibits are in the main Rivera Hall at the centre of the complex.

At the time of my visit, some of the exhibits were still under construction. Nevertheless, there was a great deal to see. For me, some of the best displays were the large mangrove and tidal paludaria and pools housing Archer Fish (*Toxotes jaculator*) and other brackish water fishes like Mudskippers (*Boleophthalmus*) and Scats (*Scatophagus*).

One of the tidal exhibits, for example, is linked to a mangrove pool sunk into the ground, and simulated tidal movements are pumped between the pools every three hours. The mangrove pool contains over 3,500 litres of crystal-clear water (about 770 gallons) which is protein skimmed and filtered by a large upright biological filter.

Also impressive is the sunken shark pool housing four Blacktipped Sharks (*Carcharinus melanopterus*), measuring about 1 metre in length and swimming in typical 'shark' fashion with their dorsal fins projecting above the water surface. They share their home with some Sting Rays and six bottom-dwelling Arabian Car-

Simulated wave/surf action within the reef tank.



The shark pool where the zoo's Arabian Carpet sharks have bred.

The tidal pool is extremely realistic.

pet Sharks (*Chiloscyllium arabicum*) which have actually bred within the pool.

Then there is the massive reef tank constructed from three aquaria in the shape of an angled 'crescent'. It measures some 7 metres (c 23ft) in total length and is 1 metre high and 1 metre wide. It contains about 8,000 litres (around 1,750 gallons) and is backed up by a 12,000-litre (c 2,600 gal) 'buffer' storage tank housed underneath.

Filtration is via a large upright biological filter and equally large protein skimmer. Every three minutes, three lots of 240 litres (some 53 gals) of seawater are 'dumped' in to simulate wave action of the reef.

Well planted with *Caulerpa* and other algae, stocked with fish, and being located at waist height, this three-tank reef exhibit is both spectacular and effective.

To the right and left of the main hall there are other smaller halls containing older aquaria of varying sizes. Here also, for example, you will find the Amazon pool containing four Arowana (*Osteoglossum bicirrhosum*). The original Arowana used to catch sparrows that came down to drink at the water's edge, even jumping out of the water to catch them! The 'new' fish are still young, though, and have not yet learned this trick — no doubt, much to the relief of the sparrows!

Large terrapins and Shovel-nose Catfish (*Pseudoplatystoma fasciatum*) share this pool with the three Arowana — a great sight to behold at feeding time, particularly, since you can view both from above and the side.

There are so many great exhibits that it's difficult to write about them all in the available space. There is even one where you can see reptiles and amphibians being incubated and hatched, along with the eggs, embryos and young of the Arabian Carpet sharks that breed in the aforementioned pool.

In fact, the Rivera Hall Complex at Rotterdam Zoo is well worth a visit, not just as part of a very interesting zoo tour, but in its own right. It has something for everyone who is interested in either aquatics or herpetology, and has a commendable record of breeding successes in both fields. I hope to report at some other time on the achievements made in the care and breeding of the zoo's large collection of amphibians and reptiles. In the meantime, should you wish to visit Rotterdam Zoo, here are the relevant details:

Rotterdam Zoo
(Blijdorp-Diergaarde),
Van Aerrenlaan 49,
3039 KE Rotterdam,
The Netherlands.
Tel: 010465 4343

CITES update

FROGS AND

By JULIAN

HERP FACT
'Digestive' Rattlesnake venom

North American Rattlesnakes, including the Sidewinder, belong to the genus *Crotalus*. These snakes are well known for producing venom. Due to this biological adaptation, they are frequently said to be "poisonous", but this is a particularly misleading term. In fact, rattlesnakes can be eaten by humans as food, usually fried, but sometimes raw!

Biologically, the venom produced by snakes is important to the way in which these reptiles feed. Snake venom not only helps to overcome prey, but it also takes part in the digestion of the food. This is because reptile venom contains enzymes which break down large insoluble molecules of protein. The action is similar to the way in which biological washing powders (which also contain enzymes) break down insoluble stains, such as blood on clothing.

To date, more than twenty different types of digestive enzyme have been identified in the venom of reptiles, although no one species possesses them all.

Snake venoms which affect the cells of the blood and the vessels of the circulatory system, are described as **haemotoxic**. These venoms cause a variety of damage to the animals into which they are injected. For example, **haemorrhagic venoms** break down the walls of blood vessels, resulting in blood loss. This gives the appearance of bruising under the skin, one of the most documented effects of rattlesnake venom.

Research at Colorado State University has revealed that the venom of the Western Diamondback Rattlesnake (*Crotalus atrox*) contains five different protein-digesting enzymes. These cause tissue damage and haemorrhaging in animals which are bitten by this species.

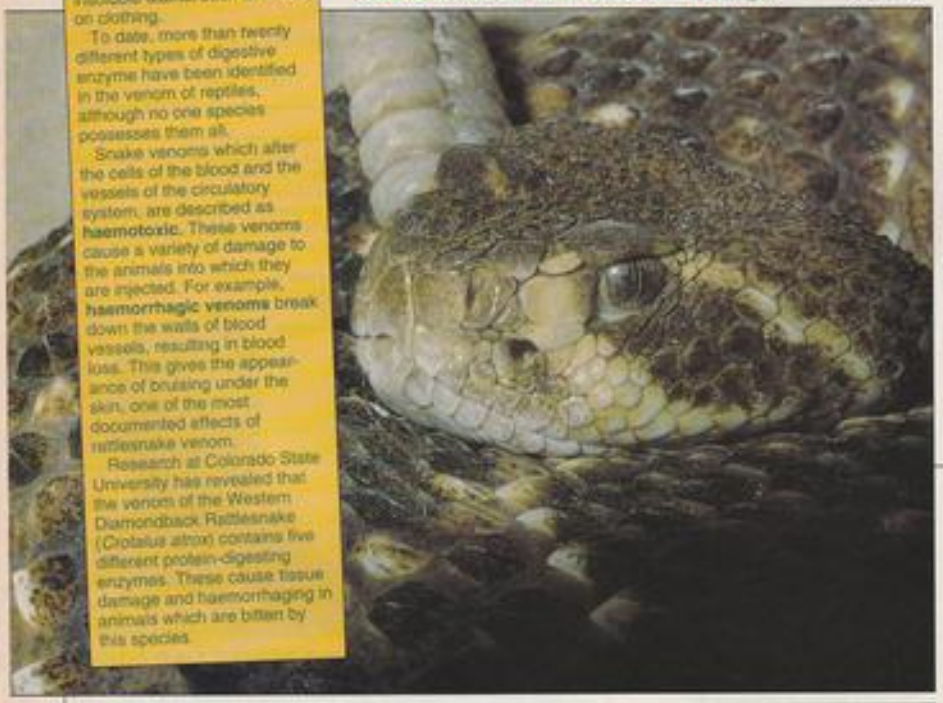
The **EC CITES Committee** has taken the following decisions with regard to the importation of particular species of gecko, as well as crocodile skins, into the European Union:

1 As from 3 May, a ban has been imposed on the importation of nine species of gecko from Madagascar — *Pheisuma abbotti, P. barbouri, P. befotakensis, P. cheekei, P. dubia, P. modesta, P. mutabilis, P. seippi* and *P. trilineata*.

2 For large consignments of crocodile skins, a list of identifying tag numbers must accompany or be entered on the permit issued by the exporting country. I emphasised the importance of crocodile farming to the economy of certain African and south east Asian countries in an article in the December 1992 edition of *A&P* (pages 98-99).

To help prove that crocodile skins imported into the European Union originate from legitimate stock, authenticated records of the serial numbers on their non-removable plastic tags and a signed export permit are essential. Such precautions will result in skins with unsatisfactory proof of legal acquisition not being accepted.

This should prevent skins illegally poached from the wild being sold in Europe, while ensuring that revenue is earned by authorised suppliers, especially crocodile farms. In this way, species of these endangered reptiles can continue to be conserved through a self-financing and sustainable breeding programme.



The Western Diamondback Rattlesnake's venom is a lethal concoction that can cause serious tissue damage. GEOFF KIDD

Breeding and lifespan records

When maintaining reptiles and amphibians in captivity, it is helpful to know whether or not other herpetologists have bred the species which you keep. You can then build on their achievements and learn from their mistakes. For example, details about the medium used to incubate eggs, together with the temperature range for successful incubation, would be valuable information to have.

Other information which is useful to know is: "How long is a particular species of reptile or amphibian likely to live for in captivity away from the dangers of predation and other hazards in the natural environment?"

Facts relating to these and many other topics can be found in the publication, *Reptiles and Amphibians in Captivity — breeding, longevity and inventory*.

This annual report is compiled

FRIENDS

N SIMS

by **Frank** and **Kate Slavens** from 1 January for every year. The 1993 edition of this reference book has just been published, and its 521 pages contain details of 34,456 specimens maintained in 222 public and private collections throughout the world.

It also names the species maintained and states the number of animals, their sex and age (adult or juvenile), whether or not they bred in the previous year (with notes about incubation), whether or not they are allowed to hibernate, and how long they have lived in captivity. Other sources of published information about captive breeding, including books, museum bulletins, journals and magazines, are also listed.

Copies of the *1993 Inventory* are available at $40 (US) hardback, or $30 (US) paperback, plus $4 overseas postage, direct from:

Frank L Slavens
PO Box 30744,
Seattle,
Washington 98103,
USA

If you want details about the reptiles and amphibians you maintain and breed to be included in the *1994 Inventory*, then relevant information should be sent to **Frank Slavens** (at the same address) as soon as possible.

Rat Snakes Guide

TFH have recently published a book with a very interesting (if slightly misleading) title: *Rat Snakes: A Hobbyist's Guide to Elaphe and Kin*. The book has been written by Ray Staszko and Jerry G. Walls and contains more than 200 colour photographs. **ISBN: 0-86622-635-4.**

I say "slightly misleading" above, because, at first glance, the title can under-represent the contents of this book — a description of EVERY species of *Elaphe*, 35 in all, including Rat, Fox and Corn Snakes.

J. Walls

It also describes Rat Snakes classified in three other genera: the two species of the genus *Bogertophis* (the Desert Rat Snakes) from the south-west USA and nothern Mexico, the single species (and possible three subspecies) of the genus *Senticolis* (the Mountain or Green Rat Snake) from North and Central America and the single species of the genus *Gonyosoma* (the Red-tailed Rat Snake) from south-east Asia.

At 208 pages in length, the book is divided into two sections. Section I covers the general care of these snakes in captivity. Basic information is given about handling, cages and fittings, feeding, captive breeding — including the incubation of eggs, and finally, health and medication.

Section II forms the majority of the book (151 pages) and deals with taxonomy and identification. The section is arranged on a geographical basis, starting with the American species, continuing with the European Rat Snakes and ending with the Asian species. Most snakes can be identified from the good colour photographs which accompany each portion of text. Some colour morphs are also shown.

Identification of each species is aided by original colour paintings of head and mid-body patterns by wildlife artist John R. Quinn. Regretably, these unique pictures are not totally scientifically correct. For example, scale counts are not accurate.

Some Asian species, mainly from Japan and China, are not shown in photographs and the reader has to rely on the paintings for illustration. Very general maps are provided which show the distribution of each species in a global, rather than regional, context.

The book ends with a summary of scale counts for the 39 different species described, a two-page selected bibliography and a four-page index.

This book will form a useful companion to the 1990 TFH publication about another group of Colubrid snakes, the Kingsnakes and Milk Snakes. I provided details of this book by Ronald G. Markel in the March 1994 edition of *A&P*: (**Question Time,** page 40).

Rat Snakes: A Hobbyist's Guide to Elaphe and Kin will prove to be an informative book for herpetologists, especially those interested in these popular Colubrid snakes. At £24.95, it represents good value.

Vital calcium

Minerals and vitamins must be present in the diet of animals, particularly the vertebrates — animals with backbones — to maintain health. For example, calcium is a mineral which is required for growth and also for many metabolic functions.

Neither reptiles nor amphibians are exceptions; these animals, too, need a regular supply of this mineral in their diet. Calcium is required by the muscles of the body so that they can contract and bring about movement. It also has a regulatory effect on the contraction of the heart, and therefore, the speed at which blood is pumped around the body.

The correct functioning of the nervous system is dependent on an adequate supply of calcium as well. The nerves carry impulses around the body and these instruct muscles to contract. Thus, co-ordinated movement is brought about in a healthy animal, as opposed to sluggish behaviour in a calcium-deficient animal.

There is evidence that lack of dietary calcium can also result in poor reproduction among captive amphibians and reptiles.

Calcium is particularly important for ossification of the skeleton. This is the strengthening of the bones with deposits of calcium salts (together with another mineral, phosphorus). In addition to the correct proportion of calcium in the diet, vitamin D_3 is also essential to ensure healthy bone formation.

KOI TALK

by Alan Rogers

Yearling Koi enjoying the benefits of first-class water achieved without waging all-out chemical warfare. ALAN ROGERS

Dangerous sweeping statements

During a conversation with a Koi keeper recently, the subject came around to the water quality checking of his new pond and biological filter as it finally approached the full maturity stages.

He had been informed by others that he should keep vigilance on dissolved ammonia and nitrite level increases, as either of these, if permitted to exist for very long, would have disastrous effects on the welfare of his Koi. He was informed that once the filters 'kicked' in, traces of ammonia would be broken down to nitrite by *Nitrosomonas* bacteria within the filter, and this, in turn, would produce a less harmful compound known as nitrate, a substance quite happily accepted by Koi. I was quite perturbed by this sweeping and —to say the least — very contentious statement.

The toxicity of *nitrite* varies according to water hardness and pH readings. The higher these readings, the less toxic nitrite becomes. Excess readings in the range of 50 mg/ltr to 100 mg/ltr levels of *nitrate* can, indeed, have a disturbing effect on Koi growth, health and activity. Natural resistance to disease is lowered and this alone will trigger off advancement of many unwelcome pathogenic problems and parasites, creating a whole new concept of diminishing health.

Usually, when the stages of development get this far, panic and further incorrect advice quickly follow from inexperienced sources. Lethal chemical cocktails and pond treatments are often administered in an attempt to remedy an already ailing environment.

Food is often refused, along with general weakness, and traumatic Koi losses ultimately add to the overall problems. Combating the reduction of nitrate levels must NEVER be dismissed lightly and every effort should be made to reduce this to below 10mg/ltr!

Battleground

Blanket weed needs 3 main factors to survive... water, sunlight and 'nitrate fertiliser' (see also **LSA to the rescue**).

Nitrates are used extensively in the agricultural industry as organic bound fertilisers for improved and enhanced plant growth development. Does this all sound very familiar to you?

Remove and eradicate the nutrient that feeds blanket weed and plant starvation will be inevitable, after which the whole scenario will resume normal conditions without the need for additional chemicals. The pond must NEVER be considered the battleground for chemical warfare!

Reducing nitrate levels by aerobic bacteria filtration and supplemented by regular water changes, allied with some effective shading from excessive sunlight, takes care of two factors. Constant water quality management and the careful administration of food will pick up the third component. Always be aware of your Koi growth and stocking rates, as these are contributions which are often overlooked. Good water quality doesn't just happen ... it has to be the ultimate objective of every serious Koi keeper.

Nevertheless, the best laid plans of mice and men can always be thwarted! In some areas, recent national reports have claimed that amounts of nitrate varying between 12.5 mg/ltr to 25 mg/ltr have been recorded coming from fresh tapwater supplies. Add this to any readings present in your pond, and the problem begins to escalate.

Mop-up plants

More and more Koi keepers seeking perfection with water quality are turning to plant filtration to 'mop up' nitrate levels. Plants with free-floating roots would appear to be the ideal choice if positioned in the external filters away from the access of the Koi. Most Koi will take great delight in reducing the plant establishment by an inviting salad lunch or, maybe, an act of sheer vandalism.

Water Hyacinths and Water Cress could be a good place to start. The choice of pond plants can be endless in terms of

Water Hyacinth — an excellent mop-up plant for the summer months.

assistance to those seeking ultimate water quality. I have seen ponds designed with return waterways, which are planted, within their shallow waters, with various species that grow and flourish with great aesthetic and practical results.

The technique of regularly adding a boost of nitrifying micro-organisms to the filter by any of a number of cultural systems available on the market, can help keep the filter in tip-top condition at all times; this is particularly so with fairly new systems, or if filtration has been affected due to adverse pond medications etc.

LSA to the rescue

Mother Nature has her own way of attempting to assist with the excess nitrate problems, in many cases by producing an algal growth, known to most of us as the proverbial "blanket weed" or sometimes known as "long string algae" and abbreviated by American Koi keepers to LSA. Blanket weed under 'favourable nitrate conditions' grows at alarming rates and absorbs, in its development, huge volumes of nitrate, thus assisting the health of the Koi and improving water quality by removing these excess levels whenever present.

Amazingly, when blanket weed growth appears, the first course of action taken in a fit of mis-conception by new hobbyists is to utilise 'alien additives' to (hopefully) dispose of it, and are usually unconcerned or unaware of the obvious presence of nitrate. By such actions they destroy Nature's hand of protection and add further complications to an already stressful environment when they administer treatments that change the water chemistry, creating further stress and danger to their Koi.

Blanket weed is not the enemy, and can easily be controlled by regular harvesting during pond maintenance. In my opinion, some pond additives for controlling LSA are not researched adequately to establish long term Koi health and vitality. I am concerned that some such treatments have been responsible for causing stunted and deformed growth in later life.

Tread with care

Adding chemical treatments — without all due care — in a closed pond environment should be avoided whenever possible. Hopefully, this single statement, if complied with, will help save many thousands of Koi from unnecessary suffering and probably premature death!

I accept that all of us may, at some time, have justifiable reasons for treating our ponds, and on these occasions, no harm will be done if the correct treatment has been selected for the appropriate problem, once satisfactorily identified. It is vital to realise that every successful pond survives in a very fine state of healthy balance, where growth and development flourish; one in which any sudden changes to water stability will throw everything from sweet harmony to alarming turmoil.

Serious Koi keepers, justifiably so, have, over recent years, shown a great interest in water purification, and I have been an advocate of water purifiers for many years. In fact, I proudly claim to be a pioneer in this field, having had disaster strike home many years ago.

As an advocate of water purifiers, I subjected this metered 'twin' Spark-L-Pure system to an intense 12-month research period, with excellent results.

To me, it is senseless laying out hard earned money offering your Koi sophisticated protection by filtering out all the undesirable elements at one end, merely to replace these with a chemical cocktail served in a watering can at the other. The mind boggles at such idiosyncrasy!

Having attempted to discourage most of you to decline regular or random medication without the pond, there are some alternatives which can be adopted when it comes down to individual Koi treatment, but before considering that aspect, there are certain items of emergency equipment that must be at hand before we attempt the alternative. Perhaps I should consider these in the next issue.

Talk to you soon.

Tomorrow's Aquarist

BY GINA SANDFORD

Sturgeons

John Cox asks, "Can you give me any information on the Sturgeon? Is it OK to put it in my tank with my Fancy Goldfish or in my pond with my Common Goldfish and Shubunkins?"

The fish most often sold for the aquarium is the Sterlet, Acipenser ruthenus. Small specimens adapt well to aquarium conditions but, be warned, they grow large, up to 90cm (36 inches), so be prepared to provide them with a large aquarium. Being cool water fishes, the temperature should be in the region of 12-15°C (54-59°F) but, in the summer months, it can rise to 22-24°C (72-75°F) without any ill effects, provided you have a suitable filtration system and very well oxygenated water.

There is no reason why Sterlets should not be introduced into a garden pool. However, as they are a silvery grey/brown colour, you are not likely to see very much of them.

Coming from Europe and Siberia, the Sterlet can cope with the cold during the winter months. The problems arise in the warmth of summer when, in the relatively still water conditions in a pond, oxygen levels drop and the Sterlet suffers. Thus, the filtration system should be very efficient to create the sort of conditions you would require to keep good-quality Koi.

Sterlets are peaceful fish if kept with fishes of their own size. They feed mainly on insect larvae, small crustaceans and the like, but are not averse to taking small fishes if the opportunity arises.

MIKE SANDFORD

The most widely available species of Sturgeon is the Sterlet, *Acipenser ruthenus*.

'Polish' sonnet

I recently received a fax from an old acquaintance who is now working in Poland. He sent me a poem that he had written and thought that I might like to share it with you so, here it is:

We can, perhaps, accept it in our minds
That natural events have sometimes been
The doom of certain species, types or kinds
Without the need for man to intervene.
Many became extinct before the day
That mankind raised his head above the rest.
But still it is beyond dispute the way
That most have met their fate must be addressed.
To our blame; so-called Homo sapiens,
By dint of his refined stupidity,
Has driven many creatures to their ends
And so reduced Creation's quality.
Another type of man it is who takes
Care of a species and refuge makes.

David J. James

Has anyone else out there any poetic leanings? Do let me know. I can probably arrange a prize of some sort for the best one submitted. Send them to TA Poem, Aquarist and Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN. Closing date: 30 September, 1994.

Jo on livefoods

I've received another letter from Jo Beal ... yes, she who usually asks for some words of wisdom to be passed to Matt Bond (Matt, did you take her to see Little Angels?), but this time it was to disagree with me!

She says, "I'm afraid I don't agree with you that it is good to feed wild live foods to fishes. I am never sure where the bugs have been, but you're the expert, so you should know!"

Hey, Jo, don't stick me on a pedestal; you get too many bruises when you fall off!

The beauty of this hobby is that we all do things our own way and, hopefully, get good results. We also get failures which, in the long term, can be just as important, as they are a learning process.

I don't believe any of us become true experts (there are too many things still left to learn),

MIKE SANDFORD

The freshwater Butterfly Fish — an interesting tropical fish with an amazing mouth.

but we do become a little better educated over the years if we just bother to learn from our mistakes and the mistakes and triumphs of others. So, if any of you want to share your experiences, good, bad or just baffling, drop me a line.

Flight of fancy

Every now and again you look for something a little out of the ordinary for the aquarium. How about giving the Butterfly Fish, Pantodon buchholzi, a chance?

These surface-dwelling predators are found in western Africa. They lurk beneath floating vegetation where they are well camouflaged and prey on insects which alight on the water's surface or on small fish. For fish that grow at most to 10cm (4in), their mouth is large, so these creatures are not to be trusted in the average community tank, but if you are keeping medium sized fishes such as rainbows, then they make a useful addition.

In captivity, Butterflies will accept flake and pelleted foods, as well as small pieces of shrimp or prawns. A novel way of feeding these fish is to float a plastic container on the water surface and allow maggots to pupate and hatch into flies. If you do this, ensure that you have a tight fitting cover glass(!) and that there is a space of about 10cm (4in) between the water surface and the cover glass, so that the fish don't damage themselves when they come up for the flies. If the aquarium is not properly covered, you may have to explain why the house is suddenly full of bluebottles!

Pantodon gets its common name from its large pectorial fins which are supposed to resemble a butterfly's wings. The thread-like pelvic (ventral) fins could also be considered the butterfly's antennae.

Winter's coming!

I hate to think of cold, grey days, but sometimes we have to.

1 This is a good time to check over your heaters and thermostats and make sure you've got spare ones in the cupboard. During the summer, aquarium heaters have probably been off for most of the time.

2 Also, give the lights a once-over. Despite what the manufacturers say, the light output does appear to deteriorate over time and, if you are anything like me, just because the tube lights up, you think it's as bright as the day you installed it. Try putting in a new one — the difference is quite stunning.

3 Clean the reflector inside the hood and also make sure that any cover glasses are free from algae and such like. After all, there's no point in spending good money on a new tube if the light can't penetrate the grime-clad cover glass!

4 While you're in the mood for hardware maintenance, don't forget the filtration system. Check bearings, seals etc. and, again, make sure you have some spares. Murphy's Law states that the thing will go wrong when you're snowed in!

THE AQUARIST
And Murphy's Law

It's not fair, is it? Disaster always strikes when you are least prepared for it... as **Sue Arnold** was. Still, there's always a silver lining...

Illustrations by the author

There are three things that it is essential for an aquarist to know:

1. Water is very wet and moves exceedingly fast.
2. Glass is very sharp and lurks in spiky fragments waiting for naked flesh.
3. Tanks always crack after the shops have shut and just before bed time.

I'm convinced that Murphy was a fish-keeper. He also knew what it was like to be deeply involved in the last five minutes of the final episode of the incumbent 'who done it?'! Biting your nails, drink in one hand, choccies in the other, waiting for the punch line, desperately hoping it was worth incarceration for twelve whole episodes.

There's turmoil in the fish tank. You barely glance at your amorous Oscars, flashing their courtship coats for the very first time. It doesn't impinge on your besotted brain, that you've waited twelve months for these two great beauties to make the earth move. For the next five minutes you don't even care.

Twelve weeks, twelve episodes. A tangled saga that lost you in episode three, but you have to know what happens... you really have to *know*...

Tomorrow's talk will not be of the latest royal scandal, or political impasse. It will not concern the best soap powder, dog food or rap of the week. No, tomorrow only one thing will matter. Who done it? Who tied you up for twelve interminable episodes, so complicated in nature that mastermind now seems as simple as A.B.C. Who in your circle guessed... sorry *solved* the mystery? Who claims the sweepstake?

'Cracking' finale

The music changes to the 'It's all coming to a head' variety. Your pulse quickens. You sit eyes staring straight ahead. Your drink is cold, your mouth is stuffed full of chocolate. A man in black slowly and silently enters a seemingly empty room...

CRACK!

You grab a soft centre, eyes never leaving the screen. The music increases in tempo. There's no sign of a gun. The sinister man in black still loiters in the shadows.

CR-A-A-A-CK!

You see a knife, but not a gun. The knife is raised. Its blade glints in evil anticipation. Now you can rightfully sit eyes glued to the screen... but your attention is gone.

Murphy strikes

Murphy has struck, ensuring you miss that very last moment.

Warm, and more than slightly smelly, water is pouring over your slippered feet. The chocolates litter the floor, tumbling out of their crinkled cases to sink in the deepening mire. Their wrappers float gently away. You leave the room at the speed of sound screaming "BUCKETS!" at everyone and nobody. Murphy had a hand in this... there's nobody.

The giant fish flap in frustration. You master your secret fear of cold cross fish and dive. The Oscars leap five foot, your knees are finely shredded. The water temperature falls to freezing. You eye the seemingly inert red giants. They stare back resentfully. You leap again.

You sit in an undignified heap picking glass from your grubby knees. You're cold and you're wet, but you're pleased. The Oscars are saved. Held captive in a far-too-small bucket, protected from jumping by a soggy book.

A question of priorities

It's all a matter of priority. The fish are your friends. You could have considered the brand new carpet... You know! The one your impatient man spent hours laying only last week, but you didn't; and it's odd how, surrounded by water, you instantly recalled the insurance renewal form lying deep in your pocket. It's been there for weeks... too many weeks. You saved the fish anyway. Aquarists are kind, if not always sensible. Murphy knows that.

Murphy knew that the spouse would not be best pleased. He guessed that one very cross man would storm out there and then. You needing just a little tender loving care. Your shirt soaked, your knees bloodied, your temper all fragile and frayed.

No knight in shining armour for you! No hint of a protective guardian angel. You might remember promising to take the better with the worse, but he doesn't. "Your fish! Your problem!", he shouts and vanishes into thin air.

You sit exhausted in the midst of chaos. The carpet's outside and you know it's forever. The room... like you... smells damp and sour. It's three in the morning and your none-too-loving husband has left you. The far-too-small bucket leaps fitfully round the floor. The fish are fed up and want to go home. You are too tired to care. Murphy has had his moment. It could happen, and it did. If you thought it would help, you'd cry.

New possibilities

Life goes on. Not one for self pity, you recover. Things could be better alone. More fish tanks, more tank busters, more time. You grin. You decide to expand. *Astronotus ocellatus* has stolen your heart. You select your new love, perhaps the Gold Edge from Equador or the Silver Edge from Peru. Tomorrow, you'll make up your mind... do things your way.

Murphy's not finished yet! Did you think that he had? Bossman returns, muddled and merry but supported by friends. You're ready to kill, but it's party time. He fills your glass to overflowing, oblivi-

ous of your state of mind. Win some, lose some, the wine looks good, so you decide not to fight and join in.

Fred has a fish tank he kept for a spare.

Freda, a carpet with almost no wear.

Gina a hoover that sucks the world dry.

Your face has a smile and you stop asking WHY?

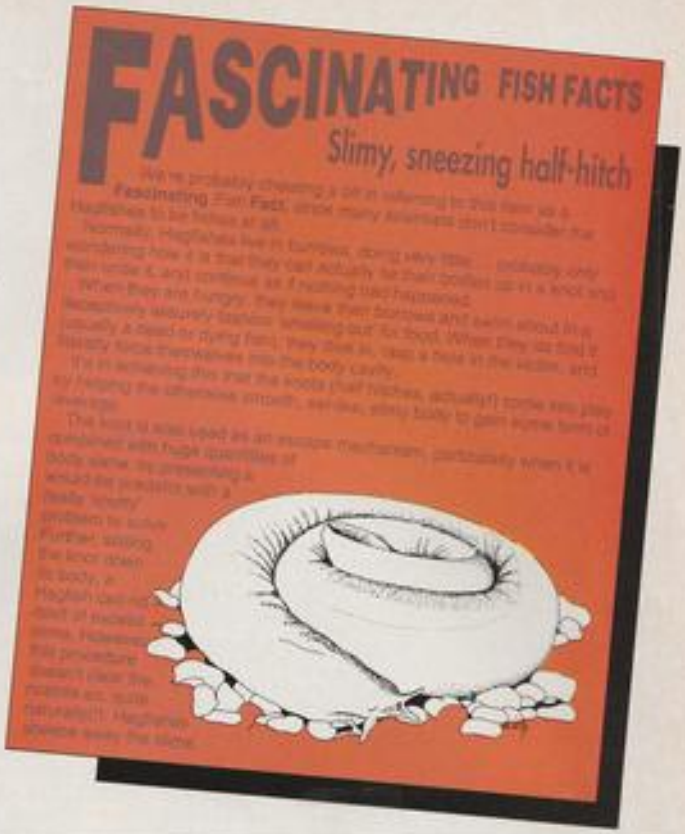
You discover who done it, and find you don't care.

The tank's all set up and the Oscars are fine.

The party is swinging, there's chat and there's wine.

Everything's sorted from murder to mat.

A storm in a tea cup... Murphy knows that!



Tight-Spawning DWARF

Steve Dent introduces a small Tanganyikan cichlid that breeds in the tightest-fitting 'caves' imaginable.

Photographs by the author

The Striped Telmat (*Telmatochromis bifrenatus*) is a fairly peaceful rock-dwelling cichlid from Lake Tanganyika in Africa. Lake Tanganyika itself is the seventh largest lake in the world and belongs to the group known as Rift Valley lakes. These lakes were formed by movements in the tectonic plates of the earth's crust and, as a result, Lake Tanganyika is believed to be the second deepest lake on the planet.

Most of the fishes in Lake Tanganyika are endemic (occur only in the lake and nowhere else) and *Telmatochromis bifrenatus* is one such fish species. There are five species in the *Telmatochromis* genus: *T. bifrenatus* and *T. vittatus*, which are closely related and similar in appearance, and the rather different *T. temporalis*, *T. bugesoni* and *T. dhonti* which is sometimes known as *T. caninus*, a junior synonym.

Shades of brown and white

As the illustration below shows, the Striped Telmat is a fairly long, cylindrical dwarf cichlid. It reaches a length of about 4 inches (10cm) for the males, with the females not much more than half this size (2½in-6cm). The overall coloration is fairly muted, being an off white base colour overlaid with brown markings.

There is a very distinct brown stripe at the base of the dorsal fin, below which is another stripe running from the snout through the lower half of the eye to the base of the caudal (tail) fin. This stripe is, however, broken and appears to have been drawn on by an artist using a shading technique to give very narrow oblique dark stripes. There is also a black edge to the dorsal fin and, sometimes, the anal fin will have this black tip as well.

Ad Konings, in his book *Tanganyika Cichlids*, questions the validity of the name *bifrenatus* given to the fish in this article because in the original description of *T. bifrenatus*, Myers noted two stripes on the body and a black stripe at the base of the dorsal fin. The fish that I have kept, and many other fishkeepers have had, has only a single stripe on the body and the stripe at the dorsal base.

There is a fish in the lake that does have a double stripe and Konings wonders if the "more common" fish is a different variety or different species.

FACT FILE

Scientific Name: Telmatochromis bifrenatus Myers 1936.

Common Name: Striped Telmat.

Distribution: Endemic to Lake Tanganyika.

Size: 12cm (4¾in) male; 6cm (2½in) female.

Male Striped Telmat hovering over 'his' pot. Note the torn fin in the fish in the background.

Wild/aquarium requirements

Either way, the fish in question lives in the lake in association with the rocky shore, so the aquarium designed to hold this species should reflect this fact. The more hiding places and rocky crevices, the better the fish appear to like it. As with all Tanganyikan fish, the water conditions should be fairly hard and alkaline. According to Staeck and Linke, Lake Tanganyika has a pH of 7.5 to 9.2, a GH (general hardness) of 7 to 11 and a KH (carbonate hardness) from 16 to 18.

If these parameters can be reproduced in your tanks, they will help the fish to feel at home, particularly for wild-caught fishes; tank-bred specimens are more adaptable but should, ideally, also be given these conditions.

When kept in small groups, male *T. bifrenatus* can be fairly quarrelsome, with a fair degree of chasing, but this is usually more of a show than real aggression. However, fins can occasionally be torn by these actions. If one male and several females are kept together, then there are fewer of these skirmishes.

Tight cave spawning

The female stays smaller than the male and often hides in caves that are too small for her mate to enter. This behaviour continues even when breeding, as one picture clearly shows. The male therefore has to fertilise the eggs by spraying his sperm *into* the spawning site. The eggs and young are then looked after by the female, while the male goes off to look for ▶

Tight-Spawning DWARF

◀ other females to spawn with.

When the fry are free-swimming, the male (father) is as likely to make a meal of his children as he is to look after them. The female appears to be the only parent to consider brood care, and this does not last very long. At least, this is my experience of tank-raised specimens.

AQUARIUM CARE

Tank Size: 60cm (24in) if kept in pairs; 90cm (36in) or larger, if kept as harems.
Temperature: 25-28°C (77-82°F).
pH: Above 8 is preferred.
Hardness: GH 7-11; KH 16-18.
Diet: Live food preferred, but will take all usual aquarium foods.

Female in her excessively tight spawning 'cave' — too small for a male to enter.

Breeding formula

The best way to ensure breeding success is to purchase five or six young fish — preferably from two or more sources — and grow them up in a fairly spacious tank. Provided this tank is equipped with plenty of rockwork and hiding places, the young fish should get on fairly well.

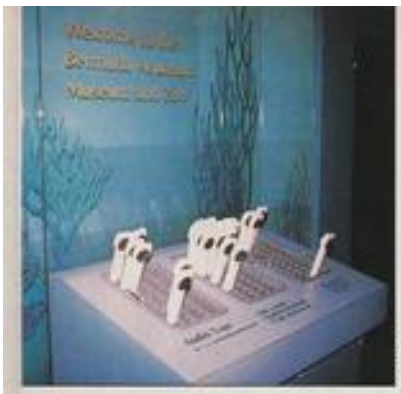
If, as the fish grow, one male starts to dominate the tank, other rival males should be removed. With a bit of luck you should be left with one male and perhaps two or three females. If this is the case, then the male will spawn with all the females as and when they are ready and, in a large tank, should live relatively peacefully for a long time.

In one of my four-foot tanks (4ft × 15 × 15in — 120 × 38 × 38cm) I have two pairs; well, two males and two females that spawn every so often, but they and the other tank inhabitants seem to make quick work of eating most of the babies. One or two young do, however, survive the attentions of the other fish in the tank and these are grown on, albeit very slowly.

The large amount of rockwork in this type of aquarium set-up makes it almost impossible to catch the fish without removing the rocks and, hence, disturbing the whole community. When space allows, I think I will set up a small tank (2ft × 15 × 15in — 60 × 38 × 38cm) for one of the males and both females and try to make a concerted effort at spawning and rearing this wonderful little cichlid. AAP

FURTHER READING

Ad Konings.	*Tanganyika Cichlids*	Verdolin Cichlids Lake Fish Movies
Staeck, W. & Linke, H.,	*Afrikanische Cichliden II — Buntbarsche aus Ostafrika*	Tetra Verlag
H.J. Richter,	*Complete Book of Dwarf Cichlids*	T.F.H. Publications, Inc.
John Ferguson,	*Telmatochromis bifrenatus*	B.C.A. Information Sheet No. 50



DAVID FORD

Top left, Bermuda Aquarium entrance with the 'Sound Sticks', a mobile radio phone service that receives information from each aquarium.

Main pic, the Bermuda islands from the air. The surrounding reefs can be seen very well from here.

Bottom right, listening to the commentary before photographing all the Bermuda coral fishes.

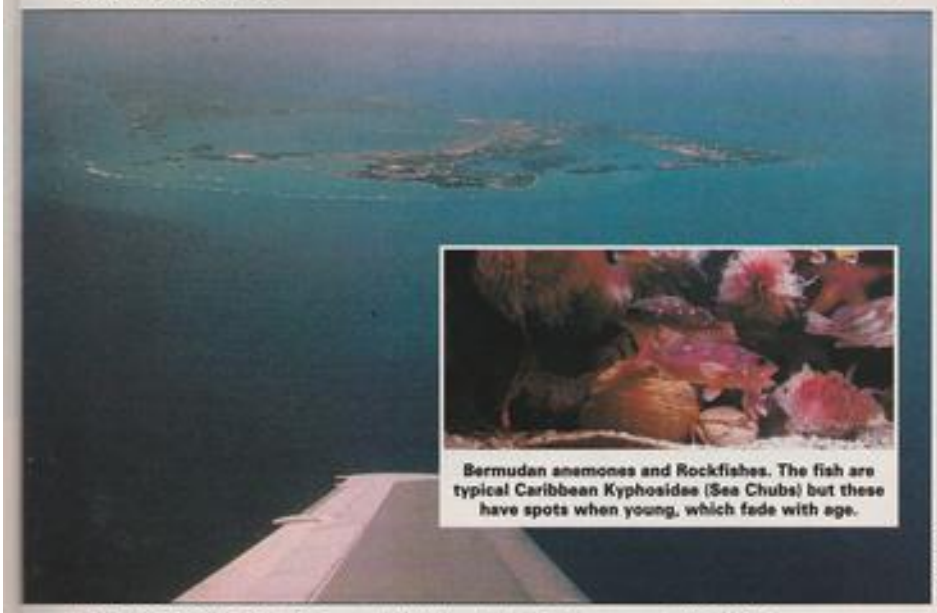
TRAVELLER'S TALES

BERMUDA SOUND TOUR

Aquarian's **Dr David Ford** visits an aquarium with a difference, and marvels at some beautiful fish that could land you in jail!

Bermuda is still part of the old British Empire... so our taxes help pay for their police. Those policemen also check that no-one captures the coral fish that abound in the Bermuda reefs, with a stiff fine if you are caught taking those fish or inverts for a home aquarium.

Situated 600 miles off the coast of North Carolina, the islands of Bermuda (all 356 of them!) occupy only 22 square miles. Only 181 islands are actually named (some are too small to step on), the populated one being Main Island; it is about the size of Heathrow Airport. The population of nearly 60,000 is totally devoted to tourism and the 50 miles of barrier reefs that surround the island are one of the attractions.



Bermudan anemones and Rockfishes. The fish are typical Caribbean Kyphosidae (Sea Chubs) but these have spots when young, which fade with age.

DAVID FORD

However, the reef should not be there... the island is 1,000 miles north of the tropical islands of the Caribbean and so should not have any corals. It's the Gulf Stream which provides the reason for the island's warm waters, while the separation also means that the corals and coral fishes are different, indeed unique.

The Colony's Government (it is a UK Colony, but not a Crown Colony, although the currency is the USA Dollar, with the Queen's head on it — which totally confuses American tourists!) has made the reef a protected area, with a ban on collection. Fishing, especially spear-fishing, is banned too, although deep sea fishing is allowed, with sport fish such as Marlin, barracuda and tuna plentiful. Hook and line fishing of the reef is accepted, if the fish taken are for food, and the authorities may even turn a blind eye to a seawater aquarium in the home... but only if you are a Bermudan!

To see the corals and the fish you need to snorkel, scuba dive or take the glass-bottomed boat; there is a submarine too. However, although the weather is warm (always around 70°F) the seas can be rough (hence, the Bermuda Triangle problems), so visitors are allowed to see the reef animals in the Government owned Bermuda Aquarium.

This public aquarium is part of the island's museum and zoo and has twenty-four 1,000-gallon tanks (plus two 2,000 and a 40,000-gallon aquarium) which take unfiltered seawater from the coastal waters at Flatts, near the capital of Hamilton. All the Bermudan live corals, seafans, sponges, anemones and many coral fishes are on display. The aquarium staff are the only people allowed to collect specimens.

To hear about the animals, 'sound sticks' are supplied. This is an audio tour; you pick up a mobile phone at the entrance and when standing in front of a particular tank, it receives a radio message that explains what fish or invertebrates are displayed therein. The fish are different too — often being slightly, sometimes very, different species to the butterflies, gobies, damsels etc., that we are familiar with. There are no clowns, but many beautiful wrasses.

After your 'travelling reporter' had rushed around the aquarium listening to the audio messages on all 24 aquaria, I toured again taking lots of flash photos of so many fishes I had never seen before. I used an electronic flash, which apparently gave an ear-splitting howl in all the mobile phones. I recall wondering why all the other visitors were complaining and sticking fingers in their ears — but I had a lot of photographs to take, because I couldn't take the fish...!

DAVID FORD

WRITE BACK

Billy Whiteside

Having just read your Editorial in the July issue, and learning about the death of Billy Whiteside, I felt that I had to put pen to paper.

I have been reading *Aquarist & Pondkeeper* since the late 1960's and — for me — **What's Your Opinion?** was one of the most enjoyable parts of the magazine; it was always a refreshing angle to allow people to have their say, without criticism.

It will feel very much as if I've lost an inivisible friend who has had a big influence on the direction in which my career has evolved.

I would appreciate it if you would extend my sincerest sympathies to his family. Extended sympathies also from all the staff at Reflections and the Membership of the Gloucestershire Aquarist Society. Our thoughts go with you. With sympathy.

Clive Norris,
Stroud,
Glouc.

This letter is typical of the ones we've been receiving, not to mention the 'phone calls, following our announcement of Billy's death in our June issue. We thank you all for your touching expressions of sympathy at the loss of our long-standing and much-loved friend. Ed

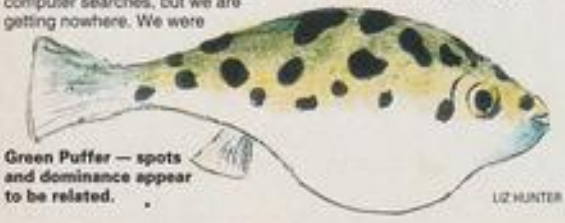
Puffer info plea

We have been conducting a behavioural study of Green Pufferfish, *Tetraodon fluviatilis*, in the School of Biological Sciences at the University of East Anglia. Our fish were bought from a local aquarium dealer, and we were wondering if any *A&P* readers could help us learn about the natural ecology of this species.

We have examined dominance among the fish in relation to their body size and the symmetry of their spot patterns. We found that larger fish were dominant (not surprising), and that fish with highly symmetric spot patterns for their size were especially dominant. This latter finding, concerning symmetry, was of particular interest because there is recent evidence that symmetric colour patterns and 'ornaments', such as long tails in birds, may reflect genetic quality and ability of animals to withstand stress during development. Indeed, fish may use each other's symmetry to assess competitive ability.

We have made all of the usual searches through the scientific literature for information on the ecology of this species, including computer searches, but we are getting nowhere. We were wondering whether any *A&P* readers have seen or worked with Pufferfish in the wild (including closely related species) or know of a popular article about their ecology. We were also wondering if it is possible to distinguish the sexes externally. Any information or suggestions would be much appreciated.

Dr John Reynolds and
Sebastian Mann,
School of Biological Sciences,
University of East Anglia.
Norwich NR4 7TJ.



Green Puffer — spots and dominance appear to be related.

LIZ HUNTER

Filtration: not optional

I refer to Alex Stephenson's article, **Ponderings**, in the July edition of *Aquarist & Pondkeeper*.

He states that filtration of a pond is an optional extra, rather than a necessity. Unfortunately, many inexperienced fishkeepers will read the article and believe in it.

In numerous cases, although not all, lack of filtration will be responsible for poor quality of water and subsequent death of many fish. We, personally, have found that a large percentage of fish suffering from ulcers and other diseases have been housed in ponds with unfiltered water.

Being involved with individual fishkeeper's problems, it is my opinion that many of them could have been avoided had filtration, however basic, been installed.

J.A. Goldsmith,
St. Johns Aquatics,
Clacton-on-Sea, Essex.

Alex comments

Response to an article is always a good thing. It shows not only that the piece has been read, but that it has also produced some independent thought. When I began producing articles for *A&P*, I said that not everybody would always agree with me and that I enjoy and value reading other viewpoints.

However, Mr Goldsmith's letter has not changed my opinion. If newcomers to the hobby are encouraged to think that filtration will rectify all the problems created by poor design and bad management, they are going to be disappointed. Of course, filtration has its uses, and can be a valuable asset, but if it *has* to be employed as a life-support system, there is something seriously wrong.

Alex Stephenson

BIOPLAST LETTER OF THE MONTH

Double flower.

WILLIAM ROSE

Siamese Twin Lily?

I have a patch of various water lilies in a garden pond containing five Koi. These, in my opinion, are the only water plants that have any survivability prospects in such a pond. This summer, a beautiful red lily produced a flower bud which was larger than those usually found on this mature plant. Awaiting the opening of this super bud was very exciting.

The sun eventually teased the bud into a bloom which was larger and appeared to have more petals than its sister flowers. On closer examination, I found the flower to have two calices. It was a truly magnificent lily.

Considering the phenomenon of this super lily flower, I believe it should have been two lily flowers. Somewhere during its early development, though, something must have happened that interfered with the separation of the two developing flowers and they remained joined together. Could this fault in nature be considered as Nymphaea Siamese Twins?

William Rose,
Ely,
Cambs.

This unusual event, captured brilliantly on film, is this month's choice for a special gift consisting of £30 or products from BioPlast (UK) Ltd (Tel: 0535 630230), which will soon be on its way with our compliments.

Ed.

Double and normal flowers for comparison.

WRITEBACK

Barley observations

I read your comments, **Incredible Barley Straw,** in the *Aquarist and Pondkeeper* (**Question Time** — July '94) with great interest and would make the following observations.

Considerable scientific research into the control of algae with barley straw has been undertaken by the Aquatic Weeds Research Unit, at Sonning (an outstation of AFRC Institute of Arable Crop Research, Long Ashton). Trials over six years have shown that a chemical released during aerobic decomposition of the straw is responsible for control of the algae.

Although, I believe, their research has not yet identified the chemical responsible, much has been learned of its characteristics and of the best ways to employ straw effectively. A dose rate of 5gm/m³ has been found to be effective.

Herbicide uptake in straw is very low and I suggest that washing the straw prior to use is not necessary. However, care must be taken, particularly with plastic filament netting, that fish, attracted to invertebrates breeding in the straw, cannot become caught by their gills in the net.

Building on the results of this research and our own trials in the water industry, Green Ways has recently launched the 'Pond Pad' for domestic ponds. These flat pads give maximum exposure of the straw to water and we have customers, professionals in the pond care business, who have achieved dramatic improvements in their pond water clarity in just 10 days.

Tony Palin,
Greenways
Environmental Care,
Chertsey, Surrey.

[For a full report on barley straw use, see William Wildgoose's article in this issue of A&P. **Ed.]**

"I still think Queen Angel would have been perfectly happy staying next door with Mr and Mrs Jones..."

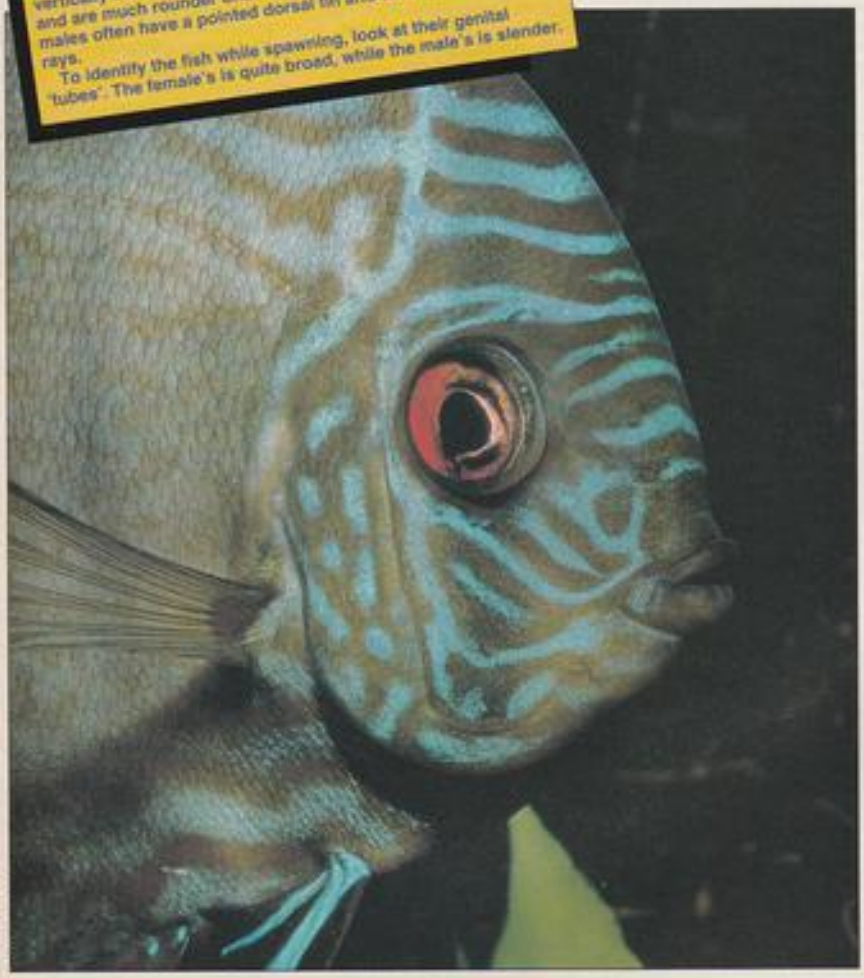
DISCUS

SEXING DISCUS

Adult Discus — when around 3½ to 4in — 9 to 10cm — are easier to sex than young fish. Determination of the sexes is possible by close inspection of the abdominal region.

Males have a slender appearance and the body underneath, between the pelvic fins and the start of the anal fin, is more vertically inclined. Females tend to be quite plump when fed and are much rounder under the pelvic area. When mature, males often have a pointed dorsal fin and will have elongated rays.

To identify the fish while spawning, look at their genital 'tubes'. The female's is quite broad, while the male's is slender.



M.P & C PIENAAR

Close up of an adult male Discus (see box for details).

pH crashes

This is probably one of the most 'popular' complaints when keeping Discus, especially where soft water is concerned.

Crashes in the pH are due to the additions of food. This organic matter is cycled and recycled by the living organisms in the tank, eventually accumulating as either detritus or dissolved organics. Many organic compounds, including proteins, amino acids, peptides, fatty acids, urea, ammonia, organic dyes, amines and phenols fall under the category of dissolved organics.

Unless they are removed from the aquarium through filtration and water changes, organics continue to accumulate and cause changes in the tank environment which are detrimental to the inhabitants.

Excess organics accumulate slowly in uncrowded, sparsely fed tanks and rather quickly in heavily-stocked, well-fed tanks, but in both cases they must be controlled by good aquarium management.

The key signs of excess dissolved organics are a

SIONS

BY STEVE DUDLEY

yellowish tinge to the water, a slimy foam at the surface and a marked drop in the pH. All indicate a need for a filter clean and a good water change.

Although partial changes of water are the best way of controlling dissolved organics, they can also be reduced to some extent by carbon filtration and UV irradiation. Both are very effective.

Eliminating Gill Flukes

Discus that are infected with these parasites actually scrape and swim against objects in the tank attempting to dislodge the irritants. Flukes can readily move from one fish to another, although they do tend to remain with the same fish.

Severe infestations invite bacterial infection through stress and through weakening the fish, as well as by breaking through the skin and mucus layers.

The most effective treatment is to prepare a formalin bath by adding 1ml of formalin for each gallon (4.5 litres) of water. Aerate this preparation vigorously because formalin tends to reduce oxygen saturation.

Remove the infected fish and place it in the solution and carefully time the hour of treatment. **If there are signs of shock, terminate the bath immediately.**

Formalin is a commercial preparation of 37% solution of Formaldehyde gas. It is available from the chemist, where you may be asked to sign the poison book. **Formalin is potent and very dangerous if inhaled and is to be kept out of children's reach at all times.**

This chemical acts as a preservative by denaturing proteins, by binding them together, thus preventing the chemical reactions of life from taking place (de-composition).

Even at very low exposure levels, formalin destroys the Gill Fluke parasites without bothering the fish. It will also destroy most bacteria as well, creating problems with bacterial filtration.

Formalin breaks down naturally over a period of weeks in solution, so it will be in the aquarium for some time, unless water changes are carried out.

This remedy is a useful treatment for other ailments besides flukes, such as external fungus, external bacteria and *Oodinium*, but keep effective doses in a separate treatment tank or you will inadvertently eliminate organisms you don't want to get rid of.

Alternative treatments for Gill Flukes are also readily available. Most recently, a product from the USA known as Fluke Tabs, has been shown to be very effective. O,o-dimethyl 2,2,2-trichloro-1-hydroxyethyl phosphorate can also be administered directly to the aquarium water.

The advantages of this compound outweigh the disadvantages, as it does not disturb the activity of the biological filter system. The only problem with this medication is that Discus tend to lose eye colour and any other red pigment present on the body for about a week. Some may also experience some skittiness, but on the whole, this is a very effective medication.

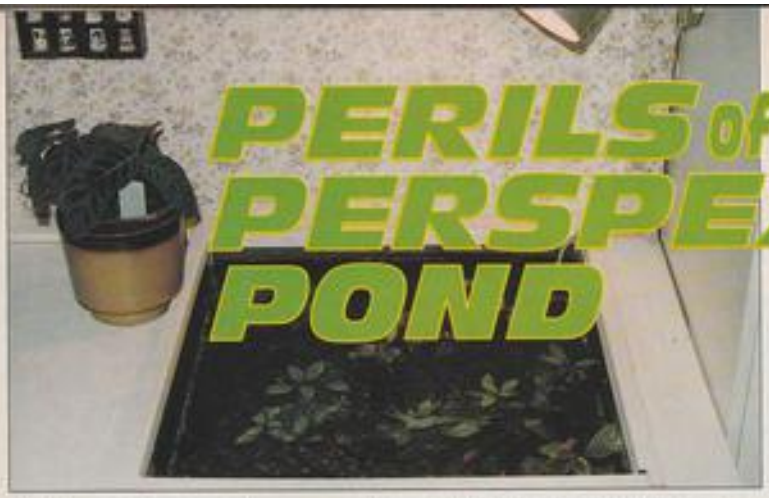
GOLDEN RULES

1. Try not to feed adult Discus more than twice per day. Often, over-fed males develop swim-bladder problems.
2. If Discus appear to be gaping at the water surface, especially after feeding, introduce an air-stone, thus ensuring escape of carbon dioxide.
3. If your Discus have stopped feeding and all water parameters check out, raise the temperature to 94°F(c34°C) for 3-4 days.
4. To adjust pH upwards, use bi-carbonate of soda. To lower it use ortho-phosphoric acid.
5. Never keep Discus in pure 100% Reverse Osmosis water as this is considerably sterile, dead water. Try to mix some tapwater with it.
6. If you are about to transfer Discus from one tank to another, wait until last thing before lights out. This will allow the fish to settle in with ease and without hassle from inmates.

Gill Fluke attached to gill tissue.

BRANDON BROWSTER

PERILS of the PERSPEX POND



Our pride and joy just after completion.

MAKE YOUR POND SAFE!

As **Susan Brewer** discovered, even the best laid plans can develop a mind of their own... and spoil your dreams of grandeur.

Photographs by the author

It was so pretty while it lasted! At the time it seemed like a good idea.

"I wish people could have ponds indoors," said daughter.

"Bet dad could make one!" said son.

"Hmmm" said dad.

Mum said nothing, she kept... well — mum!

A year or so previously, my husband had built a long, low unit in our lounge, which incorporated, at one end, a deep square trough to contain houseplants. The trough was illuminated by a green bulb, and looked very attractive, for a while. Then, unfortunately, the plants developed mealy bug, aphids, scale insect, acne, bubonic plague — you name it, they caught it. Which is why dad said "Hmmm", in such a thoughtful way when the indoor pond idea was broached.

A trip to our local DIY store produced a large sheet of perspex. After several hours of measuring, muttering, sawing and swearing, (perspex cracks easily when sawn!), dad proudly emerged from the shed, bearing a square translucent box, the sides of which were glued with aquarium sealant.

"Dad's made an indoor pond!" said daughter.

"Bet it leaks," said son.

Dad looked as if he wanted to clip son around ear but, unfortunately, his hands were full of perspex pond.

The small procession wended its way through the garden, conservatory, kitchen, hall, and into the lounge, finally coming to a halt by the redundant plant trough. Dad, making the most of the moment, raised the perspex pond shoulder high, then reverently lowered it, down, down, down, into the trough.

It didn't fit! Quickly, I covered the children's ears to shield them from the rather unusual language echoing about the room as dad wrestled with the pond, which was now wedged at a forty-five degree angle in the plant trough. Eventually, however, after much struggling, grunting and a fortifying lager, it was free. Dad slunk back to the shed, sawed and shaved a few millimetres off the box, re-glued it — and success! Proudly, he lowered the perspex container into place. We all cheered to boost his morale. The erstwhile plant trough was now a pond. Or, rather, it was *capable* of being a pond. First, it needed to be filled with water.

"I'll fill it!" said daughter, clutching a mini watering can.

"I'll help!" said son, waving his water pistol.

"No!" thundered dad. "I'll do it myself." And he did.

I followed behind with the mop — it's amazing how water spreads when it splashes over floors, carpets, magazines and the cat.

Later that evening, we had to admit that it looked really good. The waist-high pond shimmered under a wall mounted spotlight. A small pump-operated fountain played on the water surface and the browny-buff gravel, emerald *Elodea* and red Fairy Moss sparkled. It would certainly be a talking point with visitors, and I knew that the 'electrics' were completely safe, as dad had taken great care with the wiring and insulation. In addition, he had installed a safety cut-out. We decided that we would buy some goldfish at the weekend, and the children went happily to bed.

Next morning we hurried into the lounge to admire the pond. It still looked beautiful — but somehow odd. Then we realised that the weight of the water had bowed the unit, and the whole thing was now sagging dangerously. Immediate action was needed. In rushed dad with a tatty piece of battening which he wedged under the trough to form a leg. Miraculously, the pond levelled again.

"I'll paint the leg one day." (Six years later, it is still unpainted and still propping up the unit!)

At the weekend, we visited our local water garden centre to buy some occupants for our little pond.

"These are the ones we'll have," announced son, pointing to some enormous Koi.

"I want these fishes," said daughter, admiring a fabulous marine tank full of butterflyfish.

"We're having these," stated dad firmly, dipping the net into a tank of cheap-and-cheerful Goldfish. The children didn't really mind and were soon engrossed in choosing the fish, insisting, of course, that each one had to be different so that they could be recognised. It took about an hour before they were satisfied. We had one with a long tail, one with an extra-long ▶

Tippy, Dusty and Co.

'SERIOUS BIT'

Although this article is written in a light hearted way, please remember:

1. Water and electricity can be a lethal combination.
2. A baby can drown in a few inches of water.
3. Fish have feelings too — don't let children tease them — it's tempting with an always-to-hand indoor pond.
4. Water-filled boxes are heavy — make sure your supporting unit is strong.
5. Check that the pond is watertight before you put it near your best carpet.
6. Stick a strip of sello-tape along the cutting line before you start sawing perspex — it prevents splintering.

Alice and friends in their new, and now permanent, garden pond home.

PERILS of the PERSPEX POND

tail, one with a black spot, one with two black spots, and a boring plain gold one because they felt sorry for it.

Of course, all the fish had to be named, and so they soon became Spot, Tippy, Dusty, Star — and Alice! They gazed blankly out from their polythene bag, not realising the great honour bestowed upon them — that they were to be the very first inhabitants of our posh indoor pond. These five little fish soon settled very happily — as far as we could tell — into their new watery home and were soon joined by two others won at a local fête.

They grew and thrived, and became quite tame, gathering at the corner for food as soon as anyone approached. Nothing seemed to worry them and they even took in their stride the small wooden sailing boat, squeezy shark and the family of plastic ducks that often (to dad's fury)

shared their domain. Certainly, son and daughter loved the pond — naval battles were regularly fought, whales sighted, and once, a clockwork submarine surfaced (this, I hasten to add, was before the fish were in residence.)

However, sadly, all good things must come to an end, and sometimes they do so when we are not really expecting it!

"Did you know," said son conversationally one lunchtime, "that the lounge carpet is soggy?"

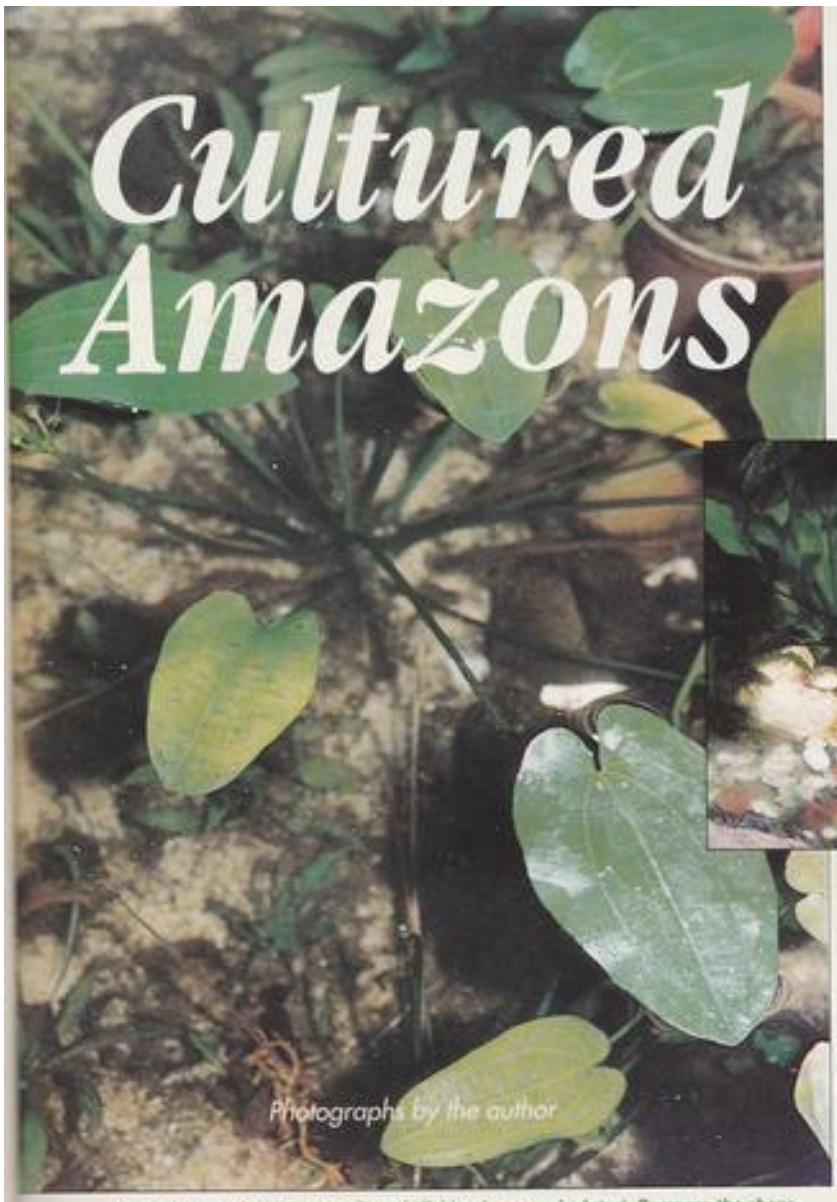
"Oh, I noticed it this morning," remarked daughter airily, "cos my foot got all wet."

We rushed into the room. The pond was half-full and dripping. The water had seeped through a faulty join in the perspex and completely soaked the wooden trough which was now as sodden as a sponge. Regretfully, we scooped up the Goldfish and transferred them to the outdoor pond. They're still there, now grown into enormous creatures who terrorise any cat foolish enough to sunbathe near the water.

The trough remains in our lounge. Once it had dried out, it became a receptacle for video tapes, magazines and tubes of smarties. No doubt, it often dreams of its two years of grandeur, when it was transformed into a beautiful indoor pond and became the focal point of the room.

As I said at the beginning, it was so pretty while it lasted! AEP

Cultured Amazons



Aerial leaves of the Amazon Sword (*Echinodorus paniculatus*). Compare the shape of these leaves with their elongated submerged equivalents in the accompanying shot of a furnished aquarium.

The Amazon Swords in this furnished aquarium were produced using tissue culture techniques.

Dr Chris Yeo of the Universiti Sains Malaysia, in Penang, shows how taking a 'cultured' view to growing aquatic plants can result, not just in beautifully healthy specimens, but in enough of them to supply the whole of the existing demand for these plants ... and help conserve them as well.

Aquatic plants are essential components of any aquarium. They are used for decoration, of course, as well as for providing natural shelters and spawning sites for some fish. In addition, aquatic plants enrich the water with oxygen during photosynthesis (their food-building process).

Numerous plant species have been used for aquarium culture over the years. Among them is the Amazon Sword Plant (*Echinodorus paniculatus* = *bleheri*), belonging to the family Alismataceae. This species is a beautiful and popular aquarium plant that grows rather tall, but has a short rootstock, and is more suitable for growing in large aquarium tanks.

A young *Echinodorus* plant in an aquarium tank makes an attractive but hardy specimen. When the plant grows larger, the leaves above the water level assume a different shape. Then a long inflorescence grows out of the water, eventually to bear white bisexual flowers.

The blooms last one to two days only, after which the flowers wither and are replaced by ball-shaped fruits. Later, young plants form along the flowering inflorescence. These plantlets produce roots rather easily.

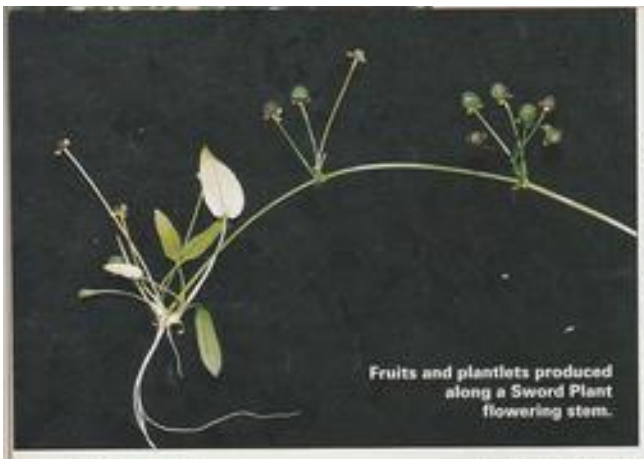
Propagating aquatic plants by means of cuttings, runners and division of the mother plant rootstock is satisfactory, but all these processes are slow if large numbers of plants are required to supply the demand of the aquarium industry. This need becomes even more urgent if the particular plant is unique.

Tissue culture techniques offer us the opportunity to do just that (ie) reproduce numerous plants over a relatively short period of time.

For the last two decades, our tissue culture laboratory at the Universiti Sains Malaysia, in Penang, has been propagating ornamentals and fruit trees by tissue culture. Recently, we extended our interest to aquatic plants, the Amazon Sword Plant (*Echinodorus paniculatus*) being one of our main targets of interest.

The explant, or tissue, used for propagation in our experiments was the stem section at the base of the leaves. The explants were first sterilised in Clorox solution before culturing in Murashige & Skoog (MS) nutrient medium. The medium was gelled using agar at 8 grams per litre.

The growing tissues were then transferred to new medium every two to three weeks. The culture tubes were kept in our laboratory at a temperature of about 25°C (77°F) and grown under 24-hour fluorescent lighting.



Fruits and plantlets produced along a Sword Plant flowering stem.

First results

Our first experiment was conducted to find the most suitable culture medium for the explant to form multiple shoots. A total of 16 media were prepared, containing varying concentrations and combinations of naphthaleneacetic acid (NAA) and benzyladenine (BA).

Explants were cultured in each medium and, after three weeks, the number of shoots produced by each explant was noted.

The results of this experiment indicated that the best medium for the explant to produce multiple shoots was MS+ 2mg/l BA. Each explant produced an average of 7.17 shoots, compared to the rest of the media which produced four to five shoots per explant.

Experiment 2

In the second experiment, we wanted to know if the explant used should be a whole stem or a half-stem split vertically into two halves.

Both types of the explants were cultured on the medium determined as being the best in the first experiment: MS+2mg/l BA. The explants were cultured for a total period of eight weeks.

The result of this experiment showed that half-stem explants produced 11 times more shoots than the whole-stem explant. Over a period of eight weeks, the half-stem explants produced 281 shoots from an initial five explants. On the other hand, whole-stem explants produced only 25 shoots from an initial five explants.

The cutting of the explant into two-vertical halves stimulated the buds to develop more shoots, hence the tremendous increase in their number. In contrast, the culture of whole-stem explants resulted in the development of the apical (tip) shoot. Due to the effects of apical dominance (i.e. the dominating effect of the main shoot tip) only few lateral shoots were formed.

Final trials

A third experiment was carried out to find which of the media: solid or liquid, promoted better and more numerous shoot formation.

In this experiment, only half-stem explants were used. They were cultured in three different ways in MS+2mg/l BA medium. In one, the explants were cultured on solid medium, i.e. MS+2mg/l BA+8g/l agar. Another lot of explants were cultured in liquid medium — the same medium as in one, but without agar. In the third option, the explants were first cultured in solid medium for two weeks and then transferred to liquid medium for another two weeks; this alternating sequence of solid-liquid was then continued. Explants cultured in the liquid were placed on an orbital shaker and rotated at 150 rpm (revolutions per minute), which is standard procedure for tissue culture in liquid media.

The results of the experiment showed that explants cultured on solid medium for the entire eight weeks produced 281 shoots, out of which seven were abnormal. Abnormal shoots were narrow and sharp.

On the other hand, explants cultured in the liquid medium produced only 141 shoots. This is approximately half the number produced by explants on solid medium. The number of abnormal shoots in liquid medium was 14, which was twice as many compared to those produced on solid medium.

When the explants were cultured in solid-liquid-solid-liquid sequence, the number of shoots produced was even lower (108) and the number of abnormal shoots was also high (12 abnormal shoots).

From the results, we concluded that shoot production of the Amazon Sword (*Echinodorus paniculatus*) is best done on a solid medium. In addition to the high shoot production, the number of abnormal shoots produced was minimal.

The results of our three experiments showed that it is possible to propagate *Echinodorus* rapidly by tissue culture without much problem. The plantlets produced grow normally and make fine specimens for our aquaria.

Close up of one of the delicate flowers.

TC advantages

Therefore, for the aquarium industry, propagating aquatic plants by tissue culture offers many advantages. For a start, the plantlets which are produced are well-formed and make better-looking specimens than plants harvested from the wild. Tissue cultured plants are also free of pest infestation.

Then, of course, the ability to produce plants in a laboratory means that 'plant poachers' need not strip the natural habitat of its treasured plant species. In fact, obtaining a plant or two from the wild is adequate for mass TC reproduction to satisfy the needs of the whole aquarium industry! Surely, this is a practical and ethical way to conserve and save our green world. AAP

Sword plantlets growing on a solid culture medium.

Removed from the culture vessels, the sturdy, healthy nature of these plantlets can be fully appreciated.

Knife-edged Expe

Two years ago, unaware that any other species of livebearer existed except the 'bread and butter fish' available through Isle of Wight stockists, I 'found' Merry Widows (*Phallichthys amates amates*). For months, I had badgered suppliers who thought me mad or offered Black Widow Tetras!

In late 1992, Roger, my husband, and I joined the Isle of Wight Aquarists Society. Within weeks, we joined a club outing to the SPAS Coldwater Show, which included visiting two London retail outlets. The first held no fascination for me, but the second, Wholesale Tropicals, was an Aladdin's cave we regularly revisit, stocking many fish I had never seen before.

Bryan — club member and FBAS judge — advised me on purchasing a few of the unbelievable (to me) range of livebearers available. Among my first 'real' livebearer purchases were *Alfaro cultratus* and the much sought-after Merry Widows.

As may be discerned from its common name, the Knife Livebearer has a distinctive knife-edged keel consisting of two rows of scales along the ventral line and a strongly compressed posterior portion (particularly in males). The males' long pelvic (ventral) fins stimulate the females' head during pairing.

First experiences

Ignorant of the conditions the Knife Livebearer required, I put them in a community tank. By the time I found literature on their care, I had lost two. They were described as being pugnacious and prone to fin-nipping, but I found them shy fish (subsequently borne out by other authors).

Eventually, two females remained. Shortly afterwards, I found four fry swimming on the surface. Since I had (a) little experience, and (b) other fish in the tank, I was unsure who had 'dropped' fry. Having removed them to a small tank to rear, I was later rewarded by the sight of four juveniles, but disappointed in having four 'females'. Only a breeder can imagine my euphoria a few days later. I spotted two gonopodiums (this is the modified anal fin of livebearing males) emerging. My husband looked on amused as I stared for hours in wonderment!

I still had problems with keeping my little brood, and a nitrate problem following a trip away reduced my flock to two females and a small male.

Time passed, our library/knowledge expanded and I started to cherish my trio.

Basic needs

Alfaro cultratus (known affectionately at home as "Alfs") are not, as commonly written, predatory or quarrelsome. They prefer peace and are easily frightened by unannounced noses pressed against tank-sides, spying on them. This results in nose/mouth damage (to the fish, not the fishkeeper!).

"Alfs" need roomy tanks, with plenty of vegetation to hide in and a good flow (note the keel-shaped body) in clear, clean water. They live in the upper half of the tank, feeding from the surface.

In the wild, they are found with the Social Diamond-scale (*Priapichthys annectens annectens*) and the Orange Dorsal Livebearer (*Phallichthys amates pittieri*) in ponds and the clear waters of stony-bottomed streams. In aquaria, they do well with other (quiet) species, but are better if kept in a species tank.

Alfaro's Livebearer (as this fish is also known) is susceptible to bacterial disease when kept in old water, especially if the specimens are very young or old. I find White Spot develops rapidly if water conditions deteriorate or excessive water changes are carried out (over 25%). Ironically, a water change (and gravel clean) usually clears the problem without resort to chemicals.

"Alfs" require a varied diet and literature suggests that they "prefer live foods, but will accept freeze-dried and flake foods". My fish eat almost anything passing their mouths slowly enough for them to devour!

They eat liquidised garden pea, flake food, brine shrimp nauplii, pelleted foods, frozen *Cyclops*/bloodworm, live Grindal Worm/whiteworm/*Daphnia*, blanched cabbage/lettuce and freeze-dried foods. They even nibble sinking catfish pellets.

Breeding

Various gestation periods are recorded (one, as long as "8-10 weeks"), but I believe this to be due to factors such as temperature and the fishkeeper's experience in detecting gravid females, as few (if any) fry survive in a 'flock-breeding situation'. I believe that our editor, John Dawes, gives the most accurate gestation period of 24 days in his book. (See Bibliography).

The major difficulty in breeding the Knife Livebearer is deciding when the female is gravid, because she will not show a gravid

Far left, pair of Alfaros (male below — showing mouth damage; see text for details).

Centre, family group.

Above right, while appreciating plant cover, the Knife Livebearer also likes to have some open swimming space.

RIENCE

Sue Crew recalls her search for, and eventual success with, the beautiful Knife Livebearer.

Photographs by Roger Crew

Fry less than a day old, showing slightly pink stomach, having just started feeding on brine shrimp nauplii (larvae).

spot in the same way as many other livebearers. In my experience, a dark line appears around the 'keel' and up behind the abdomen. The female also becomes a little broader and 'double chinned', but does not 'square off' in normal livebearer fashion.

To 'mate' a pair, literature suggests raising the tank temperature by 2°C (3.6°F) but I have not found this necessary. My fish bred at 80°F (c26.6°C), pH7, 10°GH (hardness) at approximately six months old (sexual maturity can be attained at three months). Their tankmates were Armoured Catfish (*Corydoras* spp) and Swordtails (*Xiphophorus hellen*).

I noticed that both my females were heavily gravid, but was not certain how far into the gestation period they were. I therefore carefully acclimatised them into the 'maternity suite', set up with similar water conditions to the main tank.

This 'maternity suite' measures 24×8 ×10in (60×20×25cm) with removable dividers giving two 6×8×10in (15×20 ×25cm) end sections and a 12×8×10in (30×20×25cm) central section. The ends are heavily planted with Java Moss and floating plant (*Riccia*, Indian Fern). The tank runs on an undergravel filter with small pea gravel substrate on top. It receives little direct sunlight and no artificial light. One female was housed in each end to await the births.

I spent hours kneeling on the floor, rear end up, getting 'fishkeeper's knee', staring into the tank looking and learning and 'spying' the fry. I was not aware how long I carried out such contortions until Roger remarked that he "recognised that face" whenever he passed!

Post-natal care

I was rewarded five days later by a 'wriggler' approximately ½in (c1.3cm) long in the gravel. Looking again, I saw what seemed like hundreds, but was actually about 50. My screams and delighted gibberings of "She's done it!", "We've cracked it!", "Just look at the little wrigglers!" brought Roger to share the happy event. How sweet is revenge, he being an Armoured Catfish fanatic keeping over 85 species of Callichthyidae.

I removed mum to the central section to rest and also because these fish are highly predatious, actively seeking fry out and devouring every single one of them — given half a chance — hence, the need for a densely planted ▶

ALFARO FACT-FILE

Common Name: Knife-tailed Livebearer, Alfaro's Livebearer, Knife Livebearer

Scientific Name: *Alfaro cultratus* (Regan 1908) *Alfaro* — named in honour of A. Alfaro *cultratus* — knife-shaped

Synonyms: *Petalosoma cultratus* (Regan 1908) *Petaluricthys cultratus* (Regan 1912) *Alfaro amazonum* (Regan 1913) *Alfaro ecuadorensis* (Meek 1912) *Petalosoma amazonum* (Regan 1911) *Petaluricthys amazonum* (Regan 1912)

Distribution: Costa Rica, Nicaragua, Brazil, Panama

Family: Poeciliidae — live-bearing toothed carps

Tribe: Poeciliini

Genus: *Alfaro* (Meek 1912) — contains only two species ie *A. cultratus* and *A. huberi*

Counts: Dorsal 8; anal 8-10; pectoral 12; pelvic 6; lateral line scales 34/35

Size: Standard length: Male — 50mm (2in); Female — 75mm (3in)

Colour: Light olive brown, silvery belly, flanks have metallic blue sheen, fins light yellow, caudal can become dark-edged in older fish

Temperature: 75°F-82°F (24°C-28°C)

Water: pH 7.0-7.6, 10°GH, 100L tank capacity (neutral to alkaline, moderately hard, clean, clear)

USEFUL REFERENCES

Axelrod, Dr. H.R. & Schultz, Dr. L.P. (1990) *Handbook of Tropical Aquarium Fishes* **TFH Publications, Inc.**

Axelrod, Dr. H.R. & Burgess, Dr. W.E. (1991) *Dr. Axelrod's Atlas of Freshwater Aquarium Fishes* 6th Ed. **TFH Publications, Inc.**

Dawes, J. (1991) *Livebearing Fishes: A Guide to their Aquarium Care, Biology and Classification* **Blandford Press.**

FBAS (1993) *National Show Fish Size & Technical Information Booklets No. 3 & 6.*

Wischnath, L. (1993) *Atlas of Livebearers of the World.* **TFH Publications, Inc.**

tank. After 24 hours rest and a good feed of bloodworm, she returned to the main tank and the male. Next day 'female two' produced fry and was treated in the same way.

From my experience, new-born fry dive into the gravel for the first few hours of their lives — probably escaping predatory parents — rising on day two to shoal between floating plants.

I allowed the females to 'flock breed' the next time, owing to inadequate space for the fry. None survived. I attempted to catch the next two broods, missing the due date by my own stupidity the first time, the second time catching the female in a breeding trap with adequate cover and witnessing the birth in the evening, only to find a Swordtail had leapt into the trap and devoured the fry overnight.

Raising fry

I try to give fry a good start by feeding Liquifry (Livebearer) for the first 2 to 3 days, creating artificial infusoria to feed from. I supplement this with three-day-old brine shrimp nauplii from day two. Fry take this avidly and it seems to promote growth and colour.

I never completely change food, always 'weaning' fish onto new diets, feeding a mixture for a day or so to aid adjustment. The frequency of the actual feeds depends on how and when I am working, but tends to be 2/3 times/ day initially.

After 3 or 4 days, Aquarian Fry Food is added to the diet and, after another week, crushed Aquarian Growth Food. Other foods are gradually introduced over the first few weeks, but always in addition to brine shrimp nauplii. This system produces robust fish which eat almost anything; the variety also seems to reduce fry mortality. This brood was raised to 1½in (3.8cm) without loss.

Knife-edged Experience

Postcript

In 1993, my "Alfs' were benched five times at shows: at Salisbury, Portsmouth (ASAS), Bristol, Manchester (British Aquarists Festival) and Weston-super-Mare (European Open). They won a fourth, third, second and two firsts, improving each time.

It gives a breeder great pleasure to be able to pass on fish to friends or to be able to introduce 'new' varieties to local suppliers in order that other aquarists may benefit. Such moments are precious and I know my fish are now spread far and wide, having been 'exported' to England from the Isle of Wight! AHP

New-born (less than 24 hours old) fry. The dots are brine shrimp egg shells.

DAVID TWIGG'S

KOI CALENDAR

DAVID TWIGG

Jobs for the month

This month of falling temperatures and shortening days brings the end of the Koi Show season. With it comes preparation of our Koi for the long UK winter.

Diet is very important at any time of the year, but particularly when temperatures fall. The food fed must be easily digestible by a less active metabolism, and the longer that we can keep our Koi feeding the better.

But how do we achieve this longer feeding period? Well, the only way, really, is to provide some method of slowing down or preventing the fall of temperature to, say, 12°C (53.5°F).

Obviously, the first thing to look at is some form of cover to remove wind chill and hold heat absorbed during the daylight hours, but this is only part of the answer. Heating the pond is the only way to guarantee holding pond temperature at the chosen level.

My way of achieving this is by the use of a swimming pool heater on Economy 7 electricity. Others use gas boilers adopted for Koi pond use. These can be swimming pool types generally designed for free-standing outdoor use, or domestic boilers, both modified to take a stainless steel heat exchanger to prevent any possible contamination. Removal of the swings of temperature, sometimes quite marked at this time of year, is removing one of the most harmful stressors that our Koi can face.

A healthy Koi going into winter is more likely to be a healthy Koi coming out of winter, and that is probably the most critical time in the Koi keeper's calendar.

If heating is not an option, then a sharp eye must be kept on the weather forecast and feeding adjusted accordingly. Mixing a little of the wheatgerm variety of pellet into the daily diet at this time of year also helps the transition to winter. The gradual introduction of any change of food is, I believe, far more acceptable to Koi than a sudden switch when a particular type of food is used up.

Drop-outs

In recent months, one or two of the regular **Calendar** entries have dropped out of the system because I have not heard from the respective club secretaries/PROs' for some time. Maybe this is because of changes in committee positions at AGM's etc.

If you spot your particular club/section is not mentioned, please bring it to the attention of your committee and, if they have found the column useful in the past, suggest that they contact me again with an update of activities. I will be pleased to add items to the column. Thanks.

What's on in September

3 — Merseyside Section BKKS. *Closed Show Cabaret*, Millbrook Manor Restaurant, Knowsley Village. Contact **Robbie,** 051 549 2001.
4 — South Hants Section BKKS *visit South Kent Ponds.* Contact **George Rooney**, 0420 473169.
— Crouch Valley Section BKKS. *Trip to visit ponds of the Chiltern Section.* Contact **Ron Parlour,** 0227 840863.
— Eastend Section BKKS. *Meeting.* Wellstead Community Centre, Vicarage Lane, East Ham, London. Contact **Phil Davis**, 0279 443754.
6 — Border Koi Club. This recently reformed group meet in Carlisle on the first Tuesday each month. Contact **Mrs Amy Fisher,** 0228 513623.
— Yorkshire Section BKKS. *Monthly meeting.* Contact **Phil Swallow**, 0422 343674.
7 — Leicestershire Koi Society. *AGM.* British Shoe Corporation Social Club, Scudamor Road, Leicester. Contact **Pip Oatell,** 0533 609707 or **Kevin Luckman**, 0455 250413.
10 — Heart of England Koi Society.

Koi Quiz night with Fish & Chip Supper. Meet in Warwick. Contact **me**, 0926 495213.
11 — Northern Koi Club, *Monthly meeting.* Contact **Tony McCann,** 061 794 1958.
— Central Section BKKS. *Visit by Taunton Section BKKS.* Contact **Sue Finney**, 021 747 2733.
— Crouch Valley Section BKKS *host Essex Section members at Crouch Valley ponds.* Contact **Ron Parlour**, 0277 840863.
— Lea Valley & Harlow Section BKKS *visit Worthing ponds.* Contact **Mick Fahey,** 081 508 5155.
12 — West Wales Section BKKS. *Monthly meeting,* Post Office Club, Swansea. Contact **Andy Tovey,** 0554 821310.
13 — Nottingham & District Section BKKS Speaker is **Peter Oakes.** The Western Club, Derby Road, Nottingham, 8pm. Contact **Shirley Hind,** 0602 810923.
14 — South Hants Section BKKS *meet,* 8pm in Denmead Church Hall. Guest speaker this month is **Ron Parlour.** Contact **George Rooney,** 0420 473169.
— Merseyside Section BKKS *Monthly meeting,* Millbrook Manor, Knowsley Village. Contact **Robbie,** 051 549 2001.
18 — Northern Koi Club. *Visit from Yorkshire Koi Society.* Contact **Tony McCann,** 061 794 1958.
21 — Crouch Valley Section BKKS. *Monthly meeting,* Laindon, Essex. Contact **Ron Parlour,** 0277 840863.

Electrical safety

I thank **Keith Nind** of Balham for writing to me with information about electrical safety devices used when wiring up installations for ponds.

Keith tells me that **Earth Leakage Circuit Breakers (E.L.C.B's)** are now no longer available, as they were prone to fault tripping and were not very accurate. **Residual Current Devices (R.C.D's)**, on the other hand, are used where a portable appliance can be plugged into a socket outlet. If your supply to your pond equipment is via sockets, then an R.C.D. should be used.

Another interesting point is that if the pond is away from the

Far left, September marks the end of the Koi Show season. Don't miss your last chance of the year to see top fish such as these.

Left, our Koi Talk expert Alan Rogers addresses a group of judges at the Telford show where some of the very best Koi in the country were exhibited.

house, as presumably most ponds are, then this will put the appliances, pumps, UV's etc. used, outside the "equipotential zone". In these cases a separate earth rod and correctly sized earth cable should be incorporated into the electrical design. Thanks again, Keith, for your letter.

Show reports

1 My thanks to **Phil Adamson** of Merseyside Section BKKS for providing results of their Open Show.

The **Grand Champion** was entered by **Neil Sanderson** who also took awards for **Supreme Champion Adult Koi**, Best in Size 1, Best in Size 4, Best in Size 6, Best Jumbo and Best Tateigoi Mature Koi. Well done Neil.

Other major prizewinners were **Amanda Sampson** with **Supreme Champion Mature Koi, Supreme Champion Baby Koi,** Best in Size 2, Best in Size 3, Best in Size 5, Best Male Koi and Best Tateigoi Adult Koi; **Gary Wright** with Best Members Mature Koi; **S. Kerfoot** with Best Members Adult Koi, Best Members Baby Koi and Best Doitsu Adult Koi; **S & G Bennett** won Best Tateigoi Baby Koi and Best Doitsu Baby Koi. Best Dealer Adult Koi went to **Northern Koi & Aquatics** and Best Dealer Baby Koi went to **Koi Den**.

Congratulations then to Show Chairman **Bob Pearson** and his team for putting on what I understand was a "superb" show.

2 Show success went to **Shirley Aquatics** by way of two major awards at the **KLAN Show** in Duisburg, Germany, recently. **Paul & Gina Stacey** received the Shirley Aquatic awards for Best and Reserve Champions in the Kohaku and GinRin classes.

Shirley Aquatics are looking to develop new markets internationally and will have participated in the **Dutch Koi Societies'** show at Arcen at the end of August. I hope to be reporting further success.

Paul Stacey — Koi Manager at Shirley Aquatics — and wife, Gina, show off the awards won by the company at the KLAN International Show in Germany.

Other shows

The last seven English shows, of what has been a very full show calendar this summer, take place this month and I list them here. I hope to meet many more readers at one or other of these shows. Please introduce yourselves if you recognise me.

3/4 Sep — Lotus Midland Koi Show. Organised by the **Central Section BKKS** and held at Avoncroft Museum of Buildings, Bromsgrove, this show will be the first ever to have a Japanese- owned Koi among its entrants. The Koi, one of the Go-Sanke varieties, is 24in long and owned by **Ryuzoh Narita** from Nagoia and arrived in the UK early in August. For a reduced entrance fee of £2.50 adults and £1.00 for children and OAPs, visitors will not only have access to the Koi show, but also to all the many attractions within the grounds of the Museum, representing 600 years of buildings. Contact **Sue Finney,** 021 747 2733.

Mid-Somerset Section BKKS. *Koi Exhibition* is part of the Countryside Cavalcade being held at Royal Bath & West Showground, Shepton Mallet. Contact **Alan Purnell,** 0458 272132.

West Wales Section BKKS *Closed Show* is part of the Llanelli Flower Festival at Peoples Park, Llanelli. Contact **Basil Evans,** 0554 772190.

11 Sep — Leicestershire Koi Society *Closed Show & Craft Fair,* British Shoe Corporation Social Club, Leicester. Contact **Pip Ostell,** 0533 609707.

12 Sep — Avon Section BKKS *Closed Show.* Blagdon Water Gardens, Upper Langford, Avon. Contact **Larry Lerway,** 0454 898207.

25 Sep — Northern Koi Club *Closed Show* at Cascade Water Gardens, Bury. Craft fair and catering on site. No entry fee. Contact **Tony McCann,** 061 794 1958.

Crouch Valley Section BKKS *Closed Show and BBQ.* Contact **Ron Parlour,** 0277 840863.

Health Slogan

One of the joys of keeping Koi is showing them to others of like mind. Whether this is by inviting people to our homes or, as many do, by taking their Koi to Shows, one of the first things that visitors see is the condition of the fish.

"Healthy water helps make healthy Koi" could be a good slogan for us all and, certainly, water quality is one of the main concerns of the organisers of the many shows around the country.

Open invitation

I would like to invite all Koi club secretaries or PROs' to send me their latest calendar for inclusion in my column and to thank all those who have kept me in touch to date.

Although I do my best to ensure all events are mentioned, it may be that some information, which arrives a little late, misses my deadline. Ideally, I need to have information at least **10 weeks** before the date of the event to guarantee publication. You may, of course, ring me direct on **0926 495213**, which will allow a little leeway.

This request also applies to dealers with special events, auctions, etc. I look forward to hearing from you.

All Koi keepers are welcomed to the events mentioned in this **Calendar** (an entry fee may be payable). Further details can be obtained from the contact telephone number quoted alongside the diary entry.

Please write to me at your earliest convenience via the **Editor, 9 Tufton Street, Ashford, Kent, TN23 1QN.** Thank you.

BARLEY-CLEAR WATER

Loosely pack an onion sack or similar non-perishable mesh bag.

Decomposing barley straw has long been used to control algae and is becoming an increasingly popular way of maintaining clear water in Koi and other ponds. However, little has been published on how it works and its effects on fish. William Wildgoose, veterinary adviser to the Koi Health Group, investigates.

Photographs — unless otherwise indicated — by the author.

In the course of my professional veterinary work, and because of my special interest in fish health, I meet a variety of Koi health problems. One case recently led me to investigate the use of barley straw in fish ponds. In view of its increasing use by Koi keepers, I think the findings will be of general interest to readers, some of whom will have been using it this summer.

I have presented the report in the form of a case history and I invite readers to respond with information about their own use of barley straw. Useful knowledge still remains to be gained about this less-than-fully understood subject.

Case study

A formal pond of 2,500 gallons (nearly 11,400 litres), lined with butyl rubber, had been built in August 1992. It contained about 80 fish (mainly Goldfish, *Carassius auratus*), ranging from 1 to 8 inches (2.5-20cm) in size, a few water lilies in baskets and a cartridge filter fountain. There was no other mechanical or biological filter system, since the stocking density was considered low.

Last April the owner telephoned me to say that all the fish were ill. Within a week all had stopped eating and were huddled at the surface in a corner of the pond. One fish had died a few days earlier, but was unavailable for examination. The clinical history — all the fish being affected simultaneously — suggested a water quality problem, but test kits failed to reveal anything abnormal. Despite a 30% water change and the addition of salt at ½ ounce per gallon (3gm/litre), there was no improvement.

In order to carry out a reliable investigation an affected fish, a 3-inch (7.5cm) Grass Carp, was sacrificed with an overdose of tricaine methane sulphonate (MS222, Sandoz). There were no external lesions, and examination of the body mucus and gill filaments failed to reveal any ectoparasites. There were no obvious internal lesions either, and samples of skin, gill, kidney, ovary, liver and spleen were fixed in 10% formal saline and sent for histological (tissue) examination.

Further samples of pond water were tested for pH, ammonia, nitrite, nitrate, chlorine and chloramine, but failed to show any significant levels.

Most fish were moved to an isolation pond and, within a few days, showed rapid clinical improvement and started eating. All fish were then fed on a commercial flaked food medicated with oxolinic acid (Aquiflake, Peter Hand Ltd). Despite further water changes, the few fish that remained in the original pond continued to deteriorate and died over the following weeks.

What was wrong?

Histological examination revealed some chronic hyperplasia (thickening) of the gill tissues, suggesting a chronic water quality

Green water in a Koi pool — everybody's pet hate.

DR DAVID FOOL

Good-quality barley straw is available at the end of the harvest in July/August. Barley produces straw that is paler than wheat or oat straw and is used as bedding for farm animals.

problem (ie something in the water had been irritating the fish gills for a long time). The main signs of disease were evident in the kidney, where a heavy infestation of sporozoan parasites (most likely *Sphaerospora* spp.) were causing significant damage.

There is no recognised treatment for this kidney disease. Destruction and disposal of the fish with thorough cleaning and disinfection of the pond is normally recommended. Some anti-protozoan treatments (eg Fumagillin) have been tried, but there is no published information on its efficacy.

During the following three weeks, the isolated fish recovered well and, because of the limited size of the isolation pond, were returned to the main pond. Within a few days, most fish had relapsed and were showing the original signs of illness.

Two more fish were sacrificed and sent for further histological examination. Very high levels of the sporozoan parasites were found in the kidneys and further damage was seen in the gill tissues.

The fish were moved back to the isolation pond, the medicated food was given and they continued to recover as before. The few fish left in the main pond failed to show any improvement, despite further water changes.

What we found

The pond was eventually inspected in June. The water was a muddy green brown colour, visible down to about 6 inches (15cm). There was no blanketweed nor obvious unicellular algae in the pond and the water lilies had poor growth.

The bottom of the pond was dredged to assess silt levels and an onion sack which contained barley straw, and had been weighted with a brick, was removed. The straw was a rotten brown-black colour and had a foul decomposing smell. It had been placed in the pond six months earlier to control algae.

I suggested that the barley straw was the cause of the problem and that the pond be drained, scrubbed and rinsed clean. The fish remained in good health when returned to the main pond, and there have been no further problems. So what happened?

The facts

When barley straw decomposes in water, it produces various chemicals or *chemical factors* which inhibit the growth of algae. These chemicals are produced in increasing amounts over 6 months as the barley straw decomposes in water at 20°C (68°F), for example.

However, there are two noteworthy points:

(i) the inhibitory effects are not apparent until the straw has been soaking for about one month, and

(ii) all inhibiting activity is lost if the straw is sterilised by steam (autoclaved).

These tight-packed sacks had sunk and started to decompose anaerobically after six weeks, producing an unpleasant odour.

Both these observations suggest that microbes are essential for the production of these factors. Recent research has shown that even finely powdered straw is not immediately active when added to water and needs, at least, a month to start being effective, just as for intact straw, indicating that the anti-algal factors are not produced until decomposition has begun. Continuing research has shown that straw introduced, say, in autumn remains active for approximately eight months, after which rapid algal growth occurs.

Use a minimum of 100 grams — this will treat up to 4,400-gallon ponds.

Both laboratory experiments and field observations have demonstrated that the anti-algal factors are only generated when the straw is decomposing in water containing sufficient oxygen. If the water in and around the straw becomes anaerobic, production of the factors stops.

Although bacteria are present when decomposition begins, various species of fungi predominate later. However, because they are not all present, it is logical to conclude that the chemicals produced are not likely to be due to any single fungal species.

Field and laboratory trials have shown that rotting wheat and linseed straw also have an anti-algal effect, although barley straw appears to be the most effective... and for the longest period. Different varieties of barley have been compared and all were found to be active against algae. Other organic materials have also been tested and several — including brown rotted wood and oak-leaves — were found to be active, although larger amounts were needed compared to barley straw. Currently, it is not clear whether these materials are generating the same chemicals or a range of different substances.

Further trials have shown that the main effect of the anti-algal factors is *algistatic* (they halt algal growth) rather than *algicidal* (kill algae) at the concentrations normally applied in water. This effect is more pronounced in unicellular algae (which produce 'green water') than filamentous blanketweed, possibly because the latter can survive longer periods in an inactive state. However, when blanketweed dies off naturally in autumn, the presence of the anti-algal factors prevents regrowth in the following spring.

The exact nature of the anti-algal factors have not been identified, as I've said, so the quantities of straw required cannot be determined precisely. However, laboratory experiments have shown that 2.7 grams of barley straw (approx 0.1oz) per cubic metre of water (a cubic metre of water contains 1000 litres or 220 gallons of water) inhibited algal growth by 95%, although in field trials 4.8 grams (0.17oz) of barley straw per cubic metre of water has been found to give satisfactory control. In ponds of volume less than 10 cubic metres (2,200 gal or 10,000 l) a minimum of 100 grams — 3.5oz (dry weight) of straw should be used.

Algal growth stops within 48 hours of exposure to the anti-algal factors, but resumes very soon after the straw is removed, indicating that they have a very short persistence in water.

The anti-algal factors are throught to be continuously generated by the decomposing straw and are rapidly absorbed by any algae present. Other experiments have revealed that the chemicals are absorbed or inactivated by contact with mud or bottom sediments. However, trials have failed to show any adverse effects of barley straw on larger plants, invertebrates or, so far, on fish.

Using barley straw

From experience gained in other water systems, barley straw added in the spring and replenished in the autumn gives good results, so now is a good time to start, if you are thinking of trying this approach. However, straw from the previous application should not be removed until the new straw has been in the water for at least one month, otherwise algal blooms can form rapidly.

It is known that oxygen and sunlight oxidise components of barley straw to produce low levels of hydrogen peroxide which has been shown to have an immediate anti-algal effect.

While much is known about the aerobic decomposition of straw, little is known

Guide to using barley straw

1. Use at 5 grams per 1000 litres (0.18oz/220gal) of water (with a minimum of 100 grams — 3.5oz)
2. Pack in open-meshed sacks (eg onion sacks)
3. Allow to decompose in well-oxygenated water
4. Keep straw on the water surface and exposed to sunlight
5. Provide good water movement for distribution
6. Allow a full month for effect to start
7. Inspect and agitate the straw monthly
8. Barley straw is most effective against 'green water' algae, rather than blanketweed
9. Replenish every 6 months BUT add replacement straw 1 month before removing the original straw.

about anaerobic rotting in water. Under anaerobic conditions in soil, however, straw is known to produce organic acids (mainly acetic acid) and phenolic compounds, many of which are toxic to fish (as, for example, with creosote-treated wood).

Straw should be lightly packed into open-weave plastic bags (eg onion sacks) and left to decompose on the surface where there is a good flow of oxygenated water and exposure to sunlight (eg in an open-topped filter). Even after soaking for a few months the straw should smell fresh. An unpleasant odour indicates anaerobic rotting and the possible release of toxic substances.

It is also recommended that the straw be removed and inspected *monthly* to improve oxygenation and allow the early detection of any bad smell. In a similar case to the one reported earlier, where Goldfish were showing general signs of ill health (but no deaths) in a pond with an excessive amount of foul rotting barley straw, the fish responded well after its removal.

Closing thought

The case history detailed in this article underlines the need for an on-site inspection of the pond to identify unknown aspects which cannot be detected by simple examination of the fish or water alone. Similarly, the lack of obvious visible damage highlights the need for more thorough laboratory investigations. In this case, the gill lesions confirmed that there *was* a water quality problem, albeit a difficult one to detect. AJP

Reference

Barrett, P.R.F. & Newman, J.R. (1993) *Straw — A Valuable Raw Material. Paper 41 — The control of algae with barley straw.* **PIRA Conference Proceedings.**

Acknowledgements

I am grateful to **Mr Pip Barrett** and **Dr Jonathan Newman,** former head and current senior research scientist, respectively, of the **Aquatic Weeds Research Unit** at the **Sonning Aquatic Research Centre,** for their constructive comments and help in providing up-to-date information for this article.

Further research into the use of barley straw and the anti-algal factors is continuing at the Aquatic Weeds Research Unit.

The text of this article appeared in **Barley Straw... and its effects on ornamental fish and algae** in the Summer '94 issue of *Koi Health Quarterly* published by the **Koi Health Group,** to whom we are indebted. For details of the KHG, write to: **3 Sunnydale Avenue, Brighton, East Sussex, BN1 8NR.**

WATER'S EDGE

BY DICK MILLS

'One-stop' solution

Dealing with snail invasions has prompted many remedies over the years (from dangling pieces of meat in the water overnight, to using low voltage batteries), but now the full force of industrial research has resulted in a much more reliable and easy method — SNAIL AWAY from **INTERPET.**

This effective treatment will not harm plants or fish, or interfere with the workings of the aquarium's filter system, common side effects with some snail treatments. Along with other treatments in the One-Stop range, which covers most common fish and aquarium ailments, Snail Away is yet another valuable aid in combating some of the nuisances which seem intent on spoiling our appreciation of aquarium life.

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

Pondkeepers 1: Herons/Cats 0

Yes, you can believe it, a successful (but safe) deterrent for any pond-predators.

The POND PROTECTION KIT, from **STARSMORE & CO.** features a six polywire barrier (erected horizontally across the water margin area of the pond) which carries an electrical pulse to deter cats and herons (kingfishers need not read on!).

A choice of mounting rods enables a pond to be fitted with the system and, in addition to the probable 'battery-hungry' Energiser used with the basic kit, a more economical mains-operated energiser is available (£3.00 per year running costs, 24 hours per day). The basic kit includes sufficient polywire to protect an 8 × 10 pond; awkward-shaped ponds may require extra mounts, cable and cable clips.

Before installing the Pond Protection Kit.

PPK in place

The system is also applicable to any area of the garden that needs protection from animal intruders, and its warning 'shock' is quite safe to humans.

Details (and demonstration video) from: **STARSMORE & CO, 21/23 Seymour Lane, Alford, Lincs LN13 9AP. Tel: 0507 466420.**

Keeping it cool

Appropriately enough, during the hottest part of the year (so far) we received news of cool relief to the natives — native marines that is — from **CORAL REEF TECHNOLOGY.**

The new range of ENVIRON AQUARIUM CHILLERS feature extra pertinent attractions: the totally inert heat exchangers avoid electrolytic reaction often found when using titanium systems, and the cooler is designed to engage progressively to prevent thermal shock occurring, which would stress the animals.

The chillers are small in size, noise output and in electrical consumption, but big in performance.

Details from: **CORAL REEF TECHNOLOGY LTD., 62 High Road, Byfleet, Surrey KT14 7QL. Tel: 0932 355121; Fax: 0932 349718.**

Lights! Water! Action!

New POND LIGHTS from **HOZELOCK** can either be anchored, say, to a fountain stem (a mounting hub is provided), or can be allowed to float free and do their own thing. The three-lamp Starter Kit includes a 24v transformer which can, if required, power an extra three lamps, thus allowing easy extension to the system.

In addition to fully automating pond and garden lighting on a regularly timed schedule at selectable 'dusk' levels, the AUTOMATIC LIGHT CONTROLLER can also be used in conjunction with a MOVEMENT SENSOR which acts as a security device. The sensitive sensor signals intruder movements within a 15m range

by either switching on the lights or, during daylight, emitting warning bleeps. The duration of 'lights on' can be selected for between one and eight minutes.

Like the Light Controller, the Movement Sensor is a safe, low-voltage device and both come with easy-to install, push-together wiring connectors, mounting plates and reasonable lengths of cable.

The new SUPER CASCADE pumps have been specially designed for those BIG water movement effects.The 3000, 4000 and 6000 models can deliver a maximum flow of up to 7,046 litres (1,550 gallons) per hour with a maximum 6 metres (18ft) head of water; a 3-metre (10ft) fountain is achieved effortlessly. Able to combine both fountain and waterfall usage simultaneously (two fountain heads are supplied, two- and three-tier), the pumps are amphibious, too, being operational both in and out of the water.

Details from: **HOZELOCK LIMITED, Haddenham, Aylesbury, Buckinghamshire HP17 8JD Tel: 0844 291881; Fax: 0844 290344.**

Beating big words

Eutrophication and super-fertilisation are two big words which plague pondkeepers during summer months, giving the familiar symptoms of nasty smells, green/brown water (whether the actual scientific descriptive words are known or not).

The build-up of nutrients (primarily phosphates), coupled with warm conditions in relatively shallow waters, encourage rapid algal growth, but this can now be combated by O'CLEAR, an ecologically-sound preparation from **AQUA COMPANY**, which presents absolutely no danger to plants or fish.

It consists of two liquids — one contains fossilised coccoliths (more big words, but actually fossilised skeletons of marine algae) to stabilise the water chemistry, and the second, an aqueous solution of aluminium-based salts to flocculate microscopic algae, phosphates, solids and other harmful substances. By eliminating phosphates, O'Clear prevents the resumption of the vicious circle of eutrophication, the resultant clear water (usually attained within a few hours) assists solar energy to initiate the natural life-cycle and establish a balanced eco-system.

Details from: **AQUA COMPANY LTD., Abbott House, 14a Hale Road, Farnham, Surrey GU9 9QH . Tel: 0252 712307; Fax 0252 712308.**

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, Alan Rogers. Tropical, Dr David Ford. Coldwater, Pauline Hodgkinson. Plants, Barry James. Marine, Gordon Kay.

TROPICAL

M P & C PIENOIR

Oscars are usually very good parents who will defend their eggs and fry against all comers.

Jaw-locking Oscars

I have a pair of 6in Oscars which have started lifting the gravel and moving it around. They also lock jaws very frequently and have cleaned a large piece of slate. So far, though, no eggs have been laid.

Will the addition of other fish speed things up?

Some advice on breeding this species would also be most helpful.

Your Oscars (*Astronotus ocellatus*) are showing all the signs of being a breeding pair, but you cannot be sure until the breeding tubes appear. The male's tube is slightly oval, whereas the female's is round.

The gravel moving and jaw locking can go on for months. The addition of other fish will not speed things up ... quite the reverse. Six inches is the usual breeding size, but the fish also need to be at least 2½ years old.

Give them lots of food, especially live food (worms etc., not aquatic live food in case of parasites) and lots of water changes. When they do spawn, Oscars are usually good parents and can be left with the eggs. If the eggs get eaten, remove the pair after the next spawning and aerate the eggs with an airstone and add Methylene Blue to prevent fungus. The fry are large enough to accept fine flake food from birth, and some freshly hatched Brine Shrimp helps rapid growth.

If nothing happens after six months or more, you should consider getting another mate for one of the fish. Trial pairing is the only way, because you cannot sex the fish by eye until the tube appears.

HERPETOLOGY

Bosc's origins

Can you explain how Bosc's Monitor gets its scientific specific (and subspecific) name "exanthematicus"? I would also appreciate some further details on this lizard.

Bosc's Monitors comprise one of the two well defined subspecies of Rock Monitors. These reptiles are distributed throughout the savanna and semi-desert regions of Africa, south of the Sahara desert. However, Rock Monitors are absent from the Western Cape.

Bosc's Monitors (*Varanus exanthematicus exanthematicus*) usually have a similar colour pattern all over their body. They have a natural distribution from Senegal eastwards to Ethiopia.

The other subspecies of Rock Monitor, the White-throated Monitor (*V. e. albigularis*) is found further south. As the common name "White-throated Monitor" suggests, these reptiles have greater contrast in their coloration than Bosc's Monitors; their belly and throat are lighter in pigmentation.

Rock Monitors are large, heavily built lizards growing to an average length of between 70 to 110cm (27½ to 43¼ inches), although a maximum of 132cm (52 inches) has been recorded. These powerful reptiles have strong limbs and sharp claws, and their skin is tough and covered with small, bead-like scales.

As its popular name suggests, a Rock Monitor lives in a tunnel that it has excavated under a rock or in a natural crevice between rocks. It might even inhabit a disused burrow excavated by another animal or a hole in a tree.

The skin is usually covered with dust and earth, and patches of old loose skin might persist. It is from this somewhat 'rough' appearance that these lizards get their specific name of *exanthmaticus* — derived from the Greek "*exanthema*", meaning, skin eruption.

CHRIS MERCER

Bosc's Monitors are much more uniformly coloured than their closest relative, the White-throated Monitor.

MARINE

Timid Betta

I presently keep two lionfishes and a Clown Trigger in my 50-gallon aquarium. I do not keep invertebrates.

I've been waiting for the right fish to come along to put the finishing touches to my collection. My dealer has a Marine Betta, which I adore. Can I buy it?

You could buy it — if you wanted to watch the poor thing bullied and harassed to death by the others! My advice would be to forget it. Marine Bettas (*Calloplesiops altivelis*) are for quiet aquariums which house either inverts or fish species like butterflies.

JOHN DAVIS

Although the Marine Betta is a grouper, it is no match for Livefish or Triggers.

Feeding stones

I've been having trouble getting my Pakistani Butterfly to feed. It has been suggested that I try a "feeding stone". Trouble is, the person has forgotten how to make them. Any ideas?

This takes me back! I can't remember the last time I used a feeding stone, let alone made one.

They are simplicity itself to make. Simply produce a pulp of some flaked food mixed with two or three types of frozen food and their 'juice'. Just spread the resultant paste over a small piece of rock or coral head, and leave it to dry.

I think I'm right in saying that people used to bake the rock/coral based food mixture in the oven for a little while, but I can't be certain of this. I'm afraid you'll just have to experiment.

COLDWATER

Size sorting

When breeding Goldfish I have been advised to keep on sorting the youngsters by their size, only keeping fishes of a similar size in the same tank. Is this really necessary?

Yes, it is necessary, because the young fish do much better with others of a similar size. As fish grow larger than their fellow tankmates, they should be moved on to share a tank with their larger brothers and sisters who, themselves, have earlier out-grown the rest of the brood.

If larger fish are allowed to remain in the same tank as smaller ones, then the largest will soon dominate the food and may even become cannibalistic towards the smallest.

In most instances, it is from these smallest fish that the better quality fish will emerge. The largest fish do, in fact, release a chemical into the water which restricts the growth of the others, so once they are removed, these others will show a burst of growth.

LAURENCE E. PERKINS

Risky snails

Is it necessary to introduce some water snails into my pond? I have been told that they help to keep the pond clean by eating up leftover food which the fish might overlook.

I do not advise you to introduce snails into your pond because, in my opinion, they can do more harm than good in a small area of water and can even become a bit of a nuisance if they undergo a population explosion. They may even bring disease into the pond, especially if they are brought in from the wild.

Snails also eat plants, as well as fish eggs, and their slime may be a form of pollution. Your pond can function quite well without these creatures, so why take the risk?

Jellyfuls of trouble: Giant Pond Snail egg masses laid on the underside of a lily pad.

KOI

UV's and treatments

Can I leave my UV pond filter switched on during pond treatments? I would also like to know how long I can expect the lamp (tube) to function satisfactorily before I need to consider replacing it when used under constant running conditions.

Switching off your UV filter during any pond treatment is always a favourable policy to adopt, although many pond treatments will probably have no repercussion on the effectiveness of most medications. However, I feel that potassium permanganate, formalin and various other parasitic treatments are unquestionably reduced in performance when subjected to return through ultra violet light, thus creating the risk of not eradicating the initial problem.

Other materials are likely to change chemical structure, with the risk of toxic or lethal conditions within the pond.

UV units are best switched off while using pond medications.

With continual use, even though the tube (lamp) remains lit, the performance of the unit will deteriorate gradually, and should be changed every 6 to 9 months, taking care not to damage the delicate quartz sleeve in the process.

The UV filtration lamp in Koi ponds has become a very popular piece of equipment over recent years, and surprisingly, many hobbyists are reluctant to switch off their systems once installed. The constant use of such equipment is really unnecessary all year round, particularly in a well managed and fully matured filtration system.

Floodlit Koi

I intend to fit halogen floodlights around my new pond very shortly, to view my Koi after dark during the coming winter months. Apart from the obvious elements of safety, do you have any suggestions that might be helpful to me? Also, will the Koi be startled when the pond is suddenly illuminated?

Obviously, by your comment, I take it that you are aware of the safety factors and dangers of mains electricity in close proximity to water. An ELCB (circuit breaker) or similar device is a must, and if you are engaging a qualified electrician (s)he will advise you on this point.

As for the lamps, choose the type that offers protection by a hinged glass front, rather than the type which leaves the halogen lamp exposed to wind and rain. If the lamps are mounted close to, or even over, the pond, there is a potential risk of the lamp shattering and the broken glass ultimately landing in the pond. By the time you discover the failure, your Koi will have sampled the deadly fragments, with the possibility of horrendous results. Another case where prevention is always better than the cure!

Koi accept artificial lighting very well and show no adverse signs of stress when suddenly exposed from darkness to light, but be warned, their colours do not look so vivid under these conditions.

PLANTS

JOHN DAWES

Amazon Swords may produce flowers under aquarium cultivation, but they are seldom fertile

Amazon sword blooms

I have an open top aquarium measuring 48×18 wide and 24in deep (120×45×60cm).

The tank has a full Dennerle system with suspended HQL lights.

The plant growth is spectacular, so much so that the *Echinodorus cordifolius* Swordplant has grown out of the tank and is in full flower. I would like to collect the seeds and produce more plants from it. How do I go about it?

First of all it is doubtful if the flowers have been fertilised as it requires flying insects to accomplish this, so *Echinodorus* species seldom produce seeds in aquaria. However, after the flowers have faded, viviparous plantlets will appear from the base of the old inflorescence.

When these are 3in (c7.5cm) tall, bend the stem down into the water. They will then produce roots. When long enough, detach the plantlets from the parent and transfer them to a shallow aquarium with just a few inches of water in it, and plant in the normal way.

When about a foot tall, they can be replanted in a furnished aquarium.

Refurbished synthetics

I have long used Simlawood as a backdrop and as terracing for my aquarium plant arrangements.

One particular BW40 piece of Simlawood has just been brought back indoors after having been left outside in the garden for a couple of years, following the stripping down of one of my tanks. When I placed it in water to clean it, I found that it floated. How do I make it sink again?

Another piece of synthetic rock was in the tank with a very large 'Plecostomus' catfish which, it seems, has grazed all the finish off the surface, exposing a black surface. Can I retexture it myself?

Some of the older models of synthetic bogwood and rocks will float if allowed to dry out completely. The problem does not, however, occur with many of the current models.

Place your BW 40 in hot water and allow it to soak until the water cools. It may sink at this point. If not, leave it in water indefinitely and, sooner or later, it will have absorbed enough water to lose its buoyancy.

The paint finishes on these products are very specialised. In many cases, you may return the piece to the manufacturer for re-coating. There is a charge, usually based on the retail prices, plus post and packaging expenses, so check these out before you send your piece off for refurbishing. If you do post anything, make sure that you protect the item well to prevent damage in transit.

COLDWATER JOTTINGS

BY STEPHEN J. SMITH

Caring about information

One of the highlights of this past season has, for me, been the publication of some pretty splendid books which have served to complement the pleasurable pursuit of fishkeeping. A vast proportion of publications covering the coldwater aspects of the hobby seem to emanate from **TFH Publications,** whose immense contribution to the hobby over the last three decades cannot pass unnoticed.

Two recent books from this stable have given me mixed feelings: one, *Garden Ponds for Everyone* by Walter Schimana, because of its comprehensive and authoritative treatment of water gardening, and another, *Goldfish for Those Who Care*, because of some of the slightly misguided (in my opinion) information it purveys with regard to a subject very close to my heart.

Let's deal with the latter first. At first glance, *Goldfish for Those Who Care* (ISBN: 0-7938-1376-6) is a fine publication, typical of a host of similar books from TFH, with liberal colour photographs and a comprehensive, highly-informative text. But, please, let's not forget that the UK is not an island off the coast of the USA and, after all, British Goldfish keepers can be considered among the best in the world.

So when I read a caption relating to the 'hood' growth of some Fancy Goldfish, "If it has a growth and a dorsal it is an Oranda; without a dorsal it is a Lionhead", or see a photograph of a Calico Comet which is referred to as a London Shubunkin, I can only wonder what UK *aficionados* make of it all. For newcomers to the hobby, it may not really matter; *for those who care*, such inaccuracies are of the utmost importance.

Despite those gripes, this is a fine book and, at just £2.45, I would expect it to do well in the run-up to Christmas (yes, it really is that time already ....!) I only hope that, if a reprint is due, the UK specialists can be consulted.

Now, let's take a book originally published in Germany and given 'the TFH treatment'. By that I mean a virtually indestructible cover, a plethora of laminated photographs, some stunning diagrams, and a reasonable price (in this case, just £17.95). The result is *Garden Ponds for Everyone* (ISBN: 0-7938-0099-4), the perfect complement to any aquarist's and water gardener's monthly diet from *A&P*.

For me, this has the strongest possibility of being my 'Book of the Year': just over 190 pages of pure information, on every aspect of pondkeeping. I can only agree with the sentiments expressed by the publishers themselves on the back cover: "*Garden Ponds for Everyone* is different from most other books in one very important respect: it concentrates primarily on factors affecting plants and planting arrangements and pays relatively little attention to fish and other animals that might live in the ponds (though there are individual chapters dealing with these aspects). In addition to a thorough treatment of significant consideration dealing with the planning and construction of ponds of normal and large size, this book also contains a large separate section that covers miniature water gardens in great detail.

"*Garden Ponds for Everyone* has a special bonus value for pond owners living in colder temperate climates, as German techniques for preventing damage caused by harsh winters are presented in full detail."

You'll never guess what is the first item on my Christmas list this year ...!

PHOTO-JOTTING

Shades of summer

September is one of the most delightful months of the year, providing the last lingering shades of the summer months. The season is still far from over and, with any luck, we still have some sunshine to come this month. (Doesn't the weather always seem to improve once the children go back to school after their long holiday ....?).

One of my favourite features of this month is the sight of an abundance of flowers on my favourite aquatic plant, the water lily, *Nymphaea*.

There are so many varieties to choose from that there must be a favourite for everyone somewhere. My own preference is for one which is fairly common, the variety 'Chromatella'.

Over the years I have propagated several plants of this variety from a single specimen 'borrowed' from a relative's pond some time ago. Its gently lemon shades provide a perfect complement to any form of pond, whether natural or formal and, happily, I have always had flowers in abundance from this variety.

Another of my favourites is 'Escarboucle' which provides a rich contrast to 'Chromatella' in that it is a luscious shade of pink, streaked with red and is a firm favourite among pond-keepers throughout the UK. Again, as with the majority of water lilies, propagation has been fairly easy. This is, without doubt, one of the most genuinely satisfying areas of the coldwater hobby.

This fine water lily variety, *Nymphaea* 'Escarboucle', is among my favourites, and provides a perfect contrast in my pond to the more subtle and equally-popular 'Chromatella'.

Electric pond treatment

I am indebted to **Keith Nind** of Balham, London SW12, for contacting me following my feature on the construction of a Koi pool (see **Building a Concrete Dream** — *A&P*, June 1994).

Keith is an approved electrical installer and was, naturally, concerned about the use of ELCBs (Earth Leakage Circuit Breakers) as part of the 'fail-safe' devices I had described in the installation of the electrical system during the project. He explained that ELCBs are no longer available as they were prone to fault tripping and were not very accurate)

"RCDs (Residual Current Devices) are used wherever a portable appliance can be plugged into a socket outlet so, if a pond has socket outlets as its source of power, an RCD must be fitted." (Happily my error was in the description rather than the installation: I had used the term ELCB to describe an RCD!)

He added: "If switched fused spurs are incorporated, an RCD is not necessary because the appliance has to be manually switched off and the fuse can also be removed if required. Though this is not necessary, I would advise the use of miniature circuit breakers in preference to fuse carriers and wire."

Especially important is Keith's final advice. "An earth rod should be driven into the ground locally to the supply outlet because if your power source comes from the house, as it would in most cases, this puts you outside the equipotential zone, so a separate

earth rod and correctly-sized earth cable should be incorporated."

As I have stated on many occasions in these columns, *electricity and water do not mix*, so, if you have any doubts whatsoever about the electrics in your pond system, please consult a qualified electrician (if you didn't understand the 'jargon' of the previous paragraph you *need* an electrician!). As for my own installation, despite a 'belt and braces' set-up, I have ensured that it has been checked over thoroughly, and that great heed has been taken of the advice provided.

JIM RONAN

Jim Ronan's splendid garden pond set-up provides inspiration to us all.

Jim's impressive pond

Coldwater Jottings reader **Jim Ronan** has responded to my mention of **Brian Singleton's** pond set-up (see **Coldwater Jottings** — *A&P*, May 1994) with details and some superb photographs of his own fabulous pond, in which he keeps a collection of Koi, Orfe, Goldfish and Tench.

I never fail to be impressed with the imagination and ingenuity which people express in producing an attractive pond and surroundings; Jim's is breathtaking! Jim explains that the pond itself is 21 feet long by six feet wide and is two feet six inches deep, lined with butyl. A filter with Lytag medium is supplemented by a Cyprio MagNit powered by a 960gph Cyprio pump and water is returned from this to a waterfall in the centre of the pond, as well as to an outlet further down the pond.

"In addition," adds Jim, "Three water ornaments are powered by a 400gph Oase pump, while a Hoffman GP500 pump provides air to an airstone.

Show willing

I was delighted to receive a swift response from **Judith Aylmer,** secretary of the **Association of Aquarists (A of A)** , to my **Soapbox** item in July's **Coldwater Jottings,** with regard to the apparent lack of support at 'general' aquatic shows from specialist Goldfish societies.

Judith has issued an open invitation to all Goldfish enthusiasts to bench fish at any of the **A of A's Superbowl Shows.** She explains that some Goldfish exhibitors may feel that the existence of only two classes — for single-tailed and twin-tailed Goldfish respectively — may not be enough for some Goldfish keepers to consider that their fish have been judged fairly. However, when there is only a handful of entries in each of these classes I can appreciate the organisers' argument in not providing additional classes which take into account the characteristics of individual Goldfish varieties.

I am informed by the A of A that there are two shows this month: **4 September** at Hemel Hempstead, run by the **CAGB Main Body** (contact **0707 325684**); and **11 September** at Queensway Hall, Dunstable (contact **M.S. Elliott** on **0582 666406**). There are also two shows next month: **2 October** in Milton Keynes (contact **0908 319324**); and **16 October** at John Hunt Everest School, Basingstoke (contact **0256 63220**).

So, to all Goldfish exhibitors, it's up to you to break the circle. If you show the best of your fish, and in significant numbers, then organisers can provide additional classes. It is to be hoped that specialist Goldfish keepers will provide a positive response in 'flying the flag' for the coldwater hobby, which will, of course, help to benefit coldwater fishkeeping in particular, and the advance and appreciation of the fishkeeping hobby in general.

SOCIETY WORLD

FBAS NEWS

1 Playing host to three very different Cameo Water Garden designs, the Federation was delighted to be honoured with a Silver-Gilt Award at the recent Hampton Court Flower Show. A **Japanese Water Garden** created by Egmont Water Gardens, together with a **Lakeland Stream,** by Town & Country Gardens, and **Oriental Patio Water Features** by Cheries Aquatics, combined to attract the enthusiasm of the Royal Horticultural Societies' Judges, as well as that of the thousands of visitors.

It was also obvious to visitors that the FBAS's was not just a pretty exhibition, as experts were on hand to answer further questions about water gardening problems (filtration and water plants were favourites, discounting the perennials of green water and blanketweed!) plus information about society locations anywhere in the UK.

2 The Federation's next big event is the **Supreme Festival of Fishkeeping** at Weston-super-Mare (Pontin's Sand Bay Holiday Centre, public days **5-6 November**) featuring such innovations as a Fish Phone-in, A Furnished Aquarium Race, Schools Painting Competition and, by courtesy of **Anglo-Aquarium Plant,** their medal-winning Pool and Patio from Hampton Court. Add to this the 1994 FBAS Supreme Championship, the Aquarian Aqua-Champ Final, **Dieter Vogt** and other eminent guest speakers, European Open Show, Specialist Society Events, Trade Stands and round-the-clock advice from panels of experts and there's a recipe for success to brighten any November weekend.

Prices have been kept at last year's figures: only £59.00 per adult (concessions for younger age groups). Information Brochure and Booking Form from: **Colin Richards, c/o 8 Acacia Avenue, Brentford, Middx TW8 8NR. Tel: 081 847 3586.**

KEVIN WEBB

Pictured, Scarborough and District AS chairman S. Jones presents the award of a specially-commissioned Silver Jubilee stained glass plaque to 'Dougie Woods for his Best in Show Dwarf Cichlid

DICK MILLS

Part of the FBAS's award-winning Hampton display.

Thorpe Moots Show

Club secretaries in and around East Anglia are being contacted by **Thorpe and District AS of Norwich** with a view to organising a regional members' show for next year.

Derek Wyer, Thorpe secretary, explained that there is a great deal of interest in the aquatic hobby throughout the east of England, and that an East Anglia show would incorporate the best of the hobby in the region. "Although we are at the very early stages, we are inviting all clubs and societies, as well as manufacturers and retailers, who would like to participate to get in touch to discuss the idea further."

Adrian Exell, product manager of **Interpet,** will be presenting a talk on water management at this month's meeting on **Monday 5 September** at the Civil Service Sports Club, Wentworth Green, off Newmarket Road, Norwich.

For details, contact: **Derek Wyer, Secretary, Thorpe and District Aquarist Society of Norwich, 66 Gloucester Street, Norwich, Norfolk NR2 2DY. Tel: 0603 613775.**

Set in glass

A special Best in Show Award of a stained glass plaque was commissioned by **Scarborough and District AS** to celebrate the society's 25th Open Show. The award was won by **'Dougie' Woods** from Lincoln, with a Dwarf cichlid, *Nannacara anomala*, which he had bred himself and grown on to show size.

The Best Exhibit Award was won by **Mr and Mrs S. Jones** of Scarborough with a breeder's team of Killies, *Aplocheilichthys pumilus*.

Fifth Prison Open

Perth Prison is to open its gates on **18 September,** but to let invited fishkeepers and their show fish in. The fifth annual invitation Open Show of the **Scottish Inch AS** will be held at Perth Prison, with members of five clubs travelling to the show by invitation: Gateshead, Blyth, WASP, FLES and Cramlington, as well as, possibly, one member of Wear Valley.

No fewer than 25 classes will be on display, with an additional 13 special prizes, as well as the A&P Gold Pin. Judging will be to USA standards and an auction of fish will take place during the show.

DIARY DATES

September

Saturday 10
Bristol AS — Annual Coldwater Open Show (3pm) and auction (1pm), St Ambrose Church Hall, Stretford Road, Whitehall, Bristol BS5 7AW. Details: **Bob Jones**. Tel: 0272 496447.
Hounslow & District AS — 31st Open Show of tropical and coldwater fish, including Hounslow International Siamese Fighter Championships and FBAS Class Ag. Youth Centre, Kingsley Road, Hounslow, Middx. Refreshments, book stall, aquatic shop, raffle, Grand Draw. Details from: **Trevor Butler,** Show Secretary, 17 Risborough Road, Maidenhead, Berks SL6 7BJ. Tel: 0628 416579.

Sunday 11
Northern Area Catfish Group — Open Show and Auction, Aspull Civic Hall, Aspull, nr Wigan. Details: **Brian Walsh,** Show Secretary, 9 Darwen Terrace, Darwen, Lancs. Tel: 0254 776567.

Sunday 18
Mid-Sussex AS — Open Show, Portslade Town Hall, Victoria Road, Portslade, Brighton. Details: **John Smith,** Tel: 0273 602407, or **Ken,** Tel: 0903 820789.

Sunday 25
Association of Southern Aquarists' Societies — 1st Fishkeeping Convention, Buckland Community Centre, Malins Road, Portsmouth, 1.15pm for 1.30pm start. Lectures by **Adrian Excell** (Interpet) and **Dr. Steve La Thangue** (Britkoi), followed by auction and buffet. Tickets (£5) MUST BE BOUGHT IN ADVANCE — NONE WILL BE AVAILABLE ON THE DAY. Contact: **Jack Stillwell** (Portsmouth and Sussex areas) — 0705 691030; **Alan Stevens** (Southampton area) — 0703 617477; **Paul Corbett** (Isle of Wight) — 0983 523724/721246, or your local ASAS society.

October

Saturday 1
Goldfish Society of Great Britain — Annual Open Show, St Paul's Church Hall, Chigwell Road, Woodford Bridge, Essex. Auction: 1pm. Refreshments available all day. Contact: **Bert McMurray,** Secretary. Tel: 0202 523173.

Sunday 2
Fordton AS — Auction. Details: **Gary Newsome,** Secretary, 11 Beech Heys Drive, Weaverham, Cheshire, CW8 3BT, Tel: 0606 853771.

Milton Keynes ASG — Open Show, A of A Superbowl round. Details: **Nigel Ridley,** 1 Lynott Close, Crownhill, Milton Keynes, Bucks MK8 0DJ.

Washington AS & Pondkeepers — Open Show, Albany Junior School/ Stella Maris Catholic Club, District 2, Washington, Tyne & Wear. Booking in: 10.30am; auction: 12.30pm; judging: 1pm. Details: **Mrs M Jacques,** Tel: 091 416 7292 or Ian, Tel: 091 410 6390.

Tuesday 4
Gloucestershire AS — Meeting with a talk on Koi, at the Bell & Gravel Pub, by the cattle market, St. Oswalds Road, Gloucester. Details: **Andy Ramsbotham,** Tel: 0452 521609.

Tuesday 4 & Thursday 13
Fordton AS — Meetings. Details: **Gary Newsome,** Secretary, 11 Beech Heys Drive, Weaverham, Cheshire, CW8 3BT, Tel: 0606 853771.

Sunday 16
Basingstoke & Dist AS — Open Show, A of A Superbowl round. Details: **Chris Ralph,** 610 Abbey Road, Popley, Basingstoke, Hants RG24 9ET.

Leeds Aquarist Society — Annual Open Show, Collingham Village Hall, Collingham, W. Yorks. Details: **Harold Pullan,** 17 Lynwood Rise, Dixon Lane, Leeds LS15 4AY. Tel: 0532 630 438.

Solway AS — Second Open Show and Auction. Benching: 10am; auction: 1.15pm; viewing: 4.30pm. Squires Motel, Collin Village, Dumfries. Details: **John Cowan,** "Etrouvel", 7 Warrenhill Road, Greenlea, Collin, Dumfries, DG1 4PW, Tel: 0387 75606.

Sunday 23
Tyne-Tees FBAS — Annual Open Show. Details: **R. Graham,** Secretary. Tel: 0388 767145.

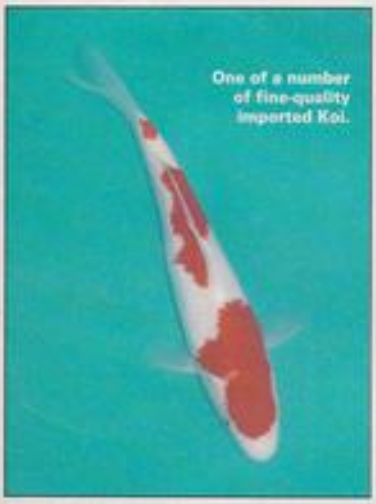
Sunday 30
Fordton AS — Auction. Details: **Gary Newsome,** Secretary, 11 Beech Heys Drive, Weaverham, Cheshire, CW8 3BT, Tel: 0606 853771.

out and about

Shades of Israel in Warwickshire

by Stephen Smith

Photographs by the author



One of a number of fine-quality imported Koi.

Behind-the-scenes, spawning is undertaken in modified animal pens. (Note the *zuger* cones in the background.)

Avon Aquatics' show pool is one of several impressive attractions.

Providing an additional attraction for pondkeepers are over two acres of lily ponds.

If you read through last month's *A&P* you will, hopefully, have enjoyed an overview of some of the coldwater aquatic breeding establishments in Israel — a five-hour flight away. A subsequent visit to a breeding establishment and retail centre at **Avon Aquatics** less than an hour's drive from my Midlands home provided me with an acute sense of *deja vu*, with what I saw instantly taking my mind back to "the Promised Land".

Situated in the heart of Warwickshire, just a few miles south of Stratford-upon-Avon, Avon Aquatics is more than just a day out for the family — it is a pondkeeping experience. I use the word pondkeeping advisedly because, for those who are not entirely 'fishy people', a significant proportion of the establishment is devoted to growing some of the most spectacular water lilies I have ever seen in the UK.

Avon Aquatics is situated on 23 acres of a former dairy farm (incidentally, a cattle herd is still tended — providing some pretty rich fertiliser for the *Daphnia* ponds!). Partners **Rex Harding** and his wife **Rosemary,** along with **Richard Morgan** and his wife **Rebecca,** started the business four years ago with two acres of lily ponds and several acres devoted to rearing Koi which they spawned themselves.

"Initially, the business was set up to cater for the trade, but two years ago, we changed the emphasis to become mainly retail," explained Richard as he tossed food pellets into an enormous carp pool containing around 1200 high-quality home-bred Koi.

The company still caters for a number of trade clients, but the establishment is now set up as a retail attraction, with a large Koi 'barn' and an even larger building accommodating a tropical fish house and an extensive dry goods shop providing everything from treatments to foods, to accessories for aquariums and ponds. There is even a picnic area where customers can relax between feeding the Koi in the aforementioned rearing lake and gazing at the high-quality fish in a purpose-built show pool.

Although a large quantity of Koi are produced by Avon Aquatics themselves, the company supplements this with imported stock, mainly from Japan. Those which are 'home-produced' are, nonetheless, very impressive and are bred through a process of which overseas breeders would be proud.

Modified cattle pens are used for spawning pools and the eggs are incubated in *zuger* jars (see my Israel report in last month's *A&P*) before growing-on, again in the cattle pen pools, and subsequently transferred to outdoor rearing pools enriched with naturally-produced (with the help of cattle manure) *Daphnia*.

Being situated in the Midlands, Avon Aquatics is easy to reach from all parts of the country and is about half-an-hour's drive from the M40 motorway, just south of Stratford-upon-Avon. To be more precise, the premises are at the end of a long track just past the village of Wimpstone, off the A3400. You won't get lost — just follow the centre's local AA signs.

Avon Aquatics and Water Lily Centre, Sweet Knowle Farm, Preston-on-Stour, Stratford-upon-Avon, Warwickshire CV37 8NR. Tel: 0789 450638; Fax: 0789 450967. Contact: Richard Morgan.

BELIZE Amazing Reptiles PART ONE

Peter Stafford of the National History Museum in London begins a two-part special on his travels through a tropical herpetologist's paradise.

Photographs — unless otherwise indicated — by the author

If you find yourself lost in the jungles of Belize, the local Maya say you should stand beneath a Cottonwood tree and wrap your arms around its trunk. Here you will be found and led to safety by the "Duende", a little old man and guardian of the forest, who announces himself by wrapping his arms around the other side of the tree and clasping your hands in his.

He is said to carry a razor-sharp machete and anyone who meets him is advised to keep their thumbs hidden, as the misfortunate character has none of his own and may try to chop them off for himself if he sees them! It is also said that his feet point backwards in order to confuse anyone who should try to track him down.

Old Man Lizard

No doubt, the legend of the Duende has, over the years, been unable to escape some distortion of the facts, but among the Cottonwood trees lives an equally bizarre creature which goes by the local name of "Old Man", and you would be forgiven for wondering if it might have anything to do with the story of the fabled little character who comes to your rescue in the forest.

Despite the goblin-like features however, it is a type of iguanid lizard. Seldom seen and extremely well camouflaged, *Corytophanes cristatus* is usually to be found perched vertically on the trunks of trees, where it likes to remain completely still and keep a watchful eye open for trouble.

If spotted and approached, this amazing reptile will shuffle around to the opposite side of the tree-trunk, in much the same way as a squirrel does to avoid being seen, and puffs out its scaly throat, taking on the appearance, some say, of a bearded old man.

If disturbed on the ground, it rears up and runs swiftly away on its long hind legs, but the most striking feature is the spectacular crest on the back of its neck, which, if threatened, is erected and stretched taut like a snail. In the damp, bright conditions of the rainforest canopy where it spends much of its time, the lizard's back often becomes coated with a smothering of green algae, making it look even more extraordinary.

The Old Man Lizard is just one of the many interesting reptiles to be found in the rainforests of Belize, formerly British Honduras, in Central America. The country is only small, occupying some 8,867 square miles squeezed between the Yucatan Peninsula and Guatemala. With much of its land still covered by trees, there are few other remaining places which offer such a haven for Central America's threatened wildlife.

Canopy & floor life

In the heart of Belize is the Maya Mountain range, where rare and endangered animals like the jaguar, tapir and Scarlet Macaw survive in considerable numbers, and the forests here are home to many interesting species of reptiles and amphibians.

Up in the trees there is a variety of lizards and snakes which, along with the Old Man Lizard, have become highly adapted to an arboreal way of life. There is the perfectly camouflaged Giant Green Anole (*Norops biporcatus*) and the striking *Laemanctus longipes*, both diurnal species with long tails, long limbs and a light body frame for shinning up tree trunks and climbing among the thin twigs high up in the tree tops.

Creeping stealthily through the lower branches in search of lizards and tree frogs you might see one of the two long Slender Vine Snakes (genus *Oxybelis*) which have the amazing ability to simulate the robotic movement a twig makes when swaying in the breeze, a habit which helps the snake remain concealed from prey and avoid being seen itself by hawks and other predators.

The ridiculously thin Brown Vine Snake (*Oxybelis aeneus*) is known locally in Belize as the "Tie-Tie" Snake, which, whether intentionally or not, reflects admirably its resemblance to a piece of string. The Blunt-headed Tree Snake (*Imantodes cenchoa*), another long, thin arboreal species, is more nocturnal in habits than the "Tie Tie" and has huge eyes which are excellent for hunting at night.

Down on the forest floor there is an equally varied assortment of lizards and snakes. The "Escorpión" (*Coleonyx*

elegans) is a terrestrial gecko active by night, while, during the day, Jungle Runners (*Ameiva festiva*), various skinks and Anolis Lizards bask in patches of sunlight which filter through the trees.

In this part of Central America, snakes form the largest component of the herpetofauna, but to see them you need a great deal of patience and a sharp eye, as most are extremely well camouflaged. The most dangerous is the Fer-de-Lance (*Bothrops asper*), or "Yellow-jaw Tommygoff", as it is known in Belize, a large Pit-Viper reaching up to six feet in length, while concealed among the leaves, the smaller Jumping Viper (*Porthidium nummifer*) and Nose-horned Viper (*P. nasutum*) can be easily overlooked.

The Jumping Viper, despite its name, does not really jump, but it can strike out with such force that its short, heavy body seems to leave the ground for a split second and 'hop' a few inches forward.

Not so difficult to see are the brightly-coloured Coral or "Coralillo" Snakes with their warning bands of red, yellow and black. There are three species in Belize. Much of their diet consists of other, smaller snakes, such as *Tantilla canula* and *Ninia diademata*, both of which feed chiefly on insects and measure only a few inches long.

Coral Snakes themselves are sometimes preyed upon by another ophiophagus species, the Kingsnake (*Lampropeltis triangulum*) which also mimics the appearance of the Coral Snake as a means of escaping predation. Even the Kingsnake, however, occasionally falls prey to the formidable, albeit perfectly harmless, Black-tail (*Drymarchon corais melanurus*), a highly accomplished snake-eater which, at some eight feet in length, will tackle virtually anything it can find, including the deadly Fer-de-Lance.

One of the more unusual snakes to be found on the forest floor is *Scaphiodontophis annulatus*. The neck and upper half of this two-foot long snake is banded with red, yellow and black like the Coral ▶

(1) Common or Green Iguana. A large male in orange breeding colours sits atop a tree overhanging the river, defending his territorial post. This geographic race, with the scientific name of *Iguana iguana rhinolopha*, is distinguished by the presence of a horn-like scale on the end of the snout.

(2) Catching a "Wowla", the Belizean name for the Common Boa Constrictor (*Boa constrictor imperator*).

(3) A newly-hatched skink, *Eumeces sumichrasti*. The young of several species have blue tails and dark longitudinal stripes, but these are normally lost as they mature.

(4) *Laemanctus longipes*, a little known and seldom seen member of the cosmopolitan and diverse Iguana family.

(5) Jumping Viper (*Porthidium nummifer*), or "Jumping Tommygoff" as it is called locally.

(6) Speckled Racer (*Drymobius margaritiferus*), an agile and common terrestrial species which preys mainly upon frogs. In Belize it goes by the local name of "Guinea Hen Snake".

(7) Morelet's Crocodile (*Crocodylus moreleti*). The species is distinguished from the very similar *C. acutus* by having a shorter, broader snout, and some extra small scales on the underside of the tail. It is also smaller than *C. acutus*, rarely exceeding 6 feet.

Amazing Reptiles

The arboreal "Old Man" Lizard (*Corytophanes cristatus*).

BELIZE FACT FILE

Some 140 species of reptile and amphibian are known from Belize, its islands and adjacent marine waters. Many have extensive ranges in the lowlands of Central America, and some also extend into South America and north to the United States.

Crocodiles: two species. Morelet's Crocodile (*Crocodylus moreleti*) occurs in freshwater, and the American Crocodile (*C. acutus*) is found in more estuarine localities.

Marine Turtles: four species.

Freshwater Turtles: eight species.

Lizards: 38 species, including 20 iguanids. The Anoles Lizard (*Anolis allisoni*), and a gecko, *Phyllodactylus insularis*, are found only on the small offshore island of Half Moon Cay.

Snakes: nine venomous species, including six Pit-Vipers and three Coral Snakes; the most dangerous are the Fer-de-Lance (*Bothrops asper*), and Tropical Rattlesnake (*Crotalus durissus*). 51 non-poisonous or rear-fanged, mildly venomous, species also occur.

Caecilians: one species.

Salamanders: four species, one of which, *Bolitoglossa mexicana*, is chiefly arboreal, living among bromeliads and other epiphytic plants.

Frogs: 25 species, including one species of *Hana* endemic to the Maya Mountains, and 12 kinds of tree frog.

Toads: two species.

The aptly named Double Snake (*Scaphiodontophis annulatus*).

Snake, while the rest of the body is a plain, uniform shade of brown, and looks like it should belong to a completely different snake.

Another unsual feature of *Scaphiodontophis*, sometimes rather aptly known by the name "Double Snake", is that it is one of the very few snakes which, like many lizards, can voluntarily discard its tail.

Along the riverbank

Isolated rivers like the intriguingly-named Monkey Tail and Raspaculo, which wind their way through the forests of the Maya Mountains, provide an important refuge for one of Central America's most threatened reptiles, the shy and solitary Morelet's Crocodile (*Crocodylus moreleti*), while the riverbank trees are home to large numbers of "Bamboo Chicken", the Common or Green Iguana (*Iguana iguana rhinolopha*).

At the first sign of danger these large and spectacular lizards leap into the river, sometimes from a great height, crashing noisily through the branches and hitting the water with a loud belly-flop. The reason for such behaviour does not become apparent until an Ornate Hawk Eagle or Great Black Hawk appears overhead, when the lizards will throw themselves out of the tree tops like lemmings over a cliff. There can be few more effective ways of avoiding capture from these birds of prey!

In breeding fettle the five-foot males are orange with prominent dark vertical bars on their sides, while the smaller females and juveniles are the more normal greenish colour. The newly-hatched babies, bright green in colour, climb up into small bushes and among the tall reeds at the side of the river to bask in the sun, a habitat also favoured by the "Maklakka" or "Cock Lizard", otherwise known as the Basilisk (*Basiliscus vittatus*). If danger threatens they will both take to the water, but while the baby Green Iguana either swims quickly away or dives to the bottom, the Basilisk escapes by skipping across the surface of the water on its hind legs.

Another reptile that can occasionally be found sunning itself at the side of the river, usually on a mud bank or concealed in a tree overhanging the water, is the Common Boa (*Boa constrictor imperator*), which the Belizeans call "Wowla" or "Wanasai". Females quite frequently grow up to 8 or 9 feet (2.4-2.7m) and weigh up to 30 pounds (13.6Kg) or so, though even the largest can be extremely difficult to see.

The only give-away may be a thick coil protruding from beneath a heap of dead leaves and twigs, or a hole in the bank.

Normally associated with rivers, swamps and other watery habitats, boas are also commonly found on dry rocky hillsides and pine savannah country in Belize.

(TO BE CONTINUED)

AFP

Sparsholt Awards

Three graduating students at Sparsholt College, Hampshire, received awards from **Interpet** at a recent presentation.

Jennifer Young has completed Sparsholt's Diploma course in Animal Care, and received the Interpet shield for the best overall performance on the course.

Emma Everett has completed the Certificate Course in Animal Care and received the Interpet Trophy, again for the best overall course performance; while **Elizabeth Stace** received the Interpet Award for the best practical student on Sparsholt College's Certificate Course in Animal Care.

Interpet chairman, Dr Neville Carrington presents the awards to two of the Sparsholt winners: Emma Everett (right) and Jennifer Young.

OFI(UK) TALK

1 Tank test passes

Aquatic Arts and **Aqua Care,** both based in Edinburgh, are the latest companies to pass safety tests for aquarium manufacture by **Ornamental Fish Industry (UK).**

The tests incorporate items on inspection, cleaning and gluing of glass and the inclusion of installation instructions, and the latest passes take to ten the number of aquarium manufacturers approved by OFI(UK). These are: Tahiti, ClearSeal, John Allan Aquariums, Merlin, Red Sea Aquarium, Seabray, GB Aquariums, Hagen, Aquatic Arts and Aqua Care.

2 International approval for Code

The **Code of Conduct** formulated by OFI (UK) has been accepted by **Ornamental Fish International (OFI),** following a presentation by OFI (UK) chief executive **Keith Davenport** at InterZoo (Nürnberg, Germany).

Keith presented the Terms and Conditions of the Code at a meeting of OFI members last summer, explaining how the Code had received recognition from government departments in the UK and overseas. This was then followed by a discussion at this year's OFI meeting held in Nürnberg. The Code was accepted in principle by OFI, with the inbuilt flexibility for it to be modified to meet local conditions and needs in the 28 countries where the organisation has members. To contact OFI, write to **The OFI Secretariat, PO Box 445, Corsham, Wilts. SN13 ORQ Fax: 0225 811215.**

Lahaina on the move

Lahaina Aquarium Systems, manufacturers and distributors of aquariums and accessories, and UK distributors for OTTO Aquarium Products, have relocated from Elgin in Morayshire, to **Lifton** in West Devon.

Manufacturing premises, research workshop and retail outlet are planned. Lahaina can be contacted on: Fax/phone **0566 784664,** where both trade and retail customers will be welcome by appointment to discuss their requirements with **Chick Holland** who has over 16 years' experience in keeping marine and tropical fish.

Minireef for Coral Reef

Coral Reef Technology has been appointed as distributor for **Minireef** range of aquaria.

"The philosophy of Minireef is 'just plug in and add water'," explained **Paul Davies** managing director of Coral Reef Technology. "We expect a great demand from discerning hobbyists for these premium products."

Paul explained that these custom-made aquaria are equally suitable, dependent on model, for community freshwater, cichlid, Dutch, marine and reef applications, and range from the simplest aquarium, to a complete system with spray-bar filtration, de-nitrification and protein skimming all built in. Added Paul: "The lighting systems are fully waterproofed and the range of styles and finishes are legion, while the use of solid oak is an attractive feature of the top-of-the-range models."

Contact: Paul Davies, Coral Reef Technology, 62 High Road, Byfleet, Surrey KT14 7QL. Tel: 0932 355121.

CAPTIVE CORAL CARE

PART ONE

THE BIG PICTURE

Nick Dakin begins a two-part review of successful aquarium care of hard corals with a look at the broader aspects of this controversial aspect of the hobby.

A coral island in the Red Sea.

CORAL WORLD EILAT

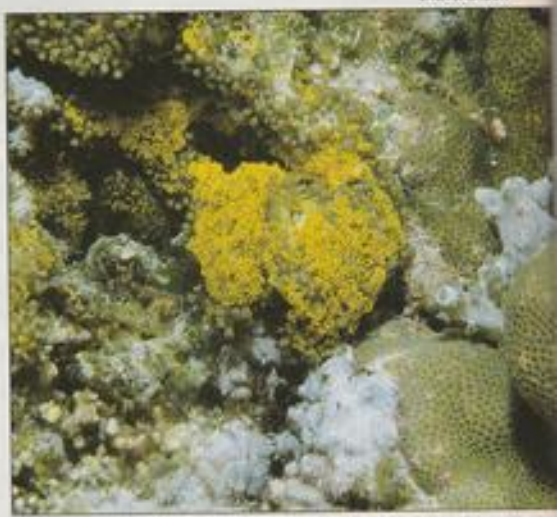
JACK JACKSON

Stony corals provide shelter for many other types of sea creatures.

TREVOR MACDONALD

Black Coral — a species of coral not kept by aquarists — is used in jewellery and is banned by CITES.

JACK JACKSON



A rare sight: fertilised coral eggs (yellow spheres) settling on a reef in the Sudan Red Sea to begin the colonisation process.

They may not be the easiest of inverts to maintain in peak condition, but species such as Tooth Coral (*Euphyllia picteti*) are far from impossible.

Quite a storm has been raging within marine fishkeeping circles over the past few years. The cause: hard corals. The subject has split the hobby right down the middle, and marinists now fall into one of two camps: those who insist, without reservation, that hard coals are impossible to keep in captivity, and those, like me, who feel that, given the correct environment, hard corals are still very difficult but not impossible, nor for that matter, unacceptable.

Truth and fiction

Firstly, let us sweep away all the uninformed gossip and rumour about what is and what isn't banned, by providing some facts. Hard corals are *not* banned from importation into the UK. *But* CITES — the Convention on International Trade in Endangered Species of Flora and Fauna — have decided to monitor the movements of these sensitive corals by placing them on their Appendix II. This means that an export licence must be granted by the country of origin and an import permit obtained from the DOE in this country.

Taking this sort of decision does not automatically assume that hard corals are endangered in any way by the aquarium trade, merely that precautionary measures are being adopted, given the world situation as a whole. In fact, all the extra paperwork and bureaucracy has caused far fewer hard corals to be imported and not, as some have misinterpreted the consequent lack of species on sale to mean, that any blanket bans have been imposed.

It may be of interest to note that only two species of invertebrates are actually banned by CITES, the Black Coral (used in the making of jewellery and of no interest to the aquarist) and the wild Giant Clam — *Tridacna gigas* (now successfully bred in captivity for the aquarium trade).

Hard coral history

Astronauts have often commented on the fact that the Great Barrier Reef can clearly be seen from space, confirming it to be the largest animal-created structure in the world. At well over 1200 miles in length, it is incredible to imagine that its construction is almost entirely due to the activity of hard coral polyps!

While many thousands of invertebrates live *on* the reef, the hard corals, quite literally, *are* the reef. These unique polyp colonies abstract calcium carbonate from the seawater to form the calcareous skeletons in which they live. As they die, new polyps build their skeletons on top of the old ones, thus maintaining and expanding the reef, sometimes to staggering proportions, as we have seen.

Although hard corals have only been studied closely for a relatively short period, they are already known to grow very slowly and be extremely long-lived when compared to other sessile ('fixed') invertebrates. Nevertheless, putting an accurate age to any particular animal or colony is very difficult and complicated further by interruptions in growth owing to damaging tropical storms and hurricanes. Study areas can be swept away in a few short hours and formerly accurate information reduced to little more than guesswork.

Hard corals, also referred to as stony corals, demand several conditions for sustained and healthy growth. Firstly, the sea should be constantly warm, certainly never falling below 70°F (21°C). Secondly, the water must be well oxygenated, gin-clear and unpolluted. Lastly, sunlight falling upon them must be of a high intensity, such as is only found in the tropical equatorial regions of the world.

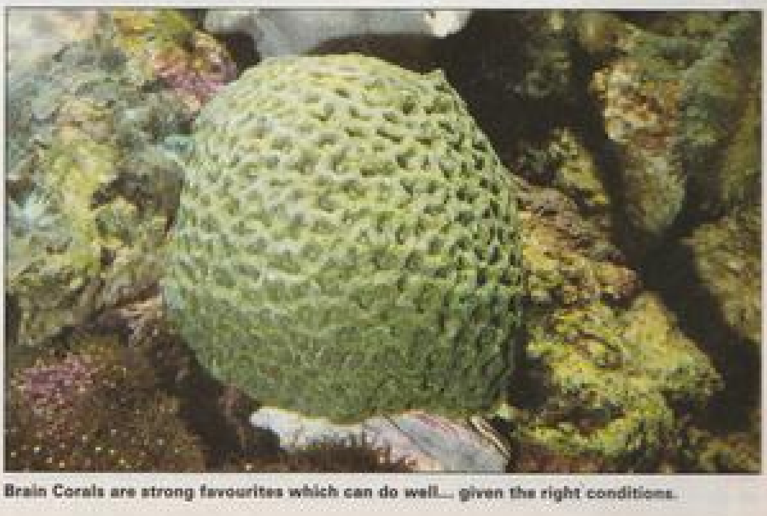
This need for intense sunlight is a key factor governing the survival of hard corals, for like their cousins the anemones, the tissues of hard corals are home to various species of algae collectively known as zooxanthellae. This relationship is truly symbiotic, as neither can live without the other; the algae provide the coral with oxygen and nutrients, while the coral gives the algae a safe home in which to live, as well as benefiting from any waste products.

Reproduction

Reproduction is achieved in one of two ways. New colonies are either established by fragments of the old 'budding off', or totally new polyps begin to grow as a result of water-borne larvae finding a new home. In common with many other sessile invertebrates (those that are fixed in one place and are unable to move) corals can reproduce sexually and thus attain a wider dispersion.

Nothing unusual in that, one may think, but on most reefs, sexual reproduction takes place on only a few chosen nights each year! On the nights (usually in November) billions of eggs and sperm are released simultaneously from the same species, hundreds, sometimes thousands of miles apart. The resultant activity causes the water to become clouded for mile upon mile!

The reasons or triggers for these mass spawnings are not precisely understood, but it would seem reasonable to assume that the 'policy' of overwhelming numbers which has evolved gives the best chance of survival — predators being allowed to satiate their hunger, while the massive majority of eggs escape to form a signifi-



Brain Corals are strong favourites which can do well... given the right conditions.

TREVOR McDONALD

Careful divers present no threat to reefs.

cant bulk of the planktonic layers circling the tropical oceans as newly hatched and developing larvae.

Lunar cycles would appear to be the logical trigger for such mass spawnings, although scientists still have much work to do in this area, owing to the infrequency of such events.

As the larvae complete their growth cycle, they descend to the reef in order to find a suitable place in which to settle. They must choose carefully, for this is where they will spend the rest of their lives. However, recent research has shown that the larvae of some species can 'change their minds', at least in the initial stages. If the first site proves unsuitable, a larva can detach itself and search for a new and better one.

While still uncommon, both types of reproduction have been observed in the aquarium, which goes to show that, given optimum conditions, hard corals can, not only thrive, but multiply in captivity.

Reef threats

It is true to say that coral reefs are one of the most delicate ecosystems in the world. Despite this, and left to their own devices, the reefs successfully run like well-oiled machines, able to regenerate and recover from natural disasters, while still managing to adapt to a slowly changing world climate.

The arrogance and interference of humankind has, however, compressed time and left some (and I stress *some*) reefs gasping for life! The pressures we have put on these areas of outstanding beauty are manifold.

For instance, coral makes excellent hardcore for building purposes and many (mostly second and third world) countries have had no hesitation, due to economic restraints, in dynamiting miles of reef for the construction of roads, airport runways, hotels for tourists and general building works.

The rapid growth in worldwide tourism has brought thousands of trampling feet to previously unspoilt, inaccessible and deserted areas. Hastily erected accommodation has meant that raw sewerage and other 'vacation waste' is pumped straight out to sea, polluting the very wildlife visitors come to admire!

I would not like to give the impression that reef damage has been caused solely by second and third world countries, though. First world countries have to bear a significant amount of responsibility as well. Wealthy and irresponsible SCUBA divers constantly souvenir hunting (with apologies to those careful and caring divers); boats dragging their anchors through the coral, cutting swathes hundreds of yards long; oil tankers flushing their tanks wherever and whenever they please, resulting in the deaths of much coral wildlife...

Who can forget the disturbing photographs taken from space of the plume of red silt hundreds of miles across spreading into the Gulf of Mexico from the Mississippi Delta? The cause? A huge area of forest was cut down further up the river for commercial gain and little thought for the environmental consequences. Subsequently, millions of tons of soil from the very heart of the USA was left with no protection from the heavy rains. Consequently, the top-soil was simply transferred from the land to the sea, smothering miles of Caribbean reef. Truly, where profits are concerned, conservation goes out of the window!

It may interest and shock readers to know that the temperate rain forests of the north-west United States are being destroyed at a greater area and rate per month than the Amazon rain forests(!), and there is nothing anyone can do about it! (Source: David Bellamy, wildlife television documentary, 1993).

TREVOR McDONALD

Even nature can present its own problems. In this case, powerful wave surges have broken up a large stand of Staghorn Coral (*Acropora cervicornis*)

The aquarium trade

As aquarists, we are all (or should be) concerned with conservation of the world's coral reefs, for if we have no access to them, we have no hobby ... simple! I would not, however, like to present a picture of total doom and gloom. The *vast majority* of reefs are perfectly healthy, being largely inaccessible and untouched by human influence.

Other reefs are farmed increasingly responsibly for supply to the aquarium trade, and it should be noted that the amounts of animals involved are infinitesimal in the scheme of things. If collecting for the trade stopped tomorrow, the only effect would be thousands of families without the benefit of a social security system being reduced to abject poverty ... not something I would want on my conscience, I'm afraid!

Collecting from reefs in a fully organised fashion has proved to be completely sustainable and in the best interests of everyone. We must outlaw the use of cyanide at every opportunity and be prepared, if necessary, to pay extra for the privilege of maintaining healthy reefs that can be farmed on a regular and safe basis.

Hobbyists' responsibility

One way in which the individual can help enormously is to make absolutely sure that the best possible conditions are provided for *long-term* survival of corals. Buying fewer corals (or fish, or whatever) means that fewer have to be collected to replace those lost through sheer waste.

Live corals, invertebrates and fish are *not* disposable commodities; they must be treated with respect and provided with accommodation that will assure them a long and healthy life.

Next time, I will be showing you how to achieve success with hard corals. It's not easy, but perfectly possible nonetheless.

(TO BE CONTINUED) ABP